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**FEDERAL  
COAL  
MANAGEMENT  
PROGRAM**

**DRAFT ENVIRONMENTAL  
IMPACT STATEMENT  
SUPPLEMENT**

**Department of the Interior  
Bureau of Land Management  
Service Center - Division of  
Environmental Impact Statement Services**

**February 1985**

February 8, 1985

Dear Reviewer:

The draft environmental impact statement (EIS) supplementing the 1979 final environmental statement for the federal coal management program is submitted for your review and comment. Please keep the draft EIS, as we may print only an abbreviated final supplemental EIS that will be an addendum to this draft. The Bureau of Land Management (BLM) will prepare the final EIS, considering the comments received on the adequacy of the draft through the public review process.

All written comments on the draft EIS should be sent to Jack Edwards, at the address on the cover sheet by April 9, 1985. A series of public hearings will be held to receive oral comments. On the basis of discussions with western governor's representatives, the following places and times have been selected:

<u>Date</u>	<u>Location</u>	<u>Time</u>
Monday, March 18, 1985	Bismarck (to be announced)	1:00 p.m.
Tuesday, March 19	Billings (to be announced)	1:00 p.m.; 7:00 p.m.
Wednesday, March 20	Albuquerque (Convention Center)	1:00 p.m.; 7:00 p.m.
Thursday, March 21	Denver (Clarion Hotel)	1:00 p.m.; 7:00 p.m.
Friday, March 22	Salt Lake City (Salt Palace)	1:00 p.m.
Tuesday, March 26	Washington, D.C. (Interior Bldg. Auditorium)	9:00 a.m.; 1:00 p.m.

The meeting times that have not yet been determined will be announced in the Federal Register.

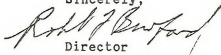
Oral and written comments should be as specific as possible and address the adequacy of the scope of the EIS or the impact analyses of the proposed action and alternatives. Particular attention is directed to materials presented in Appendix 6, which includes BLM proposals for modifying the federal coal management program in response to recommendations in reports by the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes and others 1984) and the Office of Technology Assessment (OTA 1984). If methodologies used to project impacts are considered inadequate, the reviewer's comments should explain the procedures for the preferred alternative methodology.

A copy of the final supplemental EIS will be sent to all who provide substantive comments on the draft EIS or who request a copy.

In accordance with the Council on Environmental Quality (CEQ) regulations of November 29, 1978, this draft incorporates a number of other documents by reference. The locations of these other documents are noted in the References Cited section.

Please note that the adoption of the proposed action does not authorize the potential impacts presented in this draft supplemental EIS. This EIS does, however, present impacts that could occur if the Proposed Action is adopted.

Sincerely,

  
Director

Enclosure

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Draft Environmental Impact  
Statement Supplement

for the

**FEDERAL COAL MANAGEMENT PROGRAM**

Prepared by

**BUREAU OF LAND MANAGEMENT**

February 1985



**Director, Bureau of Land Management**

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COVER SHEET

Federal Coal Management Program  
Supplemental Environmental Impact Statement

(X) Draft

( ) Final

Lead Agency

U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies

U.S. Department of Agriculture, Forest Service

Counties That Could be Directly Affected

FORT UNION COAL REGION

Montana Carter, Custer, Daniels, Dawson, Fallon, Garfield, McCone, Prairie, Richland, Roosevelt, Sheridan, Valley, Wibaux

North Dakota Adams, Billings, Bowman, Burke, Burleigh, Divide, Dunn, Golden Valley, Grant, Hattinger, McHenry, McKenzie, McLean, Mercer, Morton, Mountrill, Oliver, Renville, Sheridan, Slope, Stark, Ward, Williams

POWDER RIVER COAL REGION

Montana Big Horn, Golden Valley, Musselshell, Powder River, Rosebud, Treasure, Yellowstone

Wyoming Big Horn, Campbell, Converse, Crook, Goshen, Johnson, Natrona, Niobrara, Sheridan, Weston

GREEN RIVER-HAMS FORK COAL REGION

Colorado Grand, Jackson, Moffat, Rio Blanco, Routt

Wyoming Albany, Carbon, Lincoln, Sublette, Sweetwater, Uinta

UINTA-SOUTHWESTERN UTAH COAL REGION

Colorado Delta, Garfield, Gunnison, Mesa, Montrose, Ouray, Pitkin, San Miguel

Utah Carbon, Daggatt, Duchesne, Emery, Garfield, Grand, Iron, Kane, Morgan, San Juan, Sanpete, Sevier, Summit, Uintah, Utah, Wasatch, Washington, Wayne

SAN JUAN RIVER COAL REGION

Colorado Archuleta, Dolores, La Plata, Montezuma, San Juan

New Mexico Bernalillo, Catron, Cibola, Lincoln, Los Alamos, McKinley, Rio Arriba, Sandoval, San Juan, Santa Fe, Socorro, Valencia

SOUTHERN APPALACHIAN COAL REGION, ALABAMA SUBREGION

Alabama Fayette, Tuscaloosa, Walker

Abstract

This supplemental environmental impact statement (EIS) assesses the environmental consequences of continuing the federal coal management program and three alternatives to this existing program: No New Federal Leasing, Preference Right and Emergency Leasing, and Leasing by Application.

The analysis focuses in particular on six federal coal regions: Fort Union (Montana, North Dakota); Powder River (Montana, Wyoming); Green River-Hams Fork (Colorado, Wyoming); Uinta-Southwestern Utah (Colorado, Utah); San Juan River (Colorado, New Mexico); and the Southern Appalachian, Alabama Subregion (Alabama).

This EIS supplements the 1979 Federal Coal Management Program Final Environmental Statement (1979 FES). It analyzes the conditions that formed the basis for the 1979 analysis and that may have changed during the past 6 years. The analysis is conducted in the context of the 1979 federal coal management program, which has evolved over the years and continues to evolve.

This document analyzes the impacts of high, medium, and low levels of coal production associated with federal leasing measures against the same levels of coal production associated with No New Federal Leasing in 1990, 1995, and 2000 for each region.

On the basis of the issues and concerns identified during scoping, this supplemental EIS focuses on the following categories of potential impacts: socioeconomic, transportation, health and safety, Native American issues, air resources, soils and vegetation, agriculture, wildlife, visual resources, recreation resources, wilderness, cultural resources, mineral and paleontological resources, and water resources.

Comments on this EIS should be directed to

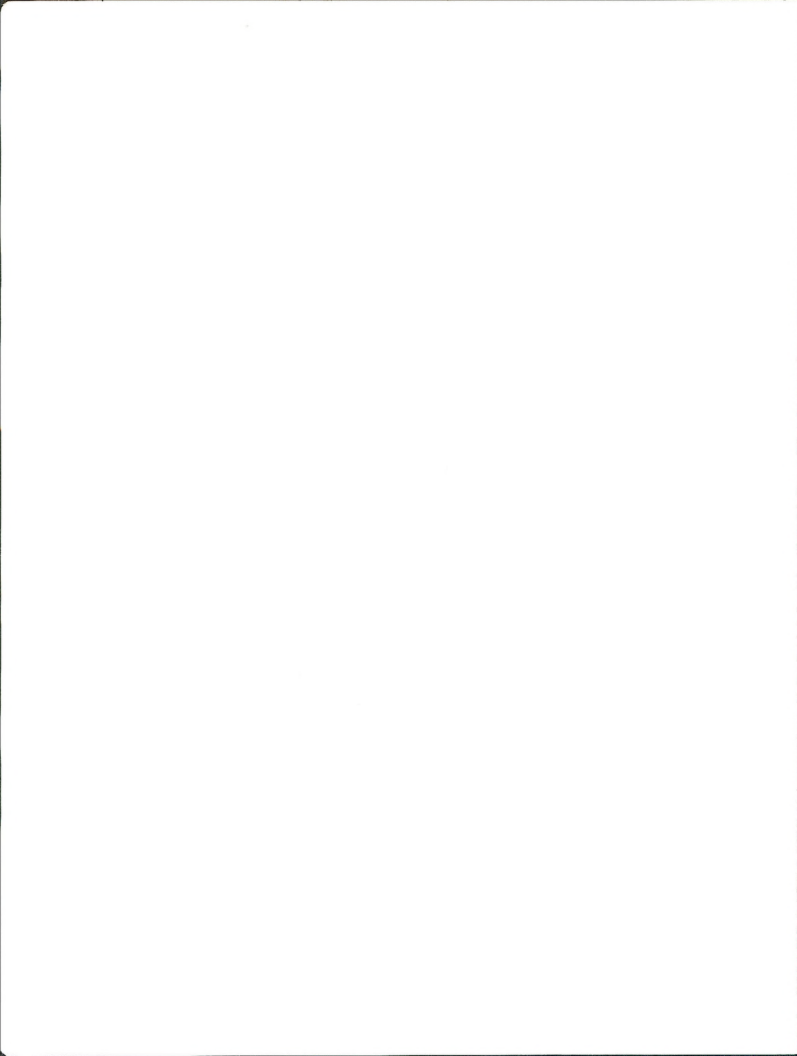
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Bureau of Land Management, Division of EIS Services  
555 Zeng Street, First Floor East, Denver, Colorado 80228  
(303) 236-1080 FTS 776-1080

Date Supplemental EIS Made Available To EPA and the Public

February 6, 1985

Date by Which Comments Must be Received

April 9, 1985



## PREFACE

The purpose of this supplemental environmental impact statement (EIS) is to analyze the potential environmental consequences of continuing the federal coal management program or of implementing three alternatives to it. This document has been prepared to supplement the 1979 Federal Coal Management Program Final Environmental Statement (1979 FES) (BLM 1979a) because many changes have occurred or are proposed in the coal program and because of changes in energy market conditions that formed the basis for the 1979 analysis.

This supplement contains seven chapters and six appendixes.

- Chapter 1, the introduction, discusses relationships between this supplemental EIS and the 1979 FES, the history and background of the federal coal leasing program, and major federal and state laws mitigating coal-related impacts.
- Chapter 2 discusses the purpose of and need for the Proposed Action and describes the Proposed Action and three alternatives: No New Federal Leasing, Preference Right and Emergency Leasing, and Leasing by Application.
- Chapter 3 presents coal production forecasts for the United States and the six federal coal regions under study and discusses the assumptions upon which the forecasts are based.
- Chapter 4 describes the affected environment and documents the impact analysis for the Proposed Action and alternatives.
- Chapter 5 presents a comparative analysis of impacts of the Proposed Action and alternatives.
- Chapter 6 discusses the trade-offs and irreversible and irretrievable commitments of resources resulting from implementing the Proposed Action or alternatives.
- Chapter 7 discusses the scoping process and the consultation and coordination involved in preparing this supplemental EIS.

The six appendixes provide background information, including data and methodologies used to conduct the analysis documented in the text.





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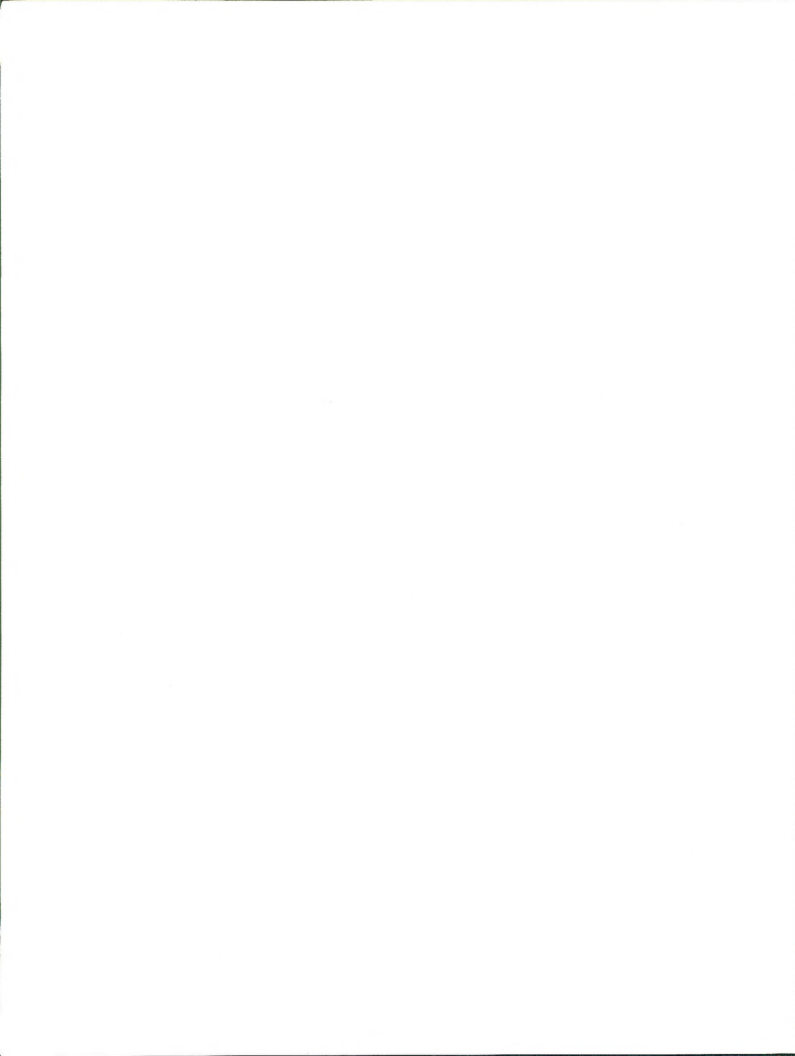
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Special thanks to the American Coal Association for providing the photographs used on the cover and chapter dividers of this supplemental EIS.



## SUMMARY





Under the Mineral Leasing Act of 1920 as amended, the Department of the Interior has responsibility for leasing federal coal lands. Until 1960, little demand existed for federal coal, and little leasing occurred. In the 1960s, leasing greatly increased. In 1971, the Department imposed a moratorium on coal leasing in response to public concerns that the lands were being leased mainly for speculation rather than development. The moratorium was lifted in July 1979, when the Department issued regulations implementing the Federal Coal Leasing Amendments Act of 1976 (FCLAA).

Before issuing its coal leasing regulations, the Department prepared a final environmental statement for its federal coal management program (BLM 1979a) (1979 FES), which was released in April 1979. This 1979 FES listed three issues that justified the need for a program to manage federal coal: (1) the need to address the Nation's serious energy problem, (2) the need to reduce the Federal Government's historically passive role in coal leasing decisions, and (3) the need to respond to critical review of coal management by the executive, legislative, and judicial branches of the Federal Government.

In the 6 years since the 1979 FES was published, many changes have been made to or proposed for the federal coal management program, and a supplemental EIS is needed because economic and environmental conditions have changed.

#### LOCATION OF COAL REGIONS

The 1979 FES used 12 federal coal production regions (Map 1-1) as basic units for analysis. These regions were delineated by similar geology and coal characteristics and with reference to markets for coal reserves developed within the regions. These same 12 regions, which have over 92 percent of the total coal reserves of the 48 conterminous states and account for over 97 percent of the Nation's 1976 federal coal production, are the basis for analysis in this supplemental EIS.

Of the 12 coal production regions analyzed in the 1979 FES, 6 regions and 2 subregions were formally identified as containing federally owned coal of major importance. Regional coal teams, however, found a lack of interest in federal coal leasing in the Denver-Raton Mesa Region and the Oklahoma Subregion, and thus this supplemental EIS concerns the following five regions and one subregion (Map 1-2) (Bureau of Mines 1976):

Fort Union Region--21,101 million tons of recoverable reserves in 13 eastern Montana and 23 western North Dakota counties,

Powder River Region--142,524 million tons of recoverable reserves in 10 northeast Wyoming and 7 southeast Montana counties,

Green River-Hams Fork Region--15,543 million tons of recoverable reserves in five northwest Colorado and six southern Wyoming counties,

## SUMMARY

Uinta-Southwestern Utah Region--7,177 million tons of recoverable reserves in 8 western Colorado and 18 eastern and southern Utah counties,

San Juan River Region--4,164 million tons of recoverable reserves in 12 northwest New Mexico and 5 southwest Colorado counties,

Alabama Subregion of the Southern Appalachian Region--2,213 million tons of recoverable reserves in three west-central Alabama counties.

### MAJOR ISSUES

Five major issues emerged from the Department's analysis of public comments on the scope of the supplemental EIS. These issues and the Department's response in this supplemental EIS are outlined in the Decision on the Scope of the Supplement to the 1979 Federal Coal Management Program FES (Appendix 6) and are summarized below.

- Relationship of the supplemental EIS to ongoing changes in the coal program. The supplemental EIS is being proposed to assess the impacts of the federal coal leasing program and will include impacts of all changes proposed for adoption as a result of program reviews. All proposed changes are described in Chapter 2 and consolidated in Appendix 6. Environmental assessments on certain proposals and findings of no significant impacts to the human environment were published.
- Scope of market analysis. To underscore the importance of supply and demand analysis, coal production forecasts are highlighted in Chapter 3 of the supplemental EIS and are supported by a separate report--Coal Production Forecast Technical Report (BLM 1985b).
- Assessment of reclamation success on surface mined western coal lands. A technical appendix (Appendix 5) on reclamation and erosion control on surface mined lands was developed for the supplemental EIS to present current results based on research and experience from existing mines.
- Impacts of the Department of the Interior's policy to carry out coal exchanges. The explanation in the major program events section of Chapter 1 of this supplemental EIS addresses this topic.
- Need to analyze a full range of alternatives in the supplemental EIS. The alternatives analyzed are described in Chapter 2. Other alternatives considered and the rationale for not including them in the supplemental EIS are also discussed in Chapter 2.

### PROPOSED ACTION AND ALTERNATIVES

The 1979 FES (BLM 1979a) analyzed seven major alternative coal programs, not all of which are now feasible or reasonable alternatives to the existing program. This Supplemental EIS analyzes the Proposed Action to continue the federal coal management program and three alternatives: (1) Leasing by Application, (2) Preference Right and Emergency Leasing, and (3) No New Federal Leasing--the no action alternative. These alternatives differ in the level of involvement of federal and state agencies and the public and, in most cases, the amount of federal coal that would be considered for leasing.

## SUMMARY

For each alternative, this supplemental EIS analyzes impacts at three coal production levels--low, medium, and high--and for three target years--1990, 1995, and 2000.

The Proposed Action would continue the federal coal management program and would include the following major elements presented in the 1979 FES: planning systems, market analysis, sales procedures, enforcement of lease terms and conditions, management of existing leases, preference right lease application (PRLA) processing, use of regional coal teams, integration of National Environmental Policy Act (NEPA) procedures, and emergency sales procedures. In addition, the Proposed Action would incorporate revisions to the program made in 1982 and 1983 and changes proposed in 1984 and 1985.

Under the Leasing by Application Alternative, the Department of the Interior would consider offering federal coal for lease sale only in response to an application for a specific amount of coal in a specific location. All federal coal would be offered through competitive sales, but regional activity planning would not be part of this program. Although no long range market analyses would be conducted, regional coal teams could be retained to carry out consultation with states and to review temporal market conditions before lease sale decisions.

Under the Preference Right and Emergency Leasing Alternative, federal coal leasing would be limited to coal deposits needed to meet emergency situations or to coal deposits applied for in preference right lease applications (PRLAs) filed before 1976. Activity planning and market analyses would not be components of this program alternative.

Under the No New Federal Leasing Alternative--the no action alternative--no program would be in place to analyze the need for leasing or to respond to lease applications. No federal coal would be offered at competitive lease sale, leased through approval of PRLAs, or leased through exchanges, and the supply of federal coal would be limited to that already under lease. The Department of the Interior could either request that Congress provide relief to preference right lease applicants to eliminate the need to further process outstanding PRLAs or indefinitely postpone this processing. BLM coal program activities would be limited to supervision of terms and conditions of existing leases.

## ENVIRONMENTAL CONSEQUENCES

This supplemental EIS is scoped to assess broad and general program-level impacts. It has not involved site-specific analysis of regions, which will be conducted in later NEPA compliance documents such as regional coal EISs.

The impacts of any of the alternatives would be directly related to the amount of coal production and would mostly result either directly or indirectly from the following factors, all of which would increase or decrease with changes in the quantities of coal mined: (1) land disturbed during mining, (2) workers needed to mine and process the coal, (3) water needed to process the coal, (4) safety and health hazards of mining and processing coal, (5) particulates (dust) stirred up by coal operations, and (5) transportation capacity needed to haul coal from mines.

## SUMMARY

Although production forecasts are the same for given production levels and target years, impacts would not necessarily be the same. To maintain production levels, new leases would have to be substituted for old leases, new operations for old operations, and large mines for small mines. Such substitutions could result in variations in impacts and production shifts from one region to another.

In this supplemental EIS, No New Federal Leasing--the no action alternative--is used as the baseline against which all impacts of the other alternatives are compared. Because an existing overcapacity in coal supplies is expected to continue for the next 5-15 years, production attributable to new federal leasing is not expected to cause any difference in production among alternatives for certain production levels in certain years. Therefore, the impacts of different alternatives are similar for many resources or conditions. Because federal coal production under Leasing by Application would be essentially the same as under the Proposed Action, the two alternatives are assumed to have similar impacts.

The main thrust of this summary is to present a general comparison of impacts projected for the 1979 FES (BLM 1979a) Preferred Program at the 1990 medium production level to impacts projected for this supplemental EIS (1985) Proposed Action at the 1990 medium production level. The major factor influencing these differences is the substantially reduced coal production estimates in 1985 (see Figure 3-1). Differences can also be attributed to the limited scope of the 1985 analysis (not including downstream coal use) and differences in loading factors or multipliers used for impact assessment. The following sections quantitatively or qualitatively compare impacts projected in 1979 to those projected in 1985 for the six coal regions combined by the resources discussed in this supplemental EIS. Because the 1979 FES did not discuss Native American issues and visual resources, their projected impacts cannot be compared between 1979 and 1985.

### SOCIOECONOMICS

Impacts to employment, population, and royalty and severance tax revenues in 1990 at the medium production level under the 1985 Proposed Action would be about 80 percent lower than the impacts projected for the 1979 Preferred Program for the same production level and target year (Table 4-7). Under the 1985 Proposed Action, the following socioeconomic impacts would occur: (1) coal-related employment in the five coal regions that can be compared would be 51,300, which is 18 percent of the 291,000 employment projected for the 1979 Preferred Program; (2) coal-related population would be 127,400, which is 23 percent of the 557,600 population projected for the 1979 Preferred Program; and (3) coal-related royalty and severance tax revenues would be \$519 million, which is 24 percent of the \$2,135 million projected for the 1979 Preferred Program.

### TRANSPORTATION

Because the 1979 FES and this supplemental EIS use different approaches and scopes, projected impacts to transportation cannot be directly compared.



## SUMMARY

Projected coal production under the 1985 Proposed Action at the medium production level in 1990 would be about half that projected for the same target year and at the same production level under the 1979 Preferred Program. Therefore, projected impacts to transportation would be lower under the 1985 Proposed Action than under the 1979 Preferred Program.

### HEALTH AND SAFETY

Coal mining is and will continue to be a high-risk occupation. Miners and plant workers will continue to be exposed to health hazards such as dust, harmful fumes, stress, and excessive noise. Health and safety hazards under the Proposed Action, however, should decline in the future for two reasons: (1) the shift in production from subsurface mines to surface mines, whose hazard rates are about only a tenth of those of subsurface mines, and (2) new technology in pollution control and mine safety and the enforcement of existing federal dust and safety standards.

The 1979 FES projected a six-region annual total of 4,284 accidents for the Preferred Program at the 1990 medium production level, as compared to 3,318 accidents projected for the 1985 Proposed Action for the same target year and production level.

### AIR RESOURCES

Total suspended particulates (TSP) calculated in the 1979 FES and in this supplemental EIS cannot be directly compared because (1) the 1979 FES did not include underground mines as a TSP source, and (2) this supplemental EIS does not include the conversion of coal to other energy forms as a TSP source. By reconciling those two minor differences, projected annual TSP under the 1979 Preferred Program medium production level for 1990 would be 720,400 tons, whereas annual TSP projected for the 1985 Proposed Action would be 333,200 tons, a 54 percent reduction from the 1979 projection.

### SOILS AND VEGETATION

Under the 1985 Proposed Action medium production level for 1990, 65 percent less land would be disturbed than would be disturbed under the 1979 Preferred Program. Because specific sites to be mined or reclaimed are not known at this level of analysis, land disturbance impacts are discussed in general terms. Actual reclamation potential highly depends on characteristics of specific areas to be reclaimed. Coal development in all regions would affect lands with varying potentials for reclamation. In both the 1979 FED and this supplemental EIS land disturbance by surface mining and coal beneficiation is combined. Since coal development is being extended on the basis of a significant downturn in the 1979 forecasts, coal operations are expected to benefit from reclamation studies and practices that might not otherwise have been available. Therefore, land disturbance from surface mining may be more readily mitigated in the future. Other local disturbances from transportation, conversion, and consumption facilities have not been measured.

## SUMMARY

### AGRICULTURE

Land disturbance under the 1985 Proposed Action would differ in the following ways from land disturbance under the 1979 Preferred Program at the medium production level for 1990: cropland--1 percent less, rangeland--12 percent more, and woodland--13 percent less. These estimates were calculated from figures only for areas with known coal deposits.

### WILDLIFE

Direct losses of wildlife habitat resulting from coal production in 1990 at the medium production level would be about 54 percent less under the 1985 Proposed Action than under the 1979 Preferred Program. Losses of individual animals would also be 54 percent lower but could be significantly higher or lower than that figure depending upon the location of the mines. Indirect impacts to wildlife caused by coal-related human population increases would also approach the 54 percent lower figure, assuming a directly proportional relationship.

### RECREATION RESOURCES AND WILDERNESS

The greatest impact on recreation resources and wilderness would be the increased or decreased demand for these resources caused by coal-related population changes. Because the location of population changes was unknown for both the 1979 and 1985 analyses, no direct comparison can be made. Population impact comparisons between the 1979 Preferred Program and the 1985 Proposed Action (see the the comparison of socioeconomic impacts) provides an approximation of recreation and wilderness impacts.

### CULTURAL RESOURCES

At the medium production level in 1990, the 1985 Proposed Action would involve 54 percent less coal production than the 1979 Preferred Program. Consequently, coal-related land disturbance and population increase under the 1985 Proposed Action would be similarly less than under the 1979 Preferred Program. Land disturbance and population increases in specific areas, however, could be significantly higher, depending upon the location of mining.

### MINERAL AND PALEONTOLOGICAL RESOURCES

BLM's policy and industry's preference generally are to avoid developing two mineral resources in the same area. As demand for both resources grows and areas with fewer conflicts are mined out, avoiding conflict areas becomes increasingly difficult. As current mining continues and new areas are opened, more conflicts with other mineral development are expected. Coal production rates under the 1985 Proposed Action in 1990 at the medium production level would be about half of those projected for the 1979 Preferred Program, and fewer future conflicts are expected between coal and other minerals under the Proposed Action than under the Preferred Program.

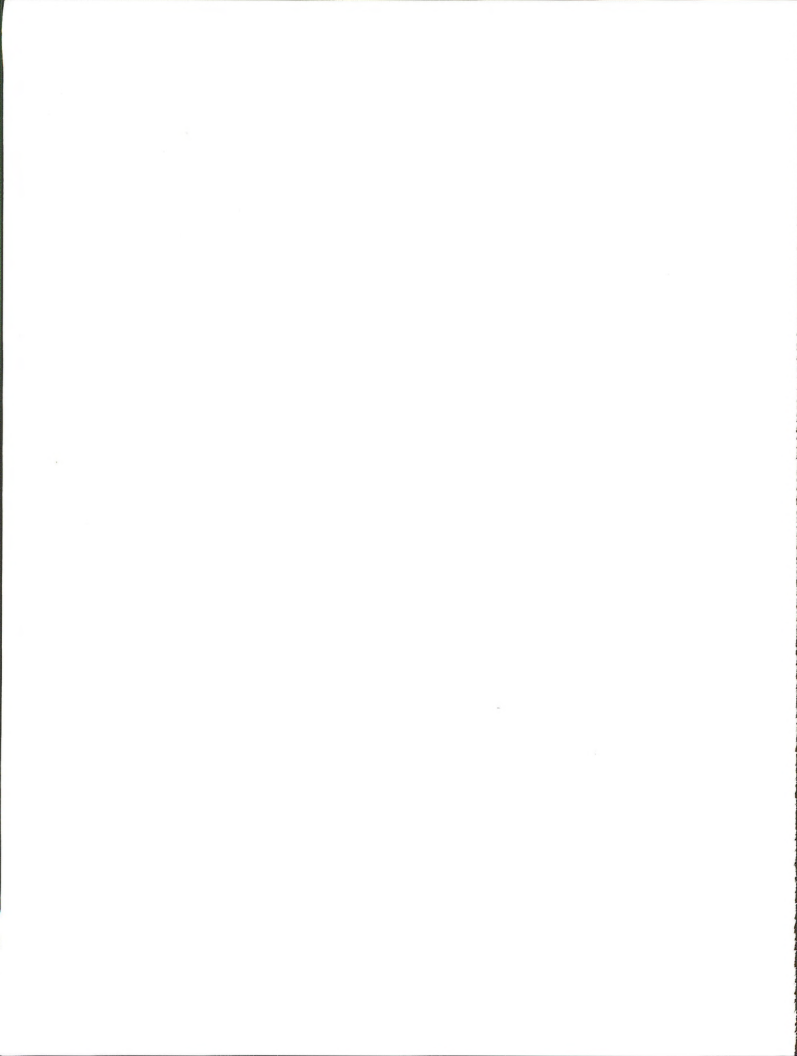
## SUMMARY

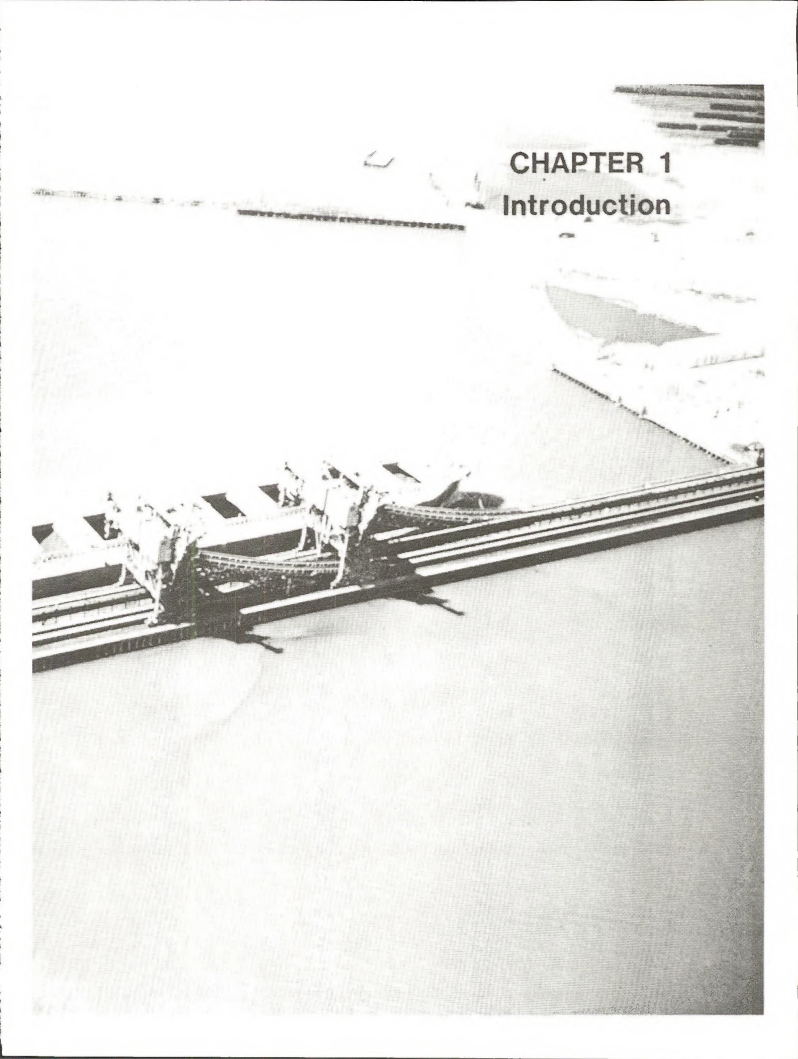
Impacts to paleontological resources can be directly related to the acreage being disturbed, which in turn depends upon the rate and location of coal production. Overall coal production as projected by this supplemental EIS would be about half of that projected by the 1979 FES, and beneficial and adverse impacts to paleontological resources should be much less for the 1985 Proposed Action than for the 1979 Preferred Program. The reduction of impacts, however, would be less than the percentage drop in coal production because proportionately more of the drop in coal production would occur in regions with less significant paleontological resources.

### WATER RESOURCES

Impacts to the hydrologic system are related to the amount of area disturbed and the closeness of the disturbance to major surface and ground water bodies. In a program-level analysis, neither the 1979 FES nor this supplemental EIS can accurately assess the proximity factor because of a lack of specific locations of coal mining. The 1985 Proposed Action would involve about half the coal production of the the 1979 Preferred Program, and thus the 1985 Proposed Action's impacts of sedimentation, total dissolved solids, and ground water disruption would be about half of those of the 1979 Preferred Program.

Annual water use projections for all six regions are 77,500 acre-feet in this supplemental EIS and 796,000 acre-feet in the 1979 FES for the Proposed Action/Preferred Program in 1990 at the medium production level. These projections show a 90 percent drop in water use for a 50 percent drop in coal production. The difference mostly results from the 1979 FES's including water used by powerplants and the supplemental EIS's not reporting on this use. This reduction would be greater in regions where mine-mouth use is common (Fort Union) than in regions from which large amounts of coal are exported (Powder River). The remainder of the difference is due to the reduced coal production and different per capita and per ton water use factors.



An aerial, black and white photograph of a large dam. The dam is a long, multi-tiered structure with several spillways. Water is seen cascading over the spillways, creating white foam. The reservoir behind the dam is calm and reflects the sky. The foreground shows the concrete structure of the dam and the water level. The overall scene is industrial and powerful.

**CHAPTER 1**  
**Introduction**



#### PURPOSE OF SUPPLEMENTAL EIS

This supplement to the April 1979 Final Environmental Statement (FES) for the Federal Coal Management Program (BLM 1979a) is prepared to analyze the cumulative impacts of leasing federal coal under an existing program and three alternative programs. It provides the top level of analysis for NEPA tiering of the federal coal management program. Its coverage is limited to the effects on the human environment of continuing a federal coal management program whose main components are based on land use planning and include activity planning and coal lease sales. It reviews the changes in coal market conditions and regional environments in the 6 years since publication of the 1979 FES. To that end, the programmatic alternatives express different amounts of federal coal that would be considered for leasing and different management approaches to structuring the coal program. Above all, this supplemental EIS serves as a timely update of environmental, coal market, and program developments that have occurred since the 1979 FES was published.

#### MANAGEMENT OBJECTIVES

The 1979 FES listed three broad issues that, taken together, identified a need for a program to manage federal coal. As set forth in Chapter 1 of the 1979 FES, the general purpose of coal management policy included the following:

- to address the Nation's serious energy problem of declining domestic oil and gas resources and limited alternatives;
- to reduce the Federal Government's historically reactive role in coal leasing decisions, the failure of earlier coal management to address modern concerns, and the potential for serious impacts to the socioeconomic infrastructure and the environment of expanded coal production and use; and
- to respond to critical reviews of coal management by the executive, legislative, and judicial branches of the Federal Government.

Viewed in 1985, the federal coal management program has evolved from the Preferred Program of the 1979 FES. Furthermore, enough federal coal has been offered at competitive lease sales since 1979 to allow energy and mining companies to increase their inventories of federal reserves under lease. This inventory can now provide a variety of coal deposits for potential development as the need arises.

In proposing to continue the federal coal management program, the Department of the Interior is guided by five important management objectives:

- to have in place a flexible mechanism that can analyze the need for leasing at a given time and place and can respond no matter how small or great that need is;

## INTRODUCTION

- to promote economically efficient and environmentally sound patterns of multiple resource use in western states;
- to maintain an orderly, predictable system that facilitates long-range planning by state and local governments, coal industry and affiliated groups, and other groups and individuals affected by or interested in federal coal development;
- to regionalize most decisions on coal leasing and to grant to state governments a major role in formulating and consenting with such decisions; and
- to promote competitive markets in western coal states where federal coal ownership is significant.

This supplemental EIS examines four federal coal management program alternatives: (1) No New Federal Leasing, (2) Preference Right and Emergency Leasing, (3) Leasing by Application, and (4) the Proposed Action--the program described in the 1979 FES as modified by later regulatory, procedural, and policy changes. These changes include recommendations adopted from reports published by the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes and others 1984) and the Office of Technology Assessment (OTA 1984). Chapter 2 describes in detail the Proposed Action and all program alternatives. Chapter 3 provides estimates of future coal production for the different alternatives. Chapters 4, 5, and 6 analyze in detail the impacts to the national and regional environments of adopting the Proposed Action and each of the alternatives.

### LOCATION OF THE PROPOSED ACTION AND ITS RELATIONSHIP TO COAL REGIONS

The 1979 FES used 12 coal supply regions as basic units for analysis. These regions were defined by similar geology and coal characteristics and with reference to markets for coal reserves developed within the regions. These same 12 regions, which contain over 92 percent of the demonstrated federal coal reserve base in the 48 conterminous states and account for over 97 percent of the Nation's current federal coal production, are the basis for analysis in this supplemental EIS (Map 1-1).

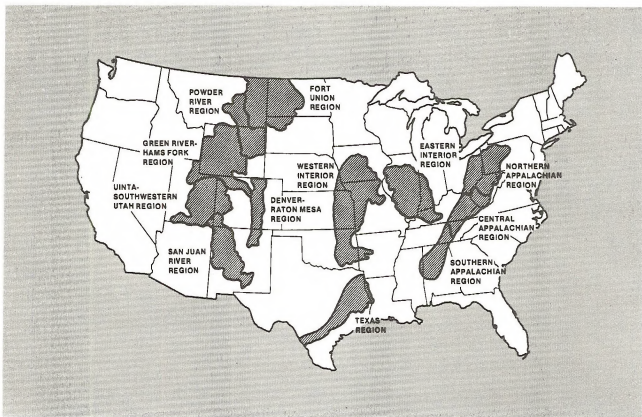
Of the 12 coal supply regions analyzed in 1979, six were formally identified as containing federally owned coal of major significance. The description of the boundaries of these regions was published in the November 9, 1979, Federal Register (44 FR 65196-97). These six regions include Fort Union (Montana and North Dakota), Powder River (Montana and Wyoming), Green River-Hams Fork (Colorado and Wyoming), Uinta-Southwestern Utah (Colorado and Utah), San Juan River (Colorado and New Mexico), and Denver-Raton Mesa (Colorado and New Mexico). For two other regions, Southern Appalachian and Western Interior, smaller subregions (Alabama and Oklahoma) were defined for federal coal lease planning.

Since the November 9, 1979, Federal Register notice, the Denver-Raton Mesa Region and the Oklahoma Subregion of the Western Interior Region have been removed from consideration for Department-initiated regional coal leasing.



## LOCATION OF THE PROPOSED ACTION

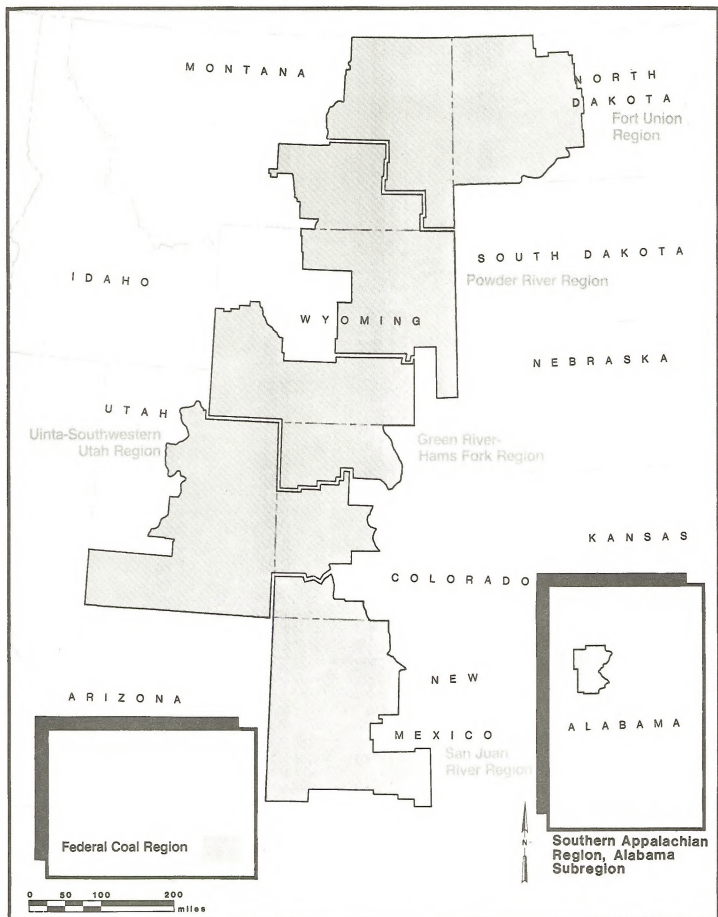
That decision followed recommendations of the associated regional coal teams (RCTs) and was based on low demand for coal leasing. Recent discussions in the Department have examined other potential adjustments to the status and



**Map 1-1 Twelve Coal Supply Regions of the United States**

configuration of the remaining coal regions and the substitution of tract-by-tract application procedures on an as-needed basis in place of BLM-initiated regionwide tract delineation and lease sales. Any change in status of RCTs would need to be proposed by RCTs before being approved by the Department of the Interior.

The major focus of this supplemental EIS is the Department of the Interior's program to lease federal coal (including all methods of leasing) within the five regions and one subregion where BLM-initiated leasing will most likely be needed to meet management objectives in the next few years (Map 1-2). The analytical base for this supplemental EIS also reflects federal coal leasing from preference right lease applications (PRLAs) and lease by application procedures outside these designated federal coal production areas, as well as from emergency leasing that may result by the year 2000. Because federal coal ownership outside the five federal coal production regions and one subregion is scattered and of small contiguous acreages, the scope and depth of analysis for leasing in these areas are usually limited to the immediate area affected by the issuance and later development of a lease.



MAP 1-2 FEDERAL COAL REGIONS

## RELATIONSHIP TO 1979 FES

### RELATIONSHIP TO THE 1979 FES

The 1979 FES evaluated seven coal management alternatives, including a preferred program. Each alternative focused on different administrative and policy limitations on the level of federal coal leasing to be achieved. This supplement to that FES revisits the assumptions and projections described in the 1979 FES and describes several program changes made in 1982 and 1983 and, more recently, changes made in response to the Report of the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes and others 1984) and the Office of Technology Assessment (OTA) report, Environmental Protection in the Federal Coal Leasing Program (OTA 1984). With this supplemental EIS as one of the bases for decision, the Secretary of the Interior may choose to continue the existing program with the changes made in response to the Linowes Commission and OTA reports, or he may decide to select a different program.

The 1979 FES was the foundation document for the Secretary of the Interior's July 1979 decision to adopt and implement a comprehensive coal management program. In August 1980, the Green River-Hams Fork Regional Coal Final EIS (BLM 1980c) was published, the first of six regional Round I EISs (Table 1-1) evaluating the effects of leasing specified amounts of federal coal in specific tracts. These regional EISs are the next level of tiering to the 1979 FES, focusing on narrower cumulative and site-specific impacts. These regional EISs were used by regional coal teams and the Secretary of the Interior in (1) deciding whether to offer federal coal for lease and (2) determining which tracts to offer in regional sales between 1981 and 1983. Results of Round I federal coal leasing are discussed in the next section of Chapter 1.

Round II of coal activity planning was begun in five of the six regions. Round II final EISs for the Uinta-Southwestern Utah Region (BLM 1983i) and the Alabama Subregion of the Southern Appalachian Region (BLM 1983d) were published in October and December 1983. A draft EIS for Green River-Hams Fork Round II coal leasing (BLM 1983b) was released for public comment in August 1983. Similarly, a draft EIS for Round II of leasing in the Powder River Region was published in January 1984 (BLM 1984d). In addition, a call for expressions of leasing interest was issued for Round II coal leasing in the Fort Union Region in April 1983 and January 1984. New tract delineation has been completed for that region.

Completion dates for Round II final regional coal EISs for the Green River-Hams Fork, Powder River, and Fort Union regions were postponed in February 1984 following publication of the Report of the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes and others 1984). Likewise, all regional coal lease sale schedules have been suspended. Regional coal sales will be resumed only if the Secretary of the Interior decides in favor of a federal coal management program based on regional activity planning.

### APPROACH OF SUPPLEMENTAL EIS AND RELATIONSHIP TO ONGOING REGIONAL EIS'S

This supplemental EIS assesses the program-level impacts of the Proposed Action and the three alternatives in five coal regions and one subregion (referred to in this supplemental EIS as the six coal regions) (Map 1-2) and

## INTRODUCTION

TABLE 1-1  
ROUND I REGIONAL COAL FINAL EIS'S

Region	Final EIS Publication Date	Reference Citation
Fort Union	February 1983	BLM 1983a
Powder River	July 1981	BLM 1981b
Green River-Hams Fork	August 1980	BLM 1980c
Uinta-Southwestern Utah	February 1981	BLM 1981d
San Juan River	March 1984	BLM 1984c
Southern Appalachian (Alabama)	January 1981	BLM 1981c

will form part of the basis for a decision by the Secretary on the need for and form of a federal coal management program. As a supplement to the initial, broadly generic EIS in the National Environmental Policy Act (NEPA) tiering process, this supplemental EIS does not address specific tracts but focuses on possible interregional effects and relationships and impacts at the national level. The progressively more site-specific environmental analysis needed to address these actions will be covered in later regional lease sale EISs, EISs or environmental assessments (EAs) on individual lease applications, and EISs or EAs on mine permit applications if the Proposed Action or one of the other action alternatives is selected.

Three levels of coal production (low, medium, and high) for three target years (1990, 1995, and 2000) are used as a basis for impact assessment to predict a range of impacts that could result from implementing the Proposed Action and each alternative. The Department of the Interior developed coal production forecasts using the Department of Energy's National Coal Model (NCM). Impact estimates relied on regional multipliers related to given amounts of coal production and were derived for each appropriate element of the human environment using recent regional coal EISs.

## HISTORY AND BACKGROUND

Under the Mineral Leasing Act of 1920 (MLA), the Department of the Interior has responsibility for federal coal leasing. Until 1960, little demand existed for federal coal, and little leasing occurred. In the 1960s, leasing greatly increased. In 1971, the Department imposed a moratorium on coal leasing in response to public concern that the lands were being leased mainly for speculation rather than development. The moratorium was lifted in July 1979 when the Department issued regulations implementing the Federal Coal Leasing Amendments Act of 1976 (FCLAA).

The 1979 FES (BLM 1979a) describes in detail the development of the federal coal management program before January 1979. The following sections in Chapter 1 update Section 1.2 of that document by describing major program events, regulatory changes, and litigation since January 1979.

## HISTORY AND BACKGROUND

### MAJOR EVENTS SINCE 1979

#### Coal Leasing

Table 1-2 lists the regional lease sales held since January 1979. The first regional lease sale under the new program was held in the Green River-Hams Fork Region on January 13, 1981, in Denver, Colorado, and on January 14, 1981, in Cheyenne, Wyoming. Since that time, regional sales have been held in the Fort Union, Powder River, Southern Appalachian, and Uinta-Southwestern Utah regions. In all, 67 coal tracts with 3.7 billion tons of coal reserves were offered at regional lease sales, 47 lease tracts were sold, and 43 leases were issued as of December 15, 1984. The lease tracts sold covered 82,754 acres and contained 2,143.9 million tons of recoverable coal reserves. Eight tracts were offered in the September 1983 Fort Union sale. Bids were accepted on three tracts covering 7,091 acres and involving 96.5 million tons of recoverable coal reserves, but a court order prohibited the issuance of coal

TABLE 1-2  
LEASES SOLD IN ALL REGIONAL SALES  
(January 1981 through February 1984)

Regions	Date of Sale	No. of Tracts	Acres	Total Recoverable Reserves (millions of tons)	Total High Bonus Bids
Fort Union	9/83	3*	7,091	96.5	\$773,310
Green River-	1/81	6	11,283	87.9	1,730,277
Hams Fork	4/81	2	5,572	64.4	9,013,430
	10/81	1	5,974	62.7	1,792,227
	4/82	2	<u>4,262</u>	<u>112.4</u>	<u>23,164,125</u>
Total-----		11	27,091	327.4	\$35,700,060
Powder River	4/82	10	16,554	1,089.6	43,484,434
	10/82	<u>2</u>	<u>5,176</u>	<u>471.6</u>	<u>23,689,632</u>
Total-----		12	21,730	1,561.2	67,179,066
Southern	6/81	6	5,040	24.3	180,537
Appalachian	12/81	4	3,629	7.3	623,605
	9/82	<u>3</u>	<u>1,520</u>	<u>1.1</u>	<u>247,114</u>
Total-----		13	10,189	32.6	1,051,256
Uinta-	7/81	5	10,854	79.7	14,200,410
Southwestern	2/82	1	160	2.3	158,400
Utah	5/82	1	640	7.5	5,216,000
	2/84	<u>1</u>	<u>4,999</u>	<u>36.7</u>	<u>9,542,041</u>
Total-----		8	16,653	126.2	24,116,851
Total All Regions-----		47	82,754	2,143.9	\$133,820,543

SOURCE: BLM 1984a.

NOTE: Data may not add up to totals shown due to independent rounding.

\*Leases have not been issued as of January 18, 1985.

## INTRODUCTION

leases on those tracts. (See Litigation section in Chapter 1.) Another tract was later reconfigured and offered and leased under the emergency provisions of the coal management regulations (43 CFR 3425.1-4). The bid for this tract had been rejected in the September 1983 sale.

Table 1-3 lists coal leases sold under the lease-by-application procedures of the 1979 federal coal management program. Since January 1979, the Department has held 50 lease-by-application sales and sold 43 leases involving 31,810 acres and 398.66 million tons of recoverable coal reserves.

As of November 30, 1984, 137 coal preference right lease applications (PRLAs) were pending, a reduction of 47 since 1979. Six more prospecting permits in Utah, reinstated by the court, may become coal PRLAs once drilling is completed under the terms of the permits. From January 1979 to the present, 23 PRLAs, covering 58,209 acres and containing 383.32 million tons of recoverable coal reserves, have become 13 leases. These preference right leases are located in Alaska, Colorado, Oklahoma, Utah, and Wyoming. During this period, 24 PRLAs were withdrawn by the applicant or rejected by BLM for failure by the applicant to show the existence of coal in commercial quantities. In March 1984, Secretary of the Interior William Clark concurred with Recommendation III-6 of the Linowes Commission, emphasizing the processing of outstanding PRLAs.

### Exchanges

The Department processes two types of exchanges involving transfers of coal resources: fee coal exchanges and coal lease exchanges. Fee coal exchanges are authorized under Section 206 of the Federal Land Policy and Management Act (FLPMA), when the Secretary of the Interior determines that transfer of ownership of the land or the underlying mineral resources on the land is in the public interest. The regulations governing fee coal exchanges are found in 43 CFR Group 2200 governing all land exchanges. Although fee coal exchanges are not part of the federal coal management program, a number of commenters on the scope of this supplemental EIS believed that exchanges have a major impact on western coal development. In response to this concern, regional coal teams will solicit public comments on and evaluate the effects of any proposed fee coal exchanges on regional competitive lease sales.

Coal lease exchanges involve the relinquishment of an existing Federal or Indian coal lease in exchange for issuance of a new coal lease of equal value. These exchanges must be specifically authorized by Federal statute because the Federal Coal Leasing Amendments Act of 1976 removed the Secretary's general authority to issue coal leases without competition. Regulations governing coal lease exchanges are found at 43 CFR 3435. Table 1-4 summarizes the status of existing authorized lease exchanges and fee coal exchanges since 1979. A discussion of the relationship and coordination between fee exchanges and coal leasing activities appears in Chapter 2.

An exception to the Secretary's lack of general authority to initiate coal lease exchanges is alluvial valley floor (AVF) coal lease exchanges, authorized by Section 510(b)(5) of the Surface Mining Control and Reclamation

## HISTORY AND BACKGROUND

TABLE 1-3  
LEASES SOLD IN ALL LEASE-BY-APPLICATION SALES  
(January 1979 through September 1984)

State	No. of Tracts	Acres	Total Recoverable Reserves*	Total High Bonus Bids
Alabama	1	520	0.72	\$ 13,078.00
Colorado	12	5,286	35.82	323,042.00
Kentucky	3	2,571	5.23	235,488.00
Montana	4	1,428	46.20	35,700.00
New Mexico	2	4,016	96.06	118,592.00
North Dakota	4	2,288	23.07	89,500.00
Oklahoma	5	1,688	3.81	227,186.50
Utah	6	4,191	45.87	3,995,117.00
Virginia	1	251	0.30	27,610.00
Wyoming	5	9,571	141.58	1,702,078.00
<b>Total all States</b>	<b>43</b>	<b>31,810</b>	<b>398.66</b>	<b>\$ 6,767,391.50</b>

Source: BLM 1984a

\* Million tons

Act (SMCRA) and implemented by the regulations in 43 CFR 3436. If an AVF lease exchange proponent meets the qualification requirements set forth in SMCRA, the proponent may be granted a federal coal lease of equivalent value without competition.

Section 510(b)(5) of SMCRA also authorizes and mandates AVF fee coal exchanges. After the qualifications have been met, AVF fee coal exchanges are carried out under Section 206 of FLPMA and the regulations of 43 CFR 2200. As of November 30, 1984, the Department is processing one AVF fee coal exchange (see Table 1-4).

### Fair Market Value

The history of the Department's procedures to certify receipt of fair market value since January 1979 is summarized in the Decision Document and Background Material Relating to Fair Market Value for Federal Coal Leases (BLM 1983n).

In the June 1979 Secretarial Issue Document on the Federal Coal Management Program (USDI 1979a), Secretary Andrus directed a multidisciplinary task force to examine issues and options concerning the receipt of fair market value for federal coal leases. The task force report, Final Report and Recommendations for the Secretary on Fair Market Value and Minimum Acceptable Bids for Federal Coal Leases (USDI 1979b), was completed in December 1979. In May 1980, the Secretarial Issue Document on Fair Market Value and Minimum Acceptable Bids for Federal Coal Leases (USDI 1980) presented a series of decisions on appraisal methodology for lease tracts, lease sale procedures, and minimum bid strategies. These decisions were amplified in a memorandum by Undersecretary of the Interior James Joseph in December 1980 to provide more detailed policy guidance for evaluating tracts too small to stand alone as efficient or

## INTRODUCTION

TABLE 1-A  
EXCHANGES INVOLVING COAL

Type	Legal Authorization	Description	Status
Fee title exchange	Public Law 95-553	Directed the Secretary of the Interior to determine if acquisition of lands around Lake DeSmet, Wyoming would be in the public interest. Acquisition would be by fee title exchange, or exchange of coal interests, or exchange of federal coal leases.	In July 1979 the Assistant Secretary determined that this exchange was not in the public interest.
Coal lease exchange	Public Law 95-554	Authorized Secretary to issue coal leases for relinquishment of 8 PRLAs in Utah and 9 leases in Wyoming. The 9 Wyoming leases are affected by Interstate Highway 90 (I-90).	In June 1981 the Utah exchange was rejected because the 8 PRLAs had insufficient value for exchange purposes.  Lease exchanges were completed with two I-90 leases in FY 82 and 83. Negotiations continue with the 4 other leases.
Coal lease exchange/ certificates of bidding rights	Public Law 96-401	Authorized the Secretary to issue non-competitive coal leases or certificates of bidding rights in compensation for relinquishing coal leases or permits on the Northern Cheyenne Indian Reservation. Leases would be issued or bidding rights given after cancellation agreements are agreed to by the Secretary, the lessee or permittee, and the Northern Cheyenne Tribe.	Cancellation agreements were reached with 4 of the 6 lessees and permittees by the statutory deadline—January 1, 1982. The other 2 permittees have to seek compensation in the U.S. Court of Claims. One lease was issued as a result of cancellation agreements to date.
Coal lease exchange	Public Law 96-475	Directed the Secretary to exchange 2 federal coal leases in the Bisti Wilderness Area for other federal coal leases in New Mexico.	Exchange coal lease issued in September 1984.
Alluvial valley floor fee coal exchange	Section 510(b), SMCRRA	Whitney Benefits qualifies for a fee title exchange of its coal-bearing lands in Campbell County, Wyoming, for title to public lands elsewhere.	Application submitted June 1981. Negotiations continue on the exact location and value of the lands selected by Whitney Benefits.
Fee mineral exchange certificates of bidding rights	Public Law 96-476	Provided for acquiring nonfederal interests within Bettlemeatz Regional Recreation Area in Montana by exchange, purchase or gift, or exchange for bidding rights or lease modification.	On November 19, 1983, a certificate of bidding rights was issued to the affected party in the amount of \$14.3 million.
Fee mineral exchange	Section 206, FLPMA	Meridian Land and Mineral Co. proposed to exchange fee title to some of its coal-bearing lands to BLM for the fee title to some of BLM's coal-bearing lands near Circle, Montana, to consolidate land and resource ownership within checkerboard ownership area.	Exchange became final in September 1983, subject to pending litigation.
Fee mineral exchange	Section 206, FLPMA	Rocky Mountain Energy (RME) proposed to exchange private inholdings in Grand Teton National Park for public coal-bearing lands in the Corral Canyon area, Wyoming.	Titles were exchanged on June 24, 1983. To equalize land values, RME agreed to pay \$1.9 million to BLM.
Fee mineral exchange	Section 206, FLPMA	The Fish and Wildlife Service proposes to acquire Teton Valley Ranch property for National Elk Refuge in exchange for coal-bearing publiclands in the Leucite Hills area, Wyoming. The public lands are east to RME's Prospect Point Coal Mine.	Negotiations continue on this land exchange.
Monetary credits	Public Law 96-466	Directed the Secretary to acquire all nonfederally owned coal within the Greenberry Wilderness Area, West Virginia. Monetary credits would be given in exchange for the interests.	Negotiations continue on the value of interests being acquired.
Fee mineral exchange	Section 206, FLPMA	South Fe Pacific Railroad proposes to exchange their mineral interests in lands in McKinley County, New Mexico with publicly owned minerals in the private-public checkerboard ownership area. Lands involved total over 45,000 acres.	Negotiations continue on this exchange proposal.
Fee mineral exchange	Section 206, FLPMA	South Fe Pacific Railroad proposes to exchange its private lands within Checo Culture National Historical Park, New Mexico, where coal mining is prohibited, for public minerals next to an area planned for coal mining.	Processing continues on this exchange.



## HISTORY AND BACKGROUND

economical mining units. This decision, known as the Joseph memorandum, was informally suspended upon the publication of interim coal lease sale procedures on September 13, 1982, and was formally rescinded in June 1983.

In April and October 1982, coal lease sales were held in the Powder River Region of southeast Montana and northeast Wyoming. Immediately before the April 1982 lease sale, procedures were adopted to define a system of postsale analysis to determine bid acceptance or rejection. In earlier lease sales, the Department had published its estimates of tract value in the notice of lease sale. For the Powder River sale in April 1982, entry-level bids were published in the sale notice. These entry level bids were below the presale appraisal values for some tracts to lower barriers to bidder participation at the lease sale.

In the weeks following the sale, criticism of the sale procedures and results mounted, amid widespread allegations--by members of the press, Congress, and public interest groups--that the government had received less than fair market value for the Powder River coal leases.

In July 1982, the Department issued final regulations that raised minimum bids from \$25 to \$100 per acre and eliminated the use of oral bidding in lease auctions. Procedures were somewhat changed in September 1982, on an interim

basis, to allow the Department to publish representative market value estimates in the lease sale notice for production maintenance tracts where, in all likelihood, only one bidder would compete at the lease sale. The postsale appraisal methodology was also modified in these interim procedures.

In May 1983, the General Accounting Office issued a report that criticized the procedures used in the Powder River sales (Analysis of the Powder River Basin Federal Coal Lease Sale: Economic Valuation Improvements and Legislative Changes Needed; GAO/RCED-83-119; May 11, 1983)(GAO 1983). In July 1983, Secretary Watt approved a revised set of coal lease sale procedures governing (1) presale evaluation of tracts, (2) the use of sealed bidding with no indication of the government's value estimates in the sale notice, (3) the averaging of serious bids for determining bid acceptance standards postsale, and (4) guidelines for reoffering tracts that fail to receive an acceptable bid.

In August 1983, Congress established the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes Commission) to review the Department's procedures to value federal coal tracts. Congress directed the Secretary of the Interior to appoint members to the commission to study the following issues:

- The method of estimating fair market value, including economic valuation methods, presale versus postsale analysis, and the value of independent review of appraisals.
- The impact on competition and on achieving fair market value of leasing large amounts of coal, particularly under depressed market conditions, versus a more moderated leasing schedule.
- Whether the leaseholder should share more in the risk of holding the lease by increasing rental rates on a regionally adjusted basis.

## INTRODUCTION

- Whether the public should share in the increase in value of its resources by imposing a tax on transfers of surface or lease rights.
- The methodology for assigning value to maintenance tracts, on the basis of the coal's value in the ground to the adjoining mine owner rather than as a competitive lease tract, when no competitive interest is expected.
- Possible methods of increasing competition, such as changing tract delineation methods, requiring meaningful fees to accompany expressions of interest, adopting intertract bidding procedures, or requiring a minimum number of bids for a competitive sale.
- Methods of evaluating tracts to reflect regional differences in coal, and establishing cents-per-ton minimums on a regional basis.
- Whether presale planning procedures are adequate, particularly with regard to land use planning, public participation, and the role of regional coal teams in determining the timing and amount of leasing.
- Methods of carrying out authorized exchanges so as to reduce adverse effects on sale competition.

The Linowes Commission published a report in February 1984 (Linowes and others 1984), which made 36 recommendations and several judgments and conclusions. On March 19, 1984, Secretary of the Interior Clark released his response to the commission's report. He accepted and agreed to implement 35 of the commission's recommendations (Table 1-5). An environmental assessment (BLM 1984a) (June 29, 1984) of adopting these proposals led to a finding of no significant impact to the human environment (Appendix 6). Final procedures will be developed on the basis of these comments. On October 31, 1984 and November 5,

1984, proposed guidelines and regulations that would permit the Department to implement the accepted Linowes Commission recommendations were published for comment in the Federal Register.

### Environmental Concerns

Soon after Congress established the Commission on Fair Market Value Policy for Federal Coal Leasing, it directed the Office of Technology Assessment (OTA) to study whether the Department's program to lease federal coal was compatible with nationally mandated environmental protection goals. The report, Environmental Protection in the Federal Coal Leasing Program (OTA 1984), was completed on May 24, 1984. It contains options in the following 10 areas of environmental concern:

- reducing leasing rates,
- decentralizing decisionmaking authority,
- improving the effectiveness of public participation,
- ensuring that comprehensive area planning is completed before a lease offering,
- developing a means of improving the data base and access to it,
- providing guidelines and standards for assessing the adequacy of the data base,

## HISTORY AND BACKGROUND

TABLE 1-5  
SUMMARY OF RECOMMENDATIONS OF THE COMMISSION ON FAIR MARKET VALUE POLICY FOR  
FEDERAL COAL LEASING AND DEPARTMENTAL PROPOSALS

Commission Recommendation	Department of the Interior Proposal
The government should establish and announce a coal leasing schedule to promote predictability of of leasing actions. (III-1)	The Department would continue to maintain a 5-year schedule and would ensure that the need for the sale was reviewed at multiple decision points. The Federal-State Advisory Board would review the schedule at its annual meetings.
The states, through their participation on the regional coal teams (RCTs), should continue to assist in establishing leasing levels and in setting leasing schedules. (III-2)	The Department would continue to support state representation on the Federal-State Coal Advisory Board and the RCTs.
The government should not seek to raise the price above the competitive market level nor lease so much as to flood the market. (III-3)	In setting leasing levels, the Department would direct the RCTs to consider past lease sales, coal production capacity, coal reserve inventory, industry expressions of interest, minimum leasing and competition for new supply contracts. All factors would be weighed against public policy needs.
The government should seek to maintain adequate diversity in the quantity and quality of federal coal lease holdings. (III-4)	To promote diversity, tracts in many coal regions would be offered. Tracts would be chosen for production maintenance and new production in accordance with tract delineation guidelines.
The amount of coal leased should achieve a fair return consistent with other public policy objectives. (III-5)	Policies and procedures for land use planning would continue to consider coal along with other competitive uses. During activity planning, tracts would be ranked by RCTs and then analyzed in BIDS. Goals other than maximizing revenues would be carefully considered.
Coal Preference Right Lease Applications should be rapidly processed to a decision point. (III-6)	The Department will continue to process coal PRLAs as quickly as possible and will prepare monthly coal PRLA status reports.
Tracts should be selected to enhance attainment of fair market value. (IV-1)	The factors affecting the degree of competition will be studied and listed. Procedures for analyzing alternative tract configurations will be offered for public comment.
More drilling should be sponsored and cooperative drilling should be encouraged. (IV-2)	The Department will sponsor more drilling and encourage cooperative drilling.
Cooperative leasing procedures are desirable. (IV-3)	BLM will actively pursue opportunities for cooperative leasing.
The exchange of federal and nonfederal coal should be pursued more vigorously. (IV-4)	Fee coal exchanges should continue to be pursued carefully and prudently. Department of Justice review of fee coal exchanges would be requested.
Leasing policies should distinguish between new production tracts and maintenance and bypass tracts. (V-1)	Definitions for new production, maintenance and bypass tracts would be prepared and would distinguish between captive (single bidder) and potentially competitive tracts.
The government should continue to rely on bonus bidding. (V-2)	The Department will continue to employ bonus bids with fixed royalties.
Intertract bidding should be used to lease some federal coal. (V-3)	Guidelines would be published for review and comment.
Minimum reimbursable bids should be established on a regional basis and expressed as some amount per ton. (V-5)	Comments will be solicited on establishing minimum bids on a regional cents-per-ton basis.
The government should have the authority to negotiate a fair price for federal coal leases where competition has failed. (V-6)	The Department will study the issue and work with Congress to determine whether a feasible approach could be defined.
Industry bids received on tracts with extensive competition, along with the government's pre-sale appraisals, can constitute important sources of information for postbid acceptance and rejection decisions. (V-7)	Industry bids will continue to be used in acceptance and rejection procedures.

Note: Commission recommendations and Department of the Interior proposals are bridged. For the full text see March 19, 1984 Review of Federal Coal Leasing (USDI 1984b).  
RCT = regional coal team.

## INTRODUCTION

TABLE 1-5 (concluded)  
SUMMARY OF RECOMMENDATIONS OF THE COMMISSION ON FAIR MARKET VALUE POLICY FOR  
FEDERAL COAL LEASING AND DEPARTMENTAL PROPOSALS

Commission Recommendation	Department of the Interior Proposal
Security of confidential data before the lease sale should be assured. (V-8)	Procedures for data security will be strengthened for lease sales.
Model design, input data and analysis for estimating fair market value should be improved. (VI-1)	The use of Monte Carlo techniques would be evaluated and compared with CREV and other similar models.
The small business tax adjustment should not be used in computing appraisal value. (VI-2)	The use of the small business tax adjustment has been eliminated.
The comparable sales adjustment should include factors identified as appropriate on the basis of comprehensive review. (VI-3)	Professional comment would continue to be sought on appraisal techniques in the areas of economies of scale, production rate, and royalty severance tax adjustments.
Estimates of tract value for noncompetitive tracts should be based on value to the adjoining coal owner or mine. (VI-4)	Public comment will be sought on how best to evaluate captive tracts.
Regulations should require lessees to report details of lease assignments. (VI-5)	Public comment would be sought on specific guidance to field offices on what details should be required.
Bidders should provide data on prices and other terms of private coal transactions for comparability analysis. (VI-6)	Recommendation not accepted.
The Department's capacity to perform appraisals should be enhanced. (VI-7)	The number of highly qualified mineral appraisers would be increased, professional capabilities of existing personnel would be enhanced, and the use of private sector appraisers would be considered.
Congress should consider allowing a 10-year extension on the diligence requirement for post-FCLAA leases. (VII-1)	The Department would work with Congress on this issue.
For pre-1976 coal leases, advance royalties should be paid beginning at the time of the next lease readjustment. (VII-2)	Similar incentives should exist for pre- and post-FCLAA leases.
Congress should examine the need for limiting payments for surface owner consents. (VII-3)	No change or review of this issue should begin until Congress finishes examining it.
Congress should consider giving the Secretary authority to lower royalty rates before a coal lease sale. (VII-4)	The Department would be pleased to work with Congress on this issue.
The basis for calculating federal royalty payments should be the F.O.B. price minus all state and local severance taxes. (VI-5)	This issue was deferred to Congress.
Congress should consider a review to assess whether shippers of coal are adequately protected from anticompetitive or discriminatory practices. (VII-6)	No position was taken on this issue.
Tract delineation teams should have an economic analysis capability. (VIII-1)	Economic analysis capability would be added to tract delineation teams.
A centralized economic appraisal function should be organized for policy, and policy should be implemented on a regional basis. (VIII-2)	This reorganizing effort is now being undertaken.
The centralized coordination group should develop a uniform appraisal method. (VIII-3)	Appraisal procedures would be continued to be defined.
The sale panel should have appraisal expertise. (VIII-4)	Qualifications for sale panel members would be published for review and comment.
The Inspector General should conduct periodic audits of the coal program. (VIII-5)	The Inspector General would conduct periodic audits and a complete review of the program.

Note: Commission recommendations and Department of the Interior proposals are abridged. For the full text, see Review of Federal Coal Leasing (USDI 1984b). RCT = regional coal team.

## HISTORY AND BACKGROUND

TABLE 1-6  
A SUMMARY OF OFFICE OF TECHNOLOGY ASSESSMENT REPORT OPTIONS AND DEPARTMENTAL RESPONSES

Option	Responses
1. Reduce leasing rates	<ul style="list-style-type: none"> <li>a. RCTs will consider existing resources, and amount of data gathering and analysis needed to resolve issues when developing long-range schedules.</li> <li>b. Decisions on leasing levels and final sale offerings will be based on a variety of factors, including market conditions and environmental concerns.</li> <li>c. Market conditions and environmental concerns are to be weighed by the RCTs in making recommendations to the Department.</li> <li>d. Smaller and more frequent sales, to gauge the market better and obtain information to use in later sale decisions.</li> </ul>
2. Decentralize decisionmaking authority	<ul style="list-style-type: none"> <li>a. The Department will accept RCT recommendations unless a clear reason exists not to do so, and will explain this reason in writing.</li> <li>b. The RCT chairman will be the BLM state director from the state primarily involved.</li> </ul>
3. Improve effectiveness of public participation	<ul style="list-style-type: none"> <li>a. BLM will develop and release land use planning and activity calendars, identifying points for public involvement.</li> <li>b. The public will be invited to participate in the call for coal and other resource information at the onset of land use planning.</li> <li>c. Availability of maps and other information describing the application of the unsuitability criteria will be announced to the public.</li> <li>d. Activity planning will begin with an RCT meeting to review a market analysis and the summary of the land use planning data and decisions.</li> <li>e. The notice for the first RCT meeting in activity planning will also announce the availability of the market analysis report and summary information at least 45 days before the RCT meeting.</li> <li>f. All decision documents will specify the nature of the decision, the key factors leading to it, supporting information (or a reference to the document containing it), and an easily understood summary.</li> <li>g. RCTs will use representative working groups, including all segments of the community, to develop information for RCT consideration.</li> <li>h. RCTs will use representative working groups, including all segments of the community, to develop information for RCT consideration.</li> <li>i. BLM manuals and regulations will specify minimum timeframes for public comments, which will be no less than 30 days for a land use planning or activity planning document.</li> </ul>
4. Ensure that comprehensive area planning is completed before offering leases.	<ul style="list-style-type: none"> <li>a. BLM will expeditiously complete Resource Management Plans (RMPs) and initiate new coal activity planning only for areas where RMPs have been completed. For areas outside coal production regions and where regions are abolished, management framework plan coal amendments may be used for coal leasing decisions where no RMP is completed.</li> <li>b. Before tract delineations, RCTs will use existing land use plans as a base to identify issues to be addressed and data to be gathered as part of activity planning.</li> <li>c. BLM will take the needed steps to ensure better coordination with the Forest Service.</li> <li>d. BLM will improve coordination with other federal agencies, state and local governments, and private organizations.</li> </ul>
5. Develop a means of improving the data base and access to it.	<ul style="list-style-type: none"> <li>a. BLM will prepare supplemental program guidance to clarify program-specific resource management planning requirements.</li> <li>b. BLM will prepare, in consultation with other agencies, data adequacy standards and guidelines.</li> <li>c. BLM will investigate new sources of data, such as exploration licenses for hydrologic and soils data.</li> <li>d. A BLM/OSM working group will suggest ways to search, extract, and apply mine plan data.</li> </ul>

## INTRODUCTION

TABLE 1-6 (concluded)  
A SUMMARY OF OFFICE OF TECHNOLOGY ASSESSMENT REPORT OPTIONS AND DEPARTMENTAL RESPONSES

Option	Response
	a. BLM will refine and integrate various systems (such as ALMRS, GIS, ESIS, INICE) to increase their availability.
6. Provide meaningful guidelines and standards for assessing the adequacy of the data base.	<p>a. At the beginning of land use planning, BLM will include a call for other resource information to aid in evaluating lands for evaluating lands for possible lease sale.</p> <p>b. Information from the call for resource information, along with BLM data bases, will be used to eliminate lands of little interest for development or land that has limited coal resource but appear to have a large number of resource conflicts and limited data to resolve them.</p> <p>c. A single summary of all land use plans to be used in a round of regional coal activity planning will be prepared for the initial RCT meeting and be available to the public before the meeting.</p> <p>d. Tract profiles will include assessments of the coal and noncoal information and other data needed to adequately evaluate the tract.</p> <p>e. RCTs will use data assessments in tract profiles in ranking tracts before their selection for regional coal leasing EIS. Tracts lacking large amounts of data will be ranked as less desirable and may be dropped altogether.</p> <p>f. In their final recommendations, RCTs will separately identify any tracts not recommended because data is insufficient to adequately assess the tract (except data normally acquired at the mine permitting stage).</p> <p>g. RCTs will identify tracts with data problems without considering the EIS alternative(s) in which the tract was analyzed or of the effect a tract's deletion would have on the recommended leasing level.</p> <p>h. After consulting the other members, the RTC chairman will appoint three science advisors to serve as ex officio members on a test basis to assist the RCT in evaluating data.</p> <p>i. OSM will assist BLM in evaluating data to assure that tracts leased will have a high probability of meeting SMCOA requirements.</p>
7. Incorporate cumulative impact assessments in pre-sale planning decisions.	<p>a. BLM will apply the four coal screens sequentially from the top down, except where it appears to be more efficient to apply them in another order.</p> <p>b. In their review of cumulative impacts of coal development, the RCTs will consider any threshold analysis performed during land use planning and will expand this analysis, where appropriate, to the broader area.</p> <p>c. BLM will review the effect of 1982-83 unsuitability criteria rule changes, asking interested parties for their concerns and for information of the effects of the changes and reporting on the need for revisions. A report will present BLM's findings and conclusions for procedures, guidelines, and data adequacy. (See Appendix 6 for the Notice of Availability of a report on this subject.)</p> <p>d. BLM will work with other organizations to refine the threshold concept and make any proposed guidance available for public comment.</p> <p>e. BLM will reinstate the consideration of threshold analysis in the coal management regulations.</p>
8. Establish policies and procedures for environmental lease exchanges.	<p>a. The Department will direct a thorough review of the BLM Land Exchange Manual and, if needed, provide more detailed guidelines on land and lease exchanges.</p> <p>b. The Department will explore, with Congress, the possibility of providing the Secretary with general lease exchange authority.</p>
9. Evaluate policies and procedures for leasing on split estate and checkerboard areas.	<p>a. Review of split estate and checkerboard land issue should be sponsored by Congress.</p>
10. Establish uniform procedures for environmental evaluation of preference right lease applications.	<p>a. BLM will prepare monthly reports to document the status of each PRLA.</p> <p>b. RCTs will receive a copy of the PRLA monthly report and will consider the amount of coal in PRLAs in making regional coal leasing recommendations.</p>

Note: OTA recommendations and Department of the Interior proposals are abridged. For the full text, see USDI 1984e.

## HISTORY AND BACKGROUND

- incorporating cumulative impact assessments in presale planning decisions,
- establishing policies and procedures for environmental lease exchanges,
- establishing uniform procedures for environmental evaluation of PRLAs, and
- evaluating policies and procedures for leasing on split-estate and checkerboard lands.

On July 9, 1984, the Department responded to the OTA report by stating that it would consider making changes in the areas of concern reported by OTA. Table 1-6 briefly describes these changes. A draft environmental assessment (EA) on these changes was circulated for comment to major interest groups in November 1984. The EA was signed by the Director on December 26, 1984 (Appendix 6). The Acting Assistant Secretary--Land and Minerals Management concurred with a finding of no significant impact on the human environment on January 5, 1985 and adopted the proposals that do not require rulemaking.

In August 1982, the National Wildlife Federation (NWF) filed a Freedom of Information Act request to obtain copies of all environmental documents (then numbering 40) prepared on all outstanding coal PRLAs and on the recently issued coal preference right leases. On the basis of a review of these documents by NWF and the Natural Resources Defense Council (NRDC) in NRDC v. Berklund, the NRDC and NWF wrote letters citing what were, in their view, serious deficiencies in those documents and in the overall processing of coal PRLAs. In a May 1983 correspondence, an attorney representing NRDC stated that NRDC would file a contempt of court citation unless the Department took "constructive steps leading to compliance" with NRDC v. Berklund.

In March 1983, BLM evaluated the environmental documents prepared for the coal PRLAs for compliance with NEPA and with the order in NRDC v. Berklund. As a result of that review, BLM directed that further environmental work be done on all PRLAs except those covered by the following documents: the San Juan River Regional Coal Second Draft Environmental Impact Statement (BLM 1983e); the Savery Coal Environmental Statement (BLM 1983o); the Final Decision Record and Environmental Assessment of Coal PRLAs--Beans Spring, Table, and Black Butte Creek Projects (BLM 1982e); the Environmental Assessment of North Fork Mining (BLM 1982f); and the Fort Union Coal Regional Final Environmental Impact Statement (BLM 1983a).

Discussion began with the environmental groups in May 1983 and included the following issues:

- depth of treatment in EISs to be prepared of alternatives to preference right lease issuance discussed in NRDC v. Berklund;
- form of mitigation required, i.e., design criteria or performance standards;
- degree of public review and participation in PRLA processing; initial showing, environmental assessment or EIS preparation, final showing determination, issue lease or reject application;

## INTRODUCTION

- how to comply with the language in the district court's opinion that EISs ought to contain estimated costs of compliance with recommended mitigation.

As of January 1985, negotiations are continuing between the Department's Solicitor's Office and environmental groups.

### Regulatory Changes

In July 1979, the Department of the Interior issued federal coal management regulations in 43 CFR 3400, incorporating the provisions of the Federal Coal Leasing Amendments Act (FCLAA), the Federal Land Policy and Management Act (FLPMA), and the Surface Mining Control and Reclamation Act (SMCRA) (44 Federal Register 42584-42652). The regulations were reviewed in 1981 and 1982 to achieve three objectives: (1) to eliminate excessive, burdensome, and counterproductive regulations, procedures, and policies; (2) to promote a "good neighbor" policy, in which participation by state governments is encouraged; and (3) to develop publicly owned resources in a manner that is both environmentally sound and responsive to market demands.

The 1981-82 review resulted in revisions to the July 1979 regulations. Changes in regulations governing the submission of written consent to lease of owners of surface land overlying federal coal were made in March 1982, and the other revisions were promulgated in July 1982 (47 Federal Register 33114-33151) and clarified in August 1983 to further achieve the objectives. In December 1983, Unsuitability Criterion 7 was revised. Table 1-7 summarizes the changes. Environmental assessments were completed and rule changes were found not to significantly affect the human environment.

### Litigation

Although the adequacy of the 1979 FES (BLM 1979a) was not challenged in court, other aspects of the program were. The discussions below summarize the major

lawsuits brought against the Department of the Interior on various aspects of the federal coal management program.

**Preference Right Lease Applications.** In NRDC v. Berklund, et al. (609 F. 2d 553) the U.S. Court of Appeals for the District of Columbia Circuit upheld the ruling of the U.S. District Court (458 F. Supp. 925, D.D.C. 1978) on November 9, 1979. The District Court ruled that the Secretary of the Interior has no discretion to refuse to issue a preference right lease if a prospecting permittee shows a discovery of coal in commercial quantities. The District Court also ruled that the Secretary should consider environmental costs as part of the commercial quantities determination, and that NEPA's environmental process applies to the full proposed action of lease issuance, even though lease issuance is not discretionary. Current negotiations over the processing of PRLAs are described above.

**Powder River Sale.** Two lawsuits challenged the 1982 regional coal lease sale for the Powder River Region. In Northern Cheyenne Tribe v. Watt, Civil No. 82-116 (D. Mont.), the tribe asserted that the EIS prepared for the sale was deficient because of its alleged failure to adequately discuss the effects of the proposed regional leasing on the plaintiff's reservation.



# HISTORY AND BACKGROUND

TABLE 1-7  
COMPARISON OF JULY 1979 REGULATIONS AND 1982/83 REGULATIONS

1979 RULES	1982/1983 RULES
<p><b>A. <u>Land Use Planning</u></b></p> <p>No special call for coal resource information was issued during land use planning.</p> <p>Leasing considerations were confined to areas with high or moderate coal development potential.</p> <p><b>Purpose:</b> To obtain more and better coal resource data earlier in the planning process and to attain the flexibility to meet the coal production needs of a region.</p>	<p>BLM will issue a call for coal resource information during land use planning to aid in early consideration of lands with coal potential.</p> <p>The restriction to considering only lands with high or moderate development potential is removed allowing all areas with coal development potential to be considered.</p> <p>After receiving alternative leasing levels and a recommended leasing level from an RCT, the Secretary will set a leasing level in a broadly defined range.</p>
<p><b>B. <u>Leasing Levels</u></b></p> <p>Leasing targets were based on Department of Energy projections of national energy needs (demand for production and other factors) in a target year approximately 10 years later.</p> <p>The regional coal team (RCT) recommended to the Secretary a single leasing target, usually involving a narrow range.</p> <p><b>Purpose:</b> Leasing levels represent a more market-oriented approach to approximating need for leasing than the leasing target approach with its attempt to closely match coal lease supply to projected demand for coal production in the target year approximately 10 years later.</p>	<p>Leasing levels will be based on various factors that may include land use planning data, regional and national market information, coal resource information, and advice from affected State governors.</p> <p>After receiving alternative leasing levels and a recommended leasing level from an RCT, the Secretary will set a leasing level in a broadly defined range.</p>
<p><b>C. <u>Praxals Consultation</u></b></p> <p>The Secretary consulted in writing with governors in states where lease sales were proposed before making a coal lease sale decision.</p> <p><b>Purpose:</b> To show the Department's commitment to coordination and consultation with the states that bear the impacts and obtain much of the financial benefits of federal coal leasing.</p>	<p>The Secretary consults in writing as before but also published in the Federal Register his reasons for accepting or rejecting governor recommendations.</p>
<p><b>D. <u>Unsuitability Criteria</u></b></p> <p>The rules established a series of 20 unsuitability criteria to be applied to lands being considered for leasing, to PHLAs, and to existing leases.</p> <p>The leasing of federally owned coal for surface mining was prohibited if coal was overlain by districts, sites, buildings, structures, or objects included on or eligible for inclusion on the National Register of Historic Places.</p> <p><b>Purpose:</b> To eliminate an unneeded regulation, because the application on existing leases had nearly always been postponed until mine plan review. The criterion of amendment conforms with Office of Surface Mining Reclamation and Enforcement criteria for designation of lands as unsuitable during mine plan review and reflects court decisions on the Surface Mining Control and Reclamation Act (SMCRA).</p>	<p>Unsuitability criteria will no longer be applied to existing leases during land use planning, but the mandatory criteria under SMCRA will still be applied to these leases during mine plan review.</p> <p>Automatic prohibition against coal leasing was removed for eligible properties. National Register sites are still protected, however.</p>
<p><b>E. <u>Emergency Leasing</u></b></p> <p>Lease applicants had to meet certain criteria before being able to bid at emergency lease sales.</p> <p>State governors were notified through the RCT of pending applications for coal lease sales.</p> <p><b>Purpose:</b> To follow the intent of Congress that all coal be leased competitively and to present more evidence of the Department's commitment to work with the states.</p>	<p>The revised regulations eliminate the requirements that (a) a lease applicant have a mine in production 2 years before filing an application; (b) a lessee be restricted to one emergency lease per operation, and (c) competition for leases sold under the emergency criteria be limited only to bidders meeting those criteria.</p> <p>State governors are doubly notified of pending lease-by-application actions through the RCT and separately.</p>
<p><b>F. <u>Surface Owner Consent</u></b></p> <p>Surface owners determined to be unqualified under section 714 of SMCRA used the regular appeal channel through Interior Board of Land Appeals (IBLA).</p> <p><b>Purpose:</b> To speed up the decision process.</p>	<p>Surface owner appeals now go to the BLM state director and then to the BLM Director. Surface owners cannot appeal to IBLA.</p>

## INTRODUCTION

TABLE 1-7 (concluded)  
COMPARISON OF JULY 1979 REGULATIONS AND 1982/83 REGULATIONS

1979 RULES	1982/1983 RULES
<p><b>G. Alluvial Valley Floor Exchanges</b></p> <p>Alluvial valley floor fee coal exchanges were discretionary.</p> <p style="padding-left: 40px;">Alluvial valley floor fee coal exchanges are mandatory rather than discretionary.</p> <p><b>Purpose:</b> To provide stronger recognition of the rights of lessees and owners of alluvial valley floors. The changes make the regulations consistent with the court's decision in <i>Texaco and NCA v. Andrus</i>.</p>	
<p><b>H. Lease Sales</b></p> <p>Competitive lease sales could be held by sealed bid only or sealed bid followed by oral auction.</p> <p style="padding-left: 40px;">All competitive lease sales must be held by sealed bid only.</p> <p>Minimum acceptable bid was \$25 per acre.</p> <p style="padding-left: 40px;">Minimum acceptable bid of \$100 per acre.</p> <p><b>Purpose:</b> To provide more assurance of the public's receipt of fair market value for the coal resource.</p>	
<p><b>I. Diligence</b></p> <p>All nonproducing coal leases issued before August 4, 1976 (the effective date of FLMCA - the Federal Coal Leasing Amendments Act) had to be producing coal in commercial quantities by June 1, 1986.</p> <p style="padding-left: 40px;">Pre-FLCAA lessees will have 10 years from the date of the first lease readjustment after August 4, 1976, to be producing coal in commercial quantities.</p> <p><b>Purpose:</b> To address concerns that the 1979 rulemaking was a unilateral adverse change in fundamental lease terms (diligent development obligations) and had a poor legal basis to be enforceable before readjusting those leases. The 1986 deadline set forth in the 1976 regulations as the time requiring production for all pre-FLCAA leases may have resulted in many leases failing to meet diligence simply because the market could not absorb that much production by 1986. The Department would be left in the situation of cancelling leases that could not meet diligence in 1986 and then face a shortfall in federal lease development in the early 1990s. Now, all leases will not be due to produce by 1986 but will be spread out between 1986 and 2005.</p>	

## HISTORY AND BACKGROUND

In National Wildlife Federation v. Burford, Civil No. 82-117 (D. Mont.) the plaintiff groups challenged the presale procedures and the sale itself. The plaintiffs alleged that the land use plans underlying the sale acreage were formulated in violation of Federal Land Policy and Management Act (FLPMA) planning standards and that the Secretary's rules (and resulting plans) on the treatment of reclaimability in the federal lands review under Section 522(b) of the Surface Mining Control and Reclamation Act (SMCRA) are legally deficient. The plaintiffs further alleged that the Department failed to receive fair market value for the lease tracts sold.

The cases were originally filed in the U.S. District Court for the District of Columbia, where a motion for a restraining order against the lease sale was denied. On the government's motion, the cases were consolidated and transferred to the federal court in Montana. The State of Wyoming and several lessees have intervened as defendants. The court heard arguments in December 1982 on cross motions for summary judgment and motions to dismiss specific allegations. The court has not yet issued its decision.

Coal Leasing Rules. In Natural Resources Defense Council v. Burford, Civil No. 82-2763 (D.D.C.), eight groups have joined to challenge the July 1982 revisions to the July 1979 coal program rules. The suit seeks (1) to prohibit the Department from implementing the revised coal regulations, (2) to declare the revised regulations improperly issued, and (3) to prohibit any future coal lease sales until the reclaimability standard of Section 522(a)(2) of SMCRA is applied to the lease tracts before a sale. In support of their lawsuit, the plaintiffs allege that the Department, in amending the rules, violated the National Environmental Policy Act (NEPA) and various provisions of the Federal Coal Leasing Amendments Act (FCLAA), FLPMA, and SMCRA. The parties have filed and fully briefed cross motions for summary judgment. The court has made no decision on this matter.

Fort Union Sale. On August 3, 1983, the House Committee on Interior and Insular Affairs adopted a resolution directing the Secretary of the Interior to withdraw lands in the Fort Union Coal Region (North Dakota and Montana) from coal leasing. Several tracts studied and covered by the resolution were scheduled for sale on September 14, 1983. The committee cited section 204(e) of FLPMA, 43 U.S.C. 1714(e), as authorizing the committee to command the Secretary to make an emergency withdrawal that would prevent or delay the scheduled sale.

The National Wildlife Federation brought suit to prohibit the Secretary from conducting the scheduled sale until he had complied with the August 3, 1983, resolution--National Wildlife Federation v. Watt, Civil No. 83-2648 (D.D.C.). In a letter of September 9, 1983, to the Chairman of the House Committee, the Secretary explained that he was not complying with the committee resolution because it was an unconstitutional attempt to legislate, in violation of the legislative procedures in Article I of the U.S. Constitution. The Secretary relied on the recent Supreme Court decision in INS v. Chadha, 358 U.S. 358, 103 S. Ct. 2764 (1983). Chairman Udall intervened as a plaintiff, and various bidders intervened as defendants.

The District Court issued a permanent injunction, holding that the Department of the Interior was obligated by its own withdrawal rules to make a withdrawal when the House of Representatives made an emergency withdrawal resolution.

## INTRODUCTION

The court did modify its injunction to conform with the committee resolution to allow an emergency lease sale of a bypass tract. The court did not consider the constitutional issue, and the Department chose not to appeal the injunction. The injunction will remain in effect until the committee revokes its resolution, the Department, after notice and comment, repeals its withdrawal regulation, or any of several similar contingencies occur.

Permanent Surface Mining Regulation Litigation II. Several groups challenged the Secretary of the Interior's federal lands regulations in 30 CFR Parts 740-746, issued to implement SMCRA. The regulations allow states to assume regulatory authority for surface coal mining and reclamation on federal lands. The Secretary retains his responsibility to approve mining plans on federal lands, to designate certain federal lands as unsuitable for mining, and to regulate other activities on federal lands. A mining plan is defined as the plan required under the Mineral Leasing Act of 1920 (MLA) to mine leased federal coal. The plaintiffs argued that these rules illegally

delegate the Secretary's responsibilities under MLA and SMCRA. On July 6, 1984, the District Court for the District of Columbia ruled that the Secretary is required under MLA to review the operation and reclamation plan components of a SMCRA permit application for a federal coal lease and that he may not delegate this authority to the states. The regulations in 30 CFR 740-746 were returned to the Department for revision to reflect the court's ruling. The Department has appealed this decision.

Alluvial Valley Floors and Unsuitability Criteria. Texaco, Inc. and the National Coal Association filed suits challenging the alluvial valley floor (AVF) provisions of the federal coal program regulations (43 CFR 3435), certain unsuitability criteria, and the application of the unsuitability criteria to leased lands. These suits were joined by the court and are referred to as Texaco and NCA v. Andrus, et al., Civil No. 79-2448 (D.D.C. August 15, 1980). The challenges were based on the regulation's exceeding SMCRA's authority.

On August 15, 1980, the U.S. District Court entered its judgment. The court generally upheld the bases of the unsuitability criteria, ruled in favor of the Department of the Interior on some points, and rejected others. It returned several regulations to the Department for revisions, consistent with its opinion.

1. The court held that AVF fee coal exchanges authorized by Section 510(b)(5) of SMCRA are mandatory, but the Secretary of the Interior retains discretion to determine whether the values of the tracts to be exchanged are equal and to determine which particular tract of federal land will be disposed of through exchange. The court further held that fee coal owners are entitled to the benefits of an exchange even though they have not made substantial financial and legal commitments toward developing their coal resources.
2. The court held that SMCRA amended the Endangered Species Act and that the Eagle Protection Act and the Migratory Bird Treaty Act were consistent with SMCRA, so that coal operators who invested substantial financial and legal commitments before SMCRA are exempt

## HISTORY AND BACKGROUND

from the provisions of these acts. With respect to the Endangered Species Act, the court's decision of October 1, 1984, in In Re: Permanent Surface Mining Regulation Litigation, Civil No. 79-1144, at 62-63, makes it apparent that a coal operator is not exempt from the Endangered Species Act. Rather, the 1980 decision means only that the Endangered Species Act cannot be the basis for the Secretary to ignore substantial financial and legal commitments when he makes unsuitability determinations under Section 522 of SMCRA.

3. The court declared invalid that portion of Unsuitability Criterion 1 that made land under study for inclusion in a federal land system, such as the National Wildlife Refuge System, unsuitable for coal leasing. The court held that SMCRA authorizes an unsuitability determination only when the lands are actually included in the federal lands system and that the Secretary cannot establish an unsuitability standard contrary to clear congressional intent.
4. Floodplains Criterion 16 was declared to be unauthorized because it makes floodplains unsuitable for coal leasing unless coal mining on floodplains can be shown not to pose a threat of loss of life or property. The court held that the Secretary must establish that a threat of loss of life or property exists before a floodplain can be deemed unsuitable for coal leasing.
5. Criterion 17, dealing with municipal watersheds, was returned to the Department for revision because the exception that would allow coal leasing where the municipal water supply would be adequately protected required the concurrence of officials of the affected local government. The court held that this concurrence requirement was unauthorized by SMCRA and was therefore unlawful.
6. Finally, the court held that only those unsuitability criteria listed in SMCRA may be applied to lands that had been leased before SMCRA.

These revisions were made to the federal coal management regulations when they were changed in July 1982.

Alton Litigation. In Utah International v. Watt, Civil No. 81-0090W (D. Utah) (consolidated) the plaintiff challenged Secretary Andrus's decision to designate certain lands in the Alton coal field in southern Utah as unsuitable for surface mining under Section 522 of SMCRA. The lawsuit represented the first challenge to the Secretary's designation of lands as unsuitable for surface coal mining. Utah International holds several federal coal leases affected by the designation.

On cross-motions for summary judgment the District Court disposed of several issues in this challenge (553 F. Supp. 872 (D. Utah 1982)). The District Court held that SMCRA's designation procedures require that the unsuitability hearings be legislative rather than adjudicatory. The court also held that SMCRA authorizes the designation of lands outside national park boundaries and that the Secretary's designation is not void because the decision was not issued within 60 days after the unsuitability hearing record was closed. Finally, the court found nothing in SMCRA or its legislative history that requires the Secretary to compile a data base and inventory before designating

## INTRODUCTION

federal lands as unsuitable.

As a result of a May 1984 hearing on the substantive issues of the case, the court dismissed Utah International's portion of the suit. Utah International may still enter a claim for damages with the Court of Claims, but as of September 30, 1984, it had filed no such claim.

Other portions of the suit, brought against the Department by the Sierra Club and the Environmental Defense Fund, remain unsettled. The unsettled issues include (1) whether the decision refusing to designate a portion of the petition area should be set aside because of failure to consider other fragile lands near Bryce Canyon National Park, (2) the cumulative significance of individual adverse impacts, and (3) whether slurry pipeline transport of coal constitutes an unsuitable surface mining operation within the petition area.

### FEDERAL AND STATE CONSTRAINTS ON AND AUTHORITIES FOR A COAL MANAGEMENT PROGRAM

Section 1.3.1 of the 1979 FES (BLM 1979a) discusses in detail the major laws affecting the federal coal program, including the Mineral Leasing Act of 1920 and Federal Coal Leasing Amendments Act of 1976; the Federal Land Policy and Management Act of 1976; the Mineral Leasing Act for Acquired Lands; and the Surface Mining Control and Reclamation Act of 1977. Other authorities are cited in less detail to provide a perspective on factors that may directly influence the demand for federal coal and the location and intensity of coal development and related activities. Many other relevant laws regulate aspects of coal development and energy conversion. The most pertinent of these laws are summarized in Table 1-8.

### INTERAGENCY RELATIONSHIPS IN FEDERAL COAL MANAGEMENT

#### Department of Energy

The Department of Energy (DOE) was established in October 1977, following enactment of the Department of Energy Organization Act (DOE Act). Under the DOE Act, many of the energy-related functions of several agencies were consolidated in a single department. See the 1979 FES (BLM 1979a), Introduction and Background, for the history of DOE's early authority and responsibility in the federal coal leasing program.

On December 23, 1981, Congress enacted Public Law (PL) 97-100 (Appropriations for the Department of the Interior and Related Agencies for FY 1982), which returned certain functions related to the leasing of federal lands to the Department of the Interior. Specifically, PL 97-100 transferred to the Secretary of the Interior the authority to issue regulations for the following purposes:

- to foster competition for federal leases,
- to establish diligence requirements for coal development operations on federal leases,
- to implement alternative bidding systems for the award of federal leases,

## FEDERAL AND STATE CONSTRAINTS

TABLE 1-B  
FEDERAL LAWS AFFECTING COAL DEVELOPMENT AND ENERGY CONSERVATION

Popular Name	Public Law/U.S. Code Citation	Purpose	Major Relevance
American Indian Religious Freedom Act of 1978.	95-341, 42 U.S.C. 1996	Establishes the policy to protect and preserve American Indian religions.	Mitigates potential harm to American Indian religious sites.
Antiquities Act of 1906	59-209; 16 U.S.C. 431	Regulates antiquities excavation and collection (including fossil remains). See FLPMA.  Protect historical values on public land.	Mitigates potential harm to historical, archeological, and paleontological resources.
Archaeological and Historical Preservation Act of 1974; Archeological Salvage Act	93-291, 86-523; 16 U.S.C. 469	Provides for recovery of data from areas to be affected by federal actions.  Provides for preservation of data (including relics and specimens) at every federal construction project.	Mitigates potential harm to historical and archaeological resources.  Mitigates potential harm to historical and archaeological resources.
Bald Eagle Protection Act of 1969, as amended	86-70; 16 U.S.C. 668	Protects bald and golden eagles.	May make certain coal lands unsuitable for development.
Clean Air Act	95-95; 42 U.S.C. 7401	Establishes requirements for areas failing to attain National Ambient Air Quality Standards (NAAQS). Provides for prevention of significant deterioration of areas where air is cleaner than NAAQS. May require a Federal permit where conflicts with coal development exist.  Modifies provisions of the Clean Air Act amendments of 1970 regarding federal facilities, enforcement strategies, coal use impacts, and interstate air pollution.	Limits industrial development within and adjacent to areas exceeding NAAQS and areas preserving clean air quality. Reduces commercial attractiveness of low-sulfur western coal as new source standard changed to percent emissions reduction.
Clean Water Act of 1977	95-217; 33 U.S.C. 1251	Establishes effluent limitations for new and existing industrial discharges into U.S. waters.  Sets limitations for public treatment discharges, with pretreatment by industrial users.  Provides mechanism to restore and maintain integrity of the nation's waters.	May reduce development options in areas where anti-degradation policy restricts discharges into high quality waters. Treatment facilities in areas with rapidly expanding infrastructure must meet water quality standards.  Effluent standards apply to coal mining point sources.
Endangered Species Act of 1973, as amended	93-205; 16 U.S.C. 1531	Protects endangered and threatened species and critical habitat from federal activities. Requires prior consultation with Fish and Wildlife Service.	May make certain coal lands unsuitable for development.
Fish and Wildlife Coordination Act of 1934	85-624; 16 U.S.C. 661	Requires consultation about water resources development actions that might affect fish or wildlife.	Mitigates potential federal coal development impacts on water resources and wildlife habitat.
Historic Preservation Act of 1966	89-665; 16 U.S.C. 470. See also 94-429; 16 U.S.C. 1609	Establishes system of classifying properties on or eligible for inclusion on National Register of Historic Places.  Mandates federal agency consultation with Advisory Council on Historic Preservation and State Historic Preservation Officers.	Mitigates potential harm to historic and archaeological values.

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TABLE 1-8 (concluded)  
FEDERAL LAWS AFFECTING COAL DEVELOPMENT AND ENERGY CONSERVATION

Popular Name	Public Law/U.S. Code Citation	Purpose	Major Relevance
National Environmental Policy Act of 1969	91-90; 42 U.S.C. 4321	Makes environmental protection part of the mandate of every Federal agency.  Requires EIS for major federal actions with potentially significant impacts.	Provides legislative authority to control energy development on environmental grounds.  EIS process must be integral part of coal leasing system.
Mining and Minerals Policy Act of 1970	91-631; 43 U.S.C. 21	Declares congressional minerals policy.	Provides broad principles for mineral resource development.
Noise Control Act of 1972	92-574; 42 U.S.C. 4901	Requires publication of information on limits of noise required to protect public health and welfare. Preempts local control of railroad equipment and yard noise emissions.	Regulations may be proposed to control coal mining noise disturbances.
Resource Conservation and Recovery Act of 1976	94-580; 42 U.S.C. 6901	Establishes guidelines for collection, transport, separation, recovery, and disposal of solid wastes.  Creates major federal hazardous waste regulatory program.  Provides assistance to establish state or regional solid waste plans.	Mining locations may be affected by EPA regulations governing disposal of coal mining wastes.  Coal industry faced with stringent permit requirements if coal wastes are classified as hazardous by EPA.
Safe Drinking Water Act of 1977	95-190; 42 U.S.C. 300	Establishes mechanism for National Primary Drinking Water Standards.	EPA conducting study of the impacts of pits, ponds, lagoons, etc. on underground water supplies for public water systems.
Soil and Water Resources Conservation Act of 1977	95-192; 16 U.S.C. 2001	Requires Secretary of Agriculture to appraise information and expertise on conservation and use of soils, plants, and woodlands.	Provides opportunity for expanded data base.
Multiple-Use Sustained Yield Act of 1960	86-519; 16 U.S.C. 528	Requires management of national forests under principles of multiple use so as to produce a sustained yield of products and services.	Mandates land management principles similar to those required under FLPMA
Forest and Rangeland Resources Planning Act of 1974	93-378; 16 U.S.C. 1600-1614	Provides for a comprehensive system of land and resource management planning for National Forest System lands.	Key factor in the Department of the Interior's determination of where coal leasing would occur.
National Forests Management Act of 1976	95-233; 16 U.S.C. 472a	Provides for a comprehensive system of land and resource management planning for National Forest System lands.	Key factor in the Department of the Interior's determination of where coal leasing would occur.
Department of Energy Organization Act of 1977	95-91; 42 U.S.C. 7101	Transfers authority to issue some coal regulations from Department of the Interior to Department of Energy (DOE), including production regulations.  DOE determines long-term national coal production goals.	Limits coal management authority exercised by the Department of the Interior.  Requires program to establish proper coordination mechanisms.
Act of September 28, 1976	94-429; 16 U.S.C. 1908	Provides for regulating mining within and repeals the application of mining laws to, areas of the National Park System and for other purposes.	Requires recognition and protection of nationally significant natural areas as they relate to surface mining.



## FEDERAL AND STATE CONSTRAINTS ON COAL MANAGEMENT

- to set rates of production for federal leases, and
- to specify procedures, terms, and conditions for the acquiring and disposing of federal royalties taken in kind.

The changes mandated by PL 97-100 left DOE with no major, direct functional role in the federal coal management program. Although DOE continues to administer programs related to energy development and use, its only direct relationship to the federal coal program involves formal consultation on alternative regional coal leasing levels.

### Department of the Interior

Until January 1982, the Department of the Interior's functions and responsibilities for managing federal coal were divided among the Office of Surface Mining Reclamation and Enforcement (OSM), the U.S. Geological Survey (USGS), and the Bureau of Land Management (BLM). At that time, the Secretary of the Interior created on an experimental basis the Minerals Management Service (MMS), which assumed all major coal-related functions of the USGS Conservation Division. This organizational structure remained in place until December 3, 1982, when the Secretary, under Secretarial Order No. 3087, consolidated primary onshore mineral operations and leasing functions of the MMS into BLM. That Secretarial order also made permanent the creation of the MMS.

This organizational structure authorized BLM to supervise all aspects of leasing and production of coal resources and gave BLM the responsibilities to enforce diligent development, assure maximum economic recovery and conservation of mineral resources, and evaluate the economics of mining. The MMS retains responsibility for rental, royalty, and bonus collection for onshore minerals. Table 1-9 shows the division of functions and responsibilities among Department of the Interior agencies. See Table 1-9 of the 1979 FES (BLM 1979a) for pre-1982 division of coal management responsibilities.

BLM has the main responsibility for implementing and administering the Mineral Leasing Act of 1920, as amended, and is the lead agency responsible for managing federal minerals, including resource conservation, diligence, and royalties. Under a variety of federal statutes, BLM is also responsible for managing and protecting all surface resources on public lands. BLM can set postmining land use and establish performance bond limits to assure protection of these resources. The Forest Service is responsible for managing and protecting surface resources on National Forest System lands.

Except for surface lands within the National Forest System, BLM prepares the required land use plans or conducts land use analyses where federal interests are not great enough to justify a land use plan. BLM has the responsibility to delineate, rank, and select lease tracts and to consult with surface owners over federal coal. BLM also conducts hearings on leasing proposals and prepares the needed environmental analyses. BLM carries out certain functions under the Surface Mining Control and Reclamation Act (SMCRA), including the initial review of federal lands to determine which lands are unsuitable for all or certain types of coal mining.

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TABLE 1-9  
DIVISION OF FUNCTIONS AND RESPONSIBILITIES OF FEDERAL COAL MANAGEMENT  
BETWEEN OSM AND BLM

FUNCTION	PRIME RESPONSIBILITY	JOINT RESPONSIBILITY	IN CONSULTA- TION WITH	CONCURRENCE FROM
<b><u>PRELEASING FUNCTIONS</u></b>				
Evaluate coal resources.	BLM	--	--	--
Partition process for designating Federal lands unsuitable for all or certain types of surface coal mining.	OSM -Receives petitions -Conducts hearings -Issues decisions.	Surface management agency and other state and local agencies.	--	--
Federal coal lands review.	BLM -applies criteria in determining suitability.  FS -applies criteria in determining suitability on NFS lands.	--	OSM and other surface management agencies.  Fish and Wildlife Service, governor, or other appropriate agency.	
Prepare regional EIS or site-specific release EIS concerning leasing.	BLM (unless other agency is designated as lead agency.	--	OSM, USGS, other agencies, and state and local interests.	--
Prepare special lease terms and conditions.	BLM or surface managing agency.	--	OSM (responsibilities under SHCRA to administer protection requirements of act); BLM (responsibilities under MLA). FWS, Governors	Forest Service
Act as Secretary's official representative in dealing with lease applicants.	BLM	--	--	--
Surface owner consent.	BLM	--	--	--
<b><u>POSTLEASING-PREMINING FUNCTIONS</u></b>				
Prepare recommendations on applications for use of Federally owned surface over leased coal for rights not granted in Federal coal lease.	BLM	OSM (BLM receives applications).-	OSM, after permit is approved.	--
Delineation of "permit area."	None until a permit application plan is approved. Then OSM assumes responsibility with concurrence of BLM.	--	--	BLM
Review, approval of permits and major modifications; lead agency for preparing site-specific EA/EISs and coordinating with other agencies outside the Department of the Interior.	BLM	--	BLM, for requirements relating to protecting natural resources BLM regarding responsibilities relating to development, production, and resource recovery requirements.	BLM, on production and recovery requirements.
Exploration on leased coal lands outside a permit area.	BLM receives application and supervises operations for all exploration outside a permit area.	--	OSM	--

## FEDERAL AND STATE CONSTRAINTS

TABLE 1-9 (concluded)  
DIVISION OF FUNCTIONS AND RESPONSIBILITIES OF FEDERAL COAL MANAGEMENT  
BETWEEN OSM AND BLM

FUNCTION	PRIME RESPONSIBILITY	JOINT RESPONSIBILITY	IN CONSULTA- TION WITH	CONCURRENCE FROM
Responsibility for all non-lessee activity on lease land before operations.	BLM	--	--	--
Responsibility for determining performance bond	OSM	--	BLM or surface managing agency	--
<b><u>FUNCTIONS AND RESPONSIBILITIES DURING MINING OPERATIONS</u></b>				
Act as Secretary's representative in dealing with lessees or operators during operations.	OSM/BLM (shared)	BLM oversees production functions; OSM assumes environmental enforcement functions. BLM retains nonmining functions outside the permit area, including rights-of-way and ancillary activities related to mining. BLM coordinates inspection functions with OSM inspections (except BLM inspections outside the permit area). MMS makes royalty audits and other nonfield inspections independently of OSM.	--	--
Take needed action in emergency environmental situations.	OSM	OSM has primary emergency authority; BLM and MMS have such authority when OSM inspectors cannot take action before significant harm will occur.	--	--
Conduct inspection before abandonment and specify and approve abandonment procedures.	OSM (main authority to approve abandonment procedures and abandonment of operations).	OSM, BLM, or surface managing agency have abandonment inspection responsibility.	Private surface owner in case of private surface	BLM or surface managing agency concurrence in approval of compliance, special requirements for protection of netural resources and post-mining land use of effected land. BLM concurrence in compliance with production and coal resource recovery requirements.
Release of reclamation bond	OSM	--	--	BLM or surface managing agency concurrence.
Release of lease bond	BLM	--	--	BLM or surface managing agency concurrence.
<p>BLM = Bureau of Land Management USGS = U.S. Geological Survey MMS = Minerals Management Service</p> <p>OSM = Office of Surface Mining Reclamation and Enforcement SMCRA = Surface Mining Control and Reclamation Act MLA = Mineral Leasing Act of 1920, as amended</p>				

## INTRODUCTION

Regulations governing OSM's permanent regulatory program were originally published on March 13, 1979 (44 Federal Register 14902-15463). These regulations, which were revised from 1982-83, establish minimum environmental performance standards for surface mining on both private and federal lands. OSM's regulations also outline permit and bonding requirements, provide for the designation of lands unsuitable for all or certain kinds of surface coal mining, and permit states to assume responsibility for mining on federal lands. See OSM's supplemental EIS on revisions to the OSM regulatory program, Proposed Revisions to the Permanent Program Regulations Implementing Section 501(b) of the Surface Mining Control and Reclamation Act of 1977 (OSM 1983) and the Introduction and Background section of the 1979 FES (BLM 1979a) for more discussion of SMCRA and its implementing regulations.

With the concurrence of BLM and the Forest Service, OSM submits recommendations to the Secretary of the Interior on the approval or disapproval of permit application packages. Applicable federal, state, and local agencies retain surface protection authority for mines that might adversely affect any public park or site listed on the National Register of Historic Places.

SMCRA provides that where mining occurs on federal lands in a state that has entered into a cooperative agreement with the Department under Section 523 of SMCRA, regulatory responsibility for reclamation requirements of federal coal development will be shared with that state. Both SMCRA and MLA, however, prohibit the Secretary's delegating to the states his responsibility for protecting the Federal Government's proprietary interest in developing federal coal. Under the state-federal cooperative agreements, the states may review and approve applications for mining permits concurrently with the federal review and approval of the operation and reclamation plan required by MLA. If the State so desires, the cooperative agreements will also transfer to the state, authority to inspect mines on federal lands and to cite any violations. See Litigation section of Chapter 1 for a discussion of the permanent program.

MMS has the responsibility to audit leases and to collect all rents, royalties, and bonuses due the Federal Government on the sale and production of federal coal.

Other Department of the Interior agencies with fewer direct coal-related responsibilities are the U.S. Fish and Wildlife Service, U.S. Geological Survey, Bureau of Mines, and Bureau of Reclamation. The U.S. Fish and Wildlife Service conducts surface mining studies and monitors work related to impacts on wildlife in general and on endangered species in particular. These studies are used to assess and predict the effects of coal-related activities on fish, wildlife, and their habitats on federal, state, and private lands. For particular requirements on Endangered Species Act consultation, see 50 CFR 402, 43 Federal Register 870.

Coal activities of the U.S. Bureau of Mines include conducting advanced coal mine health and safety research and demonstration projects on backfilling and subsidence. The U.S. Geological Survey provides technical assistance for hydrologic studies and administers a coal exploratory program that provides maps, local and regional stratigraphy and correlation networks, and coal resource assessments.

## FEDERAL AND STATE CONSTRAINTS ON COAL MANAGEMENT

### Other Federal Agencies With Coal-Related Responsibilities

Table 1-8 of the 1979 FES (BLM 1979a) summarizes relevant coal management functions within the federal structure. Most significant of these functions and responsibilities are the following:

- Under the Federal Coal Leasing Amendments Act (FCLAA), the Secretary of Agriculture must consent to federal leases under Forest Service jurisdiction and may add terms and conditions to the lease to protect environmental values.
- The Department of Justice must review lease proposals to ensure compliance with antitrust laws.

### MAJOR FEDERAL AND STATE LAWS MITIGATING COAL-RELATED IMPACTS

This section reviews the major laws and regulations that control the development of federal coal resources, placing the main emphasis on statutes that directly control leasing and mining. Other authorities are cited in less detail to provide a perspective on coal development and related activities.

#### Mineral Leasing Act of 1920 (MLA) and Federal Coal Leasing Amendments Act of 1976 (FCLAA)

MLA, both before and after enactment of FCLAA, gave the Secretary of the Interior considerable discretion in formulating and including stipulations for federal coal leases. These stipulations are designed to protect other resources and to mitigate environmental impacts. The ultimate mitigation is the Secretary's discretion under MLA in regard to leasing.

In FCLAA, Congress ratified the BLM practice of preparing land use plans before issuing competitive leases. FCLAA also raised state shares of federal coal leasing revenues (bonuses, rents, and royalties) from 37.5 to 50 percent with the strong suggestion that the new portion of the monies be used to provide an increased range of public services and facilities in areas affected by federal coal development. Finally, public bodies were entitled to have set aside a reasonable number of leasing tracts for their own production and use.

#### Federal Land Policy and Management Act (FLPMA)

Enacted in October 1976, FLPMA provides for the use and management of the federally owned lands administered by the Secretary of the Interior through BLM. Title II of FLPMA provides BLM with a statutory mandate for land use planning for public lands. In the development of land use plans, BLM must

- apply the principles of multiple use and sustained yield;
- give priority to the protection of areas of critical environmental concern (such as historic, cultural, or scenic values, fish and wildlife resources);
- consider present as well as future uses of public lands; and

## INTRODUCTION

- coordinate planning with that of federal, state, and local agencies.

FLPMA changed the use of mineral revenues by states and local governments. First, FLPMA provided that the entire 50 percent of the funds received by the Federal Government for developing leasable minerals on federal land, which FCLAA had provided to the states, could be used for any public purpose. Second, FLPMA established a program to provide low-interest loans to state and local governments to be affected by mining on federal land. Congress, however, has not funded such a loan program.

FLPMA also requires the Department of the Interior to review all BLM lands for potential wilderness designation. The major steps in the process are inventory, identification of wilderness study areas, presidential recommendations, and formal congressional designation. Proposed procedures and requirements for the Department of the Interior's management were published in 44 Federal Register 2699 (1979).

### Surface Mining Control and Reclamation Act (SMCRA)

Congress approved the Surface Mining Control and Reclamation Act (SMCRA) (Public Law 95-87, 30 U.S.C. 1201 et seq..) in August 1977. SMCRA establishes a detailed national program for addressing the environmental effects of coal mining. Of particular importance are the act's requirements that surface coal mining be conducted in accordance with environmental protection performance standards (Sec. 515) and that federal lands be reviewed to determine their suitability for all or certain types of surface mining, either as part of land use planning at the federal, state, and local levels, or as a result of an unsuitability petition (Sec. 522). Through the BLM unsuitability criteria screening process, the Department seeks to determine acceptability for leasing during land use planning. SMCRA requires operators to post a bond to ensure that the mined land is reclaimed.

The performance standards of Section 515 are minimum standards that apply to mining and reclamation. Under SMCRA, the states may impose standards that are more stringent. Among other things, the standards require the following:

- obtaining the maximum use and conservation of coal being recovered,
- restoring disturbed land to original or better conditions,
- restoring land to the approximate original contour of the land surface,
- stabilizing and protecting all surface areas,
- protecting prime farmlands through specific reclamation techniques,
- reducing disturbances to the existing hydrologic balance, and
- restricting mining on steep slopes.

Section 522 of SMCRA establishes a procedure for designating lands as unsuitable for all or certain types of coal mining. The Secretary of the Interior determines unsuitability for federal lands, and states have authority over nonfederal lands. Section 522(e) provides specific unsuitability criteria that define categories of land that must be protected from or during mining (incorporated in BLM's land use planning regulations as Criteria 1, 3, and 7). Interested parties may also petition the permitting agency (OSM or a

## FEDERAL AND STATE CONSTRAINTS ON COAL MANAGEMENT

state regulatory agency in states with approved programs) to have areas designated unsuitable. The petition must be granted if reclamation of disturbed lands is determined not to be economically or technologically feasible. Unsuitability status may also be granted if, as a result of the petition, it is determined that mining would

- conflict with existing land use plans,
- significantly affect important fragile or historic lands,
- result in substantial loss or reduction in the productivity of renewable resource lands that produce food or fiber, or
- substantially endanger life and property in natural hazard lands--areas subject to frequent flooding and areas of unstable geology.

States. Each of the western states with significant coal reserves had enacted surface mining legislation in the 1970s before the passage of SMCRA. The stringency of the pre-SMCRA state programs varied significantly. All western states have revised their programs to comply with SMCRA, have received approval of their permanent regulatory programs, and have qualified for assuming primary regulatory jurisdiction over surface mining and reclamation.

Thus, the states have assumed primary responsibility for permit compliance and enforcement of SMCRA's requirements. States with approved permits that have entered into a cooperative agreement with the Department of the Interior also have the authority to regulate mining on federal lands within their boundaries. The Secretary of the Interior, however, retains the authority to approve or disapprove coal mining on federal lands and to designate federal lands unsuitable for mining.

State Permit Programs. To accomplish its goals, SMCRA mandated state permit programs for surface mines and for surface operations of underground mines. Each application for a surface coal mining and reclamation permit must include detailed information on the type and method of coal mining and the engineering techniques and equipment to be used; the probable hydrologic consequences of the mining and reclamation, both on and off the mine site; any manmade features or significant archaeological sites that may be affected by mining; the geological and physical characteristics of the coal, including a chemical analysis of potentially acid- or toxic-forming strata; a soil survey of potential prime farmland; and the reclamation plan.

The probable hydrologic consequences of mining and reclamation must be determined relative to the hydrologic regime and the quantity and quality of surface and ground water systems, including dissolved and suspended solids under seasonal flow conditions. Enough data must be collected to enable the regulatory agency to assess the probable cumulative impacts on hydrology and water availability of all mining in the area.

## INTRODUCTION

The reclamation plan must describe the condition of the land before mining, including its existing and potential land uses, its productivity, and its average yield of food, fiber, forage, or wood products under optimum management. The plan also must specify the proposed postmining land use and describe in detail how this use will be achieved, including the engineering techniques and equipment to be used, the cost per acre of reclamation, and a detailed timetable for accomplishing reclamation. In addition, the plan must describe the means of compliance with applicable air and water quality and health and safety regulations.

All surface mining permits issued under SMCRA must require that coal mining meet all applicable environmental protection performance standards. These standards govern the maximum recovery of coal; restoring the land to its approximate original contour; use of explosives; waste disposal, including the use of waste piles as dams or embankments; building of access roads; and revegetation. Additional, more stringent standards apply to environmentally sensitive areas, such as prime farmland, steep slopes, alluvial valley floors, and timber lands.

Underground mining also requires the mine operator to prevent subsidence to the extent possible, seal all openings to the surface, and prevent acid or other toxic drainage.

### Clean Air Act

The Clean Air Act established a national system of air quality regulation and gave the Environmental Protection Agency (EPA) the responsibility for implementing federal regulations and standards. States were mandated to devise state implementation plans. In the absence of state action, federal intervention is required.

The central feature of the 1970 Clean Air Act Amendments is the requirement that EPA issue National Ambient Air Quality Standards (NAAQS). The NAAQS define air quality by the ambient concentration of pollutants.

The amendments provide for two types of ambient air quality standards: (1) primary standards designed to protect human health and (2) secondary standards designed to safeguard public welfare.

EPA has identified six pollutants as having potentially adverse effects on public health and welfare and has established primary and secondary NAAQS for each. These pollutants are sulfur oxides, particulate matter, nitrogen dioxide, photochemical oxidants (from the combination of hydrocarbons and ozone), carbon monoxide, and lead.

To enable pollution control programs to be managed locally, 247 air quality control regions (AQCRs) were designated. Each AQCR is classified as to whether it meets national standards. The classification of an area with respect to ambient air quality has important consequences. Regions that EPA finds to be in non-attainment status are subject to a particular set of restrictions (offset requirements) under the act. Nondegradation regions (where air is cleaner than the standards), are subject to a different set of regulations, which are intended for Prevention of Significant Deterioration (PSD).



## FEDERAL AND STATE CONSTRAINTS ON COAL MANAGEMENT

In 1974, PSD regulations were issued and incorporated into all state implementation plans. In 1977, these regulations were incorporated into the Clean Air Act with some changes.

In general, the PSD program divides clean air areas into three classes. Certain national parks, wilderness areas, and monuments that existed when the act was passed were immediately designated as Class I areas. Class I areas are subject to the lowest PSD increments and are mainly valued for their scenic beauty. All other clean air areas were designated Class II. In Class II areas, some additional air pollution and moderate industrial growth are allowed. Individual states or Indian tribal governing bodies can redesignate some Class II areas as Class III areas where major industrial development is foreseen. In Class III areas, air pollution up to half the level of the secondary standards is permitted. The states or Indian tribes also can redesignate Class II areas as Class I. Either type of redesignation is subject to EPA approval and to hearings and consultations with the managers of affected federal lands or states in the case of Indian action.

All state implementation plans must specify emission limitations and other standards for each class area. Maximum allowable concentrations for a specified period of exposure must not exceed the applicable primary or secondary NAAQS, whichever is stricter.

To obtain a permit for a facility in a nondegradation area, a special preconstruction review must show that the facility will pollute the air in excess of NAAQS or PSD standards more than once per year in any air quality control region. Best available control technology (BACT) must be used for all pollutants regulated by the act, and the effects of the emissions from the facility on the ambient air quality that could result from any growth associated with the facility must also be analyzed. The PSD impact projections are cumulative for the region of the source. More assessments of the effects on visibility in Class I areas and on air quality-related values must be included in the PSD review.

New source review for PSD permits under the Clean Air Act is now required for all projects that fall within the 30 industrial categories on EPA's list (28 of which were specified by the Clean Air Act itself) and emit at least 100 tons per year of any air pollutant regulated under the Clean Air Act. Uncategorized sources are also subject to review if they emit more than 250 tons per year unless they exceed this level only because of fugitive emissions. On October 26, 1984, EPA reaffirmed its regulation that includes fugitive emissions in the determination of whether a listed source needs a PSD permit. At the same time, EPA also proposed to add surface coal mines to the list of 30 industrial categories.

Almost all surface coal mines in the West emit more than 100 tons per year because of unpaved haul roads, draglines, graders, scrapers, blasting, coal loading and storage, and other functions of surface mining. Thus, if this proposal is made final, most new mines would be subject to new source review for PSD permits.

On March 20, 1984, EPA also proposed changing the primary (health) NAAQS from a total suspended particulate (tsp) to a "PM-10" (diameter of 10 microns or

## INTRODUCTION

less) standard. Most particles from surface mine fugitive dust exceed that size, but surface coal mines would also have to meet secondary tsp standards.

The ultimate effect on surface coal mining cannot now be determined because these are only proposals and may be cancelled or changed. For example, EPA may decide not to list surface coal mines because the costs could outweigh the benefits, or EPA may decide to sublist only mines which could affect Class I areas or only those which could affect Class I and Class II areas. EPA is evaluating possible effects of this proposal as part of the rulemaking process.

### Clean Water Act

OSM and EPA are the main federal agencies responsible for review of water resource impacts of coal mining. Water resource data is a major component of a mine permit application, and compliance with water resource performance standards must be shown before an application can be approved. Section 515(b) of SMCRA establishes performance standards for water resource impacts, including

- control of discharges from mining and reclamation,
- control of erosion and attendant water pollution,
- impoundment of water on mining sites, and
- protection of ground water recharge capacity.

Discharges from mining and reclamation are regulated by OSM, the state regulatory authority, and the agency responsible for implementing the Clean Water Act in each state. The Clean Water Act requires mines to obtain discharge permits and to comply with EPA or state effluent limitations. The Clean Water Act permit system, however, applies only during the active phase of mining. SMCRA regulates all water discharged as a result of coal mining and reclamation. Effluent limitations established by OSM are similar to those adopted by EPA.

In addition, OSM regulations require sediment control measures using the "best technology currently available" and minimum standards for permanent and temporary impoundments as part of reclamation. Permanent impoundments may be built only if size and design criteria will ensure stability, safety, and access. SMCRA also requires that the recharge capability of the mined area be restored to the approximate premining condition and that mine operators monitor ground and surface water quantity and quality in the permit and surrounding area before, during, and after mining.

SMCRA gives special protection to alluvial valley floors (AVFs) in the western United States because of their agricultural and hydrologic importance. The more significant AVFs are protected from coal mining and its associated disturbance. The less important AVFs may be mined, but standards for reclamation are higher than for other types of mined areas.

Section 510(b)(5) of SMCRA allows the Secretary of the Interior to issue leases for unleased federal coal reserves in exchange for existing leases that cannot be mined because of AVF designations, provided that coal is not yet

## FEDERAL AND STATE CONSTRAINTS ON COAL MANAGEMENT

being produced from the mine and the operator had made a substantial legal or financial commitment to develop a mine before January 1, 1977. (See the discussion of Exchanges in Chapter 1.)

### Mineral Leasing Act for Acquired Lands

The Mineral Leasing Act for Acquired Lands governs leasing on federally acquired lands for coal as well as other minerals covered by the Mineral Leasing Act. The act requires the consent of the head of the federal agency having administrative jurisdiction over the lands before BLM can lease for coal. The Federal Coal Leasing Amendments Act grants similar veto authority to the surface managing agency with regard to nonacquired lands. Otherwise, leasing and operations provisions are the same as those for nonacquired lands.

### State Policies, Constraints, and Mitigation

State policies and legislative actions may influence the development of federal coal. This section does not attempt to compile a comprehensive list of laws or permits but to show the main controls on coal development established by state legislation. Table 1-6 in the 1979 FES (BLM 1979a) lists some of these laws and briefly states their purpose and the state office or agency responsible for their administration and enforcement.

Since the 1979 FES, New Mexico has repealed its version of the National Environmental Policy Act. In 1981, Colorado passed a hazardous waste act, which is administered by the Colorado Department of Health. New York has recently enacted an acid rain statute to reduce sulfur emissions within the state; other northeastern states may pass similar laws. The impact of such state or federal laws is difficult to predict. Such laws could result in installation of stack gas scrubbers to reduce emissions, purchase of more western low-sulfur coal, or the development of innovative coal preparation and combustion technology.

Table 1-10 lists the main coal mining-related laws of states within the six coal regions, briefly states their purpose, and identifies the state office or agency responsible for their administration and enforcement.

# INTRODUCTION

TABLE 1-10  
STATE LEGISLATION AFFECTING COAL DEVELOPMENT AND ENERGY CONSERVATION

Lead State Agency	Legislation	Purpose	Major Relevance
<b>NORTH DAKOTA</b>			
North Dakota State Department of Health	North Dakota Air Pollution Control Act	Establishes and administers air quality standards.	Requires plans to issue permits to build, install, modify, use, or operate any air contaminant source.
	Solid Waste Management and Land Protection Act	Establishes solid waste disposal standards.	Required to approve or disapprove permits for solid waste disposal plan. Also enforces North Dakota New Source Performance Standards.
Environmental Health and Engineering Services	North Dakota Water Pollution Control Act	Establishes and administers water quality standards.	Responsible for establishing and administering standards to prevent or abate pollution of state waters.
Environmental Control	North Dakota Century Code (NDCC 23-25)	Protects air quality.	Provides means of preventing significant deterioration of state air quality as related to energy development. Involves review of application for permit to build or operate facilities and monitoring of facilities in operation.
	NDCC 23-29	Manages solid waste disposal.	Requires permits for solid waste disposal facilities.
	NDCC 61-28	Protects water quality.	Responsible for establishing and administering standards to prevent or abate pollution of state waters. Requires application for and receipt of a permit to discharge mine water.
North Dakota State Water Commission	NDCC 61-04	Administers water use.	Permits must be secured for all appropriations of water for industrial uses greater than 5,000 acre-feet.
	NDCC 61-02 NDCC 61-16	Administers water use.	Permits must be obtained with the approval of the local water management district for building of dikes or dams for water storage greater than 12.5 acre-feet.
	NDCC 38-121	Provides for data recovery.	Requires a permit for coal and requires the filing of coal exploration data with the State Geologist
North Dakota State Engineer	NDCC 61-04	Administers water use.	Permits must be secured for all appropriations of water for industrial use less than 5,000 acre-feet.
	NDCC 61-01	Administers water use.	Permits must be obtained with the approval of the local water management district for drainage.
North Dakota Land Development	NDCC 15-05	Protects and administers coal resources.	Responsible for leasing state coal. Also authorized to coordinate leasing with federal leasing to prevent speculation.
North Dakota Public Services Commission	North Dakota Surface Owners Protection Act NDCC 38-18	Protects surface owner rights.	Requires approval by surface owners before permitting mining plans. Issue permits for surface mining.
	NDCC 38-14	Protects surface owner rights.	Requires application for and receipt of a permit for coal surface mining and reclamation.

# FEDERAL AND STATE CONSTRAINTS

TABLE 1.10 (continued)  
STATE LEGISLATION AFFECTING COAL DEVELOPMENT AND ENERGY CONSERVATION

Lead State Agency	Legislation	Purpose	Major Relevance
<b>NORTH DAKOTA (continued)</b>			
	NDCC 49-22	Protects surface owner rights.	Regulates siting of conversion and transmission facilities through the North Dakota Facility Siting Act. Requires application for and receipt of (1) certificate of site compatibility (2) certificate of corridor compatibility and (3) route permit for transmission facility within the corridor.
North Dakota Coal Development Impact Office	House Bill 1262, Section 15	Mitigates coal-related impacts.	Authorized to issue state funds to aid areas affected by coal development.
	NDCC 57-62		Authorized to issue financial grants to affected taxing districts that show extraordinary expenditures caused by coal development and related growth.
<b>MONTANA</b>			
Department of Natural Resources and Conservation	Montana Major Facility Siting Act	Provides for review and regulation of major facilities.	Vests in the department the authority to require and review long-range planning by certain utilities, to give approval to energy generation and conversion plant sites and associated facilities, and to require preconstruction certification of such facilities.
Environmental Quality Council	Montana Environmental Policy Act	Declares a state policy to encourage productive and enjoyable harmony between man and his environment.	To promote efforts to prevent or eliminate damage to the environment and biosphere and stimulate human health and welfare; to enrich the understanding of the ecological systems and natural resources important to the state; and to establish an environmental quality council.
Montana Department of Health and Environmental Sciences	Montana Water Pollution Control Law Montana Water Quality Criteria Montana Pollutant Discharge Elimination System Permit Montana Solid Waste Management Act Montana Refuse Disposal Regulations Montana Clean Air Act Montana Air Quality Regulations	Protects the environment.	All these laws and regulations are designed to reduce contamination and pollution and maintain the quality of the environment by establishing standards and maximum amounts of deviation of pollutant substances.
Montana Department of State Lands		Protects resources and the environment.	The Department of State Lands prepares a detailed site-specific EIS for all coal mine permit applications and may grant or deny surface mining permits.
	Montana Strip and Underground Mine Reclamation Act	Protects resources and the environment.	The act and promulgated rules contain detailed standards for the method of mining, blasting, subsidence stabilization, water control, backfilling, grading, highwall reduction, topsoiling, and reclaiming lands affected by proposed mining.

# INTRODUCTION

TABLE 1-10 (continued)  
STATE LEGISLATION AFFECTING COAL DEVELOPMENT AND ENERGY CONSERVATION

Lead State Agency	Legislation	Purpose	Major Relevance
<b>MONTANA (continued)</b>			
	Strip Mined Coal Conservation Act	Protects resources and the environment.	The act's intent is to prevent waste of marketable coal.
	State Antiquities Act Chapter 25 of Title 81, S.C.M. 1947	Protects resources and the environment.	Administered by the Department of State Lands and the Board of Land Commissioners, this act provides for the registration and protection of historic, prehistoric, archeologic, paleontologic, scientific, or cultural sites and objects on state lands.
<b>WYOMING</b>			
Wyoming Department of Environmental Quality --Land Quality Division --Water Quality Division --Air Quality Division	Wyoming Environmental Quality Act of 1973 --Land Quality Rules and Regulations, 1975 --Water Quality Standard for Wyoming, 1973 --Wyoming Ambient Air Quality Regulations --Solid Waste Management Rules and Regulations, 1975	Protects land, air, and water quality.	Has authority relating to air quality, solid wastes, water quality, mining, and mine-land reclamation. The Land Quality Division issues permits and licenses to mine upon approval of a mining and reclamation plan. Mined-land reclamation provisions of the mining and reclamation plan are administered and enforced by the Land Quality Division. The Air Quality Division issues permits to build and operate coal mines after approval of applications with regard to plans for monitoring and controlling air contaminants. The Water Quality Division issues permits to build settling ponds and waste water systems and issues NPDES permits for discharging waste water. The Solid Waste Division issues construction fill permits and industrial waste facility permits for solid waste disposal during building and operation of coal mines.
Wyoming Industrial Siting Administration	Wyoming Industrial Development Information and Siting Act, 1975 as amended 1977 & 1981 W.S. 35-12-101 through 35-12-121	Protects Wyoming's environment.	Requires furnishing extensive information and a state permit before certain facilities can be built. Affects such developments as gasification or electric generation proposals. Control does not apply to public properties except as provided by law.
Commissioner of Public Lands	Title 36 Wyoming Statute, 1977	Protects and manages state lands.	Commissioner is responsible for administering, leasing and managing state lands. Utility lines, roads, and railroad spurs crossing state land require easements from the Commissioner.
Land Use Administration	Land Use Planning Act	Protects and manages state lands.	The act requires county land use plans, which could conflict with or modify some energy development proposals.
Wyoming State Engineer	Wyoming Industrial Department Information and Siting Act W.S. 35-12-107 W.S. 41-4, 4-10, 41-26 to 41-46, and 41-121 to 41-147	Administers and protects state waters.	Any storage, impoundment or use of surface or ground water for mining and coal processing requires a permit from the State Engineer. Water pipelines and diversion structures that could affect other users also require a permit.

# FEDERAL AND STATE CONSTRAINTS

TABLE 1.10 (continued)  
STATE LEGISLATION AFFECTING COAL DEVELOPMENT AND ENERGY CONSERVATION

Lead State Agency	Legislation	Purpose	Major Relevance
<b>COLORADO</b>			
Colorado Department of Health --Water Quality Control Commission	Colorado Water Quality Control Act	Establishes and administers water quality standards in state waters.	Requires site review and permit issuance for projects involving water, sewage, and waste disposal. Establishes criteria for erosion control dams.
--Air Pollution Control Commission	Colorado Air Pollution Control Act	Establishes and administers air quality standards.	Requires mines to use dust preventive measures in all mining procedures, including construction.
State Land Use Commission	House Bill 1041 Colorado Land Use Act of 1974	Protects the utility, value, and future of all lands within the state, including the public domain and privately owned land.	Local governments have the duty to identify, designate, and administer such areas and activities of state interest, including mineral resource areas and mining.
	Colorado Antiquities Act of 1973	Provides for the protection of historical, natural, or archaeological values and for data recovery.	Establishes areas containing or having significant impacts on historical, natural, or archaeological resources as being of state interest. BLM must coordinate with State Historic Preservation Officer before approving mining plans or rights-of-way.
Colorado Department of Natural Resources Division of Mines	Mining Employees Safety Act	Provides for mine safety.	Monitors mine safety practices.
Mined Land Reclamation Board	Colorado Mined Land Reclamation Act of 1976	Provides for the reclamation of land subjected to surface disturbance by mining, thereby conserving natural resources, protecting wildlife and aquatic resources, and establishing recreation, home, and industrial sites to protect and perpetuate the taxable value of property.	Mine operation must obtain a permit. A plan of operations must be submitted, which includes a reclamation section. The board must hold public hearings and the involved county must approve issuance of a permit.
	Colorado Mined Land Reclamation Act of 1979	Mitigates impacts, assures reclamation, perpetuates existing regulations, and ensures that Colorado can carry out the intent and purposes of SHCRA.	Provides strict timeframes for administering permitting provisions. Performance standards require restoring disturbed lands to a condition equal to or better than before mining; returning disturbed lands to the approximate original contour; stabilizing and protecting all surface areas during and after mining; reducing disturbances to the prevailing hydrologic balance; and protecting alluvial valley floors. In addition, the Colorado act applies to "surface operations and surface impacts incident to an underground coal mine." Underground operations must comply with most of the detailed performance standards for surface mines even though special performance standards, such as preventing material damage by subsidence, are developed for some aspects of underground operations (Colorado Revised Statutes 1979).

# INTRODUCTION

TABLE 1-10 (continued)  
STATE LEGISLATION AFFECTING COAL DEVELOPMENT AND ENERGY CONSERVATION

Lead State Agency	Legislation	Purpose	Major Relevance
<b>UTAH</b>			
Air Conservation Committee	Utah Air Conservation Regulations Utah Code Annotated Section 26-13-6	Protects air quality.	Approves notice of intent to build sources of air pollution, including Prevention of Significant Deterioration (PSD) permit.
Utah Bureau of Water Quality	Water Quality Standards for Utah Utah Code Annotated 26-11-8	Protects water quality.	Important prescribed standards include those specifying maximum permissible concentrations of dissolved solids, minimum permissible concentrations of dissolved oxygen, and permissible temperatures of state waters. Also establishes anti-degradation policy and effluent standards.
State Historic Preservation Officer	Utah State Antiquities Act (HB 366, 1977) Utah Code Annotated 63-18-25	Protects historical, natural, paleontological, or archaeological values and provides for data recovery.	Requires a paleontological survey before mining can begin. No mining or rights-of-way will be approved until the surface management agency has coordinated professional cultural resource (including archaeological, architectural, and historical remains) surveys with the State Historic Preservation Officer.
Division of Oil, Gas, and Mining	Utah Code Annotated 40-8-13 (Supp. 1981); Rule M-3	Protects surface resources.	Issues notices of intention to begin exploratory drilling and mining. Could make some areas unsuitable for mining. Requires a reclamation plan.
Department of Community and Economic Development	Utah Code Annotated 63-51-10 (Supp. 1981) (S.B. 170)	Mitigates socioeconomic impacts.	Requires the submittal of a financial impact statement and a plan to mitigate socioeconomic impacts.
<b>NEW MEXICO</b>			
New Mexico Environmental Improvement Division	Environmental Improvement Act of 1971 NMSA 12-12 through 14	Establishes responsibilities for environmental management and consumer protection programs.	Programs include food protection, water supply, and pollution as provided in the Water Quality Act; liquid and solid wastes; air quality management as provided in the Air Quality Act; radiation control; noise control; nuisance abatement vector control; occupational health and safety; sanitation of public buildings.
	Air Quality Control Regulation 201	Establishes and enforces regulations to prevent or abate air pollution.	Requires submission of plans, specifications, and other relevant information before issuing a permit for the building or modification of any new source of air contamination.
	New Mexico Air Quality Standards and Regulations, Section 672	Establishes and enforces regulations to prevent or abate air pollution.	Requires that coal handling machinery be equipped and haul roads be sprayed to prevent particulate matter from becoming airborne.
New Mexico Coal Surface Mining Commission	New Mexico Surface Mining Act of 1979, Rule 80-1, Part 20	Establishes and enforces surface mining regulations.	Requires that a full range of coal mining protection be established on affected areas and that diverse and permanent vegetation cover capable of self-regeneration at least equal in extent to natural vegetation be established on affected areas.



# FEDERAL AND STATE CONSTRAINTS

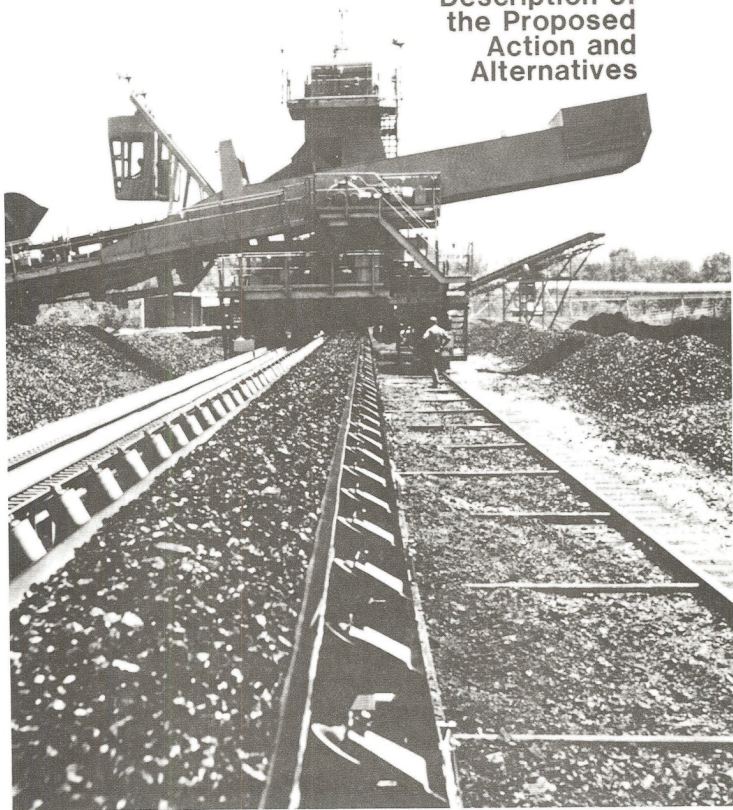
TABLE 1-10 (concluded)  
STATE LEGISLATION AFFECTING COAL DEVELOPMENT AND ENERGY CONSERVATION

Lead State Agency	Legislation	Purpose	Major Relevance
<u>NEW MEXICO (continued)</u>			
	Rule 80-1, Part 20-41	Establishes and enforces surface mining regulations.	Requires that surface coal mining be planned and conducted to reduce adverse changes in water quality and quantity.
	State of New Mexico Senate Memorial 31	Provides for the recovery of paleontologic data.	Requires mines on state lands to notify the State of New Mexico, Dept. of Finance and Administration, Office of Cultural Affairs, if important fossils are found.
State Game Commission	Regulation 563	Provides for protecting state endangered species and subspecies.	May make certain coal lands off-limits to development.
State Historic Preservation Officer	Cultural Properties Act, as amended, 1969	Provides for protecting historical values and recovering of data.	Regulates antiquities excavation and collection and protects historical values on public, Indian trust, and state lands.
Water Quality Control Commission	Water Quality Control Act	Protects surface and ground water.	Establishes and administers a comprehensive water quality program and develops a continuing planning process, including adoption of water quality standards as a guide to water pollution control. Also certifies permits to the U.S. Environmental Protection Agency for the discharge of any water contaminant either directly or indirectly into water. Has ground water regulations for strip or tunnel mines.
State Engineer of New Mexico	N.M. State Annotated (1953 Compil.), Section 72-2-1	Provides for the general supervision, measurement, appropriation, and distribution of state waters. Responsible for the safety of all state and private dams and for providing guidelines to counties for formulating local regulations.	Any person drilling a mine lode discovery hole or mine drill hole to a depth of 10 feet more, and finds a water body or water-bearing stratum must report it to the State Engineer. Any person wanting to engage in mine dewatering in a declared underground water basin must apply to the State Engineer for a permit.
<u>ALABAMA</u>			
The Alabama Department of Environmental Management	Alabama Law (Reg. Session 1982) ACT No. 82-612 S.47-Mr. White & Mr. Holmes  CODE OF ALABAMA:  Title 22, Chapter 22 Pollution Discharge Elimination System Permit  Alabama Air Pollution Control Act of 1971  Solid Waste Disposal Act of 1969. Hazardous Waste Management Act of 1978	Provides for the management of state resources in a manner compatible with the environment and the health and welfare of state residents.	All laws and regulations designed to reduce contamination and pollution and maintain the quality of the environment by setting standards and maximum amounts of deviation of pollutant substances.
Surface Mining and Reclamation Commission	Surface Mining Control and Reclamation Act Of 1977, as Revised	Regulates coal mining.	Regulations pertaining to water flow and quantity; top soil conservation and replacement; high wall reduction; burying or neutralizing of toxic waste; revegetation for beneficial use, and land use planning.

\*NPDES = National Pollutant Discharge Elimination System



**CHAPTER 2**  
**Description of**  
**the Proposed**  
**Action and**  
**Alternatives**





CHAPTER 2  
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

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**PURPOSE AND NEED**

The Federal Land Policy and Management Act of 1976 (FLPMA) provides the framework and guiding principles for operations of the Bureau of Land Management (BLM). Section 302 of FLPMA requires that the Secretary of the Interior manage the public lands under principles of multiple use and sustained yield in accordance with the land use plans developed under Section 302 of FLPMA. Any management of resources on the public lands must, therefore, consider the other resources on public lands in program activities and balance those uses for the public interest. The Department of the Interior believes a program is needed to meet the mandate of Section 302 of FLPMA, to provide the Secretary of the Interior with a framework within which to consider the proper management of federal coal while giving due consideration to other uses of the public lands.

The 1979 FES (BLM 1979a) on the federal coal management program identified an immediate need for new federal coal leasing. Regional coal leasing since 1981 has resulted in the issuance of leases for 2.6 billion tons of federal coal, which may have satisfied immediate needs. The issue in this supplemental EIS is thus not the immediate need for leasing as such. Rather, the issue is the national importance of having a program through which the Federal Government can (1) identify future leasing needs and (2) respond by offering coal for lease in a timely manner to capture the benefits derived from such leasing. These benefits include the following:

- Promoting more economically and environmentally desirable patterns of coal development.
- Providing the opportunity for industry to acquire federal coal leases as a means of addressing the Nation's energy needs.
- Meeting legal requirements and providing administrative advantages.
- Promoting competition within the coal industry.
- Supporting other factors in the national interest.

**PATTERNS OF DEVELOPMENT**

The Federal Government controls about 60 percent of the western coal reserve base and indirectly affects the use of at least 20 percent more due to checkerboard land ownership patterns. Because of the government's dominant reserve holdings in the key western coal regions, mines of inefficient size and configuration could likely result if only nonfederal coal could be mined. For example, in areas of checkerboard ownership, development would focus on alternating nonfederal sections and five-section nonfederal blocks centered on state sections. If such development occurs, efficient mining patterns would be distorted, mining costs would increase, and the most efficient or environmentally desirable patterns of coal mining could not be achieved.

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Without procedures to consider the need for federal coal leasing, unleased federal parcels lying in the path of active mines could be bypassed at a cost to consumers and the government. Such operations would then forgo the opportunity to produce relatively low-cost coal, and the coal parcels bypassed would generally be too small to be mined independently at a later date.

Without the opportunity to lease federal coal, some existing mines may have to shut down because they cannot obtain needed coal and fulfill contracts. BLM has estimated that over the next 10 years at least 26 emergency coal leases must be issued to maintain production at existing mines. These 26 coal leases will involve 100 million tons of federal coal. In addition to the inefficiencies and hardships associated with premature closing of active mines, other unwanted side effects might include a shift of coal mining to previously undeveloped locations. New mining facilities, roads, housing, and public services would be needed if such shifts occur, and the amount of land adversely affected by coal mining might increase.

The Department of the Interior expects future federal leasing to displace development on some existing leases, including those that emerge from the processing of outstanding preference right lease applications (PRLAs). Leases dating before the initial coal leasing moratorium in May 1971 were issued with little or no attention to land use planning and environmental considerations, as were the prospecting permits associated with outstanding PRLAs. Shifting coal development from the sites of these existing leases and leases that may be issued from PRLAs to future federal lease sites selected through a process of comprehensive planning and environmental screening could foster economically and environmentally improved development patterns.

From a national perspective, damaging interregional and intraregional shifts in coal development would result from a policy of no future federal coal leasing. The resulting altered patterns of coal development, which are summarized in Chapters 3, 4, and 5, might have adverse environmental consequences and might decrease the current interregional economic efficiency in coal production.

The scale of interregional and intraregional shifts in coal development that might result if the government cannot consider the need for future federal coal leasing cannot be precisely estimated. The extent of such shifts would depend on many site-specific considerations and the particular requirements of existing and proposed mines. BLM has, however, projected some interregional shifting using forecasts of the Department of Energy's National Coal Model (NCM) (see Chapter 3). Without provisions for considering new federal coal leasing, BLM estimates that the Powder River Region would have the greatest potential for intraregional and interregional shifting of production. This shifting would represent a departure from the most economically optimal production patterns. Under one modeled scenario, production that would occur with further federal coal leasing in the Wyoming portion of the Powder River region would be shifted to midwestern mines and the Montana portion of the Powder River region by the year 2000. The assumptions of this scenario include enactment of national acid rain legislation and relatively low transportation costs.

## PURPOSE AND NEED

Under assumptions that include escalating transportation costs, the Fort Union Region would undergo a transfer of production into the Powder River Region and the Midwest without further federal leasing. Under several scenarios, the Uinta-Southwestern Utah Region would experience short-term shifts of 3 to 4 million tons per year into Wyoming without further federal coal leasing. For the Green River-Hams Fork and San Juan River regions, no interregional shifting was detected under the tested scenarios. See Chapter 3 for tables on regional production shifts under varying production levels for 1995 and 2000.

### ADDRESSING THE NATION'S ENERGY NEEDS

A critical point identified in the 1979 FES (BLM 1979a) was the need to lease federal coal to avoid a projected shortage in the coal supply. Later events have dispelled concerns of a shortage, marking the major shift in the program's emphasis since 1979. The market demand for coal, as with any commodity, will always be satisfied in a competitive market. As long as the pricing mechanism is allowed to function, federal and nonfederal mines will produce enough coal to meet market demands. Current analysis reveals that a policy of no future federal coal leasing would probably not cause a nationwide coal shortage. The price of coal, however, would probably increase. Without future federal coal leasing, coal will be developed to meet consumer demand, but it will be developed on coal tracts that have a higher development cost.

Without the ability to consider the need for new federal coal leasing, the Federal Government cannot provide the opportunity to satisfy the market demand for the acquisition and development of new federal coal leases. BLM's planning process must be able to respond both to today's demands and to future needs.

Forecasts of future energy demands and supplies are subject to many uncertainties, which increase as the forecasts are extended into the future. As events since 1979 have shown, it is difficult to predict accurately how energy users and suppliers would respond to greater energy scarcity, new energy and environmental legislation, and changing energy prices, or to what extent users would adopt conservation measures or be willing to change their behavior patterns. Information about current and expected future energy reserves is often inaccurate or unreliable. Changes in technology may greatly alter the relative economics of different energy sources. Changes in government regulations can also cause important shifts in the relative desirability of one energy source compared to another.

Even with their uncertainties and weaknesses, production forecasts and capacity estimates are appropriate sources of information. At the medium production level, 410 million tons per year of coal would be needed from the West by 1995, an increase of 46 percent over 1983 coal production for western regions. Over that same period, the productive capacity could increase by 16 percent without any future federal coal leasing. The current productive capacity of active coal mines in the federal western coal regions is now at 170 percent of the current coal production. By 1995, the overall projected productive capacity will have dropped to 130 percent of forecasted coal production, and by the year 2000, capacity in some regions will be eclipsed by demand.

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The discussion in the 1979 FES (BLM 1979a) heavily emphasized supply and demand forecasts almost to the exclusion of what was even then recognized as the real cost of no future federal coal leasing. As stated in the 1979 FES, the main effect of leasing less federal coal than is needed to meet national energy objectives is likely to be altered patterns of coal development at both national and regional levels. Total national coal production is not likely to be significantly reduced, but coal production costs and coal prices would rise.

Coal production in the western United States is constrained by a lack of markets and is therefore relatively unaffected in the aggregate by leasing levels. In other words, although a policy of no new federal coal leasing might tighten supplies and increase costs, it would not lower coal production. Similarly, a policy of overleasing would not lead to increased coal production levels. Overleasing can, however, lead to uncertainty as to where coal will be mined in the future.

### LEGAL AND ADMINISTRATIVE FACTORS

Procedures to consider the need for future competitive leasing make up only one component of a federal coal management program. The Department of the Interior has no existing statutory alternative to processing PRLAs and, for those applicants able to show commercial quantities of coal under appropriate environmental controls, must either issue a noncompetitive lease or offer an exchange, purchase, or other suitable compensation. A continuation of federal coal leasing, at least to the extent of issuing noncompetitive leases for PRLAs meeting this test, thus appears necessary absent legislative relief. A formal program would be required at least to process the PRLAs; to conduct land use planning required by law before leases can be issued; to assess environmental impacts of preference right leasing; and to consider whether exchange, displacement through new competitive leasing, or other approaches are appropriate for dealing with environmentally unsatisfactory PRLAs.

### COMPETITION

A particularly critical requirement for a market or industry to be competitive is that enough buyers and sellers exist so that no individual or small group of buyers or sellers can significantly influence a commodity's price. The national importance of the coal industry has generated much concern about its competitiveness. One of the goals of federal coal management is to ensure that enough lease tracts are available for development to further healthy competition in coal markets, especially for utility contracts. This goal has also been an ongoing concern of the Antitrust Division of the Department of Justice.

A decision not to offer federal coal would inhibit competition in the western coal industry. Coal purchasers would have to obtain coal from companies holding existing federal leases or nonfederal reserves. The 15 largest coal companies account for over 40 percent of the Nation's current coal production. Of the Nation's estimated 6,300 active coal mines, the 50 largest mines account for 30 percent of total production. Past federal coal leasing has also been somewhat concentrated in that 38 percent of the acreage under lease and 63 percent of leased federal reserves are controlled by 11 firms.



## PURPOSE AND NEED

Of the 32 new production tracts leased competitively since 1981, about 57 percent were acquired by companies with no previous federal coal lease holdings. Only one new production lease offered since 1981 was acquired by a company listed among the 15 largest federal coal lessees.

The dominant use of western coal is for generating electric power. The Department of the Interior believes that it is in the national interest to lease enough coal to allow several potential suppliers to bid on new utility contracts. By providing a mechanism for future federal coal leasing, the Federal Government will give new firms the opportunity to enter a region as potential coal suppliers. More firms operating in a region will also force coal suppliers to compete for new utility contracts.

Though the benefits derived from more competition within the regional coal industry cannot be measured, competition among suppliers in a market situation will in general tend to reduce the cost of that product or service and the price paid by consumers.

### OTHER FACTORS IN THE NATIONAL INTEREST

Continuation of the federal coal management program would provide management flexibility to deal with changing market and political circumstances. It would not necessarily result in new competitive leasing. Rather, it would provide a mechanism to regularly study the need to lease. If coal were needed for future development, the program could respond to that need. If coal leasing were not needed, the program would provide a mechanism for a decision not to lease. If rational energy needs should sharply escalate in the future due to international political events, this management flexibility could provide national security benefits.

The ability to lease in a timely manner can also promote job stability by allowing existing mines the opportunity to purchase coal reserves when needed to continue their operations. This ability also promotes the social stability of mining communities.

Federal and state governments would also benefit from the added bonuses and royalties that could be obtained from sales of new federal leases. From fiscal year 1981 through 1983, \$130 million was bid in total high bonuses for federal coal leases sold. Half of these revenues were provided to the states and another 40 percent placed in the reclamation fund. During the same period \$81 million more in production royalties and rentals were distributed to states.

### PROPOSED ACTION AND ALTERNATIVES--INTRODUCTION

The 1979 FES (BLM 1979a) analyzed seven major alternative coal programs. The alternatives analyzed in this supplemental EIS are (1) the Proposed Action to continue the current coal management program, (2) Leasing by Application, (3) Preference Right and Emergency Leasing, and (4) No New Federal Leasing--the no action alternative. These alternatives differ in the level of involvement of the public and of federal and state agencies, as well as in the amount of federal coal that would be considered for leasing. Table 2-1 summarizes the main features of these alternatives.

# DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

TABLE 2-1  
COMPARISON OF ALTERNATIVES

ALTERNATIVES	PROPOSED ACTION	LEASING BY APPLICATION	PREFERENCE RIGHT AND EMERGENCY LEASING	NO NEW FEDERAL LEASING
<b>ACTION INITIATOR</b>	Department of the Interior and the states through the RCTs, in analyzing market forecasts, land use plans, and expressions of interest.	Industry, through individual applications.	Industry, through individual emergency lease applications. Dept. of the Interior, through processing of PRLAs	None
<b>MAJOR OBJECTIVES</b>	Provide opportunity for new entrants; promote more efficient development of the federal coal resource; provide stability in the demand/supply equilibrium for national security objective.	Provide stability in supply/demand equilibrium; provide opportunity for new entrants. Reduce nationwide activity planning costs.	Encourage development of PRLAs, continuation of existing operations, and avoidance of coal bypass.	Encourage development of leases already issued.
<b>EXTENT OF STATE ROLE</b>	Full participation through RCTs, FSCAB, consultations with governors.	Consultation with governors.	Consultation with governors.	Consultation with governors.
<b>TYPES OF TRACTS</b>	Any type: new production, non-emergency production maintenance, bypass, and emergency production maintenance.	Any type, determined by applicant.	Limited quantity with short-term need for emergency least tracts; production maintenance or new production for PRLAs.	None.
<b>LAND-USE PLANNING</b>	Future rounds would require resource management plans. Applications could be based on amendments to management framework plans, if date adequacy standards are met.	Future applications could be based on amendments to management framework plans.	Future applications could be based on amendments to management framework plans.	AVF exchanges and lease modifications could be based on management framework plan amendments.
<b>PREFERENCE RIGHT LEASE APPLICATIONS (PRLAs)</b>	Expedited processing within 2 years (except those with wilderness conflicts).	Expedited processing within 2 years (except those with wilderness conflicts).	Expedited processing within 2 years (except those with wilderness conflicts).	Indefinite deferral of processing, exchange for noncoal lease or monetary credits, or request for legislative relief.
<b>RCT</b> = Regional Coal Team	<b>FSCAB</b> = Federal-State Coal Advisory Board		<b>AVF</b> = alluvial valley floor	

None of these alternatives would significantly alter the level of coal production required to meet the Nation's energy needs. Development patterns to meet that need (i.e., mining of federal versus nonfederal coal) could vary, however, depending on the program alternative selected.

In addition to its Preferred Program, the 1979 FES considered six major alternatives:

## PROPOSED ACTION AND ALTERNATIVES-INTRODUCTION

- allow no new federal leasing until at least 1985;
- process and lease only outstanding preference right lease applications (PRLAs);
- lease only bypass coal and coal needed to maintain existing operations (emergency leasing);
- lease to meet the coal industry's indication of need;
- allow state determination of leasing levels; and
- lease to meet Department of Energy coal production goals.

Not all of these are now feasible or reasonable alternatives to the current Proposed Action. Some of the 1979 alternatives are incorporated into the present alternatives, but under a different title. Circumstances have changed since 1979, and these changes have made certain other alternatives unworkable. The following discussion clarifies disposition of each 1979 FES alternative.

- No New Federal Leasing Until at Least 1985: This 1979 alternative is incorporated into the No New Federal Leasing Alternative.
- Process and Lease Only Outstanding Preference Right Lease Applications: This 1979 alternative has been incorporated into the Preference Right and Emergency Leasing Alternative.
- Lease Only Bypass Coal and Coal Needed to Maintain Existing Operations (Emergency Leasing): This 1979 alternative has been incorporated into the Preference Right and Emergency Leasing Alternative.
- Lease to Meet the Coal Industry's Indications of Need: This 1979 alternative has been incorporated into the Leasing by Application Alternative. Coal lease sales would be held in response to applications by industry nominations, and the number of tracts and amount of coal offered at lease sales would vary by the number and location of applications.
- Allow State Determinations of Leasing Levels: Events have made this 1979 alternative a moot issue. Implementing the 1979 coal program in the intervening years has involved extensive state government participation in determining the amount of coal offered for lease sale. Furthermore, changes in the Federal-State Coal Advisory Board Charter in 1984 (Appendix 2) have strengthened the role of the western coal states. As stated in the charter, the lease sale recommendations of the RCT will be accepted by the Department except for instances of overriding national interest. As a result, no attempt has been made to design a separate alternative along these lines.

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

- Leasing to Meet Department of Energy (DOE) Coal Production Goals: The DOE no longer provides production goals but does prepare demand projections. This 1979 alternative is not included as a separate alternative for environmental impact analysis because the impacts of this type of program are treated either in the No New Federal Leasing Alternative (on the assumption of no demand for coal), or treated in the Leasing by Application Alternative (on the assumption that demand for coal does or will exist). DOE demand projections are also taken into account in determining leasing levels under the Proposed Action.

During scoping for this supplemental EIS a commenter suggested that a "Leasing for Need" alternative be studied. Such study would involve identifying need as follows:

- assessing the need for coal production based on consumer demand and
- assessing likely coal production from existing and planned mines.

Both of these items are included as features of market analysis in the Proposed Action. Furthermore, the Proposed Action calls for periodic and topical re-evaluations of the outlook for federal coal and the appropriate number of tracts to be offered to assure compatibility with market conditions. The major difference between the Proposed Action and the Leasing for Need alternative is that the Leasing for Need alternative proposes that the Department adopt a specified fixed, discretion-limiting policy on the setting of leasing levels. This is a question of policy related to implementing a specific program component, not a separate program design alternative. The Proposed Action includes most of the significant points in the Leasing for Need alternative proposal, and the remaining minor differences are not believed sufficient to warrant a separate alternative in this supplemental EIS.

Some commenters suggested that the supplemental EIS have the 1979 program as one alternative, the program as changed in 1982-83 as another alternative, and the program as changed in 1984-85 as yet another alternative. The Department does not believe that such an approach is needed or desirable because these programs do not differ enough in their essential components (the procedural steps and the regulatory standards for what kinds of lands will be studied and delineated, and for decision on how much coal should be leased) to constitute reasonably contrasting alternatives. Furthermore, all of the program changes adopted since 1979 have been addressed and analyzed in environmental assessments and none of them have been found to have significant environmental impacts. The recently proposed implementation items from the Linowes (Linowes and others 1984) and OTA (1984) reports similarly appear to lack measurable environmental impacts. None of these adopted or proposed changes would disturb the basic land use planning, regional activity planning, and lease sale procedures of the 1979 program. Therefore, the Department has not accepted the suggestion to analyze the three programs identified with changes in 1979, 1982-1983, and 1984-1985.

## PROPOSED ACTION

### PROPOSED ACTION

The Proposed Action would continue the federal coal management program. On June 1, 1979, the Secretary of the Interior established this program, which was described in the 1979 FES (BLM 1979a) as the Preferred Program. The following major elements were presented in the 1979 FES:

- planning systems,
- need for leasing (market analysis),
- sales procedures,
- enforcement of lease terms and conditions,
- management of existing leases,
- preference right lease application (PRLA) processing,
- integration of National Environmental Policy Act (NEPA) procedures, and
- emergency sales procedures.

The program was implemented mainly through regulations published in July 1979. The regulations were amended in 1982 and 1983 (see Table 1-9). More amendments to the regulations and revisions in procedures through internal instructions and manuals have been proposed in 1984 and will be proposed in 1985. Some of these latest revisions restore regulatory provisions deleted from the 1979 rules in 1982. The 1979 FES on the coal management program and the environmental assessments on later changes are incorporated by reference into this supplemental EIS (Table 2-2).

Appendix 6 contains current versions of the 1984-85 proposed program revisions, some of which have been published in the Federal Register for public comment. Other items in Appendix 6 will appear in the Federal Register in the coming months in slightly revised form for more public comment. Comments on the draft supplemental EIS addressing Appendix 6 proposals will be analyzed in the final supplemental EIS and will be considered in the decision record for the specific proposal commented upon.

Certain elements of the Proposed Action would also be part of the other alternatives providing for federal coal leasing because of statutory or policy requirements. For example, the Federal Coal Leasing Amendments Act of 1976 (FCLAA) requires that no federal coal be offered in a lease sale unless the lands containing the coal deposits have been included in a comprehensive land use plan and all tracts sold receive not less than fair market value. Thus, the descriptions of the alternatives to the Proposed Action are briefer than the description of the Proposed Action because those elements common to all alternatives are described only for the Proposed Action. The essential elements of the current program are summarized below, under headings similar to those in the 1979 FES.

# DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

TABLE 2 2  
ENVIRONMENTAL DOCUMENTS INCORPORATED BY REFERENCE

Title/Date	Description
<u>Final Environmental Statement Federal Coal Management Program</u> April 1979 (SLM 1979a)	This EIS considered the environmental impacts, on a national and interregional basis of seven alternatives, including a Preferred Program. The preferred program provided for the administration of existing leases, PHMA processing, review of Federal lands, and other coal management activities to establish standards and procedures for determining when, where, and how the right to mine federal coal should, through competitive sales, be leased. Site-specific and intraregional impacts were deferred to the regional EISs in the tiering process.
<u>Environmental Assessment for Revisions to the Federal Coal Management Rules</u> July 1982 (SLM 1982d)	This EA considered the potential environmental impacts of final rules designed to eliminate burdensome and outdated provisions and to streamline the rules for both prelease and postlease activities. Language was also clarified to conform with court decisions, such as <i>Texaco, Inc. v. Andrus</i> , and to correct editing errors. Because the basic structure of the program was unchanged and the Proposed Action would increase procedural efficiency, the only alternative considered was No Action. The Department of the Interior concurred with the finding of no significant impacts on July 1, 1982.
<u>Environmental Assessment for Decision on Fair Market Value for Federally Owned Coal</u> July 1983 (SLM 1983j)	This EA analyzed the potential impacts on the human environment of the procedural changes to determining fair market value for coal leasing, resulting from criticism of the Department of the Interior's procedures in 1982 Powder River Basin federal coal lease sales. It found that the proposed procedures would not effect the number of tracts offered or, ultimately, the number of tracts developed. The finding of no significant impacts was approved by the Department on July 26, 1983.
<u>Environmental Assessment for Amendments to the Federal Coal Management Rules</u> <u>Usability Criterion Number 2</u> <u>(43 CFR 346.1(a))</u> March 1983 (SLM 1983k)	This EA considered the potential effects on the human environment of the revision in Criterion 7 (unsuitability of sites for the National Register of Historic Places) resulting from the need to remove unneeded limitations on land use decisions and bring preleasing regulations into consistency with recent court decisions and legal interpretations and the criteria proposed by the Office of Surface Mining for designating lands unsuitable during mine plan review. The Department of the Interior concurred with the finding of no significant impacts on May 30, 1983.
<u>Environmental Assessment for Proposed Revisions to the Federal Coal Management Rules and Procedures</u> , June 1984 (SLM 1984a)	This EA examined the potential impacts on the human environment of proposed revisions in the coal management regulations and internal instruction documents to implement proposals made by the Secretary of the Interior (in <u>Review of Federal Coal Leasing</u> ) in response to recommendations by the Commission on Fair Market Value Policy for Federal Coal Leasing. The Department of Interior concurred with the finding of no significant impact on June 29, 1984. The draft rulemaking for these proposals was published in the <u>Federal Register</u> in November 5, 1984. Other, non-rulemaking proposals have been published in the <u>Federal Register</u> for public comment before implementation.
<u>Environmental Assessment for Proposed Revision of the Federal Coal Management Rules and Procedures</u> January 1985 (SLM 1985a)	This EA examined the potential impacts on the human environment of proposed revisions in the coal management regulations and internal instruction documents made by the Secretary of the Interior (in <u>Review of Planning Considerations in Federal Coal Leasing</u> USDI 1984). The review was in response to options presented by the Office of Technology Assessment (in <u>Environmental Protection in the Federal Coal Leasing Program</u> OTA 1984). Draft proposals were discussed with certain groups in December 1984 and January 1985. Proposed rules are expected to be published in the <u>Federal Register</u> in April 1985. The Department concurred with a finding of no significant impacts on January 9, 1985, and adopted those proposals that do not require rulemaking.

## PROPOSED ACTION

### PLANNING SYSTEMS

#### Land Use Planning

For the federal coal management program, the major contribution of land use planning is to identify lands acceptable for further consideration for coal leasing. Coal development on specific tracts is not considered during land use planning but during activity planning (see next section). The major steps in BLM land use planning are shown in Figure 2-1.

The Forest and Rangeland Renewable Resources Planning Act of 1974 and the National Forests Management Act of 1976 (Table 1-8) provide the statutory basis for land and resource management planning for National Forest System lands. Land resource management planning regulations (36 CFR 219) set forth planning requirements for mineral resources. Forest Service Manual 1900--Planning--provides guidance on developing forest management plans.

At the onset of land use planning, the July 1982 rulemaking added a call for the public to submit coal resource information. A 1985 proposal would also include a call for relevant noncoal data. Information obtained in this manner would be used along with existing data bases to make a number of land use planning decisions, especially in applying the four coal screens. These screens are as follows:

- Development Potential. Under the 1979 coal management regulations, only those areas with high to moderate development potential coal deposits were considered acceptable for further consideration for leasing. This requirement was changed in the July 1982 rulemaking to include all areas with development potential. Lands without development potential are dropped from further consideration for coal leasing.
- Unsuitability. Twenty unsuitability criteria, most of which reflect provisions of federal legislation, such as the Surface Mining Control and Reclamation Act (SMCRA) and the Endangered Species Act, are applied to screen out land unsuitable for all or certain specified methods of surface mining. Criteria 1, 2, 3, 7, 9, 11, 12, 13, 14, 16, and 17 were modified or refined by rulemaking in July 1982 and December 1983 (Appendix 1).
- Multiple Use Trade-off. All coal and noncoal resources are identified for the lands being studied. Areas may be eliminated from further consideration for coal leasing to protect a noncoal resource that is locally important or unique, where coal mining would preclude use or protection of a valuable noncoal resource not included in the unsuitability criteria and the noncoal resource is of greater value than the coal.

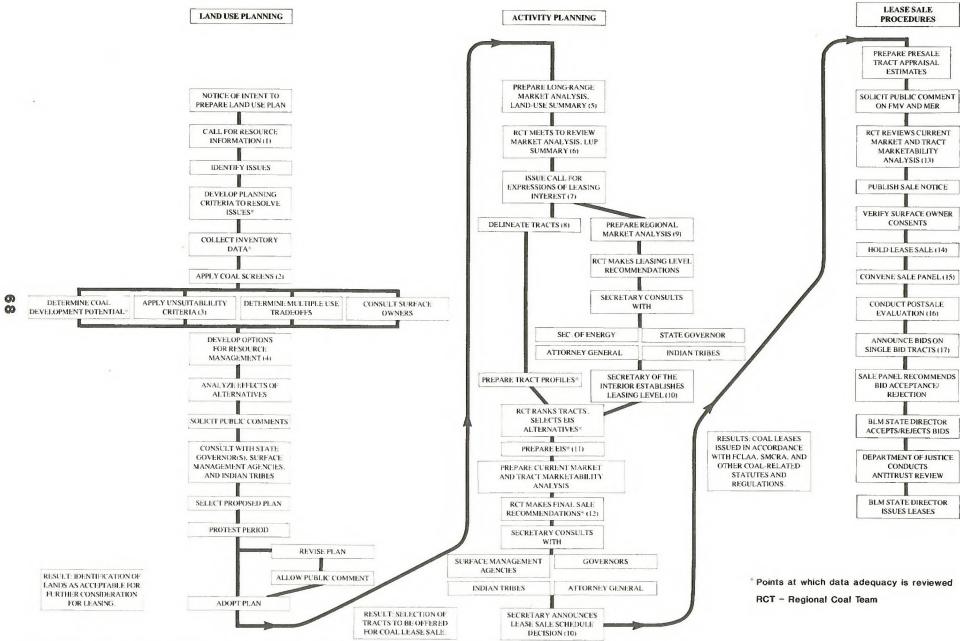


Figure 2-1 Proposed Coal Leasing Program Flow Chart (Proposed Action)

\* Points at which data adequacy is reviewed  
 RCT – Regional Coal Team



## PROPOSED ACTION

### Endnotes for Figure 2-1

1. Modified step. The call for coal resource information, required in 43 CFR 3420.1-2 is expanded to include a call for all resource information (Office of Technology Assessment (OTA)\* Option 3).
2. Modified step. The screens are applied sequentially unless earlier application of later screens eliminates lands with no more expenditure of money or personnel resources (OTA Option 5).
3. Modified step. By Federal Register notice, the public is invited to comment on the application of the unsuitability criteria. The regulations in 43 CFR Subpart 3461 are revised to reflect this opportunity for public comment (OTA Option 3).
4. Modified step. The decisionmaker considers thresholds at this point in a manner presently under study in BLM (OTA Option 7).
5. New step. As an early assessment of the need for coal leasing, a long-range market analysis is prepared for the regional coal team (RCT) for use in deciding whether to initiate activity planning (OTA Option 3 and FMV III-1). A land use plan summary provides data and guides further data collection (OTA Option 3).
6. New steps. The regulations are changed to require activity planning to begin with an RCT meeting to review the need for further coal leasing in the region. The public has access to the market analysis and land use plan summary at least 45 days before the meeting (OTA Option 3).

The RCT chairman is the BLM state director in the state for which coal leasing is proposed. The composition of at least one RCT is modified on an experimental basis to include three science advisors (one in renewable resources, one in nonrenewable resources, and the third in reclamation) to advise the RCT on scientific matters (OTA Option 6).

7. Modified step. Procedures are developed to screen the expressions received for seriousness of intent (OTA Options 2 and 6).
8. Modified step. Procedures for delineating alternative tract configurations are developed (FMV\*\* IV-1). Formal definitions of the terms "new production tract," "bypass tract," "non-captive, unlimited tract" are developed for use in tract delineation (FMV V-1). The tract delineation team, appointed by the BLM state director, is interdisciplinary, and its work is reviewed by a review council (FMV IV-2).

\* OTA refers to recommendations in the U.S. Congress, Office of Technology Assessment report--Environmental Protection in the Federal Coal Leasing Program (OTA 1984).

\*\* FMV refers to recommendations in the Report of the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes and others 1984).

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

### Endnotes for Figure 2-1 (continued)

9. Modified step. Procedures are modified to include formal consideration in the paper of the level of expected leasing from coal PRLAs and the screened expressions, i.e., indications of demand (OTA Option 9).
10. Clarified step. The Department has stated that the RCT recommendations are rebuttable presumptions, which the Secretary of the Interior will accept unless acceptance is not in the public interest (OTA Option 2).
11. Modified step. The regulations are revised to study a proposed action and alternatives rather than a preferred alternative and alternatives (FMV III-1). As part of the cumulative analysis, each regional EIS will consider impact thresholds (OTA Option 6).
12. Modified step. As part of this step, the RCT will consider the current market and tract marketability analysis and the use of phased sales in the region, on the basis of phased sale guidelines (FMV III-1).
13. New step. The comments on FMV and MER are used, along with the current market and tract marketability analysis, to affirm or modify the previous sale decision (FMV III-1; OTA Option 3).
14. Modified step. Several new or modified bidding systems are used as appropriate--cooperative leasing (FMV IV-3); and experimental auction techniques, including intertract bidding (FMV IV-5 and V-3). Minimum bids are set on a regional basis and expressed as either dollars-per-acre or cents-per-ton (FMV V-5). For single bid tracts the announcement of the amount of the bids is delayed pending the outcome of evaluation on the multiple-bid tracts (FMV V-7).
- 15,16. Modified steps. Guidelines for composition of the sale panel are being developed (FMV VIII-4). The 25 percent rule is being reviewed for effectiveness (FMV V-7).
17. New step. See endnote 15 above.

## PROPOSED ACTION

- Surface Owner Consultation. For split estate lands (private surface over federal coal), surface owners who may be qualified under Section 714 of SMCRA are asked to state their opinion for or against surface coal mining on their land. Areas where a significant number of such owners oppose surface mining of federal coal are eliminated from consideration for this mining method, unless no other lands are available.

Originally, the screens were applied in the above order, but the sequential requirement was eliminated in the July 1982 rulemaking. In a 1985 proposal, these screens would again be applied sequentially as listed except where the authorized officer feels that applying screens in a different order would be more efficient. Thus, there would be no need to apply all the screens on lands eliminated by the first screen applied.

Threshold levels, as defined in the BLM land use planning manual, are specific defined levels of resource use, production, or conditions established as maximum or minimum constraints in the land use plan. For example, a minimum amount of winter wildlife habitat might be essential for the survival of a herd or a minimum level of coal production might be essential for supporting existing transportation systems. Thresholds are usually established for defined geographic areas but are not necessarily site specific. Thresholds were also part of the 1979 coal regulations for land use planning but were eliminated in the July 1982 rulemaking as redundant because they are also a component of the general land use planning regulations. Regulation changes will be drafted in 1985 to reinstate the threshold concept in the coal regulations.

Public notice and opportunity to participate in resource management plan preparation will be appropriate to the areas and people involved and will be provided at the following points in the planning process:

- review of the proposed planning criteria,
- publication of the draft resource management plan and draft EIS,
- publication of the proposed resource management plan and final EIS, which triggers the opportunity for protest, and
- public notice and comment on any significant change made to the plan as a result of action on a protest.

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

### Activity Planning

The major feature that distinguishes the Proposed Action from the other alternatives is regional activity planning, the process in which specific coal tracts in the six coal production regions are delineated, analyzed for environmental impacts, ranked, and selected for possible lease sale at the initiative of the Department. A key feature of activity planning is the federal-state relationship.

Coal program activities in each coal region will be guided by a regional coal team (RCT), an advisory group of five voting members (three in Alabama), chartered under the Federal Advisory Committee Act. These members will include the governors of the states involved in the region (or their representatives) and BLM state directors of the involved states. The fifth member (third in Alabama) was originally a BLM state director from a state outside the region, who, as the BLM Director's representative, served as chairman. The revised Federal-State Advisory Board Charter (Appendix 2), signed in 1984, designates as chairman the BLM state director in the state with the greatest direct concern. The fifth member (third in Alabama) was changed to a representative of the BLM state director in that same state.

Representatives of several federal and state agencies with special expertise or jurisdiction in topics discussed by the RCT serve as ex officio members. A proposal adopted in 1984 calls for three science advisors also to serve on a test basis as ex officio members to advise the RCTs on data adequacy in their respective areas: renewable resources, nonrenewable resources, and reclamation and mitigation techniques. A BLM Washington Office representative will also serve as an ex officio member.

Another change adopted in principle in 1984 is the use of working groups that would include all segments within the community. These groups would develop information requested by the RCT.

The RCTs provide the mechanism for Department of the Interior-state consultation and coordination in all other major coal program proposals in the region and will serve as the Secretary's major forum for balancing regional and national interests. RCTs make recommendations to the Secretary of the Interior through the BLM Director on a variety of decisions, with the leasing level and final sale decisions being the most visible. Under a 1984 proposal, the RCT sale recommendation would separately identify tracts lacking data for adequate resource and economic assessment. Also added in the charter in 1984 is a requirement that the Secretary accept RCT recommendations except in the case of an overriding national interest or in the case that the Secretary accepts the advice of a state governor. For instances where the Secretary does not accept an RCT's recommendation, a written explanation will be provided to the RCT and to the public.

## PROPOSED ACTION

The RCT members make up the Federal-State Coal Advisory Board (FSCAB), an advisory group also chartered under provisions established by the Federal Advisory Committee Act. The BLM Director or his designated representative is the chairman of the FSCAB. The FSCAB meets at least once each year to review long-range planning schedules and other federal coal management issues of national interest. A responsibility added in 1984 was to review and comment on the Department's long-range market analysis used for developing long-range lease sale planning schedules (see Market Demand Analysis section below).

The RCTs and the FSCAB will also serve as the forum for coordinating information pertaining to coal leasing and fee coal and coal lease exchanges as stated in the FSCAB Charter (Appendix 2). The RCTs will review coal exchange proposals to evaluate their effects on competitive leasing and will use new market analyses or review tract delineation and selection or final RCT recommendations to the Secretary as needed. Although the responsible BLM state director will continue to approve or reject coal exchanges, the RCTs will have the opportunity to advise the state directors about the impacts of the exchanges on competitive coal leasing before the exchanges are approved.

A 1984 decision by the Secretary would require that any new activity planning be initiated only for areas where a resource management plan (instead of a management framework plan) has been completed. Although many changes have been made in the details of activity planning, the overall process remains the same as described in detail in the 1979 FES (BLM 1979a). The major steps are shown in Figure 2-1.

The following are major features of activity planning:

- reviewing summaries of land use plans to identify unresolved issues and data needed to be gathered to permit tract delineation assessment of impacts, and determination of fair market value (to be adopted in 1985).\*
- conducting market analyses of need to consider leasing (proposed in 1984,)
- calling for expressions of interest and other resource information,
- delineating coal tracts (including review of data adequacy),
- ranking coal tracts,
- selecting tracts for analysis in an EIS
- establishing leasing levels for analysis in regional EISs,
- conducting analyses of site-specific and cumulative impacts through tract profiles and a regional EIS,
- recommending tracts for lease offering, and
- designating timing of sales and types of offering, including issues such as special leasing opportunities (public body), phased sales, intertract bidding, and cooperative leasing.

\*Under the 1979 regulations, qualified surface owners were provided an opportunity to submit a statement of refusal to consent to surface mining during activity planning. A statement of refusal to consent was binding on the Federal Government and on the surface owner for the life of the land use plan unless the land changed ownership. The land was thus excluded from further consideration for leasing. The July 1982 rulemaking changed that time period to the activity planning cycle and thus allowed the surface owner to change his or her mind at an earlier date.

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Public participation is encouraged throughout activity planning by the following means:

- comment on market analyses (proposed in 1984),
- response to calls for expressions of leasing interest,
- review of tract profiles (site-specific analyses and summary of delineation reports),
- review of regional EISs,
- comment on tracts to be considered in RCT final recommendations for lease offering (being proposed in 1985),
- comment during RCT meetings,
- working groups to advise RCTs (being proposed in 1985),
- comment on factors to be used by RCTs in ranking tracts, and
- comment on initial leasing level paper, before RCT meeting to consider leasing level alternatives (proposed in 1984).

Upon receipt of the RCT sale schedule recommendations, the Secretary of the Interior consults with the governors of the states in which tracts are located, any affected Indian tribes, and the U.S. Attorney General. If any tract is within the National Forest System, consent to lease must be obtained from the Secretary of Agriculture, who may also prescribe the terms and conditions in any lease for those tracts. The January 1983 rulemaking also allows the governors to propose lease stipulations.

The Secretary of the Interior's final sale schedule decision is based on a variety of factors, including market and environmental analyses and the results of these consultations. Should a need arise later, the Secretary may revise the list of tracts to be offered or the timing of the sale. Procedures being proposed in 1985 would require the Secretary to consult first with all affected parties before such revision. Under procedures established by rulemaking in 1983, the Secretary may reoffer unsold tracts if the RCT reviews the sale schedule and the Secretary consults with the governor(s).

### LEASING OUTSIDE COAL PRODUCTION REGIONS

The above procedures were intended to apply to federal coal lands within any of 12 proposed coal regions. Only six federal coal regions and two subregions were established; one region and one subregion were later cancelled because of the lack of enough interest to justify regional leasing (see description in Chapter 1).

Outside the existing five federal coal production regions, federal coal may be leased upon application. Within designated federal coal production regions, lease by application is permitted only for emergency leasing. Such leasing outside the regions does not have to meet emergency criteria. Under leasing by application, an applicant must meet the same qualifications as any bidder in regional lease sales. Upon receipt of a valid application, the Department of the Interior notifies the governor of the state in which the coal deposit is located, ensures that a comprehensive land use plan is completed, prepares an environmental analysis on the proposed action, and determines lease terms and conditions and fair market value.

## PROPOSED ACTION

Where no federal interest exists in the surface or where coal deposits are insufficient to justify the costs of a federal land use plan, a land use analysis, which consists of applying the four coal screens (described under the land use planning section above) may be prepared for the area. The land use plan of another agency may be used if a review of the plan finds that it satisfies essential BLM requirements.

Public participation occurs through a hearing on the environmental document, the proposal to offer the federal coal in a lease sale, and the fair market value and maximum economic recovery of the designated tract (as specified in 43 CFR 3425.1-4). The governor is consulted before the decision on whether to hold the lease sale. As in regional leasing, if the tract lies within the National Forest System, consent to the sale and the lease terms is required from the Secretary of Agriculture. If federal coal leasing on the land is administered under the Mineral Leasing Act for Acquired Lands, consent is required from the head of the federal agency with administrative jurisdiction over the lands. Sales procedures are similar to those described below.

### MARKET DEMAND ANALYSIS (NEED FOR LEASING)

Before any decision is made to hold a regional lease sale, the need for leasing is determined from an analysis of national and regional coal markets. Thorough market analyses will be conducted at three points in the activity planning process. (1) A long-range market analysis (proposed in 1984) would be used as input to the long-range planning schedule (proposed in 1984) recommended by the Federal-State Coal Advisory Board and also used as an input in the RCT decision to begin coal activity planning. (2) The regional market analysis, expanded in 1984, is used as input to the leasing level decision. The leasing level becomes the basis for the proposed action in the regional EIS. (3) The final market demand analysis, proposed in 1984, would be the current market and tract marketability analysis provided to the RCTs before they formulate lease sale schedule recommendations for specific tracts. In approving the lease sale schedule, the Secretary of the Interior would also have the information from this current market and tract marketability analysis.

#### Long-Range Market Analysis

The Federal-State Coal Advisory Board would use long-range market analysis as one consideration in arriving at a long-range lease sale planning schedule. Long-range market analysis will mainly address coal production forecasts and coal productive capacity estimates for the regions. The purpose of this market analysis is to assess the need to begin activity planning using trend information, not to establish any particular leasing level.

#### Regional Market Analysis

The regional market analysis assesses the levels of leasing needed to meet certain objectives. Using this analysis and other information, the RCTs recommend to the Secretary a leasing level range defining the limits within which the Proposed Action of the regional EIS must fall. The objectives of the leasing level include (1) promoting competition within the coal industry for utility contracts, (2) providing the opportunity for industry to acquire

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

lower development cost federal coal leases to meet the Nation's energy needs, and (3) fostering a stable coal market. Six mathematical algorithms have been developed to calculate a level of leasing that would satisfy an array of objectives. (See market analysis section in Appendix 6.)

In the 1979 FES (BLM 1979a), an objective in establishing the "leasing target" was to set a level of leasing that would satisfy Department of Energy production goals, which were directly linked to the coal production forecasts from the National Coal Model. In 1982, the term "leasing target" was changed to "leasing level." In addition to forecasted production needs, the revised leasing level process considers a variety of factors, including market stability, competition, and demand for coal reserves.

### Current Market and Tract Marketability Analysis

The proposed current market and tract marketability analysis would provide topical information about coal markets and the marketability of federal coal tracts being considered for lease sale. This information would be used by the RCT and the Secretary of the Interior in evaluating if and when lease sales should be held and which tracts, if any, would be most likely to draw an acceptable high bid. As with the use of the earlier analyses of market demand, the current market and tract marketability analysis is only one component of the Secretary's decision on selecting tracts for lease sale and on setting a schedule to offer these tracts.

For lease sales to be held more than 120 calendar days after the lease sale schedule is set, the current market and tract marketability analysis would be reviewed and results provided to the Secretary to assure that the market information and the Secretary's decision remain timely. If the results show some revision might be needed in the planned sale(s), the Secretary would consult with all affected parties.

### SALES PROCEDURES

Chapter 1 includes a summary of major events in the evolution of the Department of the Interior's procedures to determine fair market value for coal lease tracts since 1979.

No federal coal proposed for surface mining and lying under surface estate owned by a private owner (as defined in Sec. 714 of SMCRA) may be offered in a lease sale unless BLM obtains evidence of the surface owner's written consent to mining. Each tract selected by the Secretary for lease sale is advertised at least 30 days before the sale. Public comment on fair market value and maximum economic recovery is also solicited at least 30 days before the sale notice on fair market value and maximum economic recovery. BLM also performs presale analysis to estimate tract values. Fair market value is determined on a tract-by-tract basis in postsale analysis. In December 1984, a draft handbook on coal lease tract appraisals was released for public comment. This handbook sets forth Department procedures and policies on the evaluation of competitively offered coal lease tracts.



## PROPOSED ACTION

Figure 2-1 shows the major lease sales procedures under the Proposed Action and their relationship to land use and activity planning. Sales procedures have been uniform from state to state. Lease sales are conducted by sealed bid and originally allowed follow-up oral bidding. In 1982, procedures were changed by regulation to eliminate oral bidding, and the minimum bid was raised from \$25 to \$100 per acre. A 1984 proposal in response to the Commission on Fair Market Value Policy for Federal Coal Leasing would allow the minimum bonus bid to be set on a region-by-region basis and to be expressed in an amount per ton of coal. Another 1984 proposal would permit the Department of the Interior to experiment with lease auction techniques that would optimize the receipt of fair market value. Future regulatory changes would be necessary to implement either proposal.

Some tracts may be set aside for special leasing opportunities for small businesses or public bodies such as rural electric cooperatives. In these sales, bids are accepted only from bidders who meet the special qualifications of the set-aside offering. No bids of less than fair market value are approved.

The Department may offer tracts through single-tract offering, in which the Department intends to issue a lease for every tract offered if the high bidder passes the fair market value test, clears Department of Justice review, and meets the other requirements of the Mineral Leasing Act of 1920, as amended. The Department is also considering several options for intertract bidding, in which more tracts would be offered than the Department intends to lease. The tracts receiving the highest bids would be leased. The other tracts may be reoffered later or not at all, depending on the criteria for choosing this method and the bids received. A proposal defining circumstances in which intertract bidding would be used was published for public comment on October 31, 1984 (Appendix 6).

The Department may offer tracts in conjunction with a sale of nonfederal coal through an arrangement called cooperative leasing. In the areas of checkerboard land ownership in the West, where alternating sections contain federal and nonfederal coal, cooperative leasing has the potential to encourage the efficient development of both federal and nonfederal coal by providing bidders with all the terms and conditions of mining all lands in a checkerboard tract before the lease auction. On October 31, 1984, the Department requested comment on its policies and procedures for cooperative leasing (Appendix 6) but so far has not held such a sale.

### SUPERVISION OF EXISTING LEASES

The Department of the Interior is responsible for approving operation and reclamation plans for federal coal leases under the requirements of the Mineral Leasing Act of 1920, as amended (MLA). BLM exercises the Secretary of the Interior's authority to manage federal exploration and mining in compliance with MLA requirements. Regulations codified in 43 CFR 3480 clarify the postlease enforcement procedures described in the 1979 FES by (1) separating Office of Surface Mining Reclamation and Enforcement (OSM) responsibilities from those of BLM; (2) retaining and clarifying BLM and Minerals Management Service (MMS) responsibilities for exploration,

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

production, development, resource recovery and protection, and royalties; and (3) revising and clarifying the existing requirements of the Federal Coal Leasing Amendments Act (FCLAA) for exploration, maximum economic recovery, resource recovery and protection plans, commercial quantities, diligent development, continued operation, and logical mining units.

An existing memorandum of understanding among OSM, the U.S. Geological Survey, and BLM concerning the division of agency responsibilities is under review to reflect organizational changes brought about by Secretarial Order No. 3087, which merged MMS onshore minerals management responsibilities into BLM. The BLM-MMS Memorandum of Understanding of December 15, 1983, details the division of responsibility between the two bureaus relating to information exchange, audit and inspection interface, regulations review, and royalty reductions.

### DILIGENT DEVELOPMENT

Regulations published in May 1976 established diligence requirements before enactment of FCLAA on August 4, 1976. Those regulations mandated each federal coal lease to be a logical mining unit (LMU) and required, among other things, a diligent development production of 2.5 percent of the recoverable reserves within 10 years of the effective date of the regulations. In December 1976, regulations were developed that established the diligence requirements for leases issued after enactment of FCLAA. Both sets of regulations defined continued operation as production of 1 percent of recoverable reserves on a 3-year average after the achievement of diligent development.

The Department of Energy (DOE) Organic Act of 1978 transferred to DOE the authority to issue diligence regulations. DOE did not assert this authority until 1981, when a joint DOE-BLM taskforce met to develop proposed regulations to implement the 1976 FCLAA diligence requirements. With the passage of the Department of the Interior Appropriations Act for fiscal year 1982, the authority to issue FCLAA diligence regulations was transferred back to the Department of Interior whose final diligence regulations became effective on August 30, 1982.

FCLAA subjects coal leases to diligent development and continued operation and requires coal to be produced in commercial quantities within 10 years of the issuance of the lease. FCLAA, however, does not specify the amount of coal production needed to satisfy these requirements. The 1982 regulations codified in 43 CFR 3483 retained the December 1976 diligence requirements for post-FCLAA leases.

These regulations changed the diligence requirements for pre-FCLAA leases by generally defining diligent development as production of 1 percent of the recoverable coal reserves within 10 years of lease readjustment. BLM is responsible for establishing recoverable reserves upon which the diligent development and continued operation requirements are based. BLM is also responsible for enforcing these requirements.

## PROPOSED ACTION

### ENVIRONMENT AND RECLAMATION

Since enactment of the Surface Mining Control and Reclamation Act (SMCRA), the Office of Surface Mining Reclamation and Enforcement (OSM) has been responsible for enforcing the environmental and reclamation aspects of surface coal mining. Surface mining permits must reflect the environmental stipulations of the leases. Where a cooperative agreement has been signed with a state, certain SMCRA responsibilities have been delegated to the state. OSM and the appropriate agency within a cooperating state are largely responsible for enforcing environmental stipulations set forth in the coal lease as well as those in the permit. The environmental and reclamation requirements of SMCRA are codified in 30 CFR Chapter VII.

Where leases are within the National Forest System, the Forest Service may require special stipulations to be attached to the permit. The Forest Service may be responsible or share responsibility for inspecting and enforcing special stipulations and environmental and reclamation requirements.

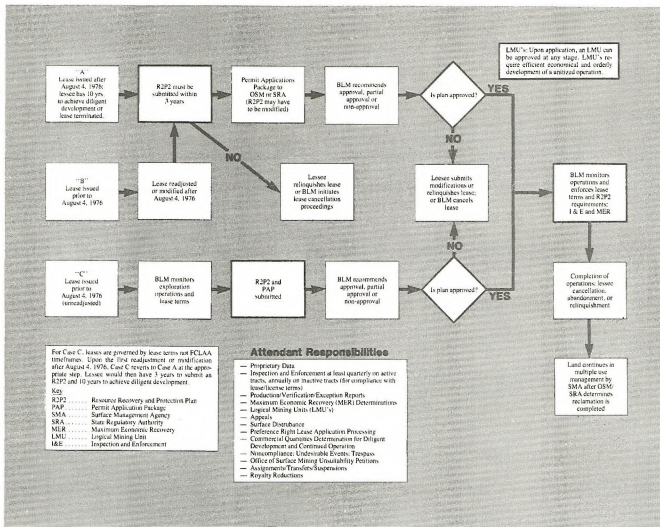
### LEASE MANAGEMENT

The management of existing leases (issued before 1976) includes both administrative and adjudicative functions. The Department of Interior applies the unsuitability standards of SMCRA to existing leases, respecting valid existing rights and substantial financial and legal commitments, Mineral Leasing Act requirements, and other applicable laws. Applying the standards and criteria is an integral part of the approval of new mines and of changes to previously approved mines.

When a mining plan is submitted for approval or change, BLM will review the proposal to determine compliance with MLA requirements and consistency with current planning and other requirements, including compliance with existing lease stipulations and the need for any more stipulations based on resource or land use considerations. At the same time, OSM (or the state) will review the proposal for compliance with SMCRA environmental and reclamation requirements. The Forest Service participates in the review of operations on leases within the National Forest System.

Figure 2-2 outlines BLM's functions in the management of leases. Note that in Case "C" leases issued before the enactment of FCLAA are governed by lease timeframes, not FCLAA timeframes. Upon the first lease readjustment or lease modification after August 4, 1976, the lessee would have 3 years to submit a resource recovery and protection plan and 10 years to achieve diligent development. Pre-FCLAA coal leases are not subject to the 1982 regulatory diligence provisions until they are readjusted or modified to add acreage or recoverable coal reserves, whichever occurs first, after August 4, 1976.

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES



**Figure 2-2 Postlease Coal Operations**

### PRLA PROCESSING

In accordance with *NRDC v. Berkland*, the Department of the Interior continues to process PRLAs that are based on coal prospecting permits issued under MLA before the enactment of FCLAA in 1976. Although FCLAA abolished this noncompetitive leasing program, it recognized valid existing rights; the Department is committed to completing the processing of outstanding PRLAs. Decisions on whether an applicant has demonstrated the discovery of coal in commercial quantities and is thus entitled to a lease are expected within 2 years for PRLAs not in conflict with areas being studied for wilderness designation. Further details of processing are outlined in 43 CFR 3430. The Department analyzes the potential environmental impacts during PRLA processing. A September 9, 1983, BLM instruction memorandum (No. 83-822), consistent with the judge's order in the *NRDC v. Berkland* litigation, offered guidance to BLM field officials on how to promote uniform application of coal regulations for PRLA processing (see Litigation section in Chapter 1). Later discussions with environmental organizations in 1983 and 1984 led to a BLM commitment to prepare site-specific or regional EIS for most remaining PRLAs. (See further discussion in Chapter 1.)

## LEASING BY APPLICATION ALTERNATIVE

Where the land for the PRLA is not included in a resource management plan or management framework plan amendment for coal, the Department conducts a land use analysis. PRLAs are exempt from the surface owner consent requirement of SMCRRA, but surface owners may be afforded some protection through the applying of unsuitability criteria, especially Criterion 3. Surface owners are also provided compensation under the act transferring title from the government to private individuals.

### NEPA PROCEDURES

Environmental analysis to meet the requirements of the National Environmental Policy Act (NEPA) is an integral part of all stages of the federal coal management program. Environmental analyses are prepared on (1) resource management plans, (2) individual delineated tracts, (3) the combinations of tracts representing leasing level alternatives, (4) exploration licenses issued for federal coal, (5) mining permits, and (6) special cases such as lease applications.

Environmental documents for land use planning and leasing of coal on National Forest System lands are prepared as part of national forest land use plans. The regional EISs analyze impacts expected from mining a particular amount of coal in specific tracts in that region. A 1984 proposed rule change would delete the reference to a preferred alternative in an EIS and replace it with a requirement for identification of one combination of tracts as the proposed action.

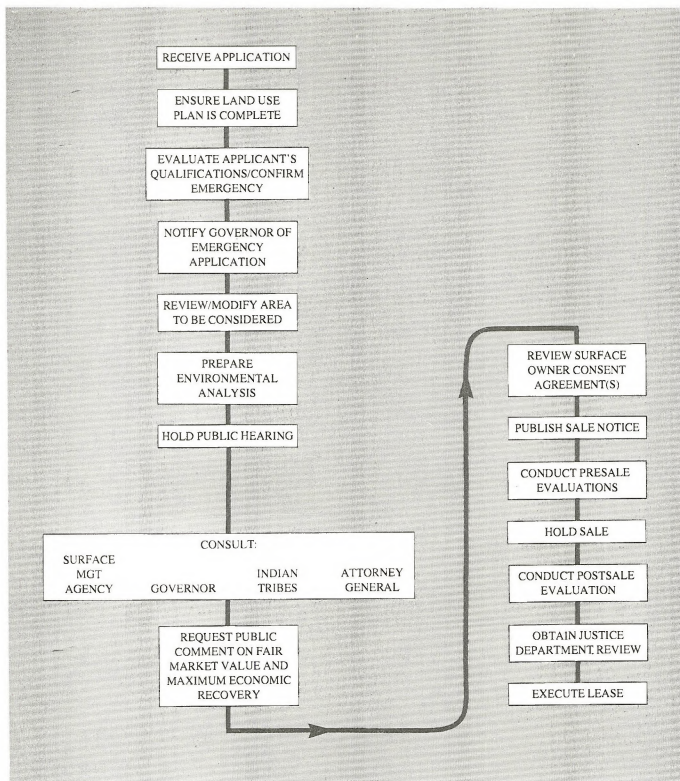
### EMERGENCY SALES PROCEDURES

As the 1979 FES anticipated, certain situations arise in which the Department of the Interior must respond to a need for federal coal leases more quickly than the full activity planning system allows. The Proposed Action thus provides for the emergency leasing of small amounts of federal coal needed by an applicant to maintain an existing level of production, to meet contract obligations, or to prevent a bypass of federal coal. Bypass refers to the situation in which a deposit of federal coal would later be rendered economically unmineable because an ongoing operation (on an adjacent federal lease or adjacent nonfederal coal) mined around it. The most federal coal that can be leased under this form of competitive leasing is the amount needed to support 8 years of production at the rate maintained by the applicant at the time of application. Details of the qualifications for applying for emergency leases are published in 43 CFR 3425.

## LEASING BY APPLICATION ALTERNATIVE

Under the Leasing By Application program alternative, the Department of the Interior would consider offering federal coal for lease sale only in response to an application for a specific quantity in a specific location. All federal coal would be offered through competitive sales, but the regional efforts of activity planning would not be part of this program. Although no market analyses would be conducted, RCTs could be retained to carry out consultation with the state before lease sale decisions. Figure 2-3 shows the major steps in this alternative.

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES



**Figure 2-3 Flow Chart of Leasing by Application**

## LEASING BY APPLICATION ALTERNATIVE

### PLANNING

In accordance with section 3(3)(A) of FCLAA, no federal coal would be offered unless the lands containing the coal are included in a comprehensive land use plan. All land use planning procedures would be the same as those described for the Proposed Action, except that amendments to management framework plans could still be used to support coal leasing decisions for areas where resource management plans have not been completed. In a few cases, a land use analysis may be prepared as described in the Leasing Outside Coal Production Regions discussion for the Proposed Action.

Under Leasing By Application, regional coal leasing would be replaced by a process of application leasing within each coal state. The Federal-State Coal Advisory Board and the regional coal teams (RCTs) might continue in their advisory role to the Secretary of the Interior, but this alternative would eliminate national market analyses; calls for expressions of interest, establishment of leasing levels, and selection of tracts for lease offering. The duties and scope of the board and the RCTs would thus be greatly reduced from those under the Proposed Action. General procedures under Leasing by Application, including consultation with the states, are described in the Leasing Outside Coal Production Regions discussion for the Proposed Action.

### SALES PROCEDURES

Sales procedures under Leasing by Application would be similar to those described for the Proposed Action. Tracts might be offered through intertract bidding under either of the following conditions: (1) if several applications are received in an area and the environmental analysis shows that if all areas/tracts applied for are offered for sale and developed, a threshold level (for example, socioeconomic impacts on a community) might be exceeded or (2) if two or more applications are received that overlap but are not identical. The Department might also offer some federal coal through cooperative leasing and in special leasing opportunities for public bodies (as provided in Section 2 of FCLAA) or small businesses.

### LEASE ENFORCEMENT/MANAGEMENT SYSTEM

Procedures for enforcement of lease terms and conditions and for lease management described for the Proposed Action would also be used for the Leasing by Application Alternative.

### PRLA PROCESSING

Outstanding PRLAs would be processed as a priority under Leasing by Application as under the Proposed Action.

### NEPA PROCEDURES

Environmental analyses under Leasing by Application would originate with and focus on individual applications. If several applications are received for one general area at the same time, the Department could combine them in one NEPA document. Cumulative analysis would be accomplished through the "with-and-without" approach now used by the Department, involving analysis of

## DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

expected coal and noncoal development both with and without applications. Alternative tract configurations and timing of proposed lease tract offerings could be incorporated as other alternatives for consideration.

### PREFERENCE RIGHT AND EMERGENCY LEASING ALTERNATIVE

Under Preference Right and Emergency Leasing, federal coal leasing would be limited to coal deposits needed to meet emergency situations (as described for the Proposed Action) and coal deposits applied for in PRLAs. Activity planning and market analyses would not be components of this program alternative.

### PLANNING

The Department would continue to offer only that coal in the West on lands included in a comprehensive land use plan, as described for the Leasing by Application Alternative. Federal coal in the East would be offered by using a land use analysis. Regional coal teams would be abolished, and coordination with the states would be as described for Leasing Outside Coal Production Regions in the Proposed Action discussion.

### SALES PROCEDURES

Sales procedures under this program would be similar to the procedures described for the Leasing by Application Alternative.

### LEASE ENFORCEMENT/MANAGEMENT SYSTEM

Enforcement of lease terms and conditions and lease management procedures for Preference Right and Emergency Leasing would be the same as that described for the Proposed Action.

### PRLA PROCESSING/NEPA PROCEDURES

PRLA processing would be the same as that described for the Proposed Action. NEPA procedures would also be the same as those described for the Proposed Action.

### NO NEW FEDERAL LEASING (NO ACTION) ALTERNATIVE

Under No New Federal Leasing, no program would be in place to analyze the need for leasing or to respond to lease applications. No federal coal would be offered at competitive lease sales, leased through approval of PRLAs, or leased through exchanges, and the supply of federal coal would be limited to that already under lease. The Department of the Interior could either request that Congress provide relief to preference right lease applicants to eliminate the need to further process outstanding PRLAs, or indefinitely postpone this processing. BLM coal program activities would be limited to supervision of terms and conditions of existing leases.

The No New Federal Leasing Alternative is viewed as the no action alternative pursuant to the interpretation by the Council on Environmental Quality (CEQ)



## LEASING BY APPLICATION ALTERNATIVE

of its regulations published in the Federal Register on March 23, 1981, 46 Fed. Reg., 18026. Although CEQ did not address the situation where an agency is supplementing an existing EIS and the Proposed Action is a continuation of the program, CEQ's discussion of the situation where an agency is required by law to act is analogous. CEQ stated that a no action alternative would be required to provide "a benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives." All "action" alternatives in this case involve in some form the continuation of a coal leasing program.



## CHAPTER 3

### Production Forecasts





### ORGANIZATION AND SUMMARY

This chapter has three sections in addition to this introduction. The first section describes how coal production forecasts were derived and the major assumptions behind these forecasts. The next section presents the forecasts and briefly explains their significance. The final section compares these and other recent forecasts with forecasts compiled for the 1979 FES (BLM 1979a).

Chapter 3 summarizes a technical report (BLM 1985b) that presents the forecasting methodology and results in greater detail, describes the sensitivity analysis used as the basis for the production levels, and provides more information on the derivation of the regional capacity estimates. Copies of the Production Forecast Technical Report may be obtained from the BLM Washington Office, Office of Solid Leasable Minerals (641), 18th and C Streets NW, Washington, DC 20240.

Coal demand forecasts used in this supplemental EIS were derived through a cooperative effort between BLM and the Department of Energy (DOE). Developing the forecasts involved combining the detailed historical and near-term (to 1995) energy data and coal outlook from DOE's Energy Information Administration (EIA); the broader, long-term (2000 and beyond) energy projections of DOE's Policy and Fossil Energy offices; and the BLM field staff's regional and mine-specific evaluation of coal production capacities through the year 2000. A major tool used in this analysis is the DOE's National Coal Model (NCM). Chapter 3 describes the NCM and its use in this effort, includes a brief discussion of the major economic and energy assumptions behind the three production levels, and discusses how alternative assumptions were incorporated into the analysis.

The coal demand forecasts show that the alternative federal coal leasing programs analyzed in this supplemental EIS may affect patterns of U.S. energy production and consumption in the future. Table 3-1 shows the range of the forecasts in the three DOE coal-producing aggregated regions of the United States and the effect on these aggregated regions of the Proposed Action versus No New Federal Leasing alternatives. More detailed tables later in this chapter show the effects on the individual federal coal production regions.

The Leasing by Application Alternative is not shown in Table 3-1 because this alternative's production forecasts are the same as those of the Proposed Action. The Preference Right and Emergency Leasing Alternative is not shown in Table 3-1 because Table 3-1 is intended to present a range of forecasts and this alternative falls within the range between the Proposed Action and No New Federal Leasing.

## ORGANIZATION AND SUMMARY

TABLE 3-1  
REGIONAL PRODUCTION FORECASTS  
(million tons/year)

Aggregated Regions	Low				Medium			High		
	<u>Production Level</u>				<u>Production Level</u>			<u>Production Level</u>		
	1985*	1990	1995	2000	1990	1995	2000	1990	1995	2000
<b>PROPOSED ACTION</b>										
Total U.S.	909	1030	1180	1350	1076	1304	1580	1100	1350	1800
Appalachian	460	520	575	615	552	632	725	560	650	800
Midwestern	193	210	275	350	222	307	405	200	250	385
Western	256	300	330	385	302	365	450	340	450	615
<b>NO NEW FEDERAL LEASING</b>										
Total U.S.	909	1030	1180	1350	1076	1304	1580	1100	1350	1775
Appalachian	460	520	575	615	552	632	725	560	650	810
Midwestern	193	210	275	350	222	307	410	200	250	415
Western	256	300	330	385	302	365	445	340	450	550

\*1985 production is based on DOE/EIA's fall 1984 estimate.

In Table 3-1, the Appalachian regions include Ohio, Pennsylvania, Maryland, Virginia, West Virginia, eastern Kentucky, eastern Tennessee, the Carolinas, Georgia, and Alabama. The Western regions consist of the northern Great Plains, the Rocky Mountain states, the Southwest, the Northwest, and Alaska. The Midwestern regions consist of all states between the Appalachian and Western regions, including Texas. The Alabama Subregion is in the Appalachian regions, the Oklahoma Subregion is in the Midwestern regions, and the remaining regions are in the Western regions.

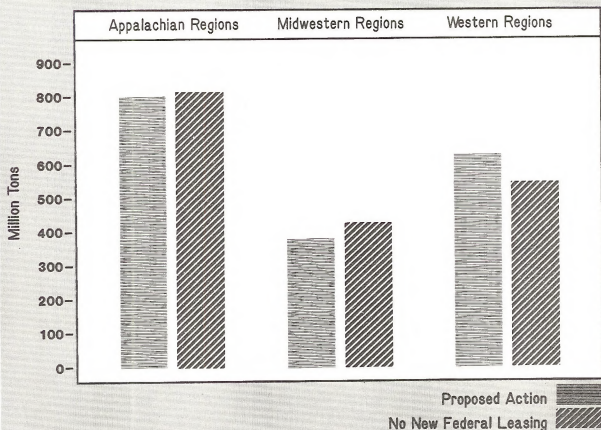
Table 3-1 generally reflects what happens among coal-producing regions of the Nation at low, medium, and high production levels. At the low production level, the Proposed Action and No New Federal Leasing do not significantly differ. At the medium production level, differences do not appear until 2000, but even then only a limited area and small tonnages are affected. At the high production level, differences are significant and widespread by 2000, especially in the Western and Midwestern regions. These differences are shown in Figure 3-1.

The final section of Chapter 3 compares the current BLM and other forecasts with those in the Federal Coal Management Program Final Environmental Statement (1979 FES) (BLM 1979a). The current forecasts show lower growth rates for coal demand than projected in the 1979 FES. The 1979 forecasts reflected the general wisdom at the time, which did not anticipate the huge leap in world oil prices and the depressing effect of that leap on the United States and world economies.

## PRODUCTION FORECASTS

### COAL PRODUCTION FORECASTS

Proposed Action versus No New Federal Leasing  
High Production Level in Year 2000



**3-1 Coal Production Forecasts, Proposed Action Versus No New Federal Leasing**

#### FORECASTING METHODOLOGY

The methodology used in forecasting involves (1) generating regional energy demands given a set of assumptions and then (2) finding the lowest cost of supplying that energy, given regional coal availability and existing/planned transportation networks. In practice, this process becomes quite complex. The following discussion summarizes that process and the main assumptions used. A more detailed discussion of the methodology and the sensitivity analysis used to derive the production forecasts presented later in Chapter 3 appears in the Production Forecasts Technical Report (BLM 1985b).

BLM has been providing regional coal production forecasts to the regional coal teams (RCTs) for their use in estimating appropriate levels of federal coal reserves to be offered at lease sales. BLM's preparation of these forecasts has involved close cooperation with the BLM field staff and DOE/EIA. BLM has been using the National Coal Model (NCM), but has modified the model's supply regions in the West to correspond directly to BLM coal leasing regions.

## ENERGY AND ECONOMIC ASSUMPTIONS

In preparing forecasts for the RCTs, BLM starts with EIA's Annual Energy Outlook scenarios as base cases but usually makes changes to analyze issues of particular concern to the Western regions.

Updating the 1979 FES (BLM 1979a), however, presents forecasting problems beyond those of recent years. The analysis for this supplemental EIS needs to look beyond 1995 to the year 2000. Because this supplemental EIS is designed to guide the choice of a coal program over the next 5 years, the resulting impacts of leasing coal from 1985 through 1990 would not occur until after 1995 because of the 8 to 10 year lead time needed to develop a lease into a producing mine. EIA is mandated to publish forecasts only through 1995, but DOE's Policy Office looks beyond 2000 and is concerned about the long-term effects of the federal coal leasing program. Although the Policy Office's forecasts are conducted on a national rather than a regional basis, national forecasts can provide the main economic and energy assumptions needed for the regional analysis.

EIA and DOE's Policy Office have provided much help in extending current forecasts to 2000. Another important aspect of the overall analysis--the regional production potential under different federal leasing policies--has been provided by BLM's field staff.

### ENERGY AND ECONOMIC ASSUMPTIONS

The following sections summarize the primary assumptions used in the supply and demand analysis. The impact analysis of this supplemental EIS uses three production levels: low, medium, and high. These levels correspond to levels of coal production in the West and to low, medium, and high total U.S. coal production. Because of shifts in production from one part of the U.S. to another under alternative assumptions, a subregion's (such as the Montana portion of Powder River) low, medium, and high production forecasts do not necessarily correspond to the overall U.S. low, medium, and high production levels. Particular instances of these disjunctive effects are explained in the forecast discussions. The main assumptions that affect demand forecasting are as follows.

#### NUCLEAR GENERATING CAPACITY

A key factor affecting the future demand for coal for electricity generation is projected growth in nuclear generating capacity. Table 3-2 shows that the highest nuclear capacity is used in the model for the low coal production level. This nuclear capacity forecast assumes that all plants that are more than 30 percent built now will be operating by 2000. The medium coal production level nuclear capacity assumes that all plants that are more than 50 percent built now will be operating by 2000. The high coal production level nuclear capacity assumes that only those plants that are now more than 80 percent built will be operating by 2000. All cases assume that several small, older nuclear power plants will be shut down at the end of 30 years of operation.

#### WORLD OIL PRICES

World oil prices play a major role in the demand for coal. Low oil prices stimulate economic growth, which in turn (1) increases the demand for



## PRODUCTION FORECASTS

TABLE 3-2  
NUCLEAR CAPACITY ASSUMPTIONS FOR PRODUCTION FORECASTS  
(in gigawatts\*/year)

Production Level	1990	1995	2000
Low	107	113	115
Medium	107	113	110
High	103	109	107

\*1 gigawatt = 1 billion watts.

electricity, (2) fuels the industrial demand for coal, and (3) stimulates the demand for coal exports. This effect of oil prices far outweighs the effect of substituting coal for oil when oil prices are high. The use of coal to manufacture synthetic fuels becomes a factor only under high oil prices, but the use of coal to make synfuels is still small compared to the drop in coal use resulting from lower economic growth and electricity demand caused by high oil prices. Boiler fuel will still be switched from oil to coal unless the price of oil drops below \$20 per barrel. Such switching will probably be slower at lower oil prices than at higher oil prices, but this effect is also relatively insignificant. Thus, as is shown in Table 3-3, low oil prices correspond to high electricity (and thus coal) demand.

Table 3-3 also shows that electricity demand stays even with gross national product (GNP) growth at the medium production level, trails GNP growth at the low production level, and leads GNP growth at the high production level.

TABLE 3-3  
WORLD OIL PRICES AND U.S. GROWTH RATES

Production Level	World Oil Prices (1983 dollars/barrel)			Percent Annual Growth (1985-2000)	
	1990	1995	2000	Gross National Product	Electricity Demand
Low	\$32	\$45	\$57	2.6%	2.3%
Mid	29	37	45	2.9	3.0
High	26	35	36	3.2	3.5

### ADDITIONAL ASSUMPTIONS

The following assumptions are also used in the analysis.

- At the high production level, coal generating capacity fulfills a large proportion of new capacity needs, partly because of the decline in the nuclear industry and the assumption that industry can build the needed

## ENERGY AND ECONOMIC ASSUMPTIONS

coal-fired generating plants in time. At the low production level, coal lags due to energy conservation, refurbishing of existing oil and gas plants, and the slightly higher nuclear capacity.

- The high production level assumes the passage of national acid rain legislation, allowing utilities a choice between using low sulfur coal or installing scrubbers. The low and medium production levels do not make this assumption.
- The high production level also assumes relatively lower transportation costs for the Wyoming portion of the Powder River Region.

### SUPPLY ASSUMPTIONS

In the supply analysis for the Proposed Action, potential production capacity is assumed to be restricted only by the economics of developing the demonstrated reserve base (DRB). This assumption also models what could happen under the Leasing by Application Alternative. Although both program alternatives assume that any economically developed federal coal needed to meet demand would be leased in time to do so, the timely meeting of demand would depend upon the foresight of the regional coal teams, industry, or both. Coal not in the DRB is assumed not to have any significant effect before 2000. A similar assumption for new mining technology is supported by DOE's Policy Office and DOE's Fossil Energy Division.

The opposite case from the Proposed Action and Leasing by Application is No New Federal Leasing, which could result from a deliberate policy not to lease any federal coal or from a program that makes leasing so procedurally difficult as to prevent coal from being mined when it is needed. Table 3-4 summarizes the regional production capacities from existing and projected mines under No New Federal Leasing as estimated by the BLM field staff. These capacity figures represent a baseline against which to estimate impacts of the other three program alternatives.

Where the BLM field staff revealed a range of possible mine capacities, the analysis used the lower end of the range to highlight and contrast the differences in environmental impacts of the leasing program alternatives in this supplemental EIS. In Alabama, the proportion of federal coal is small, and the nature of the market is such that federal leasing will not significantly affect potential capacities. In the Western regions, the BLM field staff included all private, state, Indian, and federal coal that could be mined without more federal leasing. The estimates include only properties that could be economically mined under current conditions if the demand existed. As they are terminated, federal leases that the staff expects will not meet diligence requirements are eliminated from consideration as potential capacity. The capacities account for depletion and represent long-term rather than short-term peak capacities. Actual mine plan information was used where it existed. Properties lacking mine plans were compared to similar properties having mine plans.

The Preference Right and Emergency Leasing Alternative adds potential production capacity to the No New Federal Leasing Alternative as an outgrowth of the issuance of preference right and emergency leases. Emergency lease tracts are small, with enough reserves to support only a few years'

## PRODUCTION FORECASTS

TABLE 3-4  
COAL PRODUCTION CAPACITY--NO NEW FEDERAL LEASING  
(million tons/year)

	1990	1995	2000
<b>Fort Union Region</b>			
North Dakota	33	33	29
Montana	<1	<1	4-17
<b>Powder River Region</b>			
Montana	42	68-100	72-108
Wyoming	245	249	252
<b>Green River-Hams Fork</b>			
Colorado	26	33	45
Wyoming	27	29	41
<b>Uinta-Southwestern Utah Region</b>			
Colorado	20	20	21
Utah	22	28	33
<b>San Juan River Region</b>			
Colorado	3	3	4
New Mexico	26-39	39-58	44-66

production. The main function of emergency leasing is to prevent unnecessary economic hardship, mine closings, or coal bypass. Estimating potential production capacity stemming from the issuance of new preference right leases is difficult because environmental uncertainties surround many outstanding PRLAs and many PRLAs have not yet been evaluated for commercial quantities, a test that must be passed if a lease is to be issued. In estimating capacities, the field staff used assumptions and procedures similar to those used for No New Federal Leasing. They generally presented these estimates as a range, and as with No New Federal Leasing, the low end of the range was used in the analysis. Table 3-5 presents the field staff's estimates of production capacity for Preference Right and Emergency Leasing.

An additional aspect of these capacity estimates of importance in assessing environmental impacts of the leasing program alternatives is how much of this capacity would come from new mines and how much would come from existing mines that have been upgraded or extended through construction or addition of new equipment. Table 3-6 gives the breakdown used for this determination in the impact analysis. The numbers are the capacities of existing mines (million of tons annual production) with and without new construction or equipment. The differences between these capacities and the above coal production capacities in Table 3-5 is the expected production from entirely new mines.

## PRODUCTION FORECASTS

TABLE 3-5  
TOTAL COAL PRODUCTION CAPACITY,  
INCLUDING PREFERENCE RIGHT AND EMERGENCY LEASES  
(million tons/year)

	1990	1995	2000
<b>Fort Union Region</b>			
North Dakota	35	37-42	38-44
Montana	<1	<1	4-17
<b>Powder River Region</b>			
Montana	48	78-110	82-118
Wyoming	245	262	265
<b>Green River-Hams Fork</b>			
Colorado	30-34	38-53	50-66
Wyoming	29	35	45
<b>Uinta-Southwestern Utah Region</b>			
Colorado	20-23	21-26	21-28
Utah	23	35	36
<b>San Juan River Region</b>			
Colorado	3	4	4
New Mexico	26-39	51-71	80-102

### PRODUCTION FORECASTS

The production forecasts are the outgrowth of sensitivity analyses using the National Coal Model (NCM), powerplant schedules, mine plans, and professional judgment. The NCM is a large linear programming model that attempts to satisfy a given set of energy demands at minimum cost from the selected coal supply curves and transportation networks. The model's main feature is its electric utilities portion because coal-fired powerplants are the major consumers of domestically produced coal. The model selects fuels, simulates powerplant construction decisions, restricts emissions, and considers interregional power transmission. Other coal demands are input for each demand region. The interregional transportation network is based upon the algorithm used in EIA's Coal Supply and Transportation Model (CSTM). The transportation costs are derived from current rates with mileage, fuel costs, terrain, congestion, and competition as variables. The supply curves for each coal region are produced by the Resource Allocation and Mine Costing Model (RAMC). Separate supply curves are generated for up to 30 coal types for surface and underground mining. Documentation of these models and their use may be obtained from EIA. Details of changes made for this analysis and their

## PRODUCTION FORECASTS

TABLE 3-6  
CAPACITY OF EXISTING OPERATIONS  
(million tons/year)

Region	Without New Construction	With New Construction or Equipment		
		1990	1995	2000
Fort Union	23	33	33	30
Powder River				
Wyoming	120	160	160	160
Montana	35	42	50	52
Green River-Hams Fork				
Wyoming	22	27	29	41
Colorado	16	26	33	45
San Juan River	25	28	28	28
Uinta-Southwestern Utah				
Colorado	6	20	20	20
Utah	15	22	28	33

use in the production forecasts are presented in the Production Forecasts Technical Report (BLM 1985b).

None of the production levels is based on one particular run of the NCM. Because the NCM, like any other model, is only an approximation of reality, sensitivity analysis and professional judgment are used to avoid the weaknesses of the model and to include important elements that may be lost in a single execution of the model. Table 3-7 and Figure 3-2 show regional coal production forecasts for No New Federal Leasing, Leasing by Application, Preference Right and Emergency Leasing, and the Proposed Action. Figure 3-3 compares production forecasts of the 1979 FES (BLM 1979a) to those of this supplemental EIS.

The forecasts for the Proposed Action essentially assume that both government and industry have the foresight to make needed reserves available (through regional lease sales and leasing by application) in time for the reserves to be developed.

At the other end of the spectrum is the No New Federal Leasing Alternative. The conditions that No New Federal Leasing assumes could result under any alternative. Even processing of PRLAs or having a leasing program in place does not guarantee that the additional reserves required under any particular alternative will be leased and developed in a timely fashion. Thus the forecasts under No New Federal Leasing represent feasible possibilities.

The third set of forecasts assumes that PRLAs are processed and emergency leasing is allowed. Although emergency leasing could be analyzed separately

## PRODUCTION FORECASTS

TABLE 3-7  
PRELIMINARY ESTIMATES OF ANNUAL COAL PRODUCTION  
(million tons)

Fort Union Region (includes North Dakota and small parts of Montana)			
Production Level	No New Federal Leasing (Baseline)	Preference Right and Emergency Leasing	Proposed Action*
<b>1990</b>			
Low	24	24	24
Medium	24	24	24
High	24	24	24
<b>1995</b>			
Low	33	33	33
Medium	33	36	36
High	33	37	37
<b>2000</b>			
Low	33	36	36
Medium	33	42	44
High	33	42	51

Note: Projected production would involve only surface mining.  
\*Production under Leasing by Application would be the same as for the Proposed Action.

Powder River Region									
Production Level	No New Federal Leasing (Baseline)			Preference Right and Emergency Leasing			Proposed Action*		
	Wyoming	Montana	Total	Wyoming	Montana	Total	Wyoming	Montana	Total
<b>1990</b>									
Low	121	41	162	121	41	162	120	41	161
Medium	121	41	162	121	41	162	120	41	161
High	157	42	199	155	42	197	155	42	197
<b>1995</b>									
Low	127	42	169	127	42	169	127	42	169
Medium	153	45	198	150	44	194	150	44	194
High	222	45	267	218	45	263	218	45	263
<b>2000</b>									
Low	170	44	214	167	44	211	167	44	211
Medium	200	50	250	197	49	246	195	49	244
High	252	72	324	265	75	340	310	64	374

Note: Projected production would involve only surface mining.  
\*Production under Leasing by Application would be the same as for the Proposed Action.

## PRODUCTION FORECASTS

TABLE 3-7 (continued)  
PRELIMINARY ESTIMATES OF ANNUAL COAL PRODUCTION  
(million tons)

Green River-Hams Fork Region										
Production Level	No New Federal Leasing (Baseline)			Preference Right and Emergency Leasing			Proposed Action*			
	Wyoming	Colorado	Total	Wyoming	Colorado	Total	Wyoming	Colorado	Total	
<b>1990</b>										
Low	Surface	21	11	32	21	11	32	20	11	31
	Subsurface	<u>0</u>	<u>4</u>	<u>4</u>	<u>0</u>	<u>4</u>	<u>4</u>	<u>0</u>	<u>4</u>	<u>4</u>
	Total	21	15	36	21	15	36	20	15	35
Medium	Surface	22	10	32	22	10	32	21	10	31
	Subsurface	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>
	Total	22	15	37	22	15	37	21	15	36
High	Surface	22	10	32	22	10	32	22	10	32
	Subsurface	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>
	Total	22	15	37	22	15	37	22	15	37
<b>1995</b>										
Low	Surface	23	11	34	23	11	34	23	11	34
	Subsurface	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>
	Total	23	16	39	23	16	39	23	16	39
Medium	Surface	27	11	38	27	11	38	27	11	38
	Subsurface	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>
	Total	27	16	43	27	16	43	27	16	43
High	Surface	27	11	38	27	11	38	27	11	38
	Subsurface	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>
	Total	27	16	43	27	16	43	27	16	43
<b>2000</b>										
Low	Surface	25	12	37	25	12	37	25	12	37
	Subsurface	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>
	Total	25	17	42	25	17	42	25	17	42
Medium	Surface	31	12	43	31	12	43	31	12	43
	Subsurface	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>
	Total	31	17	48	31	17	48	31	17	48
High	Surface	35	20	55	33	17	50	30	15	45
	Subsurface	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>5</u>	<u>5</u>
	Total	35	25	60	33	22	55	30	20	50

\*Production under Leasing by Application would be the same as for the Proposed Action.

## PRODUCTION FORECASTS

TABLE 3-7 (continued)  
PRELIMINARY ESTIMATES OF ANNUAL COAL PRODUCTION  
(million tons)

Production Level	Uinta-Southwestern Utah Region								
	No New Federal Leasing (Baseline)			Preference Right and Emergency Leasing			Proposed Action		
	Colorado	Utah	Total	Colorado	Utah	Total	Colorado	Utah	Total
<b>1990</b>									
Low	5	22	27	5	22	27	5	22	27
Medium	5	22	27	5	22	27	5	22	27
High	6	22	28	6	22	28	6	22	28
<b>1995</b>									
Low	6	26	32	6	26	32	6	26	32
Medium	6	27	33	6	27	33	6	27	33
High	7	29	36	7	30	37	7	30	37
<b>2000</b>									
Low	7	28	35	7	28	35	7	28	35
Medium	7	30	37	7	30	37	7	30	37
High	10	33	43	7	40	47	7	40	47

Note: All mines would be subsurface underground except for some small surface mines in Colorado.  
\*Production under Leasing by Application would be the same as under the Proposed Action.

San Juan River Region*			
Production Level	No New Federal Leasing (Baseline)	Preference Right and Emergency Leasing	Proposed Action**
<b>1990</b>			
Low	28	28	30
Medium	28	28	30
High	28	28	30
<b>1995</b>			
Low	34	34	34
Medium	38	38	38
High	41	40	40
<b>2000</b>			
Low	37	37	37
Medium	46	46	46
High	48	56	56

Note: Projected production would involve only surface mining.  
Mining would occur mostly in New Mexico, less than one-third million tons would be mined in Colorado.  
\*High production level is based on the assumption that a railroad will be built into the San Juan Basin.  
\*\*Production under Leasing by Application would be the same as under the Proposed Action.



## PRODUCTION FORECASTS

TABLE 3-7 (concluded)  
PRELIMINARY ESTIMATES OF ANNUAL COAL PRODUCTION  
(million tons)

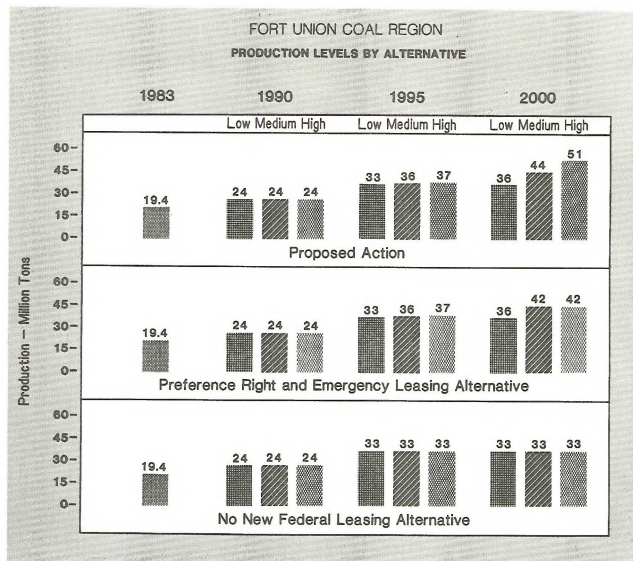
Alabama Subregion			
Production Level	No-Action (Baseline)	Preference Right and Emergency Leasing*	Proposed Action**
<b>1990</b>			
Low			
Surface	12	12	12
Subsurface	<u>18</u>	<u>18</u>	<u>18</u>
Total	30	30	30
Medium			
Surface	14	14	14
Subsurface	<u>21</u>	<u>21</u>	<u>21</u>
Total	35	35	35
High			
Surface	14	14	14
Subsurface	<u>21</u>	<u>21</u>	<u>21</u>
Total	35	35	35
<b>1995</b>			
Low			
Surface	10	10	10
Subsurface	<u>20</u>	<u>20</u>	<u>20</u>
Total	30	30	30
Medium			
Surface	15	15	15
Subsurface	<u>21</u>	<u>21</u>	<u>21</u>
Total	36	36	36
High			
Surface	15	15	15
Subsurface	<u>21</u>	<u>21</u>	<u>21</u>
Total	36	36	36
<b>2000</b>			
Low			
Surface	10	10	10
Subsurface	<u>20</u>	<u>20</u>	<u>20</u>
Total	30	30	30
Medium			
Surface	16	16	16
Subsurface	<u>21</u>	<u>21</u>	<u>21</u>
Total	37	37	37
High			
Surface	16	16	16
Subsurface	<u>21</u>	<u>21</u>	<u>21</u>
Total	37	37	37

Note: All surface mines are small (average--150,000 tons per year) as are underground mines (average--775,000 tons per year).

\*In the Alabama Subregion, this alternative would involve issuance of emergency but not preference right leases, as there are no PRLAs in this subregion.

\*\*Production under Leasing by Application would be the same as under the Proposed Action.

## PRODUCTION FORECASTS



**Figure 3-2a**

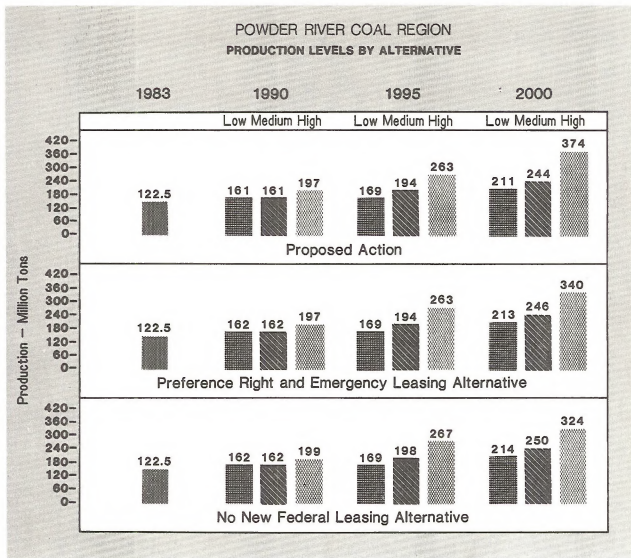
as an alternative, its effects are insignificant. Emergency leasing was combined with preference right leasing to represent the next step down from a full regional leasing program.

### TRANSPORTATION DESTINATIONS

The destinations of coal mined from the federal coal production regions will vary at each coal production level. Table 3-8 compares coal distribution from Western regions under the Proposed Action and No New Federal Leasing.

The 1985 distribution estimates are based on current distribution of western coal and are extended to include growth over the next year and scheduled plant startups and contractual arrangements for this period. The 1985 estimates are the same at all production levels.

## PRODUCTION FORECASTS



**Figure 3-2b**

The destinations used in Table 3-8 are defined as follows:

Local region is the coal supply region and nearby markets.

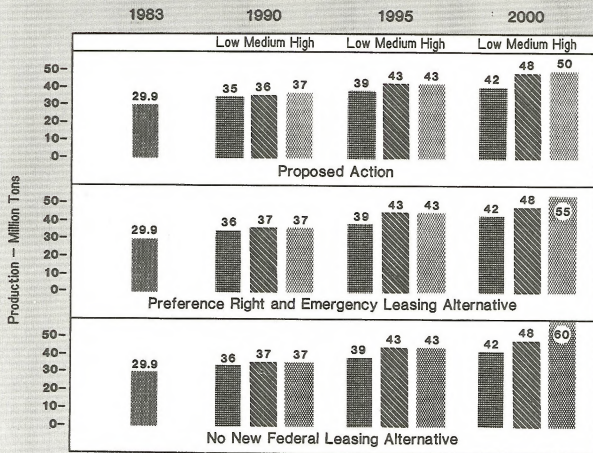
Other Rockies includes the rest of the Rocky Mountain states outside the local region (Montana, Idaho, Wyoming, Colorado, Utah, Nevada, Arizona, New Mexico).

Midwest includes the states east of the Rocky Mountain states, west of the Mississippi River, and some areas in states just east of the Mississippi River (especially Illinois).

West includes Washington, Oregon, California, and some coal for export from the West Coast. In some cases coal for generating electricity in these states may actually go to powerplants just over the border in Nevada or Arizona, particularly coal from the Uinta-Southwestern Utah and San Juan River regions.

## PRODUCTION FORECASTS

### GREEN RIVER-HAMS FORK COAL REGION PRODUCTION LEVELS BY ALTERNATIVE



**Figure 3-2c**

The federal coal production regions in the West are as follows:

Powder River--southeast Montana and Northeast Wyoming;

Fort Union--eastern Montana and western North Dakota;

Green River-Hams Fork--southern Wyoming and northern Colorado;

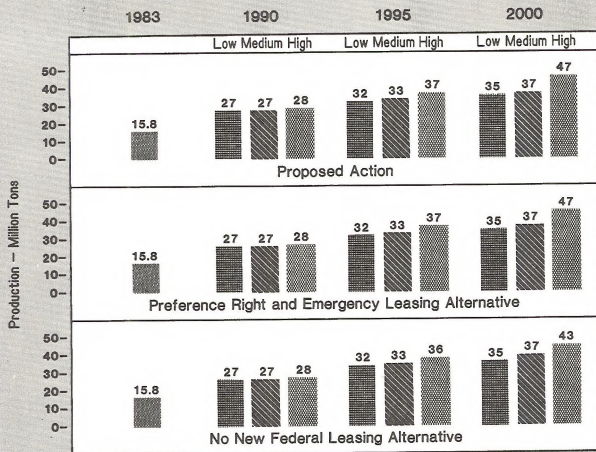
Uinta-Southwestern Utah--southern and western Utah and western Colorado;

San Juan River--northwest New Mexico, southwest Colorado, and northeast Arizona.

Much of the demand in the Western regions (particularly in the Fort Union, Powder River, and San Juan River regions) is for powerplants that transmit electricity outside the regions.

## PRODUCTION FORECASTS

### UINTA-SOUTHWESTERN UTAH COAL REGION PRODUCTION LEVELS BY ALTERNATIVE

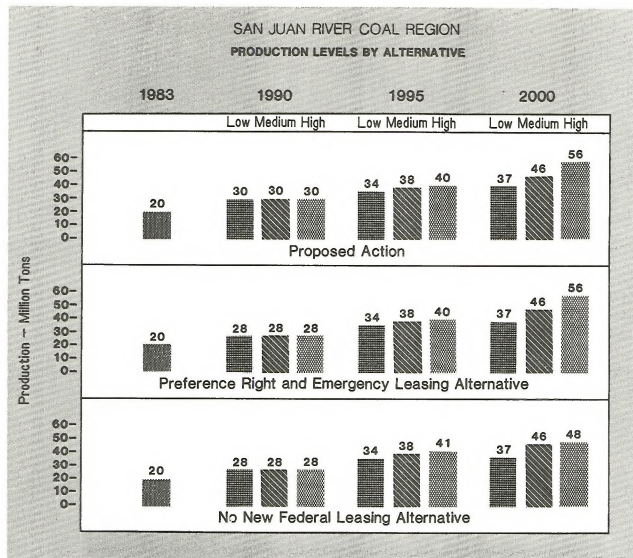


**Figure 3-2d**

At the medium production level under the Proposed Action, most markets would gradually grow but make a large jump between 1995 and 2000, when it is assumed that nuclear capacity will stagnate and excess electric generation capacities will disappear. In absolute numbers, the Powder River Region will continue to dominate the market, but the relative increases will be larger in the Fort Union, San Juan River, and Uinta-Southwestern Utah regions. (The Uinta-Southwestern Utah Region's increase is somewhat exaggerated because this region appears to be taking longer to recover from the recession in which its coal production was severely depressed.) The low production level shows similar but smaller gains in all regions.

The high production level has the highest production in all regions, but production is much higher on an absolute level in the Powder River Region. The combination of acid rain legislation, allowing tradeoffs between low sulfur coal and scrubbers, and relatively lower transportation rates out of the Powder River Region will allow this region to capture much of the increased demand outside the West. The Powder River Region will even capture

## PRODUCTION FORECASTS



**Figure 3-2e**

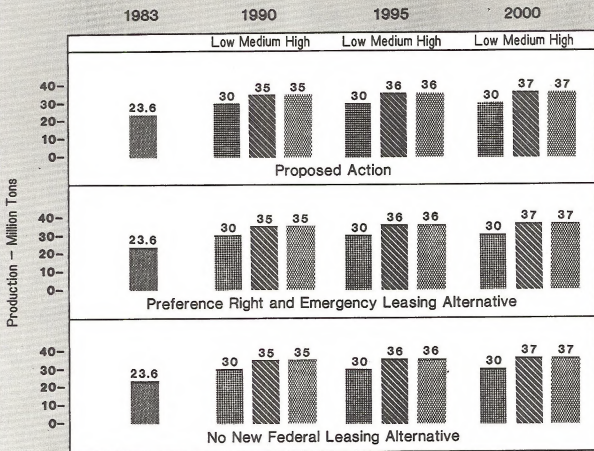
some projected production that midwestern coal producers had been expected to gain at medium level production, mainly because of acid rain restrictions. This shift will mostly affect the small producers in Illinois and in the Midwest west of the Mississippi River. The East will also capture some of the Midwest's projected production, affecting mostly Indiana, Ohio, and western Kentucky.

Another way to examine the forecasts is to compare regional market shares to the current situation. Table 3-9 compares estimated 1985 market shares to the forecasted market shares in 2000 under No New Federal Leasing and the Proposed Action.

At the low and medium production levels, the Western regions will maintain their market share, and the Midwestern regions will gain market shares at the expense of the Appalachian regions. At the high production levels, the Western regions will gain at the expense of the Appalachian regions, and the Midwest will maintain its 1985 market share.

## PRODUCTION FORECASTS

### ALABAMA COAL SUBREGION PRODUCTION LEVELS BY ALTERNATIVE



**Figure 3-2f**

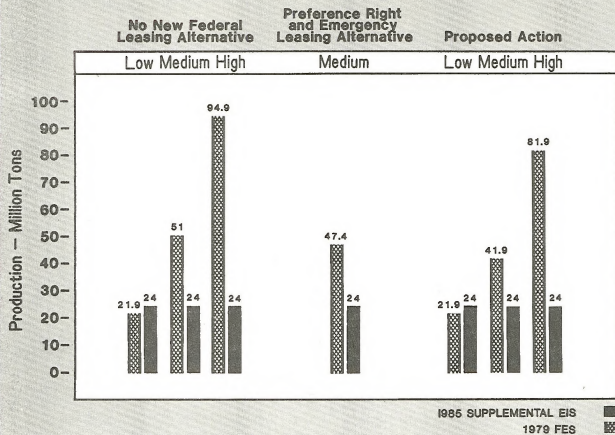
The reason for these trends is two-fold. The consistent drift westward in share of coal produced will result from the expectation that energy demand is increasing much faster in the West and Southwest than in other regions of the United States. Between the Western and Midwestern regions the division of market share will be driven by coal quality and transportation costs. At the low and medium production levels, higher average heat content and closeness to the industrialized regions provide an extra advantage for midwestern coal. At the high production level, the low sulfur content and smaller increases in transportation costs out of the Powder River Region will give the Western regions, but mainly the Powder River Region, an advantage.

#### PRODUCTION FORECASTS UNDER NO NEW FEDERAL LEASING

The No New Federal Leasing forecasts estimate regional production under the assumption that no new federal coal leasing occurs--no regional sales, no leases by application, no emergency sales, and no preference right leasing. The same outcome could theoretically result under coal leasing if newly issued

## PRODUCTION FORECASTS

### FORT UNION COAL REGION 1990 COAL PRODUCTION ESTIMATE 1979 FES versus 1985 Supplemental EIS



**Figure 3-3a**

leases either are not competitive or displace existing capacity in the same region. The analysis assumes that the only existing capacity consists of the federal, state, and Indian leased reserves and known private reserves that could form competitive mines by 1990, 1995, or 2000. The BLM field staff made these capacity estimates using knowledge of the regions concerned.

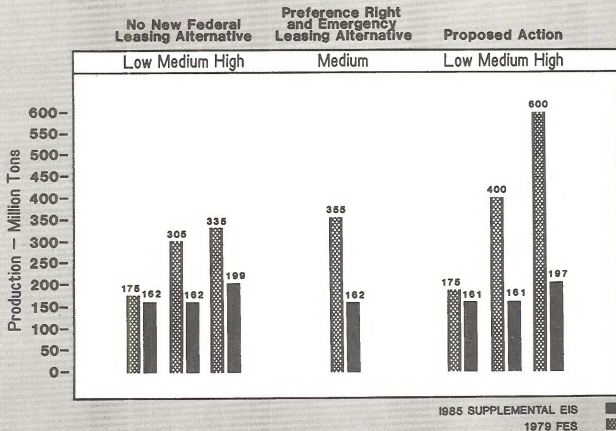
#### Changes From No New Federal Leasing at the Low Production Level

The demands on coal supplies generated at the low production level are such that projected production under the Proposed Action would differ only slightly from that under No New Federal Leasing. Because of the time needed to develop mines, the San Juan River Region's capacity will restrict 1990 production to 28 million tons, 2 million tons less than the unrestricted forecast of the Proposed Action. The resulting production shifts (Table 3-7) will involve surface-mined coal. In 1995, new mine construction will meet the demand so that no changes will occur from the Proposed Action forecasts. By 2000, capacity will be reached in the Fort Union Region at 33 million tons. The resulting production shifts will all involve surface-mined coal.



## PRODUCTION FORECASTS

### POWDER RIVER COAL REGION 1990 COAL PRODUCTION ESTIMATE 1979 FES versus 1985 Supplemental EIS



**Figure 3-3b**

#### Changes From No New Federal Leasing at the Medium Production Level

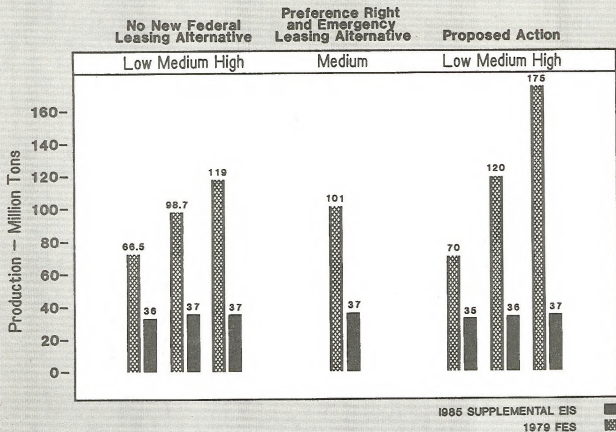
In 1990 the changes from No New Federal Leasing under the Proposed Action at the medium production level would be the same as at the low production level. The restriction in the Fort Union Region and resulting shifts would occur by 1995 instead of by 2000. In 2000, changes under the Proposed Action would be greater because of the higher production forecast in the Fort Union Region under the Proposed Action. Some of these changes would involve more shifts to the Powder River Region as shown in Table 3-7 but would also involve a 5-million-ton shift to the Midwest, probably to surface-mined coal in Illinois.

#### Changes From No New Federal Leasing at the High Production Level

The most significant changes in production patterns between No New Federal Leasing and the Proposed Action would occur at the high production level. In 1990, the San Juan River Region would still have a shortage, but the net production gains would all occur in the Powder River Region because of its transportation advantage at this production level. In 1995, capacity

## PRODUCTION FORECASTS

### GREEN RIVER-HAMS FORK COAL REGION 1990 COAL PRODUCTION ESTIMATE 1979 FES versus 1985 Supplemental EIS



**Figure 3-3c**

restrictions will be reached, not only in the Fort Union Region, but also in the Uinta-Southwestern Utah Region. The only net gainers would be the Powder River and San Juan River regions (although the San Juan River Region will gain only 1 million tons). Thus far, except for the Fort Union Region in 2000 at the medium production level, all production changes will be insignificant--less than 10 percent of any affected region's expected production.

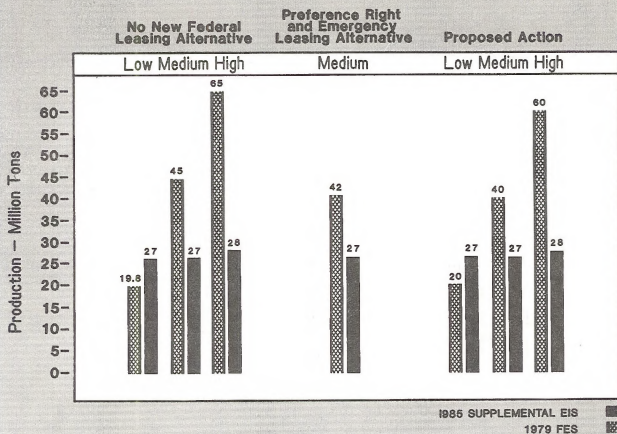
In 2000, changes greater than 10 percent will occur in all regions. The San Juan River and Fort Union regions, the Utah part of the Uinta-Southwestern Utah Region, and the Wyoming part of Powder River Region will all be significantly restricted below demand for production from these regions. The Colorado part of Uinta-Southwestern Utah Region, both parts of Green River-Hams Fork Region, and the Montana part of the Powder River Region will pick up some of the losses, but mostly to satisfy local or western demand.

The Western regions as a whole will lose a significant portion of the midwestern demand market. Western production will drop by 65 million tons from its forecast under the Proposed Action. The Midwestern regions will gain

## PRODUCTION FORECASTS

### UINTA-SOUTHWESTERN UTAH COAL REGION

**1990 COAL PRODUCTION ESTIMATE  
1979 FES versus 1985 Supplemental EIS**



**Figure 3-2d**

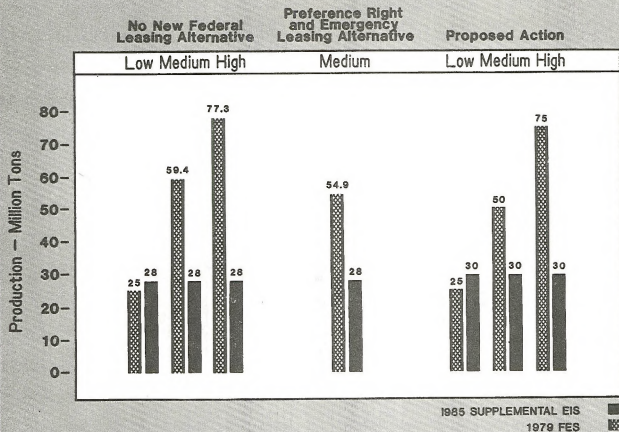
30 million tons, and the Appalachian regions will gain 10 million tons. Except for the Uinta-Southwestern Utah Region shifts, all western production changes will involve surface-mined coal. The Midwestern regions' gains will be almost all surface-mined coal, mostly in Texas and Illinois and the rest scattered. The Appalachian regions' gains will probably all come from subsurface coal in eastern Kentucky and southern West Virginia.

Another aspect of the coal production shifts is that total U.S. production will drop by 25 million tons, partly because of higher average heat content in the Midwestern and Appalachian regions and partly because of more use of natural gas in the Midwest and Southwest and more use of both oil and gas on the West Coast.

The effect of No New Federal Leasing has the tendency to maintain current market shares. At the low and medium production levels, the trend of shifting market shares from Appalachian to the Midwestern regions will continue, but at the high production level the dominance of new production in Western regions will decrease with gains by both the Midwestern and Appalachian regions.

## PRODUCTION FORECASTS

### SAN JUAN RIVER COAL REGION 1990 COAL PRODUCTION ESTIMATE 1979 FES versus 1985 Supplemental EIS



**Figure 3-3e**

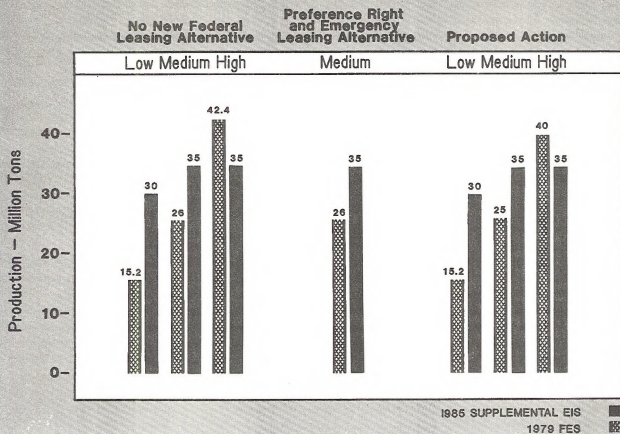
The market shares among the federal regions also track more closely to current shares at both the medium and high production levels. These production shifts will result in a variety of costs and benefits, but one sure result will be higher energy costs, particularly in certain regions. Not only will lower cost energy supplies be replaced by higher cost supplies, but the restricted competition will result in higher profit margins for some energy suppliers with the greater costs being passed on to the end users. The cost impact on a national basis will be small, but in certain regions--the Midwest and West--the impact could be significant.

#### PRODUCTION FORECASTS UNDER PREFERENCE RIGHT AND EMERGENCY LEASING

Forecasts under the assumption of emergency leasing only were not generated because they would not significantly differ from forecasts for No New Federal Leasing. Some of the small production changes may be avoided, but not the major shifts. Estimating potential capacity resulting from the issuing of preference right leases was difficult because of a lack of information for many PRLAs and the uncertainties of issuance.

## PRODUCTION FORECASTS

### ALABAMA COAL SUBREGION 1990 COAL PRODUCTION ESTIMATE 1979 FES versus 1985 Supplemental EIS



**Figure 3-3f**

Although BLM is legally required to process outstanding PRLAs, there is no guarantee that leases will be issued. Of the PRLAs processed since 1976, half were either rejected or withdrawn. Of the remaining PRLAs, some will likely fail to meet commercial quantities criteria, and others have unresolved environmental conflicts.

The BLM field staff estimated a range of capacities from outstanding PRLAs. The forecasts for this alternative used the low end of these ranges to ensure the greatest differences from the Proposed Action. The regional production changes at the low and medium production levels were insignificant, falling between the Proposed Action and No New Federal Leasing. Transportation distribution tables were not made for production levels for Preference Right and Emergency Leasing. At the high production level, the only significant shifts will occur after 1995. The production and transportation results fall between the Proposed Action and No New Federal Leasing.

## PRODUCTION FORECASTS

TABLE 3-8  
COAL DISTRIBUTION FROM WESTERN LEASING REGIONS  
HIGH PRODUCTION LEVEL  
(million tons/year)

Source Region	Produc- tion	No New Federal Leasing Destination				Proposed Action* Destination				
		Local Regions	Other Rockies	Midwest	West	Produc- tion	Local Regions	Other Rockies	Midwest	West
1985										
Fort Union	21	21	0	0	0	--	--	--	--	--
Powder River	140	25	5	105	5	--	--	--	--	--
Green River-										
Hams Fork	34	20	2	11	1	--	--	--	--	--
Uinta-SW Utah	18	11	3	2	2	--	--	--	--	--
San Juan River	23	22	0	0	1	--	--	--	--	--
1990										
Fort Union	24	24	0	0	0	--	--	--	--	--
Powder River	199	30	17	142	10	197	--	--	140	--
Green River-										
Hams Fork	37	22	3	10	2	--	21	--	11	--
Uinta-SW Utah	28	17	6	2	3	--	--	7	--	2
San Juan River	28	23	0	0	5	30	--	--	1	6
1995										
Fort Union	33	30	0	3	0	36	--	--	6	--
Powder River	267	35	22	190	20	263	--	--	186	--
Green River-										
Hams Fork	43	24	5	10	4	--	--	--	--	--
Uinta-SW Utah	36	22	10	2	2	37	--	--	--	3
San Juan River	41	25	0	3	13	40	--	--	--	12
2000										
Fort Union	33	33	0	0	0	51	41	--	10	--
Powder River	324	50	30	220	24	374	--	--	265	29
Green River-										
Hams Fork	60	32	6	18	4	50	28	--	12	--
Uinta-SW Utah	43	25	7	1	10	47	--	10	3	9
San Juan River	48	31	0	0	17	56	32	--	6	18

\*Tonnes for the Proposed Action are shown only where they differ from No New Federal Leasing.

## FORECAST COMPARISONS

TABLE 3-9  
COMPARISON OF REGIONAL MARKET SHARES  
AT YEAR 2000 PRODUCTION LEVELS  
(Percent of Total U.S. Production)

Region	No New Federal Leasing				Proposed Action			
	1985	Low	Medium	High	1985	Low	Medium	High
Appalachian	46	46	45	51	46	46	46	51
Midwestern	26	26	21	21	26	26	23	21
Western	28	28	34	28	28	28	31	28
Fort Union	3	3	3	2	3	2	2	2
Powder River	16	15	21	16	16	16	18	16
Green River-Hams Fork	4	3	3	3	4	3	3	3
Uinta-SW Utah	3	2	3	2	3	2	2	2
San Juan River	3	3	3	3	3	3	3	3
Alabama Subregion	3	2	2	2	3	2	2	2

### FORECAST COMPARISONS

This section compares current forecasts to the 1979 FES (BLM 1979a) forecasts and other recent forecasts to provide a perspective from which to view the current forecasts in the supplemental EIS.

The 1979 forecasts (Table 3-10) now appear high, but a closer examination reveals that the low production forecasts are not too far off. In 1985, U.S. total coal production will be below that forecast in 1979 by less than 10 percent, according to current estimates. The forecast for 1990 of 1,114 million tons compares favorably to the current forecast range of 1,030 to 1,100 million tons. A review of the assumptions used in the low production forecast in 1979 shows why this forecast compares favorably to reality.

The world oil prices used ranged from \$13 to \$20 per barrel (\$13 at the low production level). These prices seem low, but they were estimated in 1975 dollars, which, when converted to 1984 dollars, are reasonably accurate. The 1979 forecasts, however, anticipated neither the enormous increase in oil prices resulting in a worldwide recession nor the later drop in prices.

The most important factor is the electricity growth rate, which accounts for most of the differences. The 1979 low production level used 3.5 percent for 1977-85 and 1985-90. This rate is high, particularly for the 1977-85 period, because of the severe recession. The 1985-90 rate used in the 1979 projections is approximately the rate used in the current forecasts for the same period.

In addition to differences in the average electric power consumption growth rate, regional differences are important. The recession most severely affected the midwestern industrial states, greatly reducing the demand for electricity in this region and accounting for most of the differences in

## PRODUCTION FORECASTS

TABLE 3-10  
REGIONAL PRODUCTION FORECASTS FROM THE 1979 FES  
(million tons/year)

	Actual	Low		Medium		High	
	<u>Production</u> 1977*	<u>Production</u> 1985	<u>Level</u> 1990	<u>Production</u> 1985	<u>Level</u> 1990	<u>Production</u> 1985	<u>Level</u> 1990
Total U.S.	688	990	1114	1116	1521	1188	1856
Appalachian	390	427	386	440	445	454	479
Midwestern	163	249	336	273	402	282	441
Western	135	314	382	404	674	452	937
Fort Union	10	18	22	20	21	23	35
Powder River	72	140	174	205	396	232	603
Green River- Hams Fork	19	90	106	112	150	129	178
Uinta-SW Utah	14	26	25	26	28	26	28
San Juan River	8	21	34	23	58	23	72
Alabama	21	21	14	21	14	21	14

\*Actual production for the Western regions was estimated for 1978.

production patterns between the 1979 FES forecasts and the current situation and forecasts.

Another important factor is nuclear capacity. For 1985, the 1979 FES used 84 gigawatts for the low production level, which will probably be just about correct. For 1990, the low figure was 150 gigawatts, which will be much too high according to actual 1985 indications.

Other factors that are less important nationally but that have large regional impacts are demand for synthetic fuels and exports. The 1979 low production level synthetic fuels demand forecasts are a little too high, whereas the exports are too low. The synthetic fuels demand mostly affects the Western regions, whereas the exports tend to affect the Appalachian regions the most. Once again, the differences in assumptions contributed to the differences in forecasts.

Transportation costs can also cause significant shifts in regional production patterns. Higher transportation costs favor high heat content coal close to the demand point. Low transportation costs favor coal with low production and utilization costs. Current transportation costs are much higher than anticipated in the 1979 FES, accounting for some of the differences between eastern and western coal production.

### COMPARISON OF CURRENT FORECASTS WITH FALL 1984 DATA RESOURCES, INC. FORECASTS

Table 3-11 presents fall 1984 coal forecasts by Data Resources, Inc. (DRI) (1984) and shows two basic points of comparison with the current forecasts.



## FORECAST COMPARISONS

TABLE 3-11  
DRI COAL PRODUCTION FORECASTS  
(million tons/year)

	1985	1990	1995	2000	2005
Total U.S.	918	1,054	1,215	1,471	1,810
Appalachian	428	489	533	625	726
Midwestern	205	220	262	328	410
Western	285	345	420	518	674
Fort Union	23	27	32	36	39
Powder River	160	212	261	339	476
Green River-Hams Fork	38	38	37	40	41
Uinta-SW Utah	25	28	33	35	34
San Juan River	20	21	27	33	45
Alabama Subregion	32	38	43	47	49

Source: Data Resources, Inc. 1984.

The overall demand for coal is in the lower part of the range of BLM forecasts, and the market shares favor the Western regions more than BLM's forecasts. (DRI has stated that its Powder River Region forecast will be lower in its winter issue.) The DRI forecasts use lower electricity demand growth rates, lower exports, and lower net coal demands than do BLM's. Synfuels and industrial steam coal demands are similar. Assumptions concerning nuclear and other steam fuel capacities for electricity generation are similar to the assumptions for the BLM high production level. DRI's transportation rates are also similar to the BLM's high production level, where the Powder River Region has a greater advantage than other regions. Thus, under DRI's forecasts, the Powder River Region will gain production, while the other Western regions are producing at about BLM's low production levels. In the DRI's forecasts the Midwestern regions have less of the market than at the BLM low and medium production levels but a similar share of the market to BLM's high production level. The market share of the Appalachian regions is less than at any of BLM's production levels. Similar differences exist even in the short-term projections for 1985.

### COMPARISON WITH DOE/EIA'S 1984 ANNUAL OUTLOOK FOR COAL

Table 3-12 summarizes the Department of Energy, Energy Information Agency's (EIA) forecasts as presented in its 1984 Annual Outlook (DOE/EIA 1984). The regional breakdown in the Annual Outlook differs somewhat from that used by BLM, but the following conclusions can be made. EIA's Fort Union Region forecasts are slightly lower than the BLM low production level forecasts. The forecasts for the rest of the Western regions are about the same as the BLM medium production level forecasts except that the Wyoming part of Powder River Region is about 10 million tons less in 1995. Thus, although the overall EIA forecast is similar to the BLM low production forecasts, it favors the West more than do the BLM forecasts. EIA forecasts for the Western regions are similar to BLM medium production forecasts.

## PRODUCTION FORECASTS

TABLE 3-12  
EIA COAL PRODUCTION FORECASTS  
(million tons)

	1985	1990	1995
Total U.S.	900	1,045	1,191
Appalachian	448	506	558
Midwestern	190	233	280
Western	262	306	353

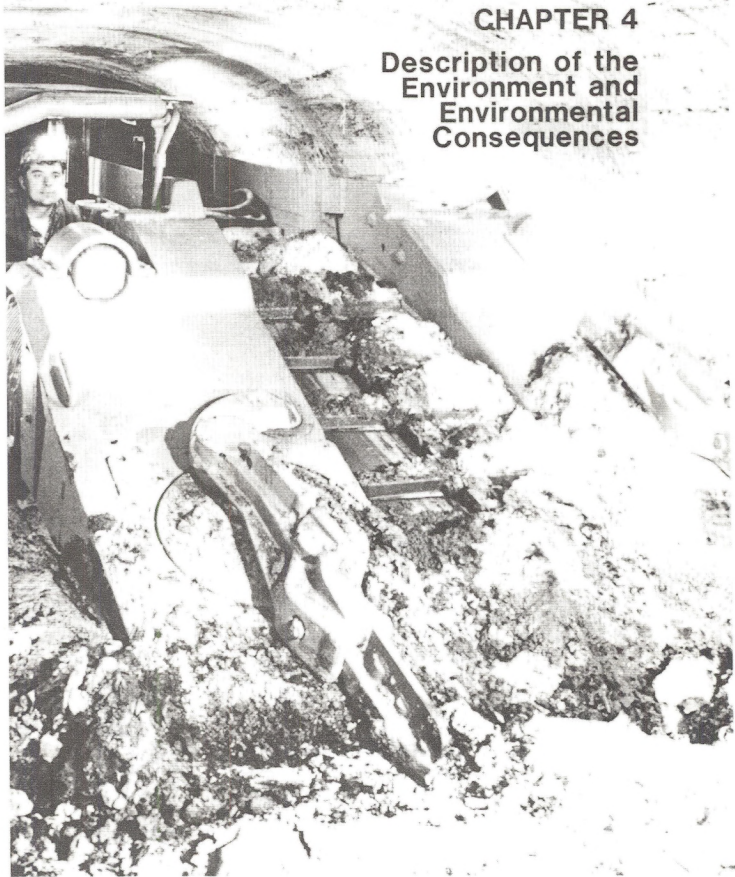
Source: DOE/EIA 1984.

### CONCLUSIONS FROM THE FORECAST COMPARISONS

Two main conclusions can be drawn from the above comparisons. First, current BLM forecasts are similar to other leading coal forecasts. Second, differences in assumptions and the uncertainties surrounding these assumptions suggest that none of these forecasts can be summarily rejected in favor of another. This reasoning and the examination of the 1979 FES forecasts reveal that the full range of forecasts should be evaluated in this supplemental EIS. Even with all the changes that have occurred since 1979, the low forecasts have been close to reality. Although the future remains unknown, an evaluation of BLM forecasts for three production levels is likely to cover the range of impacts that actually result.

## CHAPTER 4

### Description of the Environment and Environmental Consequences





CHAPTER 4  
DESCRIPTION OF THE ENVIRONMENT  
AND ENVIRONMENTAL CONSEQUENCES

---

INTRODUCTION

Chapter 4 consists of two major sections: (1) scope of the analysis and analytical approach and (2) description of the environment and environmental impact analysis.

The first section describes the scope of the analysis of the program alternatives, the major issues raised in the scoping process, and how these issues are addressed in the supplemental EIS or will be in later EISs. This section also outlines the general analytical approach and impact estimation procedures.

The affected environment and environmental impact analysis portion describes the environment that would be affected by the Proposed Action and alternatives and shows the results of the analysis for each resource under each alternative by region. General impacts that apply to each region, alternative, time period, and production level are addressed first to reduce repetition. Impacts are then analyzed for each alternative by region. Where impacts would not differ by alternative, they are discussed by region. The resources are discussed in the same order for consistency, but this order does not represent a priority of importance. Where impacts would not differ by alternative, they are discussed by region. Chapter 5 compares the impacts of alternatives by resource.

As shown in Chapter 3, impacts of a federal coal leasing program can be projected only for certain regions in certain target years because existing and planned mine capacity may be sufficient to meet projected coal demand whether or not any more federal coal is leased. Therefore, the environmental impact analysis only addresses the "impact points" shown in Table 4-1 where a federal program to lease coal would have measurable environmental effects.

#### SCOPE OF THE ANALYSIS AND ANALYTICAL APPROACH

##### Scope of the Analysis

This EIS is a programmatic supplement to assess the national impacts of four federal coal management program alternatives. The scope of this supplement is limited to analyzing program-level impacts. A broad statement of overall impacts of the program will enable the Department of the Interior to make decisions concerning broad program design and national policy questions. This supplemental EIS does not involve analyses of leasing specific amounts of coal or of leasing specific sites. These analyses will be conducted for lease sales and for individual operations as stated in the discussion of tiering in the Purpose and Need section of Chapter 1. The impacts would apply to all land ownership--federal (BLM, Forest Services, etc.), state, Indian, and private.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-1  
COAL IMPACT POINTS

(Points at which coal production under Preference Right and Emergency Leasing, Leasing by Application\*, and the Proposed Action would differ from No New Federal Leasing)

Fort Union Region			
<u>Preference Right and Emergency Leasing</u>		<u>Proposed Action/Leasing by Application</u>	
1995	Medium	1995	Medium
	High		High
2000	Low	2000	Low
	Medium		Medium
	High		High
Powder River Region			
<u>Preference Right and Emergency Leasing</u>		<u>Proposed Action/Leasing by Application</u>	
1990	High (Wyoming only)	1990	High (Wyoming only)
1995	Medium (Wyoming and Montana)	1995	Medium (Wyoming and Montana)
	High (Wyoming only)		High (Wyoming only)
2000	Low (Wyoming only)	2000	Low (Wyoming only)
	Medium (Wyoming and Montana)		Medium (Wyoming and Montana)
	High (Wyoming and Montana)		High (Wyoming and Montana)
Green River-Hams Fork			
<u>Preference Right and Emergency Leasing</u>		<u>Proposed Action/Leasing by Application</u>	
2000	High (Wyoming and Colorado)	1990	Low (Wyoming only)
			Medium (Wyoming only)
		2000	High (Wyoming and Colorado)
Uinta-Southwestern Utah			
<u>Preference Right and Emergency Leasing</u>		<u>Proposed Action/Leasing by Application</u>	
1995	High (Utah only)	1995	High (Utah only)
2000	High (Colorado and Utah)	2000	High (Colorado and Utah)
San Juan River			
<u>Preference Right and Emergency Leasing</u>		<u>Proposed Action/Leasing by Application</u>	
1995	High	1990	Low
2000	High		Medium
		1995	High
		2000	High
Alabama			
None			

\* Leasing by Application and the Proposed Action have similar impacts as discussed in Chapter 3. Therefore the tables and discussion in Chapter 4 do not distinguish between the two alternatives but simply show impacts for the Proposed Action.

## INTRODUCTION

The impact analysis addresses the following cycles of coal development: exploration and mine development, surface and subsurface extraction and beneficiation, and transportation. The analysis in this supplemental EIS does not cover the impact of conversion facilities because development of new conversion facilities cannot be shown to depend on new federal coal leasing at the programmatic level. Where conversion facilities are proposed for leasing or mining of federal coal, the building of such facilities will require compliance with the National Environmental Policy Act. One observation, however, can be made at this time: because this supplemental EIS projects coal production to be less than that projected by the 1979 FES, fewer impacts would result from the fewer conversions that might occur.

Later site-specific analyses of individual tracts and regional EISs will evaluate potential impacts of leasing. The location and type of new facilities is better addressed at a later review and decision point in site-specific or regional analyses when more specific data exists..

Five major issues emerged from the Department of the Interior's analysis of comments on the scope of the supplement. The five issues and the Department's response in this supplemental EIS are outlined in the Decision on the Scope of the Supplement to the 1979 FES (USDI 1984b) and are summarized below.

- Relationships of the supplement to ongoing changes in the coal program. Recent changes to the coal program resulting from 1984 reports by the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes Commission) (Linowes and others 1984) and the Office of Technology Assessment (OTA 1984) were analyzed in separate environmental assessments, and findings of no significant impact were made. Comments on the draft EIS may, however, discuss interrelationships of the components of the coal program, including the effect of all recently proposed changes. All regulatory changes will be made final after the final supplemental EIS is published and all public comments are considered.
- Scope of market analysis. To underscore the importance of market analysis, it is highlighted in Chapter 3 of this supplemental EIS and is further supported by a separate technical report (BLM 1985b).
- Assessment of reclamation success on surface-mined western coal lands. A technical appendix (Appendix 5) on reclamation and erosion control on surface mined lands was developed for the supplemental EIS to present summary results based on research and experience from existing mines.
- Impacts of the Department's policy to pursue coal exchanges. To address this topic, an explanation is included in Chapter 1 of this supplemental EIS.
- Programmatic alternatives. Programmatic alternatives that the Department should analyze in the supplemental EIS are described in Chapter 2. Other alternatives considered and the rationale for not including them in the supplemental EIS are given in Chapter 2--Proposed Action and Alternatives.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

### Analytical Approach

This supplemental EIS contains a general analysis of the environmental impacts of four alternative federal programs at three coal production levels in six coal regions. The analysis focuses on the impacts at low, medium, and high levels of coal production for target years 1990, 1995, and 2000 in each region. The impacts for each of these points under No New Federal Leasing were analyzed and documented. For the Proposed Action and the other alternatives, the analysis identified impact points (Table 4-1) at which projected production would differ from the No New Federal Leasing Alternative, which was used as the baseline. Only the impact at these points were analyzed and documented in the EIS. Impacts stated for these points would be associated only with total coal production in a target year, not with the difference in production between the Proposed Action or alternative and No New Federal Leasing. Chapter 5, Comparative Analysis, documents the differences in impacts between No New Federal Leasing and the Proposed Action and other alternatives and also addresses impacts outside the federal coal production regions.

Two other factors must be considered in a discussion of the analytical approach to this supplemental EIS:

- Coal production might be the same under different alternatives, but the impacts would not necessarily be the same because of (1) the need to develop coal reserves as reserves are mined, (2) the substitution of less expensive coal for more expensive coal, and (3) the substitution of more environmentally acceptable coal for coal with higher environmental costs.

- Although impacts can be estimated, they cannot be determined at the programmatic level because most are site specific and depend upon local conditions at time of mining, such as the type of habitat being disturbed and the condition of the surrounding area or the population level of a specific community and its existing housing.

Because the Proposed Action is the continuation of a modified program to manage federal coal and not a specific proposal to develop coal, the analyses assumed three levels of possible production needed to meet national demands. If implemented, the Proposed Action would initiate procedures that would consider new leasing and development of coal reserves. Decisions under the Proposed Action to lease or not to lease would also influence to a degree the development of federal reserves under leases previously issued by the Department. Therefore, three levels (low, medium, and high) of possible coal demand were used as a basis for impact assessment and were developed to attempt to predict a range of impacts that could possibly result from proceeding with the Proposed Action. The reader of this supplemental EIS should keep in mind that even though this EIS projects impacts, implementing the Proposed Action would not ensure that any of these impacts would occur, only that they or similar impacts might occur if more federal coal reserves are leased and developed.



## SOCIOECONOMICS

In addition to the Proposed Action and No New Federal Leasing, two other alternatives are analyzed: (1) Preference Right and Emergency Leasing and (2) Leasing by Application. Because production levels for Leasing by Application were assumed to be the same as for the Proposed Action (see Chapter 3), the impacts for this alternative are also assumed to be the same throughout the analysis. Because all analysis for the Proposed Action applies equally to Leasing by Application, the later alternative will not be discussed separately in this chapter. Assumptions for the production levels under each alternative are outlined in Chapter 3.

Regional multipliers, developed from regional coal EISs, were used to predict resource impacts whenever possible. Where data did not permit the use of regional multipliers, national multipliers were used. Appendix 4, Methodologies, compares 1985 multipliers with the environmental loading factors used in the 1979 EIS (BLM 1979a). The multipliers are based on units of coal production associated with a particular resource attribute. The multiplier is applied to the amount of coal production for each production level, time period, and alternative except for the No New Federal Leasing Alternative. Estimating procedures for resources are also given in Appendix 4. Assumptions for specific resources are given in the individual resource sections in Chapter 4.

## SOCIOECONOMICS

### AFFECTED ENVIRONMENT

The area of influence for socioeconomic analysis for each coal region differs somewhat from the coal region itself because coal is not expected to be mined in all parts of the regions. Appendix 4 defines the socioeconomic areas of influence. General socioeconomic concerns of Native Americans are discussed in the Native American Issues section of Chapter 4.

#### Fort Union Region

The Fort Union Region has a relatively small population, low population density, and fairly small communities. See Appendix 4, for the counties making up the region's area of influence. Total population of this area in 1982 was estimated at 191,200, with population density averaging 6.9 persons per square mile (Table 4-2a). The largest community is Bismarck, North Dakota, with a 1980 population of 61,000 in its urbanized area. Four other communities have populations ranging from 5,000 to 16,000.

Except for the Bismarck area, communities in the area of influence are limited in their infrastructures. Medical and social services, shopping opportunities, and recreation facilities are particularly deficient. Public safety has been seen as a problem in some of the communities experiencing recent growth (BLM 1982a).

The area's economy is based on agriculture and mining. Agriculture consists mainly of wheat farming in the northern and eastern parts and cattle ranching with some irrigated farming in the southern and western parts.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-2a  
POPULATION AND ECONOMIC CHARACTERISTICS FOR THE AREA OF INFLUENCE\*  
FORT UNION COAL REGION\*\*

Total Population	191,200			
Total Area (square miles)	27,801			
Population per square mile	6.9			
Per capita personal income	\$10,956			
Per capita personal income as a percent of U.S. average	99			

Economic Factors	Employment	% of Total	Earnings (thousands)	% of Total
Agriculture	11,014	12	\$ 99,410	7
Mineral Industry	4,973	5	151,553	10
Construction	7,912	8	217,459	14
Manufacturing	3,246	3	66,910	4
Transportation, communication, and utilities	7,014	7	214,211	14
Trade	18,878	20	247,771	16
Finance, insurance, and real estate	3,044	3	60,408	4
Services	17,087	18	238,225	16
Nonfarm proprietors	3,582	9	**	
Government	<u>14,817</u>	15	<u>227,842</u>	15
TOTAL	96,567		1,523,789	

\*Data is for counties expected to be affected by coal development under either the no lessing or lessing alternatives.

\*\*Employment and earnings figures are calculated on different bases. Nonfarm proprietors' earnings are included in each sector, whereas employment is reported as a separate figure.

Mineral developments include coal, oil, and gas. Because the coal is lignite, it is used mainly in mine-mouth facilities, and little is being exported from the region. Table 4-2a shows that the mineral industry has become an important component of the economy, constituting 5 percent of employment and 10 percent of earnings. Those parts of the area of influence not involved in mineral development are continuing on a gradual long-term decline in employment and population.

Local attitudes toward coal development can be described as qualified approval. Residents of smaller communities would like to see the economic base expanded to add a buffer for years when agricultural production is down. Residents of rural areas, however, express strong concerns about the conservation of agriculture, the protection of air and water quality, and such adverse impacts of development as crowding and increased crime (BLM 1982a).

## SOCIOECONOMICS

### Powder River Region

The Powder River Region has a small population, low population density, and relatively small communities. (See Appendix 4 for the counties making up the area of influence.) The area of influence had an estimated 1982 population of 228,200 and an average density of 4.7 persons per square mile (Table 4-2b). Casper, Wyoming, with a 1980 population of 59,000 in its urbanized area, is the largest community. Five other communities have populations ranging from 5,000 to 15,000.

TABLE 4-2b  
POPULATION AND ECONOMIC CHARACTERISTICS FOR THE AREA OF INFLUENCE  
POWDER RIVER COAL REGION\*

Total Population	228,200			
Total Area (square miles)	48,223			
Population per square mile	4.7			
Per capita personal income	\$12,590			
Per capita personal income as a percent of U.S. average	113			

Economic Factors	Employment	% of Total	Earnings (thousands)	% of Total
Agriculture	9,895	8	\$ 29,509	1
Mineral Industry	18,221	15	603,611	27
Construction	12,010	10	351,585	16
Manufacturing	3,538	3	91,959	4
Transportation, communication, and utilities	5,948	5	168,097	8
Trade	21,693	18	335,441	15
Finance, insurance, and real estate	3,669	3	75,040	4
Services	15,727	13	272,458	12
Nonfarm proprietors	11,191	10	**	
Government	<u>18,263</u>	15	<u>285,333</u>	13
<b>TOTAL</b>	<b>120,155</b>		<b>2,213,033</b>	

\*Data is for counties expected to be affected by coal development under either the no leasing or leasing alternatives.

\*\*Employment and earnings figures are calculated on different bases. Nonfarm proprietors' earnings are included in each sector, whereas employment is reported as a separate figure.

Infrastructure development in the area presents a mixed picture. Those communities affected by recent mineral development have expanded their infrastructure and can accommodate further population growth. Most communities in areas untouched by mining have more limited facilities that would require significant expansion for growth. Inadequate medical service is the infrastructural problem most often mentioned in area communities (BLM 1981b).

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Agriculture and mining provide most of the area's economic base. Cattle ranching and irrigated hay farming dominate agriculture. Oil, gas, and coal are the leading mineral products. Mining, including refining, provides 15 percent of total employment and 27 percent of earnings in the area, ranking first. The current energy market slump, however, has lowered near-term employment and population expectations in most of the area. Area's outside the influence of mineral development have remained fairly stable in population and employment.

Local attitudes toward coal development vary. Attitudes in Wyoming, where recent coal mining growth has occurred, are highly favorable toward development. The current depressed economic conditions in Wyoming tend to increase the support for development. Attitudes in Montana areas are mixed, with support in towns and mixed opposition and support in rural areas. Opposition in Montana appears to center on changes in the rural lifestyle that would result from growth and the high degree of transiency among recent coal-related populations.

### Green River-Hams Fork Region

The Green River-Hams Fork Region has the smallest total population of the six regions, the lowest density, and the smallest communities. Appendix 4 shows the counties in its area of influence. This area has an estimated total 1982 population of 140,800, and an average population density of 3.9 persons per square mile (Table 4-2c). The area's largest community is Rock Springs, Wyoming, with an estimated 1985 population of 25,000 in the city and surrounding area. Five other communities have populations ranging from 5,000 to 13,000.

Infrastructure development in this area has benefitted from recent mining-induced growth. Most of the larger communities can accommodate population increases, but the infrastructures of the smaller communities would be strained by a large population influx. Medical and social services are most often in short supply, and fire protection in many communities is given a below-average rating under the national fire insurance rating system.

Mining, agriculture, and tourism are the area's economic mainstays. Coal, oil and gas, trona, and uranium are the main mineral products. Cattle, sheep, and irrigated hay make up most of the agricultural production. The tourist industry is important in scattered locations that provide skiing, water sports, and dispersed recreation. Mining provides 22 percent of total employment and 37 percent of earnings, ranking first. As in the Powder River Region, slumping energy markets have depressed the local economies in all parts of the area, except in the few places where tourism has maintained the local base. Because mineral development has pervaded the entire region, virtually no parts of the area are unaffected by the current economic conditions in mining.

Attitudes toward coal development display the same qualified approval as described for the Fort Union Region, with current economic conditions raising the level of approval. Residents recognize that development of the area's mineral resources is the only likely means of economic recovery and further growth. On the other hand, experience of past mining slumps, reinforced by

## SOCIOECONOMICS

TABLE 4-2c  
POPULATION AND ECONOMIC CHARACTERISTICS FOR THE AREA OF INFLUENCE  
GREEN RIVER-HAMS FORK COAL REGION\*

Total Population	140,800			
Total Area (square miles)	36,119			
Population per square mile	3.9			
Per capita personal income	\$11,747			
Per capita personal income as a percent of U.S. average	106			

Economic Factors	Employment	% of Total	Earnings (thousands)	% of Total
Agriculture	3,803	5	\$ 13,202	1
Mineral Industry	15,687	22	532,289	37
Construction	6,520	9	180,468	13
Manufacturing	1,652	2	38,822	3
Transportation, communication, and utilities	6,129	8	172,268	12
Trade	12,014	16	162,270	11
Finance, insurance, and real estate	2,126	3	36,519	3
Services	8,102	11	121,823	8
Nonfarm proprietors	6,167	9	2	
Government	<u>11,117</u>	15	<u>176,527</u>	12
<b>TOTAL</b>	<b>73,317</b>		<b>1,434,188</b>	

\*Data is for counties expected to be affected by coal development under either the no leasing or leasing alternatives.

\*\*Employment and earnings figures are calculated on different bases. Nonfarm proprietors' earnings are included in each sector, whereas employment is reported as a separate figure.

the present one, makes residents skeptical toward proposals lacking a promise of stability. Protection of the area's natural beauty and recreation opportunities is rated important to both the tourist economy and the local lifestyle.

### Uinta-Southwestern Utah Region

Though similar to the other western coal regions in demographic characteristics, the Uinta-Southwestern Utah Region has perhaps the most uneven population distribution, with a few areas of relative concentration surrounded by expanses of virtually uninhabited land. (See Appendix 4 for the counties included in the area of influence.) The area had a total estimated 1982 population of 215,600, and a population density of 7.9 persons per square mile (Table 4-2d). Grand Junction, Colorado is the area's largest community, having a population of 57,000 within its urbanized area. Three other communities have populations ranging from 5,000 to 9,000.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-2d  
POPULATION AND ECONOMIC CHARACTERISTICS FOR THE ARRA OF INFLUENCE  
UINTA-SOUTHWESTERN UTAH COAL REGION\*

Total Population	215,600			
Total Area (square miles)	27,120			
Population per square mile	7.9			
Per capita personal income	\$9,712			
Per capita personal income as a percent of U.S. average	87			

Economic Factors	Employment	% of Total	Earnings (thousands)	% of Total
Agriculture	6,810	7	\$ 21,392	1
Mineral Industry	9,481	10	325,291	21
Construction	6,687	7	167,456	11
Manufacturing	5,355	5	91,801	6
Transportation, communication, and utilities	5,408	5	142,486	9
Trade	20,284	20	249,616	16
Finance, insurance, and real estate	4,105	4	69,232	5
Services	16,279	16	253,002	16
Nonfarm proprietors	10,575	11	**	
Government	15,431	15	227,487	15
<b>TOTAL</b>	<b>100,415</b>		<b>1,547,763</b>	

\*Data is for counties expected to be affected by coal development under either the no leasing or leasing alternatives.

\*\*Employment and earnings figures are calculated on different bases. Nonfarm proprietors' earnings are included in each sector, while employment is reported as a separate figure.

Infrastructure development in many communities is barely adequate to serve present populations. Problems prevail in medical services, water treatment, sewage and solid waste disposal, and fire protection. Recent developments absorbed the existing surplus but is insufficient for future needs.

Mining is the dominant economic activity, but tourism is growing and federal military and civilian operations are important in local areas. Coal, oil and gas, uranium, and other metals are or have been important in different parts of the area. A long history of mining booms and slumps, including the current slump, have caused persistent employment and population instability. Ten national parks, recreation areas, and monuments; other natural and scenic areas; ski resorts; and abundant white water provide the stimulus for a growing tourist industry. Agriculture, mostly livestock grazing and related hay production, is widespread but overshadowed by other developments.

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Current economic conditions have created a more favorable attitude toward more coal development, but the support is heavily qualified by the area's experience. Infrastructure problems caused by recent growth have spurred a strong demand for more orderly development. As in the Green River-Hams Fork region, skepticism resulting from mining's past instability and the value placed on the area's natural beauty and recreation opportunities are important local concerns.

### San Juan River Region

The San Juan River Region is similar to the other western coal regions in having a low population density, but it also has the lowest per capita personal income. (Appendix 4 shows the counties included in the area of influence.) The area had a total estimated 1982 population of 317,400, and a population density of 7.0 persons per square mile. The area's largest community is Farmington, New Mexico, with an estimated population of 40,000 in the city and surrounding area (Table 4-2e). Eight other communities have populations ranging from 5,000 to 18,000.

TABLE 4-2e  
POPULATION AND ECONOMIC CHARACTERISTICS FOR THE AREA OF INFLUENCE  
SAN JUAN RIVER COAL REGION\*

Total Population	317,400			
Total Area (square miles)	45,051			
Population per square mile	7.0			
Per capita personal income	\$6,955			
Per capita personal income as a percent of U.S. average	63			
<hr/>				
<b>Economic Factors</b>	<b>Employment</b>	<b>% of Total</b>	<b>Earnings (thousands)</b>	<b>% of Total</b>
Agriculture	3,628	4	\$ 44,125	3
Mineral Industry	8,312	9	280,781	18
Construction	7,705	8	183,016	12
Manufacturing	3,527	4	69,654	4
Transportation, communication, and utilities	7,096	8	209,055	13
Trade	14,615	16	181,165	11
Finance, insurance, and real estate	2,245	2	34,075	2
Services	16,932	18	228,493	14
Nonfarm proprietors	6,036	6	**	
Government	<u>23,077</u>	25	<u>370,653</u>	23
<b>TOTAL</b>	<b>93,173</b>		<b>1,601,017</b>	

\*Data is for counties expected to be affected by coal development under either the no leasing or leasing alternatives.

\*\*Employment and earnings figures are calculated on different bases. Nonfarm proprietors' earnings are included in each sector, whereas employment is reported as a separate figure.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Rapid growth in the 1970s placed strains on the infrastructures of some communities, but recent improvements have provided enough capacity for present and near-future needs. Most of the larger communities can accommodate population increases, but the smaller communities and Indian reservations would require additions to their infrastructures to handle a large population influx.

Mining and agriculture make up the area's economic base, with mining the dominant activity. Oil and gas, coal, uranium, and other metals are or have been important in different parts of the area. Agriculture consists mainly of livestock grazing with some irrigated farming. The area's scenic and archaeological attractions have induced a small but growing tourist industry. Table 4-2e shows that mining is an important sector of the economy, accounting for 9 percent of total employment and 18 percent of earnings. As a result, the current energy slump has significantly affected the economy, and, as in the Green River-Hams Fork and Uinta-Southwestern Utah regions, the effect has spread throughout the area of influence.

Those communities experiencing recent mineral-related growth are now better equipped to deal with the resulting social changes. As in the other western coal regions, current economic conditions have created some support for more coal development. Protection of the area's natural beauty, recreation opportunities, and air and water quality, however, remain important local concerns.

### Alabama Subregion

Unlike the western coal regions, the Alabama Subregion has a large population, high population density, and larger communities. (See Appendix 4 for the counties in the area of influence.) The area had a total estimated 1982 population of 898,200 and a population density of 231.0 persons per square mile. Birmingham, Alabama, with a 1980 urbanized area population of 606,000 is the dominant community (Table 4-2f). Three other communities have populations ranging from 5,000 to 75,000.

The area's larger communities have well-developed infrastructures that can accommodate growth at the currently expected rate. Expansion required by baseline growth is included in local development plans.

The area's diversified economic base includes manufacturing, trade, service, mining, and agriculture. Birmingham is a major steel-producing center and a regional center for trade and services. Coal is the main mineral product, but a potential exists for oil and gas development. Agricultural products include cotton, a variety of other crops, and livestock. Industrial recession has raised area unemployment to the two-digit level and, under the projected moderate baseline growth, the jobless rate would remain relatively high.

Local attitudes toward coal development, conditioned by long experience with the coal industry, can be described as highly qualified approval. Recession and high unemployment have increased the support for further development. Environmental problems resulting from past coal development, especially strip mines, have nevertheless created a strong demand for more effective environmental controls.



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TABLE 4-2f  
POPULATION AND ECONOMIC CHARACTERISTICS FOR THE AREA OF INFLUENCE  
SOUTHERN APPALACHIAN COAL REGION  
ALABAMA SUBREGION\*\*

Total Population	898,200			
Total Area (square miles)	3,889			
Population per square mile	231			
Per capita personal income	\$10,144			
Per capita personal income as a percent of U.S. average	91			

Economic Factors	Employment	% of Total	Earnings (thousands)	% of Total
Agriculture	5,019	1	\$ 26,501	*
Mineral Industry	11,177	3	404,280	6
Construction	18,630	4	417,582	6
Manufacturing	58,078	14	1,285,973	18
Transportation, communication, and utilities	29,206	7	846,034	12
Trade	86,667	21	1,263,904	18
Finance, insurance, and real estate	24,943	6	480,125	7
Services	86,238	21	1,274,712	18
Nonfarm proprietors	22,404	5	***	
Government	<u>74,900</u>	18	<u>1,098,650</u>	15
<b>TOTAL</b>	<b>417,262</b>		<b>7,097,761</b>	

\*Less than 0.5 percent.

\*\*Data is for counties expected to be affected by coal development under either the no leasing or leasing alternatives

\*\*\*Employment and earnings figures are calculated on different bases. Nonfarm proprietors' earnings are included in each sector, whereas employment is reported as a separate figure.

### IMPACTS

The general types of impacts that would result from either No New Federal Leasing or any of the alternative federal coal management programs are described in the General Impacts section. Later sections on each of the alternatives highlight differences in the degree and regional distribution of impacts. Impacts directly attributable to the choice of a federal coal program would occur only at impact points shown in Table 4-1.

#### General Impacts

Increased coal production would create both beneficial and adverse impacts in the local area surrounding new or expanded mines. Beneficial impacts would include more jobs, new business opportunities, expanded shopping and entertainment facilities, and increased local government revenues. Adverse effects would include (1) additions to local government capital and operating costs that sometimes create financial difficulties, (2) temporary shortfalls in housing and public services, (3) increased social problems and emotional stress, and (4) irreversible changes in local lifestyles.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

The following elements of the socioeconomic environment could be affected by later federal coal leasing actions resulting from the decision on the federal coal management program alternatives:

- existing local business, industry, and agriculture;
- employment opportunities;
- population;
- housing and infrastructure;
- local government revenues and expenditures; and
- social structures and lifestyles.

Possible impacts to each of these elements are described in the following subsections. The discussions are general and are intended to define the categories of impacts and to show how they relate to one another. Combined with the numerical data presented in the sections on the alternatives, they portray the overall nature and size of changes in the economic and social environment that could result from program decisions. Appendix 4, Methodologies, describes the data sources and analysis methods used to make these estimates.

This analysis cannot be used by local officials to plan mitigation strategy. Coal program impacts would not be evenly spread over an area of influence but would be concentrated near the coal tracts that are leased. Information on specific tracts and the communities that would be affected by them is not included in a programmatic analysis of this type. Future regional and site-specific EISs will address environmental impacts at the community level.

**Existing Local Business, Industry, and Agriculture.** Coal development would affect local business, industry, and agriculture in three different ways: (1) resource conflicts, (2) secondary business growth, and (3) urbanization.

Resource conflicts would occur when the land, water, and human resources that would be affected by coal mining are now used in other economic activities. Agriculture is nearly always affected by surface mining because most coal deposits are on lands that are being farmed or grazed. The significance of this impact would depend on the presence of undeveloped agricultural land in each locale. Such land exists in many parts of the western coal regions, but little if any exists in the Alabama Subregion.

Secondary business growth would be stimulated (a) by local purchases of supplies and services by the mines and (b) by local spending of incomes by mine employees. The infusion of new money into an area would create new jobs and business opportunities, but the infusion of new money would often be accompanied by the less desirable effect of local inflation.

Urbanization refers to the expansion of communities onto nearby agricultural land, which may result in the loss of agricultural production and income. Because many communities lie in river valleys, particularly in the western coal regions, urbanization all too often causes conversion of higher quality cropland to urban uses.

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**Employment Opportunities.** Increased coal production would create more jobs. Increased employment would be needed to build mines and to mine and beneficiate coal. More jobs would be created by secondary business growth as described above.

Workers would be needed to build the mines before mining could begin. Construction would begin 2 to 5 years before a mine is in operation. But construction work occurs mainly in the mine development phase, and workers often have to move after a mine is fully developed. Therefore, increased construction employment would be short term although the number of construction workers is often larger in smaller communities than is the permanent operation workforce.

Although all coal mining creates jobs, fewer jobs are created by surface mines than by subsurface mines of equal productive capacity. The reason is that the massive draglines and shovels used in surface mining require much less labor for each ton of coal recovered than do the necessarily smaller machines used in subsurface mining. Therefore, the impacts to employment and earnings and related population growth in an area would depend partly on the type of mining.

The main sources of labor for western coal production, in addition to now unemployed miners, would be agricultural workers and to some degree construction workers. Workers skilled in heavy equipment operation could easily transfer their skills to surface mining. Operators of small farms and ranches often supplement their incomes by working in mining. Many agricultural workers are expected to respond to the higher income opportunities of coal mining and in so doing could reduce the supply and increase the cost of agricultural labor (BLM 1979a). The same phenomenon may occur with employees of local businesses.

The severity of competition for labor would vary by locale, depending on the size of the local labor force and the degree of immigration.

Because mining wages are higher than the average wage rates in most areas, coal development would tend to increase earnings at a higher rate than other employment and would thus provide a greater-than-proportional stimulus to local business growth.

**Population.** Population growth would result from employment growth. Population growth, in turn, could have many other economic, fiscal, and social impacts in the affected communities. Population growth is the best indicator of impact severity because most impacts on quality of life that would require mitigation would result from population growth. A large workforce is often needed for mine construction. Because a larger percentage of construction workers tend to be single or leave their families elsewhere, the population impact of construction is usually lower than the employment impact. Nevertheless, the size of the construction force would often be large enough to cause a temporary population bulge that would disappear when the project is completed.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

A mine normally reaches full production after a few years, at which time its employment stabilizes and the resulting population growth ends. More operation than construction workers tend to be married and bring their families with them, so the proportionate population impact would be greater.

Increased population creates new secondary jobs. Depending on how many of the jobs are filled from the local labor force and immigrating workers' families, a further increase of workers and population might result. Construction usually causes less secondary business growth than operation because of its temporary nature.

**Housing and Infrastructure.** The need for more housing would be in fairly direct proportion to population growth, affected only by variations in the percent of single workers and average family size. The need for more new housing, however, would depend on the existing vacant housing stock. Areas that have undergone a slump would generally need less new housing than areas that have had a stable or increasing population. The type of housing required would be strongly influenced by the temporary or permanent nature of new jobs, with temporary workers more likely to seek rental or mobile housing and permanent workers preferring single-family units. A temporarily large increase in mobile homes might be unavoidable in rapid growth areas until the permanent housing stock is expanded. The affect of new housing and expanded urban land use is addressed in the Agriculture section of Chapter 4.

Infrastructure refers to all the facilities and services provided by local governments. The basic list includes public schools, health care, public safety and fire protection, water supply, sewage and solid waste disposal, transportation facilities, libraries, parks and recreation facilities, and social services. Population growth increases the need for all types of infrastructure, usually in some proportion to the number of new people. Affected communities, however, might differ radically in the problems that might arise.

Economic and social change would have different impacts, requiring different mitigation measures, in three broad categories of impacted communities.

- (1) Places that have previously experienced growth, that have facilities and services in place, and that have existing staffs and budgets to deal with social services, planning, and land use. In these communities the problem of additional growth would probably be least severe and most easily solved.
- (2) Places where local government has not been required to respond to rapid change. These communities would probably need to change patterns of residential and commercial development and priorities for government activity and spending; much social and political conflict and disruption of community fabric could result.
- (3) Small or isolated communities where few commercial and government facilities and services exist. Introducing coal development-induced populations into such areas would have major economic and social affects, including up-front expenditures for capital improvement needs beyond local funding capabilities and drastic changes in lifestyles (BLM 1979a).

## SOCIOECONOMICS

Indian reservations within the coal regions fall into all of the above three categories. Some have already experienced energy-related growth and have expanded their infrastructure to meet additional needs. Most, however, would probably face a combination of the second and third category problems if new or expanded coal mining occurs nearby. Significant infrastructure additions could be needed, and traditional development patterns would change.

**Local Government Revenues and Expenditures.** Expanded coal production would increase both the revenues and expenditures of local governments in the affected areas. Local revenues would be boosted by ad valorem, sales and use, and other taxes and fees paid by the mines; by further additions to these tax revenues resulting from population and secondary business growth; and by the parts of state severance taxes and federal royalties and bonuses that would be returned to the affected areas by state governments. On the other hand, local expenditures would be increased by the need to expand infrastructure and public services to meet the needs of increased population and business.

Because local tax rates vary by area, any appropriate environmental analysis will be included in the regional EISs. Nonlocal revenues--federal royalty and state severance tax revenues that would accrue to the states--are discussed in this supplemental EIS. (See Table 4-5 in the No New Federal Leasing section.) These revenues would be distributed to the affected local areas at the discretion of each state government.

Acquiring funds to expand infrastructure and public services would be a major problem to the third category of communities described under Housing and Infrastructure and could be a problem to communities in the other two categories, depending on the scale of the impacts and the size of existing infrastructures. The problem would be the result of the following:

1. Time lags between the identification of specific needs and the acquisition of facilities to meet those needs (lead time).
2. Time lags between the need to fund the development of the infrastructure and the generation of tax revenues from the additional population served (front-end funding).
3. Geographic differences between the location of coal development and the jurisdiction receiving increased infrastructure demands (jurisdictional mismatch).

Future tax lead time impacts can be mitigated only by implementing planning programs before energy resource development. Because of the general nature of the tax lead time problem, a concerted private, state, and federal approach would be required.

Although prospective revenues (from royalties, severance taxes, and local property and sales taxes) might be adequate to cover operating and capital investment costs over time, they could probably not be obtained when needed. Also, because uncertainties plague coal development and make it difficult to predict when or whether coal production will occur, even the eventual receipt of these revenues might not be guaranteed. This front-end funding deficiency or timely allocation of bonus payments could be met through federal or state

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

loans, prepayment of taxes, federal grants, and direct financing of community facilities by coal developers (BLM 1979a). In addition, Utah and North Dakota (see Table 1-10) have legislation providing impact mitigation. These same mechanisms could also be used to overcome the jurisdictional mismatch problem.

Because Indian reservations are autonomous jurisdictions rather than subunits of the states, they cannot participate in some of the above financing arrangements. Reservations do not levy property and sales taxes, and they do not receive distributions of federal royalties and state severance taxes. Royalties received from mineral development on Indian lands and other concessions negotiated with developers can be obtained when development occurs on the reservation. To deal with the impacts of off-reservation developments, assistance is limited to federal programs through the Bureau of Indian Affairs and other agencies.

**Social Structures and Lifestyle.** Population growth could lead to more local governmental formality and regulation because of growth pressures, and local governments could need more outside professional help in dealing with growth-related problems (Mountain West Research 1982). Coordination would be required, among authorities at the state, county, and municipal levels along with the cooperation of industrial firms.

The affected communities would become further segmented and diversified (Mountain West Research 1982), and length of residence, occupation, religious preference, and similar characteristics would become even more influential in defining relations among residents. Differences in values and experiences between some newcomers and long-term residents could cause animosity and mistrust, especially where existing social structures are strong and closely knit.

Retail expansion could improve employment opportunities for local residents who may have limited job experience. This economic activity could also increase the number of young residents leaving local high schools to enter the job market (Mountain West Research 1982).

Residents, particularly women and the elderly, would feel less secure as more young men enter the area. Community life would become more impersonal. Stress attached to residence in a rapid-growth area would also be widespread. Crime would likely increase or exceed increases in population levels (Mountain West Research 1982).

Family instabilities (including child neglect and abuse, dissolutions, and conflict between spouses) would be more evident, particularly in residential living environments (such as mobile home parks) with limited space, lack of privacy, and few amenities. Housing shortfalls (supply, variety, and affordability) would intensify these problems (Mountain West Research 1982).

Although housing shortages could have major local social consequences, the presence of other services and facilities would also be important in the adaptation of communities and individuals to rapid growth. Quality of education could suffer if buildings, employees, and maintenance funds could not be provided in a timely manner.

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Health care is also a typical problem in such settings. A lack of facilities, employees, and particularly emergency care treatment could cause hardships. Mental health services could be critical in reducing some of the adaptive problems of individuals. Timely availability of such services, along with housing, education, and health care, would almost certainly reduce the instabilities often associated with rapid growth.

These effects would be more pronounced in areas that have not recently experienced rapid growth; hostility toward newcomers might be greater and needed infrastructure and services might be lacking. But as construction nears completion and facilities become operational, the local social environment would become more stable and predictable.

The timespan for the stabilization of the social environment would depend on the use of mechanisms to provide up-front funds to shorten the lead time between the beginning of construction and the completion of facilities (see Chapter 1, Major Federal and State Laws Mitigating Coal Related Impacts for a discussion of the mechanisms). As the local social environment stabilizes, an area may gain such benefits as better medical facilities and schools and increased cultural opportunities. These benefits tend to offset the problems experienced during the period of adjustment.

### No New Federal Leasing

Coal production is expected to increase in the Western coal regions even without new federal leasing (see Table 3-1), and expanded production could bring more employment and population to the affected areas. These impacts cannot be predicted with certainty because of possible variations in local economic conditions. If any areas of influence experience a future slump because of downturns in the noncoal parts of their economies, more coal production might only reduce their losses in employment and population. Therefore, the discussion below merely points to upward changes in the economic and social environments of the areas, and the significance of these impacts will be analyzed in the future regional coal EISs.

All of these discussions are based on the estimates of coal mining and beneficiation employment in Table 4-3, coal-related population in Table 4-4, and coal royalties and severance taxes in Table 4-5. (See Appendix 4 for data sources and analysis methods.)

Because the increases in coal production and coal-related economic factors generally continue through the year 2000, the discussion is limited to that year. See Table 3-7 for 1990 and 1995 coal production projections.

Fort Union Region. At all three production levels, the Fort Union Region's total annual coal production would increase from 19.4 million tons in 1983 to 33 million tons by 2000. The resulting total coal-related employment would be 2,400, total coal-related population would be 6,000, and total annual coal royalty and severance tax revenues would be \$32 million.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Powder River Region. At the low production level, the Powder River Region's total annual coal production would increase from 122.5 million tons in 1983 to 214 million tons by 2000. The resulting total coal-related employment would be 23,200, total coal-related population would be 58,700, and total annual coal royalty and severance tax revenues would be \$516 million.

The region's coal-related employment would be smaller in relation to its production than in some other regions because all mining would be by surface methods, which require less employment per ton of coal produced than do subsurface methods. Coal-related population, however, would be proportionally greater than in some other regions because the fairly small present labor force would require that most new jobs be filled by immigrating workers. Royalty and severance tax revenues would be higher relative to production than in most other regions because of the large percentage of federally owned coal and the higher state severance tax rates.

At the medium production level, annual coal production would rise to 250 million tons by 2000, total coal-related employment would be 27,000, total coal-related population would be 68,500, and total annual coal royalty and severance tax revenues would be \$601 million.

TABLE 4-3  
TOTAL COAL-RELATED EMPLOYMENT\*

Fort Union Region**							
Production Level	No New Federal Leasing		Preference Right and Emergency Leasing**		Proposed Action**		
	Construction	Operation	Construction	Operation	Construction	Operation	
<u>1990</u>							
Low	540	1,850	--	--	--	--	--
Medium	540	1,850	720	--	720	--	--
High	540	1,850	790	--	790	--	--
<u>1995</u>							
Low	0	2,440	180	--	180	--	--
Medium	0	2,440	360	2,630	480	2,630	2,630
High	0	2,440	300	2,700	850	2,700	2,700
<u>2000</u>							
Low	0	2,440	180	2,630	180	2,630	2,630
Medium	0	2,440	360	3,020	480	3,150	3,150
High	0	2,440	360	3,020	850	3,610	3,610

\*Includes secondary employment.

\*\*Figures are mostly for North Dakota but include insignificant numbers in Montana.

\*\*\*Figures are shown only where they differ from those for No New Federal Leasing.



## SOCIOECONOMICS

TABLE 4-3 (continued)  
TOTAL COAL-RELATED EMPLOYMENT\*

Powder River Region							
Production Level	No New Federal Leasing		Preference Right and Emergency Leasing**		Proposed Action**		
	Wyoming	Montana	Wyoming	Montana	Wyoming	Montana	
Construction Employment							
<u>1990</u>							
Low	410	70	--	--	480	--	
Medium	2,180	270	1,980	200	2,050	200	
High	4,430	200	4,300	--	4,300	--	
<u>1995</u>							
Low	2,930	140	2,730	--	2,730	--	
Medium	3,200	340	--	--	3,070	--	
High	2,050	1,840	3,200	2,050	6,270	1,300	
<u>2000</u>							
Low	2,930	140	2,730	--	2,730	--	
Medium	3,200	340	--	--	3,070	--	
High	2,050	1,840	3,200	2,050	6,270	1,300	
Operation Employment							
<u>1990</u>							
Low	11,370	3,850	--	--	11,280	--	
Medium	11,370	3,850	--	--	11,280	--	
High	14,760	3,950	14,570	--	14,570	--	
<u>1995</u>							
Low	11,940	3,950	--	--	--	--	
Medium	14,380	4,230	14,100	4,140	14,100	4,140	
High	20,870	4,230	20,490	--	20,490	--	
<u>2000</u>							
Low	15,980	4,140	15,700	--	15,700	--	
Medium	18,800	4,700	18,520	4,610	18,330	4,610	
High	23,690	6,770	24,910	7,050	29,140	6,020	

\*Includes secondary employment. Some secondary employment related to Montana coal mining (shown under Montana) is expected to occur in Sheridan County, Wyoming.

\*\*Figures are shown only where they differ from those for No New Federal Leasing.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-3 (continued)  
TOTAL COAL-RELATED EMPLOYMENT\*

Green River-Hams Fork Region						
Production Level	No New Federal Leasing		Preference Right and Emergency Leasing**		Proposed Action**	
	Wyoming	Colorado	Wyoming	Colorado	Wyoming	Colorado
Construction Employment						
<u>1990</u>						
Low	60	80	--	--	--	--
Medium	400	0	--	--	320	--
High	400	0	--	--	--	--
 <u>1995</u>						
Low	130	60	--	--	--	--
Medium	250	60	--	--	--	--
High	510	570	380	380	190	250
 <u>2000</u>						
Low	130	60	--	--	--	--
Medium	250	60	--	--	--	--
High	510	570	380	380	190	250
Operation Employment						
<u>1990</u>						
Low	4,100	4,310	--	--	3,900	--
Medium	4,270	4,620	--	--	4,100	--
High	4,270	4,620	--	--	--	--
 <u>1995</u>						
Low	4,440	4,790	--	--	--	--
Medium	5,130	4,790	--	--	--	--
High	5,130	4,790	--	--	--	--
 <u>2000</u>						
Low	4,780	4,970	--	--	--	--
Medium	5,820	4,970	--	--	--	--
High	6,510	6,340	6,170	5,820	5,650	5,480

\*Includes secondary employment.

\*\*Figures are shown only where they differ from those for No New Federal Leasing.

## SOCIOECONOMICS

TABLE 4-3 (continued)  
TOTAL COAL-RELATED EMPLOYMENT\*

Uinta-Southwestern Utah Region							
Production Level	No New Federal Leasing		Preference Right and Emergency Leasing**		Proposed Action**		
	Utah	Colorado	Utah	Colorado	Utah	Colorado	
Construction Employment							
<u>1990</u>							
Low	530	70	--	--	--	--	--
Medium	660	70	--	--	--	--	--
High	930	130	1,060	--	1,060	--	--
<u>1995</u>							
Low	260	130	--	--	--	--	--
Medium	400	130	--	--	--	--	--
High	530	400	1,320	0	1,320	0	0
<u>2000</u>							
Low	260	130	--	--	--	--	--
Medium	400	130	--	--	--	--	--
High	530	400	1,320	130	1,320	130	130
Operation Employment							
<u>1990</u>							
Low	13,120	3,060	--	--	--	--	--
Medium	13,120	3,060	--	--	--	--	--
High	13,120	3,620	--	--	--	--	--
<u>1995</u>							
Low	15,350	3,620	--	--	--	--	--
Medium	15,900	3,620	--	--	--	--	--
High	17,020	4,180	17,580	--	17,580	--	--
<u>2000</u>							
Low	16,460	4,180	--	--	--	--	--
Medium	17,580	4,180	--	--	--	--	--
High	19,250	5,850	23,150	4,180	23,150	4,180	4,180

\*Includes secondary employment.

\*\*Figures are shown only where they differ from those for No New Federal Leasing.

**DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

TABLE 4-3 (concluded)  
TOTAL COAL-RELATED EMPLOYMENT\*

<u>San Juan River Region**</u>						
<u>Production Level</u>	<u>No New Federal Leasing</u>		<u>Preference Right and Emergency Leasing***</u>		<u>Proposed Action***</u>	
	<u>Construction</u>	<u>Operation</u>	<u>Construction</u>	<u>Operation</u>	<u>Construction</u>	<u>Operation</u>
<u>1990</u>						
Low	360	4,680	--	--	240	4,960
Medium	600	4,680	--	--	480	4,960
High	790	4,680	720	--	600	4,960
<u>1995</u>						
Low	180	5,540	--	--	--	--
Medium	480	6,110	--	--	--	--
High	420	6,550	970	6,400	970	6,400
<u>2000</u>						
Low	180	5,970	--	--	--	--
Medium	480	7,260	--	--	--	--
High	420	7,550	970	8,700	970	8,700
<u>Alabama Subregion</u>						
<u>Production Level</u>	<u>No New Federal Leasing</u>		<u>Preference Right and Emergency Leasing***</u>		<u>Proposed Action***</u>	
	<u>Construction</u>	<u>Operation</u>	<u>Construction</u>	<u>Operation</u>	<u>Construction</u>	<u>Operation</u>
<u>1990</u>						
Low	190	19,410	--	--	--	--
Medium	40	21,220	--	--	--	--
High	40	21,220	--	--	--	--
<u>1995</u>						
Low	0	20,020	--	--	--	--
Medium	40	21,390	--	--	--	--
High	40	21,390	--	--	--	--
<u>2000</u>						
Low	0	20,020	--	--	--	--
Medium	40	21,570	--	--	--	--
High	40	21,570	--	--	--	--

\*Includes secondary employment.

\*\*Figures are mainly for New Mexico but include insignificant numbers in Colorado.

\*\*\*Figures are shown only when they differ from those for No New Federal Leasing.

## SOCIOECONOMICS

TABLE 4-4  
TOTAL COAL-RELATED POPULATION

Fort Union Region, North Dakota						
Production Level	No New Federal Leasing		Preference Right and Emergency Leasing*		Proposed Action	
<u>1990</u>						
Low	5,600		--		--	
Medium	5,600		5,800		5,800	
High	5,600		9,900		5,900	
<u>1995</u>						
Low	6,000		6,200		6,200	
Medium	6,000		7,000		7,100	
High	6,000		7,000		7,900	
<u>2000</u>						
Low	6,000		6,700		6,700	
Medium	6,000		7,800		8,300	
High	6,000		7,800		9,800	
Powder River Region**						
Production Level	No New Federal Leasing		Preference Right and Emergency Leasing***		Proposed Action***	
	Wyoming	Montana	Wyoming	Montana	Wyoming	Montana
<u>1990</u>						
Low	30,400	10,200	--	--	30,300	--
Medium	34,100	10,600	33,700	10,400	33,600	10,400
High	47,600	10,700	46,800	--	46,800	--
<u>1995</u>						
Low	37,200	10,500	36,700	--	36,700	--
Medium	44,100	11,700	43,300	11,500	43,100	11,500
High	58,500	14,800	60,000	15,300	66,400	13,900
<u>2000</u>						
Low	47,700	11,000	46,500	--	46,500	--
Medium	55,600	12,900	54,800	12,700	54,100	12,700
High	65,900	21,400	71,400	22,600	88,800	18,300

\*North Dakota has no PRLAs.

\*\*From 40 to 50 percent of the coal-related population in Montana is expected to live in Sheridan County, Wyoming.

\*\*\*Figures are shown only where they differ from those for No New Federal Leasing.

DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-4 (continued)  
TOTAL COAL-RELATED POPULATION

Green River-Hams Fork Region						
Production Level	No New Federal Leasing		Preference Right and Emergency Leasing*		Proposed Action*	
	Wyoming	Colorado	Wyoming	Colorado	Wyoming	Colorado
<u>1990</u>						
Low	10,800	10,800	--	--	10,300	--
Medium	11,600	11,500	--	--	11,200	--
High	11,600	11,500	--	--	--	--
<u>1995</u>						
Low	11,700	12,000	--	--	--	--
Medium	13,500	12,000	--	--	--	--
High	14,000	12,900	13,800	12,600	13,400	12,300
<u>2000</u>						
Low	12,500	12,400	--	--	--	--
Medium	15,200	12,400	--	--	--	--
High	17,200	16,600	16,200	15,000	14,600	14,000
Uinta-Southwestern Utah Region						
Production Level	No New Federal Leasing		Preference Right and Emergency Leasing*		Proposed Action*	
	Utah	Colorado	Utah	Colorado	Utah	Colorado
<u>1990</u>						
Low	33,600	7,900	--	--	--	--
Medium	33,900	7,900	--	--	--	--
High	34,300	9,400	34,600	--	34,600	--
<u>1995</u>						
Low	38,400	9,400	--	--	--	--
Medium	39,900	9,400	--	--	--	--
High	42,800	11,100	45,500	10,400	45,500	10,400
<u>2000</u>						
Low	41,000	10,700	--	--	--	--
Medium	43,900	10,700	--	--	--	--
High	48,000	15,100	58,600	10,700	58,600	10,700

\*Figures are shown only where they differ from these for No New Federal Leasing.

## SOCIOECONOMICS

TABLE 4-4 (concluded)  
TOTAL COAL-RELATED POPULATION

San Juan River Region, New Mexico			
Production Level	No New Federal Leasing	Preference Right and Emergency Leasing*	Proposed Action*
<u>1990</u>			
Low	12,200	--	12,700
Medium	12,600	--	13,100
High	12,900	12,800	13,200
<u>1995</u>			
Low	13,800	--	--
Medium	15,500	--	--
High	16,400	16,900	16,900
<u>2000</u>			
Low	14,800	--	--
Medium	18,000	--	--
High	18,600	21,900	21,900
Alabama Subregion			
Production Level	No New Federal Leasing	Preference Right and Emergency Leasing*	Proposed Action*
<u>1990</u>			
Low	42,600	--	--
Medium	42,900	--	--
High	42,900	--	--
<u>1995</u>			
Low	42,800	--	--
Medium	42,900	--	--
High	42,900	--	--
<u>2000</u>			
Low	42,800	--	--
Medium	42,900	--	--
High	42,900	--	--

\*Figures are shown only where they differ from those for No New Federal Leasing.

# DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 4-5  
TOTAL COAL ROYALTY AND SEVERANCE TAX REVENUES  
(thousand dollars)

North Dakota*			
	No New Federal Leasing	Preference Right and Emergency Leasing**	Proposed Action**
<b>1990</b>			
<b>Low Production Level</b>			
Royalties	\$ 2,700	--	--
Severance Taxes	20,400	--	--
<b>Medium Production Level</b>			
Royalties	2,700	--	--
Severance Taxes	20,400	--	--
<b>High Production Level</b>			
Royalties	2,700	--	--
Severance Taxes	20,400		
<b>1995</b>			
<b>Low Production Level</b>			
Royalties	4,300	--	--
Severance Taxes	28,000	--	--
<b>Medium Production Level</b>			
Royalties	4,300	\$4,700	\$4,700
Severance Taxes	28,100	30,600	30,600
<b>High Production Level</b>			
Royalties	4,300	4,900	4,900
Severance Taxes	28,000	31,400	31,400
<b>2000</b>			
<b>Low Production Level</b>			
Royalties	4,400	4,800	4,800
Severance Taxes	28,000	30,600	30,600
<b>Medium Production Level</b>			
Royalties	4,400	5,600	5,900
Severance Taxes	28,000	35,700	37,400
<b>High Production Level</b>			
Royalties	4,400	5,600	6,900
Severance Taxes	28,000	35,700	43,400

Note: Royalty figures represent the half share of federal coal royalties remitted to the states. See Royalties and Severance Tax section of Appendix 4 for procedures used to develop this table.

\*Figures include insignificant amounts in Montana.

\*\*Figures are shown only where they differ from those for No New Federal Leasing.



## SOCIOECONOMICS

TABLE 4-5 (continued)  
TOTAL COAL ROYALTY AND SEVERANCE TAX REVENUES  
(thousand dollars)

<u>Montana</u>			
	No New Federal Leasing	Preference Right and Emergency Leasing*	Proposed Action*
<b>1990</b>			
<b>Low Production Level</b>			
Royalties	\$ 14,700	--	--
Severance Taxes	113,400	--	--
<b>Medium Production Level</b>			
Royalties	14,700	--	--
Severance Taxes	113,400	--	--
<b>High Production Level</b>			
Royalties	15,100	--	--
Severance Taxes	116,100	--	--
<b>1995</b>			
<b>Low Production Level</b>			
Royalties	24,000	--	--
Severance Taxes	118,000	--	--
<b>Medium Production Level</b>			
Royalties	25,700	\$25,100	\$25,100
Severance Taxes	126,400	123,600	123,600
<b>High Production Level</b>			
Royalties	25,700	--	--
Severance Taxes	126,400	--	--
<b>2000</b>			
<b>Low Production Level</b>			
Royalties	25,500	--	--
Severance Taxes	125,400	--	--
<b>Medium Production Level</b>			
Royalties	28,900	28,300	28,300
Severance Taxes	142,400	139,600	139,600
<b>High Production Level</b>			
Royalties	41,700	43,400	37,000
Severance Taxes	205,100	213,700	182,300

Note: Royalty figures represent the half share of federal coal royalties remitted to the states. See Royalties and Severance Tax section of Appendix 4 for procedures used to develop this table.

\*Figures are shown only where they differ from those for No New Federal Leasing.

# DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 4-5 (continued)  
TOTAL COAL ROYALTY AND SEVERANCE TAX REVENUES  
(thousand dollars)

Wyoming							
	No New Federal Leasing		Preference Right and Emergency Leasing*		Proposed Action*		
	Powder River	Green River- Hams Fork	Powder River	Green River- Hams Fork	Powder River	Green River Hams Fork	
<b>1990</b>							
Low Production Level							
Royalties	\$43,400	\$12,900	--	--	\$43,100	\$12,200	
Severance Taxes	184,400	58,200	--	--	182,900	55,400	
Medium Production Level							
Royalties	43,400	13,500	--	--	43,100	12,900	
Severance Taxes	184,400	61,000	--	--	182,900	58,200	
High Production Level							
Royalties	56,400	13,500	\$55,600	--	55,600	--	
Severance Taxes	239,300	61,000	236,200	--	236,200	--	
<b>1995</b>							
Low Production Level							
Royalties	72,500	15,700	--	--	--	--	
Severance Taxes	196,600	64,700	--	--	--	--	
Medium Production Level							
Royalties	87,300	18,500	85,600	--	85,600	--	
Severance Taxes	236,800	76,000	232,200	--	232,200	--	
High Production Level							
Royalties	126,700	18,500	124,400	--	124,400	--	
Severance Taxes	343,700	76,000	337,500	--	337,500	--	
<b>2000</b>							
Low Production Level							
Royalties	98,300	18,900	96,600	--	96,600	--	
Severance Taxes	266,900	71,400	262,200	--	262,200	--	
Medium Production Level							
Royalties	115,700	23,500	114,000	--	12,800	--	
Severance Taxes	314,000	88,500	309,300	--	306,200	--	
High Production Level							
Royalties	145,800	26,500	153,300	25,000	179,300	22,700	
Severance Taxes	395,600	99,900	416,000	94,200	486,700	85,600	

Note: Royalty figures represent the half share of federal coal royalties remitted to the states.  
\*Figures are shown only where they differ from those for No New Federal Leasing. See Royalties and Severance Tax section of Appendix 4 for procedures used to develop this table.

## SOCIOECONOMICS

TABLE 4-5 (continued)  
TOTAL COAL ROYALTY AND SEVERANCE TAX REVENUES  
(thousand dollars)

Colorado						
	<u>No New Federal Leasing</u>		<u>Preference Right and Emergency Leasing*</u>		<u>Proposed Action*</u>	
	Green River- Hams Fork	Uinta- SW Utah	Green River- Hams Fork	Uinta- SW Utah	Green River Hams Fork	Uinta SW Uta
<b>1990</b>						
Low Production Level						
Royalties	\$ 9,200	\$4,000	--	--	--	--
Severance Taxes	9,000	3,000	--	--	--	--
Medium Production Level						
Royalties	9,200	4,000	--	--	--	--
Severance Taxes	9,000	3,000	--	--	--	--
High Production Level						
Royalties	9,200	4,800	--	--	--	--
Severance Taxes	9,000	3,600	--	--	--	--
<b>1995</b>						
Low Production Level						
Royalties	11,000	5,200	--	--	--	--
Severance Taxes	9,600	3,600	--	--	--	--
Medium Production Level						
Royalties	11,000	5,200	--	--	--	--
Severance Taxes	9,600	3,600	--	--	--	--
High Production Level						
Royalties	11,000	6,100	--	--	--	--
Severance Taxes	9,600	4,200	--	--	--	--
<b>2000</b>						
Low Production Level						
Royalties	12,900	6,200	--	--	--	--
Severance Taxes	10,200	4,200	--	--	--	--
Medium Production Level						
Royalties	12,900	6,200	--	--	--	--
Severance Taxes	10,200	4,200	--	--	--	--
High Production Level						
Royalties	18,900	8,900	\$16,700	\$6,200	\$15,200	\$6,200
Severance Taxes	13,000	6,000	13,200	4,200	12,000	4,200

Note: Royalty figures represent the half share of federal coal royalties remitted to the states.  
\*Figures are shown only where they differ from those for No New Federal Leasing. See Royalties and Severance Tax section of Appendix 4 for procedures used to develop this table.

DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 4-5 (continued)  
TOTAL COAL ROYALTY AND SEVERANCE TAX REVENUES  
(thousand dollars)

Utah			
	No New Federal Leasing	Preference Right and Emergency Leasing*	Proposed Action*
<b>1990</b>			
Low Production Level			
Royalties	\$17,600	--	--
Medium Production Level			
Royalties	17,600	--	--
High Production Level			
Royalties	17,600	--	--
<b>1995</b>			
Low Production Level			
Royalties	22,700	--	--
Medium Production Level			
Royalties	23,600	--	--
High Production Level			
Royalties	25,300	26,200	26,200
<b>2000</b>			
Low Production Level			
Royalties	24,900	--	--
Medium Production Level			
Royalties	26,700	--	--
High Production Level			
Royalties	29,400	35,600	35,600

Note: Royalty figures represent the half share of federal coal royalties remitted to the states. See Royalties and Severance Tax section of Appendix 4 for procedures used to develop this table.

\*Figures are shown only where they differ from those for No New Federal Leasing.

## SOCIOECONOMICS

TABLE 4-5 (continued)  
TOTAL COAL ROYALTY AND SEVERANCE TAX REVENUES  
(thousand dollars)

New Mexico*			
	No New Federal Leasing	Preference Right and Emergency Leasing**	Proposed Action**
<b>1990</b>			
Low Production Level			
Royalties	\$11,900	--	\$12,700
Severance Taxes	14,000	--	15,000
Medium Production Level			
Royalties	11,900	--	12,700
Severance Taxes	14,000	--	15,000
High Production Level			
Royalties	11,900	--	12,700
Severance Taxes	14,000	--	15,000
<b>1995</b>			
Low Production Level			
Royalties	14,700	--	--
Severance Taxes	17,000	--	--
Medium Production Level			
Royalties	16,500	--	--
Severance Taxes	19,000	--	--
High Production Level			
Royalties	17,800	--	--
Severance Taxes	20,500	--	--
<b>2000</b>			
Low Production Level			
Royalties	17,800	--	--
Severance Taxes	18,500	--	--
Medium Production Level			
Royalties	22,100	--	--
Severance Taxes	23,000	--	--
High Production Level			
Royalties	23,100	\$27,000	27,000
Severance Taxes	24,000	28,000	28,000

Note: Royalty figures represent the half share of federal coal royalties remitted to the states. See Royalties and Severance Tax section of Appendix 4 for procedures used to develop this table.

\*Figures include insignificant amounts in Colorado.

\*\*Figures are shown only where they differ from those for No New Federal Leasing.

# DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 4-5 (concluded)  
TOTAL COAL ROYALTY AND SEVERANCE TAX REVENUES  
(thousand dollars)

Alabama			
	No New Federal Leasing	Preference Right and Emergency Leasing*	Proposed Action*
<b>1990</b>			
Low Production Level			
Royalties	\$2,000	--	--
Severance Taxes	11,100	--	--
Medium Production Level			
Royalties	2,300	--	--
Severance Taxes	13,000	--	--
High Production Level			
Royalties	2,300	--	--
Severance Taxes	13,000	--	--
<b>1995</b>			
Low Production Level			
Royalties	2,100	--	--
Severance Taxes	11,100	--	--
Medium Production Level			
Royalties	2,500	--	--
Severance Taxes	13,300	--	--
High Production Level			
Royalties	2,500	--	--
Severance Taxes	13,300	--	--
<b>2000</b>			
Low Production Level			
Royalties	2,100	--	--
Severance Taxes	11,100	--	--
Medium Production Level			
Royalties	2,600	--	--
Severance Taxes	13,700	--	--
High Production Level			
Royalties	2,600	--	--
Severance Taxes	13,700	--	--

Note: Royalty figures represent the half share of federal coal royalties remitted to the states. See Royalties and Severance Tax section of Appendix 4 for procedures used to develop this table.

\*Figures are shown only where they differ from those for No New Federal Leasing.

## SOCIOECONOMICS

At the high production level, annual coal production would reach 324 million tons by 2000, total coal-related employment would be 34,300, total coal-related population would be 87,300, and total annual coal royalty and severance tax revenues would be \$788 million.

**Green River-Hams Fork Region.** At the low production level, total annual coal production in this region would increase from 29.9 million tons in 1983 to 42 million tons by 2000. The resulting total coal-related employment in 2000 would be 9,900, total coal-related population would be 24,900, and total annual coal royalty and severance tax revenues would be \$113 million. The region's coal-related population would be greater relative to its employment than in some other regions because the fairly small present labor force would require that most new jobs be filled by immigrating workers.

At the medium production level, total annual coal production would rise to 48 million tons by 2000. Total coal-related employment would be 11,100, total coal-related population would be 27,600, and total annual coal royalty and severance tax revenues would be \$135 million.

At the high production level, total annual coal production would rise to 60 million tons by 2000. Total coal-related employment would be 13,900, total coal-related population would be 33,800, and total annual coal royalty and severance tax revenues would be \$160 million.

**Uinta-Southwestern Utah Region.** At the low production level, total annual coal production in this region would increase from 15.8 million tons in 1983 to 35 million tons by 2000. The resulting total annual coal-related employment would be 21,000, total coal-related population would be 51,700, and total annual coal royalty revenues would be \$35 million. The region's coal-related employment would be greater relative to its production than in some other regions because most mining would be by subsurface methods, which require more employment per ton of coal produced than do surface methods. In addition, its coal-related population would be proportionally greater than in some other regions because the fairly small present labor force would require that most new jobs be filled by immigrating workers.

At the medium production level, total annual coal production would rise to 37 million tons by 2000. Total coal-related employment would be 22,300, total coal-related population would be 54,600, and total annual coal royalty revenues would be \$37 million.

At the high production level, coal production would become 43 million tons by 2000, total coal-related employment would be 26,000, total coal-related population would be 63,100, and total annual coal royalty revenues would be \$44 million.

**San Juan River Region.** At the low production level, total annual coal production in the region would increase from 20 million tons in 1983 to 37 million tons by 2000. The resulting total coal-related employment would be 6,100, total coal-related population would be 14,800, and total annual coal royalty and severance tax revenues would be \$36 million.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

At the medium production level, total annual coal production would rise to 46 million tons by 2,000. Total coal-related employment would be 7,700, total coal-related population would be 18,000, and total annual coal royalty and severance tax revenues would be \$45 million.

At the high production level, total annual coal production would become 48 million tons by 2000. Total coal-related employment would be 8,000, total coal-related population would be 18,600, and total annual coal royalty and severance tax revenues would be \$47 million.

**Alabama Subregion.** At the low production level, the Alabama Subregion's total annual coal production would increase from 23.6 million tons in 1983 to 30 million tons by 2000. The resulting total coal-related employment would be 20,000, total coal-related population would be 42,800, and total annual coal royalty and severance tax revenues would be \$13 million. The subregion's coal-related population would be less in relation to its employment than in most other regions because the large existing labor force and high unemployment reveal that most new jobs would be filled by residents.

At both the medium and high production levels, total annual coal production would rise to 37 million tons by 2000. Total coal-related employment would be 21,600, total coal-related population would be 42,900, and total annual coal royalty and severance tax revenues would be \$16 million.

### Preference Right and Emergency Leasing

More coal production and greater employment, population, and revenue increases would occur in federal coal regions under this alternative than under No New Federal Leasing, but the increases would not be spread evenly over the six coal regions. At different production levels, some regions would have increased impacts, while impacts in others would not change or would slightly decline. (See discussion in Chapter 3.) Table 4-6 shows the percent changes from No New Federal Leasing in coal production and economic impacts. Because the largest changes would occur in the year 2000, the analysis of percent changes are for 2000. (See Tables 4-3, 4-4, and 4-5 for changes in 1990 and 1995.) These changes are in coal-related impacts only and do not represent changes over baseline employment, population, and revenue in the regions. These changes would, however, be large enough to create potentially significant impacts at some production levels in the Fort Union, Uinta-Southwestern Utah, and San Juan River regions. Moreover, even changes that would involve small percentages over an entire region could significantly affect communities near new mines.

**Fort Union Region.** At the low production level, a 9 percent increase in coal production would cause economic impacts ranging from a 9 percent increase in revenues to a 15 percent increase in employment over that for No New Federal Leasing. At both the medium and high production levels, a 27 percent increase in coal production would create economic impacts ranging from a 27 percent increase in annual revenues to a 39 percent increase in employment.



## SOCIOECONOMICS

**Powder River Region.** At the low and medium production levels, decreases of 1 to 2 percent in coal production would result in declines of 1 to 2 percent in the economic variables. At the high production level, a 5 percent increase in coal production would lead to impacts ranging from 5 percent in annual revenues to 8 percent increase in employment and population.

**Green River-Hams Fork Region.** No changes would occur at the low and medium production levels. At the high production level, a decrease of 8 percent in coal production would result in a decrease from 7 to 8 percent in the economic variables.

**Uinta-Southwestern Utah Region.** No changes would occur at the low and medium production levels. At the high production level, an increase of 9 percent in coal production would cause increased economic impacts, varying from a 4 percent increase in annual revenues to an 11 percent increase in employment.

**San Juan River Region.** No changes would occur at the low and medium production levels. At the high production level, an increase of 17 percent in coal production would create economic impacts varying from a 17 percent increase in annual revenues to a 21 percent increase in employment.

**Alabama Subregion.** No changes would occur from No New Federal Leasing at any production level.

### Proposed Action

Under the Proposed Action, changes from No New Federal Leasing would occur in the same pattern as under Preference Right and Emergency Leasing, but the degree of change would be greater at the medium and high production levels (Table 4-6). Changes at the low production level would be the same as under Preference Right and Emergency Leasing.

The changes under the Proposed Action would be large enough to create potentially significant impacts at some production levels in all six regions, and even the changes that would involve relatively small percentages over an entire region could significantly affect communities near new mines.

**Fort Union Region.** Impacts at the low production level would be the same as under Preference Right and Emergency Leasing. At the medium production level, a 33 percent growth in coal production would lead to economic impacts ranging from a 34 percent increase in annual revenues to a 49 percent increase in employment. At the high production level, a 55 percent increase in production would create impacts varying from a 55 percent increase in annual revenues to an 83 percent increase in employment.

**Powder River Region.** Impacts at the low production level would be the same as under Preference Right and Emergency Leasing. At the medium production level, a decline of 2 percent in production would result in decreases of 2 to 3 percent in the economic factors. At the high production level, a rise of 15 percent in production would cause impacts ranging from a 12 percent increase

# DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-6  
 COAL-RELATED ECONOMIC IMPACTS: PERCENT CHANGE  
 FROM NO NEW FEDERAL LEASING IN 2000

	Fort Union	Powder River	Green River-Hams Fork	Uinta-SW Utah	San Juan River
Preference Right and Emergency Leasing					
Low Production Level					
Coal production	9	-1	0	0	0
Employment	15	-2	0	0	0
Population	12	-2	0	0	0
Revenues	9	-1	0	0	0
Medium Production Level					
Coal production	27	-2	0	0	0
Employment	39	-1	0	0	0
Population	30	-1	0	0	0
Revenues	27	-2	0	0	0
High Production Level					
Coal production	27	5	-8	9	17
Employment	39	8	-8	11	21
Population	30	8	-8	10	18
Revenues	27	5	-7	4	17
Proposed Action					
Low Production Level					
Coal production	9	-1	0	0	0
Employment	15	-2	0	0	0
Population	12	-2	0	0	0
Revenues	9	-1	0	0	0
Medium Production Level					
Coal production	33	-2	0	0	0
Employment	49	-3	0	0	0
Population	38	-2	0	0	0
Revenues	34	-2	0	0	0
High Production Level					
Coal Production	55	15	-17	9	17
Employment	83	24	-17	11	21
Population	63	23	-15	10	18
Revenues	55	12	-15	4	17

Note: The Alabama Subregion is omitted from this table because in the subregion no changes from No New Federal Leasing would occur under either alternative.

## TRANSPORTATION

in annual revenues to a 24 percent increase in employment. An apparent discrepancy between changes in coal production and economic impacts in the Powder River and San Juan River regions is explained by the assumption that the San Juan River Region would have more local labor for coal mining than would the Powder River Region.

**Green River-Hams Fork Region.** No changes would occur at the low and medium production levels. At the high production level, a decrease of 17 percent in production would result in a decrease in the economic variables of from 15 to 17 percent.

**Uinta-Southwestern Utah Region, San Juan River Region, and Alabama Subregion.** Under the Proposed Action, impacts at all production levels in these regions would be the same as under Preference Right and Emergency Leasing.

### COMPARISON OF 1979 FES AND 1985 EIS PROJECTED IMPACTS

Table 4-7 compares projections of socioeconomic impacts of this supplemental EIS to projections of the 1979 FES (BLM 1979a). Impacts to employment, population, and royalty and severance tax revenues in 1990 at the medium production level of the 1985 Proposed Action average about 80 percent lower than impacts projected for the 1979 FES Preferred Program. A total of 51,300 workers would be needed under the 1985 Proposed Action, which is 18 percent of the 291,000 workers needed under the 1979 Preferred Program. The 1985 Proposed Action would cause a population increase of 127,400 or 23 percent of the 557,000 projected for the 1979 Preferred Program. And the 1985 Proposed Action would generate \$519 million in royalties and severance taxes, 24 percent of the \$2,135 million projected for the 1979 Preferred Program.

## TRANSPORTATION

### ASSUMPTIONS

Production estimates used to analyze impacts in this supplemental EIS are based on current and projected conditions of the transportation network, among other factors. Because the level of production considered the transportation system, actual impacts to the system should be slight. Other factors, listed below, also have a bearing on projected impacts to transportation networks.

- Railroad capacity can be increased and bottlenecks can thus be eliminated by applying some or all the following methods:
  - double tracking of single-track lines,
  - alternating single and double tracks,
  - increasing the length and frequency of passing sidings, and
  - upgrading traffic control systems to automatic block signals or centralized traffic control.
  
- The railroad industry would expand line capacity to meet demand as evidenced by its current plans. Impacts on rights-of-way of projected increases in coal traffic could be mitigated by adding to or upgrading existing networks.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-7  
COMPARISON OF 1979 AND 1985 SOCIOECONOMIC PROJECTIONS  
(based on the medium production level in 1990)

	1979 Projections			1985 Projections		
	No New Leasing	PRLAs Only	Preferred Program	No New Fed. Leasing	Preference Right & Emerg. Leasing	Proposed Action
<b>Employment</b>						
Fort Union	17,340	16,080	14,179	2,390	2,570	2,570
Powder River	126,392	146,771	156,941	17,680	17,410	17,380
Green River-Hams Fork	45,259	46,677	54,390	9,200	9,200	9,030
Uinta-Southwestern Utah	40,718	37,930	36,451	16,910	16,910	16,910
San Juan River	<u>32,983</u>	<u>31,382</u>	<u>29,063</u>	<u>5,280</u>	<u>5,280</u>	<u>5,440</u>
Total.....	262,692	278,840	291,024	51,460	51,370	51,330

Population						
Fort Union	82,600	80,100	75,700	5,500	5,800	5,800
Powder River	203,400	239,100	275,300	44,700	44,100	44,000
Green River-Hams Fork	69,400	69,100	85,000	23,100	23,100	22,700
Uinta-Southwestern Utah	79,300	71,900	71,300	41,800	41,800	41,800
San Juan River	<u>57,100</u>	<u>54,300</u>	<u>50,300</u>	<u>12,600</u>	<u>12,600</u>	<u>13,100</u>
Total.....	491,800	514,500	557,600	127,700	127,400	127,400

Royalty and Severance Tax Revenues (thousand dollars)						
Colorado			\$66,200			\$25,200
Montana			923,100			128,100
New Mexico			85,200			27,700
North Dakota			80,900			23,100
Utah			36,400			17,600
Wyoming			<u>943,000</u>			<u>227,100</u>
Total.....			2,134,800			518,800

Note: Projections for the Alabama Subregion are not compared because separate 1979 projections were not made for that area.

- Impacts of roadway traffic directly relate to several factors: speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, operating cost, and traffic volume.
- Truck transportation would generally be limited to short-haul intrastate movements of 50 to 75 miles (Congressional Research Service 1978).
- Most long-haul coal would be carried by railroads.
- Slurry pipelines could increase as a coal transportation mode if major issues such as water availability and right-of-way access over rail lines are resolved. Such pipelines now appear to have little application in the near future. If the slurry industry can overcome these obstacles, the building of slurry lines would tend to reduce the amount of coal carried by railroads and barges.

## TRANSPORTATION

### AFFECTED ENVIRONMENT

#### Fort Union Region

The major roadway serving the Fort Union Region is Interstate 94, which runs east and west across North Dakota and Montana. The major U.S. Highways in North Dakota are US 85, 52, 83, 2, 12, and in Montana, US 2 and 12. State secondary, county, Bureau of Indian Affairs, Fort Peck Reservation, and private roads serve as collectors.

The Burlington Northern and the Soo lines crisscross the region. The Burlington Northern is the major railroad and is an important link in the nation's railroad system.

#### Powder River Region

The major roadways serving this region are Interstate 94 and 90 running east and west and Interstate 25 running north and south. The major U.S. highways in Montana are US 59, 39, 49, and 314 and in Wyoming US 14, 212, 16, 85, 18, 20, and 87. Also serving the region are state secondary, county, Forest Service, Bureau of Indian Affairs, Crow and Northern Cheyenne reservation, and private roads.

The Burlington Northern Railroad operates three main rail lines within the Powder River Region on which most coal is carried east. The new Chicago and Northwestern line has been completed and is moving coal. The Interstate Commerce Commission is considering the Tongue River railroad proposal to build a track from Miles City to Ashland, Montana. This new spur would aid in moving coal from the southeast Montana fields to connect with the Burlington Northern at Miles City.

Highway and rail systems are discussed further in previously published documents (BLM 1979c, 1981b; USGS and Montana Department of State Lands 1979).

#### Green River-Hams Fork Region

The major roadway serving the region is Interstate 80, which runs east and west across Wyoming. The major U.S. highway in the Colorado part of this region is US 40, and the major US highways in the Wyoming part are US 13, 191, 789, 187, 189, and 30. State secondary, county, Forest Service, and private roads also serve the region.

The Denver and Rio Grande Western (D&RGW) Railroad operates in Colorado, and the Union Pacific operates in Wyoming. The D&RGW Railroad in Colorado runs from Craig to Denver and from Bond to Grand Junction. For trains moving east, the major constraint on the line's capacity is the Moffat Tunnel between Bond and Denver. The Union Pacific Railroad is a double-track mainline running east and west across southern Wyoming. Most of the trackage is controlled by centralized traffic control--an advanced signaling system. The rest of the trackage is controlled by an automatic block signaling system. The Union Pacific and D&RGW mainlines have many at-grade crossings within Wyoming and Colorado. Overall traffic for both railroads has declined since 1980 owing to an economic downturn.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

### Uinta-Southwestern Utah Region

Vehicular traffic within central Utah is carried on four major highways, which form a loop. The north leg is formed by US 6, the east leg by Utah State Highway 10, the south leg by Interstate 70, and the west leg by US 89. In addition, some local traffic crosses the Wasatch Plateau on State Highway 29 between Orangeville and Joe's Valley, on the county road between Joe's Valley and Ephraim, on State Highway 31 between Huntington and Fairview, and on the county road between Ferron and Mayfield.

The Utah Department of Transportation reported that traffic is heaviest on the four-lane portion of US 6 north and west of Price. A bypass to the south has been completed and has relieved some traffic congestion in Price, but traffic on State Highway 10 south of Price is reaching a practical maximum for a two-lane highway (BLM 1983h).

Property has been acquired for a proposed D&RGW Castle Valley spur line, to begin at the Wellington coal loadout facilities 1 mile west of Wellington and continue southward 65 miles through Castle Valley to a proposed loop and coal loadout facility 4 miles southeast of Emery. The construction timetable will depend on supply and demand for coal.

Vehicle transportation in south Utah mainly follows US 89, which forms an L along the west and south sides of the coal tracts. As the main route between Flagstaff, Arizona, and the cities of the Wasatch Front in northern Utah, US 89 carries commercial and recreational traffic.

The major roadway serving west central Colorado is Interstate 70, running east and west and connecting Denver to the Uinta-Southwestern Utah Region. The major U.S. highways in Colorado are US 550 and 50. State secondary, county, and Forest Service roads serve as collectors.

The D&RGW Railroad runs east and west across the Uinta-Southwestern Utah Region. For coal trains moving east out of the region the major constraint on the line's capacity is the Moffat Tunnel between Bond and Denver.

The D&RGW spur from Grand Junction is used solely to haul coal. The line ends just past Somerset at the Hawks Nest Mine and connects loadout facilities of several coal mines along the route. The closest rail service to the Cedaredge coal area is Delta, Colorado, 14 miles to the south. Each day, two 100-car trains carry coal from Somerset to Grand Junction and return to Somerset. Coal cars are sidled at loadout facilities until they are filled with coal near Delta and Paonia.

### San Juan River Region

The major roadway serving the region is Interstate 40 running east and west and Interstate 25 running north and south. The major U.S. highways in New Mexico part of the region are US 555, 666, 57, and 371 and in the Colorado part, US 160 and 666. Also serving the region are state secondary, county, Forest Service, Bureau of Indian Affairs, and Navajo, Zuni, Southern Ute, Ute Mountain, and Pueblo reservation roads.

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The San Juan River Region's public roads that serve rural and suburban areas include state highways, county roads, county-maintained roads, and roads maintained by the Bureau of Indian Affairs. New Mexico State Highway 44, US 550, and Interstate 40 form the major transportation network. Coal is hauled by truck to Gallup, New Mexico from the Chimney Rock Mine near Pagosa Springs, Colorado.

The Atchinson, Topeka & Santa Fe (AT&SF) Railroad crosses the region, and the Star Lake Railroad has been completed to Lee Ranch Mine. The AT&SF runs east-west through Gallup, across the center of the region. An existing AT&SF spur line passes near the Gamarco and Samson Lake coal areas, providing a mode of coal transport.

The proposed route of the Star Lake Railroad runs within 2 to 10 miles of all but two of the San Juan River Region's coal areas. Trucks would use newly built coal-hauling roads or rebuilt bladed roads to serve loadout facilities on the Star Lake Railroad, but not in the Colorado part of the region. The potential also exists for the building of rail spurs or conveyor belts to carry coal from proposed competitive lease tracts or preference right leases. As with roads, these spurs would be built to serve loadout facilities.

### Alabama Subregion

In 1981, 1,099 miles of navigable waterways, 4,947 miles of railroad, and 25,842 miles of public highway allowed internal movement of Alabama coal (BLM 1983c). Tramways, conveyors, and private railroads were used to a lesser extent, but exact amount of coal hauled by each are unknown. The amount of coal carried by barge is also unknown. Barge transportation dominates deliveries of coal to the port of Mobile, but rail shipments are increasing.

Alabama's rail system is well developed and serves most of the state. Fayette, Tuscaloosa, and Walker counties are served by four major Class I rail lines. The Norfolk Southern Corporation alone operates seven unit coal trains in Alabama, four of which originate in the three-county area. The remaining three trains travel through Walker County on a route between Pride in Colbert County and powerplants operated by the Georgia Power Company.

Coal from the Alabama Subregion is hauled by barge on the Black Warrior River. At Demopolis the Black Warrior River joins the Tombigbee River, which is navigable to Mobile.

Barge sizes vary, but they are generally either regular 900-ton or jumbo 1,400-ton. The number of barges in tow on the Black Warrior-Tombigbee River system ranges from two to six. Average speed for coal traffic on the Black Warrior and Tombigbee Rivers is 6.67 miles per hour downstream and 4.51 miles per hour upstream.

Water transport through the William B. Oliver Lock and Dam on the Black Warrior River in the western Tuscaloosa metropolitan area is representative of such transport in the southern end of the subregion. In 1980, 10 million tons of coal passed through this lock, which can handle at least 20 million tons per year in the future (Smith 1983).

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

### IMPACTS

#### General Impacts

**Railroads.** The environmental impacts on the railroads as on overall system or institution would both depend on and be affected by the physical capacity of the railroad system, including rights-of-way, railroad plants, and railroad equipment (hopper cars and locomotives).

Potential transportation impacts would be a regional issue because over half of the total U.S. recoverable coal reserves lies within six western states: Colorado, New Mexico, Montana, North Dakota, Utah, and Wyoming.

Because of the willingness of the railroad industry to expand line capacity as evidenced by current plans, impacts on rights-of-way of projected increases in coal traffic would be relatively small or could be mitigated through additions to or upgrading of existing networks.

Nonmeasurable impacts of increased coal transportation by rail might be more severe as coal trains move through rural areas and communities along rights-of-way. More recently, however, projected increases in coal movements, particularly in the West, have caused growing public concern.

Impacts of railroads on highway traffic relate to both the length and the number of unit trains. For example, 40 unit trains (100 cars per train) coming and going (a total of 80 trains) at an average of 20 miles per hour would cause a 4.6-hour aggregate delay at crossings over a 24-hour period. Shorter delays would occur in undeveloped areas where train speeds can increase. Although the passage of single trains might not create significant problems, repeated passages would. Trains blocking crossings would cause queuing of vehicular traffic, adding to the transit time needed to cross communities built along railroads. Blocked crossings would also increasingly hinder the movement of emergency fire, police, and health vehicles. Such blockage has been a problem in Denver and in other eastern slope towns in Colorado and in other states.

Rail-highway crossing impacts would be highly site-specific, depending on the location of the rail line, the volume of rail and vehicular traffic, and the type of rail crossing. Federal Railroad Administration standards for rail-crossing protection devices are largely based on rail and vehicular traffic volumes. In smaller communities, local traffic volumes could be too low to require separate crossings or, in many instances, even flashing warning lights or crossing gates. In addition, small communities that developed around main rail lines are often cut into segments by the lines. Even nominal increases in rail traffic through these communities could impede the free flow of commerce and personal traffic. Communities wanting more safety devices are usually required to finance these improvements. Such funding could be obtained from coal revenues received by the states, from local and state tax revenues through cooperative cost sharing with or reimbursement by the railway company, or from matching fund programs with the state highway department.

New rail extensions, however, offer greater flexibility for planning for separated crossings. For example, the Interstate Commerce Commission certificate authorizing the building of the rail line connecting Gillette and



## TRANSPORTATION

Douglas, Wyoming, required adequate access and ease of movement for local residents. As a result, more separated (not at grade) crossings are being built.

**Highways.** One-tenth of the Nation's coal production moves from mine by truck (U.S. Department of Transportation 1978). The effects of such movements by truck is of concern because coal trucks travel on local and secondary road systems that usually cannot withstand repeated use by heavy trucks, even where the gross vehicular weights are within posted limits.

Perhaps one of the most important impacts could be the perceived rather than the actual impact of the truck traffic on a local community: residents would be aware of more traffic volume, noise and vibration, coal spillage and dust, and visual impacts. These impacts would be a consideration in determining the need for highway improvement. Specific impacts and their locations cannot be determined at the programmatic level. The regional EISs would specifically assess these types of impacts.

Increased project traffic would increase accidents, especially at junctions. Traffic accidents would increase directly in proportion to increased traffic volume and the deterioration in the road conditions resulting from increased use.

### Fort Union Region

Coal mining at the high production level under No New Federal Leasing and at the low, medium, and high production levels under the Proposed Action and other alternatives would similarly affect transportation in the Fort Union Region. Under all alternatives and at all production levels, the Burlington Northern Railroad could increase its coal train traffic without exceeding the track capacity to the year 2000. No significant impacts would result. The hauling of coal by truck is limited to short distances within and from coal areas, and impacts to highway transportation would be insignificant and limited to the coal areas. Specific roads crossing the coal areas might need to be relocated, but such relocation would involve little disturbance and would not significantly impair roadways or impede traffic flow.

### Powder River Region

Coal mining at all production levels under the Proposed Action and alternatives would have similar impacts in the Powder River Region. Impacts at the medium and low production levels of No New Federal Leasing would be least severe, and transportation-related impacts at the high production levels of the Proposed Action and Preference Right and Emergency Leasing would be more severe because of possible increased production.

**Railroads.** Increased mainline traffic would disrupt automobile traffic at grade crossings for longer periods. On the basis of an assumed line capacity rate of 25 trains per day from single-track lines and 75 trains per day for double-track lines, however, increased traffic would not exceed the capacity of the mainline system and would not significantly disturb the two railroad systems. No significant impacts would be associated with railroads in the Powder River Region because they have already been upgraded to meet the projected coal production.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Nonmeasurable impacts of increased coal transportation by rail would be more severe. These impacts relate to the movement of coal trains through rural areas and communities. Increased train traffic (1995 to 2000) would significantly affect five population centers: Miles City, Montana, and Gillette, Newcastle, Torrington, and Lusk, Wyoming. The proposed Tongue River Railroad connection at Miles City could cause more minor congestion and delays at railroad crossings. For example, the coming and going of only 50 (100-car) unit trains at 20 miles per hour at a grade road crossing could cause a 5 hour and 15 minute aggregate delay, a significant impact to the flow of highway traffic at grade crossings. The least time needed for a train moving at 20 miles per hour to pass through an intersection would be 3.5 minutes. The delay for any one vehicle would depend on the level of congestion caused by the backup of traffic.

**Highways.** Traffic would increase along major routes serving the mine areas because of increased employment and population. The major routes affected in Wyoming would be Wyoming State Highway 59, south and north of Gillette, US 14-16 north of Gillette, and State Highway 338 north of Sheridan. Highways affected in Montana would be Interstate 94 west of Miles City to Forsyth, State Highway 39 south of Interstate 94, US 212 from Interstate 90 to Broadus, State Highway 314 from Ashland to the Wyoming border, Interstate 90 from Billings to Sheridan, Wyoming, and State Highway 314 from Decker to Busby.

Most of the major highway systems could handle increased traffic. US 14-16 and Wyoming State Highway 59 north of Gillette lack the structural design and alignment to carry large volumes of traffic (Hanlin 1983). In Montana, reconstruction and repairs already planned should keep highways in good condition (Braut 1983).

### Green River-Hams Fork Region

All production levels under the Proposed Action and alternatives would similarly affect transportation in the Green River-Hams Fork Region. But the following production levels would have less severe impacts than the others: medium and low production levels for No New Federal Leasing (for railroads and highways) and the low production levels for the Proposed Action and the Preference Right and Emergency Leasing (for highways only).

**Railroads.** The Denver and Rio Grande Western (D&RGW) and the Union Pacific railroads have stated that increased rail traffic should not exceed track capacity, at least in the near future. As rail traffic increases in the future, capital would be invested, and maintenance performed to meet demand. Exposure factors and time delays at grade crossings would increase proportionately to rail traffic increases.

The major restriction on the D&RGW track capacity for trains moving east is the Moffat Tunnel (between Bond and Denver), which has a maximum capacity of 48 trains per day. This analysis assumed that most Colorado coal shipped by rail would travel east and that track capacity through the Moffat Tunnel would not be reached by 2000. Moreover, some coal trains might travel west from the mines, avoiding the Moffat Tunnel and ensuring adequate track capacity.

**Highways.** The highway system in the Green River-Hams Fork Region would not be significantly affected except on US 40 between Craig and Steamboat

## TRANSPORTATION

Springs. Most of the other road segments in Wyoming and Colorado would be at less than 50 percent of capacity during peak traffic hours, but US 40 is projected to reach or exceed capacity by 2000. An increase in traffic can be expected on most roads within the region.

Several segments of Wyoming State Highways 13 and 789 and US 191 in Wyoming would undergo minor congestion or periodic slowdowns during peak traffic hours as capacity is approached by the year 2000. Such congestion could cause significant impacts. All other Wyoming highways would have enough excess capacity to meet the needs of predicted increase in traffic volume. Internal traffic in Craig, Rawlins, and Rock Springs would significantly increase, causing much congestion in these communities.

Large average daily traffic increases would occur on county roads, including Moffat County Roads 17, 30, 33, and 47 and Routt County Roads 27, 53, 59, and 61. Large increases in average daily traffic would also affect several Wyoming County Roads, including Seminole Road and 20-Mile Road in Carbon County and Sweetwater County Roads 4-15, 4-18, and 4-76. Because no data exists for analyzing traffic on these roads, the potential for significant impacts is unknown.

### Uinta-Southwestern Utah Region

Although all production levels under the Proposed Action and alternatives would similarly affect transportation in the Uinta-Southwestern Utah Region, the medium and low production levels of No New Federal Leasing would have less severe impacts than most production levels under the other alternatives. Impacts under the medium and high production levels for the Proposed Action would occur only in 1990.

Railroads. On the basis of an assumed link capacity rate of 25 trains per day for single-track lines and 70 trains per day for double-track lines, hauling of coal under No New Federal Leasing would not exceed the system capacity of the Union Pacific and the D&RGW mainlines. The two railroad systems would not be significantly affected.

Nonmeasurable impacts of increased coal transportation by rail would perhaps be more severe. These impacts relate to traffic congestion within urban areas along the rights-of-way. A potential exists for traffic congestion in downtown Price, Utah, both from volume of traffic and from interruptions to traffic on Utah State Highway 10, less than a block south of its intersection with US 6, where the D&RGW crosses it at grade. If only half the coal mined and projected to be mined in the area passes across this intersection and one 100-car coal train (10,000 tons) 1.6 miles long requires 5 minutes to pass, the crossing could be blocked on the average of six times per day, backing traffic into the US 6-State Highway intersection. Although the analysis was made for projected production for the year 2000, some traffic congestion would occur almost immediately.

Highways. Secondary roads in central Utah are generally adequate to meet the needs of expected traffic. Proposed secondary roads projected to carry current mining traffic are also projected to be upgraded with mining development. As production increases to the year 2000, overcrowding will occur on State Highway 10 south from Price to Castle Dale and on US 6 across

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Soldier Summit from Castle Gate to Spanish Fork. This overcrowded condition would significantly interfere with traffic movement.

In southern Utah, traffic would increase on the main highways and negligibly increase on secondary roads. Despite the variety and increase in traffic, the highways in southern Utah would accommodate the projected traffic, and increased traffic would not significantly affect the main roadway system. Although existing secondary roads can accommodate only light traffic at best, traffic on these roads is projected to be light to negligible in the absence of federal leasing.

In western Colorado, daily traffic would increase, but this increase is expected to be slight on all state and county roads and would not significantly disrupt the west Colorado road system.

### San Juan River Region

All alternatives and production levels would similarly affect transportation in the San Juan River Region. The medium and low production levels of No New Federal Leasing, however, would have less severe effects than the other production levels.

**Railroads.** Because of its location, the Atchinson, Topeka & Santa Fe could carry a high volume of the region's coal. The Proposed Action and the alternatives could significantly affect the railroad system.

The new Star Lake Railroad system is built as far as Lee Ranch Mine and when finished will interconnect the coal areas. The new railroad will avoid impacts by providing greater flexibility for separate crossings, adequate access, and ease of movement for local residents. The newly built line would cause fewer time delays for highway traffic than established lines.

**Highways.** The largest increase in average daily traffic would occur along two major routes connecting the tri-city area of Farmington, Aztec, and Bloomfield. One route includes segments of New Mexico State Highways 44 and 57, and the other route is State Highway 371. This increased traffic would cause significant traffic congestion.

### Alabama Subregion

The Proposed Action and No New Federal Leasing would similarly affect transportation in the Alabama Subregion. The medium and low production levels of the No New Federal Leasing Alternative, however, would have less severe impacts than the other production levels under other alternatives. Emergency leasing but not preference right leasing would apply to this subregion because the subregion has no outstanding PRLAs.

**Railroads.** The subregion's rail system is well developed, and its capacities far exceed its present use. The railroad system would not be significantly affected by any alternative.

**Highways.** Roads in the subregion could handle all the needs generated by projected coal production and should not undergo any major increases in congestion as a result of traffic increases. No significant impacts would result.

## HEALTH AND SAFETY

A few unpaved county roads might be relocated but only for short segments. Traffic flow would not be significantly affected.

**Waterways.** Capabilities of existing barge facilities exceed any potential increase in coal transport. The Corps of Engineers has determined that nonstructural changes at the William B. Oliver Lock and Dam would increase capacity to more than 20 million tons. Barge transportation would thus not be significantly affected.

## HEALTH AND SAFETY

The subject of health and safety does not lend itself to an analysis-by-alternative discussion. Rather, the impact discussion applies to all alternatives and regions.

### AFFECTED ENVIRONMENT

The percentage of surface and subsurface coal production in the federal coal regions is as follows.

	Surface %	Subsurface %
Fort Union	100	0
Powder River	100	0
Green River-Hams Fork	70	30
Uinta-Southwestern Utah	1	99
San Juan River	100	*
Alabama Subregion	34	66

\*Less than 1 percent.

Mining is and will continue to be a high-risk occupation in which overall fatalities occur five times more often than in manufacturing. The frequency of disabling accidents is about three times higher than in manufacturing. On a per-ton basis, surface mining is about nine times safer than subsurface mining (OTA 1979). (See Appendix 4, Health and Safety Methodology.)

### Health Hazards

Some health risks of mining are common to subsurface and surface mining but are magnified for subsurface mining. In the subsurface mine, the dangers of dust, fumes, noise, and other contaminants are intensified by close quarters and artificial ventilation. To a lesser degree, surface miners also face health hazards. The outdoor worker is exposed to dust, heat and cold, diesel fumes, whole-body vibration, noise, and stress. Because the subsurface environment is so clearly more hazardous, comparatively little research has focused on surface miners. Therefore, the following discussions are directed mainly at subsurface mining and to a lesser extent at surface mining.

**Mortality.** The recognition and prevention of disease are hampered by the time required for many occupationally linked diseases to appear. One mortality study surveyed more than 23,000 United Mine Workers of America

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

miners, of whom 7,628 had died between 1959 and 1971 (Rockette 1977). Rockette found coal miners died more often than the United States male population from respiratory disease (pneumonconiosis, influenza, emphysema, asthma, and tuberculosis), accidents, hypertension, and stomach and lung cancer.

**Coal Dust.** All mine dust, of which coal dust is most prominent, is classed as either respirable or nonrespirable. Only the smallest particles (smaller than 5 micrograms) are respirable (OTA 1979). When these small particles are retained in the gas-exchanging sacs of the lungs, they cause pneumonconiosis. Coal workers' pneumonconiosis is defined as a chronic dust disease of the lung arising out of employment in an underground coal mine.

Health effects of particulates range from short-term irritation to the inducing of chronic disease such as fibrosis and lung cancer. Irritations lead to bronchoconstrictions and reduced airway size. Repeated irritation results in bronchitis and occasionally asthma. Pulmonary fibrosis results from exposure to coal dust, which causes the lungs to become stiff and resistant to the diffusion of oxygen and carbon dioxide. Although larger particles are not retained in the lungs, continuous exposure to them during the normal work year produces a more or less constant irritation of the upper respiratory tract.

**Other Mine Dusts.** Coal mine dusts contain a wide range of noncoal constituents, including silica and hazardous substances such as benzenes, phenols, and naphthalenes. Trace and other elements such as arsenic, beryllium, cadmium, fluorine, lead, mercury, and selenium also occur in coal and all appear on the Environmental Protection Agency's list of hazardous elements. Little research has been conducted on the health effects of trace element dust or trace element compounds generated in coal extraction. Trace elements may have a role in producing black lung disability, either alone or synergistically. They may also play a role in the excess lung and stomach cancer found in miners.

**Harmful Fumes and Gases.** Hazardous fumes and gases are often produced in underground mines under both normal and abnormal conditions. Common gases include nitrogen and its oxides, carbon dioxide, methane and other hydrocarbons, sulfur dioxide, and hydrogen sulfide. If ventilation is maintained at required levels, these gases are diluted and carried quickly away from the working area. Miners are often exposed to noxious or poisonous fumes from fires in machinery, conveyor belts, oils, and synthetic materials. No studies have assessed the health impacts of these substances on miners.

**Noise.** Noise is a proven hazard to both underground and surface miners. Occupational noise has the following possible effects: temporary or permanent loss in hearing sensitivity, physical and psychological disorders, interference with speech communications or the conception of other wanted sounds, and disruption of job performance. Without reliable noise data, it is impossible to predict the extent of hearing impairment miners would experience in the future.

Noise control requires careful equipment engineering and work design. Exposure can be reduced by providing personal protective headgear, but this approach is usually less reliable than engineering control and may increase accidents.

## HEALTH AND SAFETY

Diesel Equipment in Coal Mines. Health hazards to both surface and underground coal miners from diesel emissions have not been studied definitively. Diesel engines, however, produce emissions that are known to be health hazards: carbon monoxide, unburned hydrocarbons, oxides of nitrogen, particulates, polynuclear aromatic hydrocarbons, phenols, aldehydes, oxides of sulfur, trace metals, nitrogen compounds, smoke, and light hydrocarbons. Exhaust scrubbers, proper maintenance, and ventilation can reduce these emissions.

### Safety Hazards

During mining, accidents result from rock and roof falls, explosions and fires, bumps and falls, electrocution, and incidents involving heavy mining equipment and vehicular traffic. In 1982, accident rates per million tons of coal produced in underground mines amounted to 0.319, whereas the rate for surface mines amounted to 0.043. Fatality rates per million tons of coal mined in 1982 amounted to 0.003 for underground mines and 0.0004 for surface mines (U.S. Department of Labor, Mine Safety and Health Administration 1984). (See Appendix 4, Health and Safety Methodology, for the methodology for the calculation of these rates and the actual calculations.)

### IMPACTS

#### Health

Workers would be exposed to several occupational health and safety hazards during the construction and operation of any coal mine or related facility.

Dust. Early 1970 studies found coal workers' pneumoniosis (CWP) to occur in 10 to 15 percent of underground coal miners. With the enforcement of existing federal dust standards, such prevalence rates are projected to be 5 percent for underground mines and 2 percent for surface mines for the year 2000 (OTA 1979). Along with CWP, coal miners would continue to experience other black lung diseases, bronchitis, severe dyspnea (shortness of breath), and airway obstructions. For every case of coal workers' pneumoniosis about three cases of bronchitis, one case of dyspnea, and two cases of airway obstruction occur. These cases are not exclusive and are often found in combination.

Truck and Rail Traffic. Truck and rail traffic create noise and have local health-related air quality impacts. As haul traffic increases, so does noise from more trains and trucks. Although noise can cause temporary or permanent loss of hearing, the greatest impact would probably be the health effects from stress. Harmful fumes and gases from trucks and trains could also have a local impact on the public by diminishing air quality and thereby increasing respiratory irritants.

#### Safety

Table 4-8 projects accidents and fatalities by coal region and alternative. Accidents and fatalities involving rail and truck traffic would be directly proportional to the number of ton-miles of coal hauled. Therefore, one can assume that as coal production increases, as predicted for later years, so will accidents and deaths. The same relationship would exist for personal traffic accidents: as population in coal areas increases, so will traffic accidents and deaths.

# DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 4-8  
AVERAGE ANNUAL ACCIDENTS AND FATALITIES  
FROM MINING, REFINING, AND PROCESSING  
(Numbers in parenthesis represent fatalities; other numbers represent accidents.)

REGION	1990			1995			2000		
	Low	Medium	High	Low	Medium	High	Low	Medium	High
Fort Union	142(1.2)	142(1.2)	142(1.2)	196(1.7)	196(1.7)	196(1.7)	196(1.7)	196(1.7)	196(1.7)
Powder River	960(8.4)	960(8.4)	1180(10.3)	1002(8.7)	1174(10.2)	1583(13.8)	1269(11.1)	1482(12.9)	1196(16.8)
Green River-Hans Fork									
Surface	190(1.7)	190(1.7)	190(1.7)	202(1.8)	225(2.0)	225(2.0)	219(1.9)	255(2.2)	324(2.8)
Subsurface	124(1.2)	168(1.6)	168(1.6)	168(1.6)	168(1.6)	168(1.6)	168(1.6)	168(1.6)	168(1.6)
Total	324(2.9)	358(3.3)	358(3.4)	370(3.4)	393(3.6)	393(3.6)	387(3.5)	423(3.8)	494(4.4)
Uinta-SW Utah	905(8.4)	905(8.4)	939(8.7)	1073(10.0)	1106(10.3)	1207(11.2)	1174(10.9)	1241(11.5)	1442(13.4)
San Juan River	166(1.4)	166(1.4)	166(1.4)	202(1.8)	225(2.0)	243(2.1)	219(1.9)	273(2.4)	285(2.5)
Alabama									
Surface	71(0.6)	83(0.7)	83(0.7)	59(0.5)	89(0.8)	89(0.8)	59(0.5)	95(0.8)	95(0.8)
Subsurface	604(5.6)	704(6.5)	704(6.5)	671(6.2)	704(6.5)	704(6.5)	671(6.2)	704(6.5)	704(6.5)
Total	675(6.2)	787(7.2)	787(7.2)	730(6.7)	793(7.3)	793(7.3)	730(6.7)	799(7.3)	799(7.3)
<b>Preference Right and Emergency Leasing<sup>a</sup></b>									
Fort Union	--	--	--	--	213(1.9)	219(1.9)	213(1.9)	249(2.2)	249(2.2)
Powder River	--	--	1168(10.2)	--	1150(10.0)	1559(13.6)	1251(10.9)	1458(12.7)	2015(17.6)
Green River-Hans Fork									
Surface	--	--	--	--	--	--	--	--	296(2.6)
Subsurface	--	--	--	--	--	--	--	--	168(1.6)
Total	--	--	--	--	--	--	--	--	464(4.2)
Uinta-SW Utah	--	--	--	--	--	1241(11.5)	--	--	1576(14.6)
San Juan River	--	--	--	--	--	237(2.1)	--	--	332(2.9)
Alabama	--	--	--	--	--	--	--	--	--
<b>Proposed Action<sup>a</sup></b>									
Fort Union	--	--	--	--	213(1.9)	219(1.9)	213(1.9)	261(2.3)	302(2.6)
Powder River	954(8.3)	954(8.3)	1168(10.2)	--	1150(10.0)	1559(13.6)	1251(10.9)	1466(12.6)	2217(19.3)
Green River-Hans Fork									
Surface	184(1.6)	184(1.6)	--	--	--	--	--	--	267(2.3)
Subsurface	134(1.2)	168(1.6)	--	--	--	--	--	--	168(1.6)
Total	318(2.8)	352(3.2)	--	--	--	--	--	--	435(3.9)
Uinta-SW Utah	--	--	--	--	--	1241(11.5)	--	--	1576(14.6)
San Juan River	178(1.6)	178(1.6)	178(1.6)	--	--	237(2.1)	--	--	332(2.9)
Alabama	--	--	--	--	--	--	--	--	--
Total	3318(29.9)								

<sup>a</sup>Includes only regions in which number of accidents would exceed those under No New Federal Leasing.



## NATIVE AMERICAN ISSUES

### General Public Health and Safety

Mining-related hazards might also affect the public because of either faulty design or unforeseen development. Some of the more obvious possibilities are as follows:

1. the presence of acid mine water pools,
2. floods caused by sediment pond failure,
3. slope failures on reconstructed surface mines, which threaten local housing,
4. possible pollution of surface and ground water used for drinking,
5. surface subsidence from mining, and
6. general long-term health problems caused by the lowering of a region's overall air quality.

### Control and Mitigation Methods

Some of the health and safety hazards can be reduced by up-to-date pollution control technology. Others will require specific industrial hygiene controls. The three major control methods are (1) worker training programs, including an intensive training program for new workers and refresher courses for workers throughout their careers, (2) the design and maintenance of safe working environments, and (3) health monitoring programs, including examinations and recordkeeping.

Mortality from the effects of diesel equipment in coal mines and from disease, mine dust, harmful fumes and gases, and noise cannot be measured because little specific data exists. One can reasonably assume, however, that mine conditions would not worsen and should improve with new technology.

## NATIVE AMERICAN ISSUES

This section discusses key concerns and issues raised by Native American groups and tribes. Concerns relating directly to environmental effects will be examined in detail in the regional or site-specific coal EISs. The impacts examined elsewhere in Chapter 4 would affect Indian tribes and their land, but such specific impacts are not identified at the programmatic level of analysis.

Tribal demands for increased environmental protection have been a dominant theme in recent tribal-federal relations concerning energy development around Indian reservations. The Northern Cheyenne and the Fort Peck (Assiniboine and Sioux) tribes petitioned the Environmental Protection Agency to reclassify their reservations to Class I areas under the Clean Air Act. These are the only instances in the country in which communities have voluntarily requested that this stringent standard be applied. Even tribes that have done little to undertake regulatory responsibilities or that have little industry to regulate have acted to preserve wildlife, unspoiled areas, and sites of historic or cultural importance. Indian tribes have a strong interest in maintaining high environmental standards (Council of Energy Resource Tribes 1979).

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

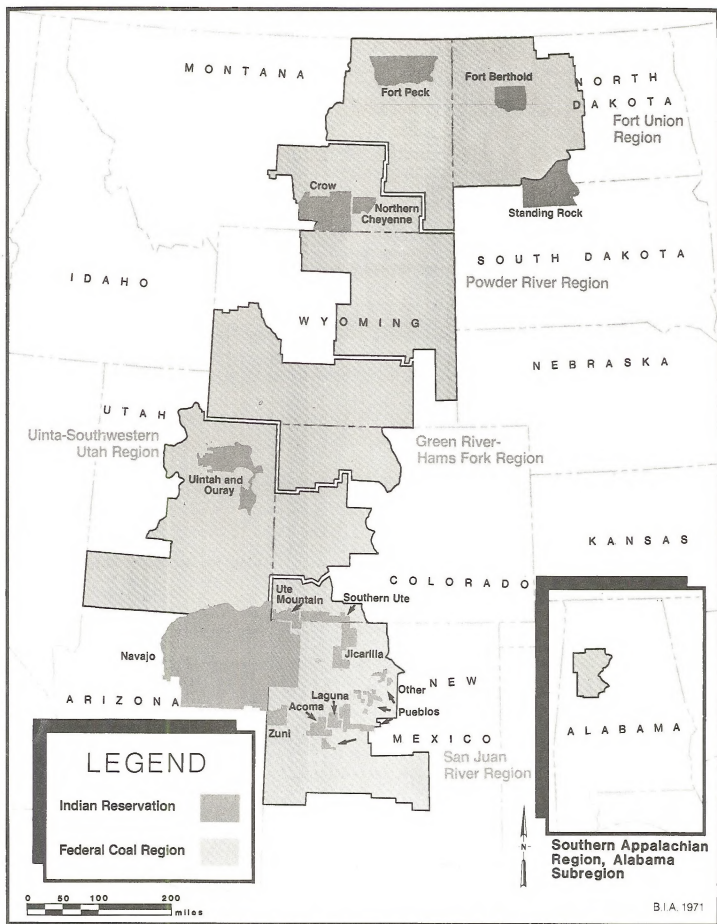
Indian tribes in the West own an estimated 70 billion tons of coal reserves, 30 billion of which are surface minable. These reserves constitute the largest continuous block of nonfederal coal and are a highly important potential source of supply for future western coal production. A total of 22.9 million tons of coal were mined on Indian lands in 1979, 13.8 percent of total western production. In 1977, the largest amount of Indian coal--11.5 million tons--was mined in Arizona. In the same year, Indian coal production was 11.4 million tons in the six western federal coal states, 6.9 million tons in New Mexico, and 4.5 million tons in Montana (BLM 1979a).

The most important Indian coal owners are the Crow and Northern Cheyenne Tribes in the Powder River Region in Montana, the Navajo Tribe in the San Juan River Region, and the three affiliated tribes in the Fort Union Region (Map 4-1). All of these tribes except the Northern Cheyenne and the off-reservation Indians in New Mexico have stated an interest in developing their coal reserves. Coal development has the potential for generating a major infusion of income for the tribes, which is a goal of the Indian self-determination policy.

Planned production for 1985 from Indian lands in the six western coal states is 25 million tons per year, but production at full maximum potential at any one time would be extremely unlikely (BLM 1979a).

Environmental concerns of Indian tribes vary greatly because of political, cultural, and geographical differences. A review of comments submitted on the various regional coal EISs and the Office of Technical Assessment report (OTA 1984) reveals three concerns common to the Indian tribes within the coal regions.

1. Tribes feel that consultation has been inconsistent and inadequate during land use planning and has tended more toward "mollification" than toward "consultation" during activity planning. Similarly, the tribes do not believe they have been given adequate information to support effective participation in decisions or recommendations on leasing levels or lease sales.
2. Indian tribes, as other interest groups, must be able to participate effectively at key decision points. Tribe involvement with a federal coal leasing program will and should vary greatly, depending on the closeness to potential coal areas and on impacts caused by expected development and on a tribe's willingness to become involved. Accordingly, it may be useful to distinguish a tribe's role on the region coal team (RCT) on the same bases--a coal area's closeness to a reservation and the size of probable environmental and socioeconomic impacts.
3. A concern of all tribes is the disparity between the tribes and state and off-reservation local governments in the availability of funds to mitigate the adverse impacts of coal development. Tribes generally do not receive a share of federal bonuses, rentals, or royalties; can not collect severance, gross proceeds, or any other taxes from off-reservation mines; and have virtually no independent tax base.



MAP 4-1 INDIAN RESERVATIONS OF THE FEDERAL COAL REGIONS

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

No Indian lands lie within the Green River-Hams Fork Region and the Alabama Subregion. (See Map 4-1 for the locations of the reservations discussed in this section.)

The following summaries present the key concerns of potentially affected tribes. Concerns about potential environmental and other impacts listed reflect a tribe's priorities, unless otherwise noted.

### FORT UNION REGION

#### Three Affiliated Tribes - Fort Berthold Reservation

In view of the reservation's location in the center of the North Dakota part of the Fort Union Region and because of the large scale of coal mining south of the reservation, the three affiliated tribes are concerned that significant adverse environmental and socioeconomic impacts will increase.

A major concern of the tribe is air quality, which involves a reduction in visibility and an increase in total suspended particulates (TSP), sulfur dioxide, and nitrogen oxides. An indirect economic impact might result from the reservation's location near Theodore Roosevelt National Park, which holds a Class I air quality designation. Developing federal coal lease tracts could use up air quality increments and reduce the likelihood that development of tribal coal could be compatible with environmental protection.

#### Fort Peck Assiniboine and Sioux Tribes

The reservation lies within the northeast Montana coal area. The tribes' environmental issues relate to (1) possible degrading of the reservations' air quality or exceeding the reservations' Class I air quality increments; (2) disrupting migratory wildlife on the reservation by disturbing habitat outside the reservation; and (3) disrupting the reservations' infrastructure and resources by a large influx of workers.

### POWDER RIVER REGION

#### Northern Cheyenne Reservation

The tribe opposes on-reservation coal extraction. Tribal policy regarding off-reservation development is largely attached to the potential for tribal members to obtain employment and other benefits at mines and facilities within daily commuting distance of the reservation. If this potential cannot be realized, the tribe is likely to oppose the proposed development. The tribe also expressed concern about air quality, water quality, tribal government operations, and maintenance of the existing culture. Making tradeoffs between economic development and cultural preservation is a continuing dilemma for the tribe (BLM 1984d).

In view of the reservation's location in the center of the Montana portion of the Powder River Region, the large scale of surrounding existing and proposed coal mines and conversion facilities has created and will likely continue to

## NATIVE AMERICAN ISSUES

create significant adverse environmental and socioeconomic impacts. In May 1983, Northern Cheyenne tribal representatives met with BLM representatives to discuss tribal concerns about possible federal coal leasing (BLM 1984d). Their concerns are as follows.

1. Ability of the tribal government to respond to the potential changes brought on by leasing on tribal government operations.
2. The extent to which coal development near the Northern Cheyenne culture could endanger the reservation as the homeland of the Northern Cheyenne.
3. Effects of coal mining on reservation communities such as Lame Deer and Busby.
4. Effects of regional population increases on the tribe's provision of services and facilities, and how such effects could be mitigated.
5. How the tribe's and the reservation's public financing (revenue and expenditures) should be addressed.
6. Effects on traffic and other potential law and order problems caused by nearby mining and how the effects could be mitigated.
7. The employment of tribal members as a mitigation measure.
8. The use of stipulations to mitigate adverse effects on the tribe.
9. Concern about the lack of site-specific analysis for specific leases.
10. The tribe's feeling that development of maintenance tracts would result in increased production and new impacts.

### Crow Reservation

Both the northeast and southeast boundaries of the Crow Reservation lie near federal coal areas (Colstrip, Spring Creek, and North/West Decker) and existing coal mines and conversion facilities. In addition, an active coal mine lies in a ceded area at the reservation's northeast border, and another mine in the southeast portion of the reservation, Youngs Creek, is slated to begin operation in 1986. The Crow are open to coal development but have the following two major concerns.

1. Air Quality. The Crow Tribe is concerned that pollution could significantly harm their reservation, especially at medium and high production levels (large-scale strip mining of coal, related conversion facilities, powerplants, and synthetic fuel operations).
2. Water Quality and Quantity. The tribe is concerned that intensive coal development could pollute tributary streams on or next to the reservation.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

### UINTA--SOUTHWESTERN UTAH REGION

Two tribes are associated with the coal leasing program within this region-- the Ute Tribe (Uintah and Ouray Reservation) and the a Paiute Tribe of Utah.

#### Uintah and Ouray Reservation

The Ute Tribe and its leaders appear to be convinced that economic development on and next to their reservation can be compatible with Ute culture, but only if the tribal government can help formulate mitigation.

Because of the tribe's strong interest in protecting the reservation's air quality, the Ute Tribe has a research facility, the Ute Research Laboratory, which is conducting an air quality monitoring program.

Even though the Ute Tribe is tied to economic development and is looking to coal development as a way to increase reservation employment, the tribe also has some environmental concerns.

1. **Traffic Volume.** Concerns include increased traffic movement across the reservation via north-south and east-west roadways, which could increase traffic accidents.
2. **Increased Population.** The tribe is concerned that population increases associated with the intensive coal development could more intensely stress the already stressed tribal public facilities and services.
3. **Socioeconomics.** The tribe sees itself in a particularly vulnerable economic situation because of the closeness of the reservation's south boundary to one of the region's coal areas. As a result, the tribe is concerned about the possible impacts of development on public services and facilities. Most likely to be heavily affected are the roads, traffic control, law and order, health care, and housing. The Ute Tribe will not be able to share the revenues provided to off-reservation government under Utah Code Annotated Section 63-51-10 (Supp. 1981) (Senate Bill 170) to mitigate such adverse impacts (see Table 1-10).
4. **Air Quality.** The tribe is concerned about fugitive dust from mining and other impacts from conversion facilities and that the reservation's air quality increments in the region are being usurped.
5. **Water Quality.** The tribe is concerned that aquifer interception and contamination from mining could affect the tribal water supply--springs, wells, streams, and rivers.
6. **Wildlife.** The tribe is concerned that off-reservation coal development could affect migration routes of wildlife moving onto the reservation, which could affect tribal food supplies.
7. **Historical and Burial Sites.** The tribe is concerned that intensive coal development could disrupt, destroy, or expose to the public many sacred historic and burial sites.

## NATIVE AMERICAN ISSUES

### SAN JUAN RIVER REGION

#### Navajo Reservation

Most of the western half of the New Mexico part of the San Juan River Region lies within the jurisdiction of the Eastern Navajo Agency, an off-reservation administrative unit of the Bureau of Indian Affairs.

The following are some of the tribal concerns that are unique to the federal coal leasing program within the land under the jurisdiction of the Eastern Navajo Agency (BLM 1983g).

1. **Navajo-Hopi Relocation.** Coal leasing would significantly affect the Navajo-Hopi relocation program and the litigation by Navajo allottees regarding surface owner consent and coal ownership.
2. **Socioeconomics.** Impacts from an influx of people would result in housing shortages, increases in crime and alcoholism, and a deterioration of law and order. All of these changes would in turn adversely affect the Navajo lifestyle.
3. **Reclamation and Revegetation.** Coal development could reduce the amount of grazing land, and the reclamation program would not be adequate to return the lost grazing land in a short period.
4. **Water Quality and Quantity.** Tribal concerns center on the availability of water needed for the proposed mining and related conversion facilities in coal areas (in view of the current scarcity for existing domestic, irrigation, and livestock demands) and the possibility of a new town in the region. Other tribal water quality concerns include ground water interception and the recharge levels of aquifers supplying water to many tribal lands. Finally, the tribe is concerned that water quality may be impaired by the increased coal mining nearby.
5. **Cultural, Archaeological, and Paleontological Resources.** The Navajo Nation strongly believes that comprehensive inventories of these resources must be undertaken before decisions are made to implement the leasing plan. Otherwise, Navajo graves and sacred sites and the rich diversity of significant archaeological and paleontological resources in the region would be irretrievably lost, not only to the tribe but to society in general.
6. **Air Quality.** The Navajo Nation is concerned about decreases in visibility and increases in total suspended particulates, sulfur dioxide, and nitrogen oxides. An indirect economic impact might result from the reservation's location near the coal areas, the possibility that air quality increments could be used up, and the decreasing likelihood that tribal coal development could be compatible with environmental protection.
7. **Noise and Vibration.** Noise and vibration of intensive coal mining could harm people, livestock, and wildlife and could damage fragile archaeological and paleontological resources.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

8. **Visual Resources.** The Navajo Tribe's key concerns are the scenic quality of the landscape and possible destruction of some unique geological formations and wilderness areas.

### Jicarilla Apache Tribe--Jicarilla Apache Reservation

The following are some of the Jicarilla Apache Reservation and tribal concerns (BLM 1983g).

1. **Water Quality and Quantity.** The Jicarilla Tribe is concerned about the availability of water from Navajo Reservoir and the San Juan River and the amount required for the proposed mining and related conversion facilities in coal areas. That surface water would preempt the tribe's rights to Navajo River water because that stream is a tributary to the San Juan. The tribe is also concerned that ground water pumping could reduce the reservations's ground water supply.
2. **Air Quality.** The Jicarilla Tribe has the following air quality concerns: (1) that chronic exposure of pollutants will lower forest and range land productivity, (2) that health effects of air pollutant exposure may aggravate respiratory disorders, (3) that haze will impair visibility, and (4) that acid precipitation and acid dry deposition may be severe enough to acidify lakes.
3. **Traffic.** Impacts from traffic generated on New Mexico State Highway 44 and other roads across the reservation could increase traffic accidents and maintenance costs.
4. **Endangered Species - Wildlife.** The tribe is concerned about protecting the bald and golden eagles and the peregrine falcon.
5. **Socioeconomic Impacts.** The tribe is concerned about pressure generated through population increases and how the following factors will affect them and their land: unauthorized wood gathering, off-road vehicle use, poaching, disturbance of archeological sites, livestock theft, increase in funds needed to mitigate these effects, and economic change that is driving up prices in Farmington, the tribe's major shopping center.

### Northern and Southern Pueblos

The 19 New Mexico pueblos lie in the east and south portion of the region to north and west of Albuquerque. A concern of the Pueblo of Sandia is the effects of coal mining on religious and cultural activities. The Pueblos also have similar concerns about socioeconomic, reclamation and revegetation, water quality and quantity, cultural resources, air quality, and visual resources.

### Other Indian Tribes--Zuni, Ute Mountain, and Southern Ute

These tribes have environmental concerns similar to those of the above tribes.



## AIR RESOURCES

### AIR RESOURCES

#### AFFECTED ENVIRONMENT

The air resources of the six coal regions consist of a combination of the climate and the air quality in and around those regions. The climate is generally moist and temperate in the Alabama Subregion and arid and semiarid in the western coal regions. Air quality in the six regions ranges from good to very good.

#### Fort Union Region

The Fort Union Region has a semiarid continental climate. Winters are long and cold; summers are short and warm. Many fronts pass through the area, but because the region is far from major moisture sources, precipitation is not plentiful. From 12 to 15 times a year, Arctic air breaks into the region, causing severe winter cold. The extreme cold is often moderated in the western and southern parts of the area by chinook winds that develop on the eastern slopes of the Rocky Mountains.

The Rocky Mountains, to the west of the region, modify the prevailing westerly flow of air masses from the northern Pacific. But no topographic barriers modify the flow of cold, dry air masses from the polar regions to the north and the warm, moist air masses from tropical regions to the south. As a result, weather patterns rapidly change.

The Fort Union Region's topography consists of rolling plains with no major elevated features obstructing air dispersion. The region's landforms that have a relatively minor and localized effect on air dispersion are the Killdeer Mountains and the Missouri and Yellowstone river valleys, including Fort Peck Reservoir and Lake Sakakawea. No distinct major air basins occur within this region as a whole (BLM 1982a).

Mean annual temperatures vary from 38°F in the northeast part of the region to 45°F in the southeast part. The region is subject to the dominant path of Arctic-generated storms crossing the United States-Canada border as well as the chinook winds that moderate the cold temperatures in the western part of the region.

The region is windy; annual average speeds are 10 miles per hour (mph). The prevailing direction is northwest, but southerly winds are common during warm months. The prevailing windy and sunny conditions cause evaporation to exceed normal precipitation by a factor of two or more.

Surface-based inversions occur on 65 percent of winter mornings and 80 percent of summer mornings. Forty to 50 percent of the inversions are accompanied by winds of 5 mph or more. On summer afternoons, surface-based inversions are rare; on winter afternoons, they occur 25 to 30 percent of the time. Morning mixing depths tend to be lowest in summer in the eastern part of the region and lowest in the winter in the western part (BLM 1979a). The region's air quality is generally very good. No part of the Fort Union Region is classified non-attainment for any pollutant (BLM 1982a).

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Total suspended particulate (TSP) data for 1979 and 1980 shows that in rural areas of eastern Montana the annual geometric mean concentrations range from 13 to 21 micrograms per cubic meter ( $\text{ug}/\text{m}^3$ ) at Scobey and 20 to 27  $\text{ug}/\text{m}^3$  at Fort Peck and Lindsay. The figures represent up to 28 percent of the Primary National Ambient Air Quality Standard (NAAQS) at Scobey and 35 percent of the Primary NAAQS and 45 percent of the Secondary NAAQS at Fort Peck and Lindsay. The highest 24-hour concentrations observed were 116  $\text{ug}/\text{m}^3$  at Scobey, 153  $\text{ug}/\text{m}^3$  at Fort Peck, and 208  $\text{ug}/\text{m}^3$  at Lindsay. These concentrations represent up to 77, 102, and 139 percent respectively of the Secondary NAAQS (BLM 1982a).

Rural sites in western North Dakota showed annual geometric means of 11 to 28  $\text{ug}/\text{m}^3$  TSP, and peak 24-hour TSP concentrations ranging from 90 to 290  $\text{ug}/\text{m}^3$ . The rural sites reach as high as 47 percent of the more stringent Secondary NAAQS for the annual geometric mean and as high as 193 percent of the 24-hour Secondary NAAQS.

### Powder River Region

The climate of the Powder River Region is continental and semiarid. Frontal systems from the Pacific regularly cross the area but drop most of their moisture on the western slopes of the Rocky Mountains. About a dozen times a year, winter storms from the north swing through the area, bringing windy and often intense cold weather with rarely significant moisture. These cold waves are often modified by periods of milder weather created by chinook winds. These winds, warm and dry, often reach velocities of 25-50 mph and may persist for several days. Spring and summer bring some moisture, but the region is considered to be dry.

Average annual temperatures vary little throughout the region, with most points averaging 45°F. Maximum temperatures exceeding 100°F occur in July. The Arctic outbreaks in winter bring extreme cold in January and February, with record lows of -50°F.

About 75 percent of the average annual precipitation of 14 inches falls from April to September. At least half the average annual precipitation falls during late spring and early summer at the start of the growing season.

Perhaps the region's most important climatic feature is the recurrence of drought cycles. Though this region is semiarid, it varies from humid in some years to arid in others and is never predictable.

The region is windy, with average speeds of 12 mph. The prevailing direction is westerly, but directions near terrain features may greatly vary. Surface-based inversions occur on 75-85 percent of the mornings, summer and winter. On winter afternoons, surface-based inversions occur 35 percent of the time. Stable conditions prevail in spite of generally windy conditions, contributing to high summer afternoon mixing heights. Air quality in the region is generally good but varies around populated areas, especially in areas of current surface coal mining (BLM 1979a).

## AIR RESOURCES

In the Wyoming part of the region, annual geometric mean TSP values range from 5 to 55  $\mu\text{g}/\text{m}^3$ , all within the state annual standard of 60  $\mu\text{g}/\text{m}^3$ . A background concentration of 15  $\mu\text{g}/\text{m}^3$  annual geometric mean has been used in most analyses performed for the Powder River Basin and has been used in this analysis. Secondary-maximum 24-hour measured values range from 8 to 330  $\mu\text{g}/\text{m}^3$ . Some of the sites exceed the State of Wyoming 24-hour standard of 150  $\mu\text{g}/\text{m}^3$ , but most sites comply.

In the Montana part of the region, annual geometric mean TSP values range from 9 to 138  $\mu\text{g}/\text{m}^3$ . Some values exceed the state annual standard of 75  $\mu\text{g}/\text{m}^3$ , but most of the monitored values were measured within the mine boundaries where the standards do not apply. Secondary-maximum 24-hour monitored concentrations range from 38 to 973  $\mu\text{g}/\text{m}^3$ . Again, some values exceed the state standard of 200  $\mu\text{g}/\text{m}^3$ , but most of the monitoring locations showing violations are within mine boundaries (PEDCo Environmental Inc.. 1983).

### Green River-Hams Fork Region

This region has mostly a semiarid continental climate. Fronts generally originate in the Pacific and drop moisture in the mountains as wind currents pass over increased elevations. The region's complex topography creates much variation in site-specific temperatures, precipitation, and surface winds.

These influences are generally less on the plateaus than in the valleys (BLM 1983b). General flooding potential is low, but flash floods may result from intense summer thunderstorms. Evaporation potential usually exceeds total precipitation.

The average annual temperatures range from 37° to 46°F with variations due mostly to differences in elevation and exposure. Frost-free growing seasons range from 28 days in Steamboat Springs, Colorado, to 130 days in Rawlins, Wyoming (BLM 1979a).

Prevailing winds for most of the region generally blow from the southwest. Most of the harsh winter storms blow from the northwest. The wind patterns are typically funneled through some of the mountain passes and canyons. The winter winds out of the north typically bring cold dry air with velocities sometimes exceeding 40 mph. During both summer and winter the region commonly has surface-based inversions that tend to be intense but not particularly deep.

Overall regional air quality is very good, being typical of undeveloped regions in the western United States. Ambient pollutant levels are usually near or below measurable limits. Notable exceptions in this region include high, short-term TSP concentrations (related to local winds) and possibly ozone and carbon monoxide, especially in towns. Locations vulnerable to decreasing air quality from extensive energy development include the immediate operation areas (coal mines), local population centers with their induced impacts, and distant areas that can be affected through long-range transport of pollutants (BLM 1983b).

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Rural annual geometric mean TSP values range from 23 to 59  $\mu\text{g}/\text{m}^3$ , and rural secondary-maximum 24-hour values range from 52 to 205  $\mu\text{g}/\text{m}^3$ . Some areas have measured high particulate levels, but because the cause is mainly natural fugitive dust, these areas have been designated unclassified (neither attainment nor non-attainment) (BLM 1983b).

### Uinta-Southwestern Utah Region

Prevailing southwest winds that cross the Colorado and Mojave deserts give most of the region an arid climate with a high evapotranspiration rate. Rugged topography and great differences in elevation and orientation, however, cause temperature and moisture to greatly vary within short distances. The result is a mosaic of microclimates with significant differences between north- and south-facing slopes and between sheltered canyon bottoms and exposed ridges. At higher elevations, subzero winter temperatures are common, summers are cold, and growing seasons are short. For several months of the year the higher peaks and mountain ranges are covered with snow, often several feet deep.

The lower elevations have hot summers, with temperatures often exceeding 100°F, especially in southern parts of the region. Even at lower elevations, subfreezing temperatures often occur in the winter. The clear, dry air typical of much of the area is conducive to rapid temperature changes. It is not unusual to have temperatures in the 80s at midday and frost at night within the same 24-hour period.

In spite of the prevailing general movement of air from west to east, many local wind variations result from the rugged topography. Warm air rises from the valley floors and plains during the day, and cold air drains down from the higher elevations at night. The resulting local wind flows can be strong but rarely last long.

Throughout rural parts of this region, air quality is generally very good, and no major particulate concentrations occur. Occasionally, air quality problems occur in the closed valleys where temperature inversions trap and hold urban and industrial emissions (BLM 1979a).

Annual geometric mean TSP values in the region range from 11 to 94  $\mu\text{g}/\text{m}^3$ . Secondary-maximum 24-hour TSP values range from 74 to 346  $\mu\text{g}/\text{m}^3$  (BLM 1983h).

### San Juan River Region

This region lies south of the major storm belt from the Pacific across the Rockies. The general climate is semiarid, with variations resulting from elevation and topography. The Pacific fronts that cross the region deposit most of their moisture on the mountains to the west. In the colder season, storms that develop off southern California move through the region once or twice a year and produce some precipitation, mostly on higher terrain as snow. During the summer, widely scattered showers and thunderstorms are spotty and erratic, often leading to drought in many areas.

## AIR RESOURCES

Annual mean temperatures vary from 48°F to 52°F. Temperatures exceeding 100°F occur throughout the region. Subzero temperatures are uncommon except in the mountains. A distinctive feature of the climate is the large variation in the daily high-low temperatures.

Annual precipitation averages less than 10 inches for most of the region, though points in northern New Mexico and southwest Colorado receive 20 inches or more. At lower elevations, about half the precipitation falls from May to August. At higher elevations, a greater proportion is received from winter storms. Summer rainfall is mostly from intense local thunderstorms, which often cause flash floods. Potential evaporation exceeds normal precipitation by a factor of 6 or more.

Wind direction tends to reflect local topography. Generally, winds are westerly during the day and easterly during the night, but terrain features complicate the wind field and cause significant deviations. For example, uneven cooling of the air results in downslope drainage of cold dense air during calm, clear nights, and the heating of valley walls and hills causes air to flow upslope and out of the valleys on calm, fair days. These terrain-induced circulations are common with the complex topography throughout the region.

Mixing heights and transport winds vary daily and seasonally. Mixing heights are generally higher in the afternoon than in the morning. Morning mixing heights are lowest during winter because of radiation inversions and afternoon mixing. Surface-based inversions occur from 80 to 90 percent of the mornings throughout the year but are uncommon during afternoons. Stagnations are highly prevalent. Ventilation values are highest in the spring because of strong transport winds and lowest during winter because of long nights, short days, snow cover, and persistent high-pressure systems. These various conditions result in a poor potential for pollution dispersion during certain periods.

Nevertheless, the region's air quality is mostly considered good and is better than the national standards. High winds can pick up dust, which can result in high particulate content in local areas for several days at a time (BLM 1979a).

The annual background level of particulates is about 30 ug/m<sup>3</sup>, which meets state and federal standards. The region is classified as an attainment area for particulates (BLM 1984c).

### Alabama Subregion

The Alabama Subregion has a moist temperate climate, with a mean annual rainfall ranging from 52 inches along its western side to 56 inches along its eastern side. Rainfall is fairly well distributed throughout the year. Winter is the wettest season and March the wettest month. Thunderstorms occur throughout the year but most often during spring and summer, when July is the wettest month. Fall is the driest season and October the driest month. Rainless periods lasting more than 2 or 3 weeks are rare. During the coldest months, frequent shifts occur between mild, moist Gulf air and cool, dry continental air (BLM 1983d)

## DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Air quality in the subregion is generally good. Fayette, Walker, and Tuscaloosa counties have been designated as attainment/unclassified areas for TSP. TSP levels in the subregion are generally below the maximum levels specified by state and federal regulations. The annual TSP standard, however, was exceeded in 1977 and 1978 in Walker County. Maximum annual TSP concentrations reached  $82 \text{ ug/m}^3$ . The annual standard was not exceeded in 1979. The 24-hour secondary standard was exceeded in 1979. The high TSP levels in Walker County are mainly due to fugitive dust from coal trucks driving on unpaved roads (Frentz and Lynnot 1978). Rural background TSP levels over the study area are approximately  $40 \text{ ug/m}^3$  (Barrett 1980).

Maximum sulfur dioxide ( $\text{SO}_2$ ) concentrations monitored in and near the subregion were found to be about 30 percent of allowable levels. Background  $\text{SO}_2$  concentrations are in the range of  $1\text{-}20 \text{ ug/m}^3$  (EPA 1979).

### IMPACTS

#### General Impacts

This section addresses air emissions so as to compare regional emission totals and federal coal management program alternatives against the No New Federal Leasing base totals. A discussion of the sources of particulate air emissions from the exploration, extraction, beneficiation and transportation cycles of coal development follows. Finally, this section discusses total emissions data for each coal region and each alternative.

Aggregated emissions do not directly represent measures of air quality degradation. The quality of the air is measured by the concentration of pollutants in the atmosphere, typically expressed in micrograms per cubic meter ( $\text{ug/m}^3$ ). Models of varying sophistication can be used to calculate, under specified circumstances, point or area source emissions into estimates of ambient air concentrations. The use of these models requires detailed information on the nature of the source and meteorological and geographic characteristics of the surrounding area.

The alternatives for a federal coal management program cannot be compared by ambient concentrations because data is not specific enough for the model calculations. These calculations also present a detailed analysis of impacts on Class I scenic and other sensitive areas. These impacts are more appropriately assessed at the regional level of analysis. A comparison of the total emissions for each alternative is the most worthwhile measure of relative air quality impact (BLM 1979a).

In estimating the total dust emissions from a coal mine, it is preferable to identify dust-producing activities and estimate emissions from each activity separately rather than to use a single emission factor for the entire mine. This method allows one to directly determine the major emission sources and their contribution to overall emissions (BLM 1979a). Potential sources of fugitive dust from coal mining are as follows (Morrison-Knudson Co. Inc. 1983):

## AIR RESOURCES

### From Mining

- facility site preparation and construction
- topsoil removal and placement
- overburden drilling, blasting, removal, and dumping
- coal drilling, blasting, and removal
- material hauling
- spoils grading
- reclamation grading and tilling
- exposed area and topsoil stockpile wind erosion
- nonmining vehicle traffic
- road maintenance and watering

### From Facilities

- crusher load-in
- crushing and screening
- conveying and conveyor transfer
- coal storage pile stacking, wind erosion, and reclaiming
- railcar loading and wind erosion

These sources are not always noticeable at every mine site. For example, only the transfer conveying and access road sources normally occur at underground mines. Recent studies have shown that of the sources listed above, haul roads and access roads most often contribute the greatest ambient particulate concentrations at and near the mine sites (PEDCO Environmental Inc.. 1978). Other major sources of particulates are wind erosion from exposed areas and from topsoil and overburden storage areas.

Fugitive emissions are pollutant emissions that are not normally vented through a controlled opening, such as a stack or baghouse vent. Most mining emissions are fugitive and consist of both gaseous and particulate matter.

Particulate emissions (TSP) are commonly referred to as fugitive dust. Significant gaseous pollutants are carbon monoxide, sulfur and nitrogen oxides, and hydrocarbons resulting from blasting and diesel equipment operation. In addition to these pollutants, lead is also emitted by gasoline engine operation (Morrison-Knudson Co. Inc.. 1983).

Another air pollution source at coal mines is exhaust emissions from employee motor vehicles and diesel-powered haul trucks and equipment. The major gaseous emissions from these sources are carbon dioxide, carbon monoxide, hydrocarbons, nitrogen oxides, and water vapor. The amount of these pollutants generated at even the larger coal mines would not be significant, as found by studies of the impact of vehicle emissions associated with western coal mines (USDI 1976).

Because gaseous pollutants are emitted in relatively small quantities, the focus of attention for mining air quality impacts is fugitive dust emissions.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

The impact of mining on existing particulate air quality at and near an active mine depends on three variables: climate, type of dust-producing operations, and size of the mine. Any one factor could greatly add to or reduce emissions from a mine site. For example, a small underground mine could contribute greatly to the ambient particulate concentration in the surrounding area because of an extremely long unpaved mine access road on which mine employees travel each day.

The impacts on air quality would be greatest at the mine site where airborne particulates would be generated and at areas close to the mine site. Air quality impacts of mining would markedly decrease with distance from the site.

Air pollutants emitted during the hauling of coal by rail or barge would include dust from coal cars and barges and the exhaust of train and tug engines. Estimates of windblown coal dust range from 0.2 to 2 percent of the volume of coal carried (DOE 1978). These estimates assume that the coal is carried dry. If it is carried wet, dust emissions could be reduced to negligible amounts.

All large-scale construction would generate essentially the same types of air pollutants. The major emissions would be fugitive dust, exhaust from motor vehicles and construction equipment (mainly carbon dioxide, carbon monoxide, hydrocarbons, nitrogen oxides, and water vapor), and smoke from the burning of cleared vegetation. The amount of the emissions would depend on the size of the construction area, the method of construction, the project duration, the type of terrain, and the type of control measures employed. In low areas and in narrow, steep-sided valleys, where the build-up of polluted air would be greater than in surrounding areas, concentrations of nitrogen oxides from construction equipment could exceed the NAAQS. The actual concentrations would depend upon such factors as wind and temperature conditions, atmospheric mixing conditions, pollutant production rates, and duration of operations (BLM 1979a).

### Legislative Status

The National Ambient Air Quality Standards (NAAQS) limit the total amounts of specific pollutants--carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and total suspended particulates (TSP)--allowed in the atmosphere. State standards include these parameters but may also be more stringent.

These standards were established to protect public health (primary standards) and public welfare (secondary standards). Areas that consistently violate minimum federal standards because of human activities are classified as non-attainment areas and must implement a plan to reduce ambient levels below the maximum pollution standards (Table 4-9). Under the Environmental Protection Agency's fugitive dust policy, areas that violate the TSP NAAQS but lack any significant industrial particulate sources and have a population below 25,000 are designated as unclassified, being neither attainment nor non-attainment areas.

Unclassified areas are generally exempt from having to follow the offset provisions, retrofit controls, and new source control requirements established for non-attainment areas by the Clean Air Act.



## AIR RESOURCES

TABLE 4-9  
NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	National Standards	
		Primary	Secondary
Oxidant (ozone)#	1 hour**	235 ug/m <sup>3</sup>	##
Carbon monoxide	8 hour	10 mg/m <sup>3</sup>	##
	1 hour	40 mg/m <sup>3</sup>	##
Nitrogen dioxide	Annual	100 ug/m <sup>3</sup>	##
Sulfur dioxide	Annual	80 ug/m <sup>3</sup>	-
	24 hour	365 ug/m <sup>3</sup>	-
	3 hour	-	1,300 ug/m <sup>3</sup>
Suspended particulate matter	Annual (geometric mean)	75 ug/m <sup>3</sup>	60 ug/m <sup>3</sup>
	24 hour	260 ug/m <sup>3</sup>	150 ug/m <sup>3</sup>
Lead	Calendar quarter	1.5 ug/m <sup>3</sup>	##
Hydrocarbons	3 hour (6-9 AM)	160 ug/m <sup>3</sup>	##

\*National standards, other than those for ozone or those based on annual averages, are not to be exceeded more than once per year.

\*\*The number of days during a calendar year in which one or more hourly values could equal or exceed the ozone standard must be less than or equal to 1.

#Guideline for oxidant control is no longer a national standard.

##Same as primary standard.

To protect areas designated as attainment or unclassified, Congress established a system for the Prevention of Significant Deterioration (PSD) (Table 4-10) through the Clean Air Act Amendments of 1977. Areas were classified by the additional TSP and sulfur dioxide degradation that would be allowed. PSD Class I areas, predominantly national parks and certain wilderness areas, have the greatest limitations: virtually any degradation would be significant. Areas where moderate, controlled growth can occur were designated as PSD Class II. PSD Class III areas are those that allow the greatest degree of degradation.

The current PSD regulations apply to coal mines only if over 250 tons of regulated pollutant are emitted annually through a stack or vent (controllable source). Because fugitive emission sources are not considered and most coal mines do not have a large, adjacent processing facility, the proposed mines are not likely to be subject to PSD regulations. Specific applicability would need to be determined once mining plans are developed.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-10  
PSD INCREMENTS

Pollutant	Averaging Time	Increments (ug/m <sup>3</sup> )		
		Class I	Class II	Class III
Sulfur dioxide	Annual	2	20	40
	24 hour	5	91	182
	3 hour	25	512	700
Particulate matter	Annual	5	19	37
	24 hour	10	37	75

Higher TSP concentrations are expected near towns because of local combustion sources and unpaved roads. Significant regional levels probably result from fugitive dust (mainly windblown). Because fugitive dust particulates are larger than those produced in combustion, they settle relatively quickly and present little inhalation health threat. The Environmental Protection Agency (EPA) has recognized this difference by developing standards for particulates less than 10 microns in diameter, commonly called inhalable particulates and abbreviated as PM-10. (EPA's new TSP regulation proposals are discussed in Chapter 1.)

PSD Class I regulations also address the potential for impacts to air quality-related values. These values include visibility, odors, and impacts to plants, animals, soils, water, and geologic and cultural structures. Visibility impacts can occur from atmospheric increases in small, light-scattering particles or increases in light-absorbing gases (typically nitrogen dioxide). The nature of potential coal mining emissions make direct impacts to air quality-related values unlikely (BLM 1983b). A possible source of impact to air quality-related values is acid precipitation. Mechanisms of acid precipitation formation are under study, and preliminary results have correlated ambient sulfuric and nitric acids with combustion byproducts (sulfates and nitrates).

### Impacts by Alternative

This discussion addresses the aggregated particulate air emissions resulting from the exploration, extraction, beneficiation, and transportation cycles of coal development in each of the six regions for 1990, 1995, and 2000 under each alternative. (See Appendix 4, Air Quality Methodology, for impact calculation methods.) Table 4-11 presents data showing tons per year of particulate air emissions for each year, alternative, and region. Table 4-12 shows percent total increase in TSP emissions for applicable year, alternative, and region as compared to the 1990 No New Federal Leasing Alternative in the respective regions.

**No New Federal Leasing.** Percentage increases in emissions over 1990 for 1995 and 2000 would be 38 percent for the Fort Union Region; 26 percent (1995) and 65 percent (2000) for the Powder River Region; 23 and 41 percent for the Green River-Hams Fork Region; 20 and 40 percent for the Uinta-Southwestern Utah Region; 36 and 64 percent for the San Juan River Region; and 5 and 10 percent for the Alabama Subregion.

## AIR RESOURCES

TABLE 4-11  
TOTAL SUSPENDED PARTICULATES  
(tons per year)

Year	Production Level	No New Federal Leasing	Preference Right and Emergency Leasing		Proposed Action		
<b>Fort Union Region</b>							
1990	Low	28,800	--		--		
	Medium	28,800	--		--		
	High	28,800	--		--		
1995	Low	39,600	--		--		
	Medium	39,600	43,200	43,200			
	High	39,600	44,400	44,400			
2000	Low	39,600	43,200	43,200			
	Medium	39,600	50,400	52,800			
	High	39,600	50,400	61,200			
<b>Powder River Region</b>							
		Wyoming	Montana	Wyoming	Montana	Wyoming	Montana
1990	Low	145,200	49,200	--		144,000	--
	Medium	145,200	49,200	--		144,000	--
	High	188,400	50,400	186,000	--		186,000
1995	Low	152,400	50,400	--		180,000	52,800
	Medium	183,600	54,000	180,000	52,800	180,000	52,800
	High	266,400	54,000	261,600	--		261,600
2000	Low	204,000	52,800	200,400	--		200,400
	Medium	240,000	60,000	236,400	58,800	234,000	58,800
	High	302,400	86,400	318,000	90,000	372,000	76,800

Preference Right and Emergency Leasing. Table 4-12 shows percentages of particulate emission change for all regions. Under Preference Right and Emergency Leasing, particulate emissions would change in all regions except the Alabama Subregion. The most change would occur in the Fort Union, Uinta-Southwestern Utah, and San Juan River regions.

Proposed Action. As shown in Table 4-12, under the Proposed Action, particulate emissions would change in all regions except the Alabama Subregion.

# DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-11 (continued)  
TOTAL SUSPENDED PARTICULATES  
(tons per year)

Year	Production Level	No New Federal Leasing	Preference Right and Emergency Leasing		Proposed Action		
<b>Green River-Hams Fork Region</b>							
		Wyoming	Colorado	Wyoming	Colorado	Wyoming Colorado	
1990	Low	25,200	14,800	--	--	24,000	--
	Medium	26,400	14,000	--	--	25,200	--
	High	26,400	14,000	--	--	--	--
1995	Low	27,600	--	--	--	--	--
	Medium	32,400	--	--	--	--	--
	High	32,400	--	--	--	--	--
2000	Low	30,000	16,400	--	--	--	--
	Medium	37,200	16,400	--	--	--	--
	High	42,000	26,000	39,600	22,400	36,000	20,000
<b>Uinta-Southwestern Utah Region</b>							
		Colorado	Utah	Colorado	Utah	Colorado	Utah
1990	Low	2,000	8,800	--	--	--	--
	Medium	2,000	8,800	--	--	--	--
	High	2,400	8,800	--	--	--	--
1995	Low	2,400	10,400	--	--	--	--
	Medium	2,400	10,800	--	--	--	--
	High	2,800	11,600	--	12,000	--	12,000
2000	Low	2,800	11,200	--	--	--	--
	Medium	2,800	12,000	--	--	--	--
	High	4,000	13,200	2,800	16,000	2,800	16,000

## SOILS AND VEGETATION

### ASSUMPTIONS

Land disturbance figures are for surface and subsurface mining and related coal beneficiation. Other land disturbance associated with transportation, conversion, consumption facilities, and population increases is not measured because it would occur at unknown levels and locations. The function of the resource management plans and prelease review is to identify fragile areas and

## SOILS AND VEGETATION

TABLE 4-11 (concluded)  
TOTAL SUSPENDED PARTICULATES  
(tons per year)

Year	Production Level	No New Federal Leasing	Preference Right and Emergency Leasing	Proposed Action
San Juan River Region*				
1990	Low	33,600	--	36,000
	Medium	33,600	--	36,000
	High	33,600	--	36,000
1995	Low	40,800	--	--
	Medium	45,600	--	--
	High	49,200	48,000	48,000
2000	Low	44,400	--	--
	Medium	55,200	--	--
	High	57,600	67,200	67,200
Alabama Subregion				
1990	Low	21,600	--	--
	Medium	25,200	--	--
	High	25,200	--	--
1995	Low	20,000	--	--
	Medium	26,400	--	--
	High	26,400	--	--
2000	Low	20,000	--	--
	Medium	27,600	--	--
	High	27,600	--	--

\*This alternative would involve emergency but not preference right leasing in the Alabama Subregion.

obvious reclamation problems to avoid leasing in areas where coal mining would significantly affect soil and vegetation. The Surface Mining Control and Reclamation Act (SMCRA) also requires premine soil studies to identify problems. Permits will not be granted to mines that cannot meet SMCRA's standards. (See Appendix 6, Reclamation and Erosion Control on Surface-Mined Lands.)

# DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 4-12  
PERCENT CHANGE IN TSP EMISSIONS

Year	Production Level	No New Federal Leasing	Preference Right and Emergency Leasing		Proposed Action	
<b>Fort Union Region</b>						
1995	Medium	--	+ 9		+ 9	
	High	--	+12		+12	
2000	Low	--	+ 9		+ 9	
	Medium	--	+27		+33	
	High	--	+27		+55	
<b>Powder River Region</b>						
			<u>WY</u>	<u>MT</u>	<u>WY</u>	<u>MT</u>
1990	Low	--	--	--	- 1	--
	Medium	--	--	--	- 1	--
	High	--	- 1	--	- 1	--
1995	Medium	--	- 2	- 2	- 2	- 2
	High	--	- 2	--	- 2	--
2000	Low	--	- 2	--	- 2	--
	Medium	--	- 2	- 2	- 3	- 2
	High	--	+ 5	+ 4	+23	-11
<b>Green River-Hams Fork Region</b>						
			<u>WY</u>	<u>CO</u>	<u>WY</u>	<u>CO</u>
1990	Low	--	--	--	- 5	--
	Medium	--	--	--	- 5	--
2000	High	--	- 6	-14	-14	-23
<b>Uinta-Southwestern Utah Region</b>						
			<u>CO</u>	<u>UTAH</u>	<u>CO</u>	<u>UTAH</u>
1995	High	--	--	+ 3	--	+ 3
2000	High	--	-30	+21	-30	+21
<b>San Juan Region</b>						
1990	Low	--	--	--	+ 7	
	Medium	--	--	--	+ 7	
	High	--	--	--	+ 7	
1995	High	--	--	--	- 2	
2000	High	--	--	+17	+17	

## SOILS AND VEGETATION

### SOILS AND VEGETATION

#### AFFECTED ENVIRONMENT

The six coal regions are located in 36 Major Land Resource Areas (MLRAs) as described by the Soil Conservation Service (SCS 1981). MLRAs are geographically associated areas with particular patterns of soils, vegetation, climate, water resources, and land uses (Map 4-2). Following are the setting, soil, and vegetation descriptions for each of the six coal regions.

#### Fort Union Coal Region

**Setting.** The Fort Union Region is located in 11 MLRAs. The areas of coal occur mainly in MLRAs 53A--Northern Dark Brown Glaciated Plains, 53B--Central Dark Brown Glaciated Plains, 54--Rolling Soft Shale Plains, 58A--Northern Rolling High Plains (northern part) and 58C--Northern Rolling High Plains (northeastern part). The region's northern part (MLRAs 53A, 53B) consists mainly of gently undulating till plains. Elevations range from 1,070 to 2,750 feet, average annual precipitation ranges from 11 to 18 inches, and the average frost-free period ranges from 110 to 135 days.

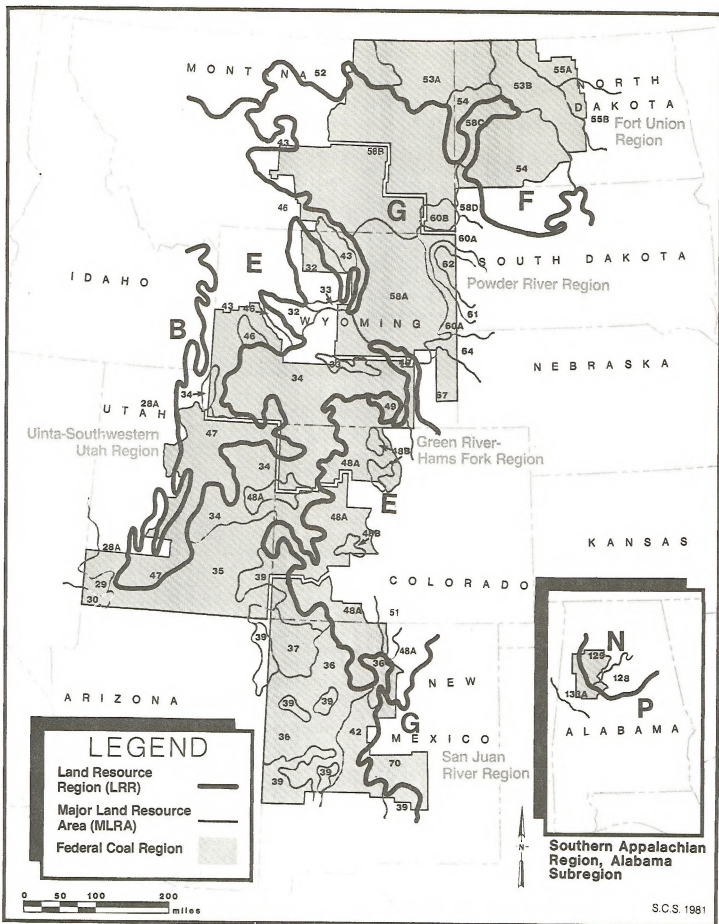
The region's southern portion (MLRAs 54, 58A, and 58C) consists mainly of moderately rolling dissected plains underlain by shale, siltstone, and sandstone. Buttes, badlands, and moderately steep and steep slopes adjoin the major valleys. Elevations range from 1,520 to 3,050 feet, average annual precipitation ranges from 8 to 12 inches, and the average frost-free season ranges from 110 to 140 days.

**Soils.** Soils in the region's northern parts are mainly deep, well drained, neutral to mildly alkaline, and medium textured, forming from glacial till on nearly level to rolling till plains. Soils in the southern parts are mainly moderately deep and deep, well drained, neutral to mildly alkaline loamy and clayey. They are forming on materials derived from soft shale, siltstone, and sandstone and are on gently rolling to strongly sloping dissected plains. Included are areas of badlands and steep-sloping shallow soils on the strongly dissected plains and sideslopes bordering intermittent drainageways and river valleys. Deep, moderately well to somewhat poorly drained alluvial soils lie on terraces and floodplains along lower streams and rivers.

**Vegetation.** This region supports mainly mixed grass-prairie vegetation. Western wheatgrass, needle and thread, blue gramma, and green needlegrass are dominant species. Prairie sandreed, sideoats gramma, and little bluestem are important species on the shallow and steep-sloping soils. Buffaloberry, chokecherry, silver sage, and prairie rose are common in draws and narrow valleys.

Interspersed with the prairie vegetation, particularly within the North Dakota part of the region, are woody draws populated with native trees and shrubs. Shelterbelt and field windbreaks are common in the area. Wetlands, specifically prairie potholes, are common on the nearly level to gently rolling plains to the north and east of the Missouri River.

**Threatened and Endangered Plants.** No listed endangered or threatened plants occur in the region, but several are proposed for inclusion on the federal list and may eventually be protected under the Endangered Species Act.



MAP 4-2 LAND RESOURCE REGIONS AND MAJOR LAND RESOURCE AREAS OF THE FEDERAL COAL REGIONS



## SOILS AND VEGETATION

Appendix 3 lists threatened, endangered, or proposed species that could occur in this region.

**Reclamation Potential.** Most soils within the region have a fair to good reclamation potential and would provide suitable plant growth materials to reclaim surface-mined land. The potential to reclaim land to a near-original state following surface mining is favorable with proper use of effective erosion control, reclamation, and revegetation measures (BLM 1982a).

### Powder River Region

**Setting.** The Powder River Region is located in 14 MLRAs. The areas of coal occur mainly within the 58A MLRA, Northern Rolling High Plains (northern part), and 58B MLRA, Northern Rolling High Plains (southern part). These MLRAs lie on broad dissected plains underlain by shale, siltstone, and sandstone. Slopes are mostly gently rolling to steep with wide belts of steeply sloping badlands bordering some of the larger river valleys. In places, flat-topped, steep sideslope buttes rise sharply above the general level of the plains.

This region has a continental, semiarid climate. Average annual precipitation ranges from 12 to 20 inches, but as much as 30 inches falls in the mountains. The average frost-free period is 100 to 140 days. Elevations range from 2,500 to 5,500 feet. One of the most important climatic features is the occurrence of drought cycles.

**Soils.** Soils in the region are mainly well drained, mildly to strongly alkaline sandy loam, loam, and clay loam, which are forming in materials derived from sandstone and shale. Deep and moderately deep, gently sloping to sloping soils are on sedimentary uplands and sideslopes. Shallow soils occur mainly on moderately steep and steep sideslopes and ridges where sedimentary formations are near the surface. Soils on the nearly level floodplains, terraces, alluvial fans, and foot slopes are deep and productive. Some soils with fluctuating water tables occur along rivers, including small areas of moderately to strongly saline soils.

**Vegetation.** Native vegetation consists mainly of short-grass prairie, grassland-sagebrush and sagebrush steppe, and areas of ponderosa pine (Kuchler 1979). Dominant grass species include western wheat, blue gramma, blue bunch wheatgrass, green needlegrass, needle and thread, and little bluestem. Typical floodplain vegetation includes cottonwood, willow, chokecherry, greasewood, saltgrass, and western wheatgrass.

**Threatened and Endangered Plants.** No plant species in the Powder River Region are listed as threatened or endangered, but some species are being considered for listing. Appendix 3 lists threatened, endangered, and proposed species that could occur in this region.

**Reclamation Potential.** The dominant soils within the region have a fair to good reclamation potential and would provide suitable plant growth materials to reclaim surface-mined land. The potential to reclaim land to a near-original state following surface mining is favorable with proper and timely use of effective erosion control, reclamation, and revegetation measures (BLM 1981a).

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

### Green River-Hams Fork Region

**Setting.** The Green River-Hams Fork Coal Region consists of a series of parallel mountain ranges and valleys. The region is located in eight MLRAs. The areas of coal occur mainly in MLRA 34--Central Desertic Basins, Mountains, and Plateaus; MLRA 47--Wasatch and Uinta Mountains; and MLRA 48A--Southern Rocky Mountains. The portion in MLRA 34 has piedmont plains, alluvial fans, and piedmont slopes extending from the surrounding mountains to form broad intermountain basins. Elevations range from 5,700 to 8,300 feet; average annual precipitation ranges from 6 to 12 inches; and the average frost-free period lasts from 80 to 100 days. The part of the region in MLRAs 47 and 48A lies in the foothills of strongly sloping to steep mountains, where average annual precipitation ranges from 14 to 30 inches and the frost-free period lasts from 60 to 100 days.

**Soils.** Where coal most commonly occurs, the soils are mainly well drained, neutral to moderately alkaline and saline, sandy loams to clay loams. They are forming in mixed materials derived mainly from sedimentary and some igneous rocks. Soils within the smoother sloping basins are deep clay loams. Soils on the low mountain footslopes and foothills (MLRAs 47 and 48) are moderately deep to deep, well drained, neutral to mildly alkaline, sandy loams, loams, and clay loams containing varying amounts (5 to 50 percent and more) of coarse fragments.

**Vegetation.** The Green River-Hams Fork Region is part of the cold desert biome and consists mainly of sagebrush or saltbush-greasewood dominated communities. Other vegetation types include mountain shrub, mixed conifer, pinyon-juniper, and small areas of riparian vegetation.

The sagebrush community consists of a mixture of low-growing shrubs dominated by sagebrush with a variable understory of perennial grasses and forbs. Understory vegetation includes bluebunch wheatgrass, thick wheatgrass, Indian ricegrass, prairie junegrass, cheatgrass, brome, lupine, rabbitbrush, broom snakeweed, and goldenweeds.

Where the salt content of the soil is relatively high, sagebrush-dominated communities are replaced by saltbush-greasewood associations. Dominant species are Nuttall saltbush, shadscale saltbush, fourwing saltbush, and black greasewood. Associated understory includes alkali sacaton, bottlebrush, squirreltail, thickspike wheatgrass, and many of the same understory species of the sagebrush community.

Shrub communities of the higher evaluations are dominated by serviceberry-snowberry-mahogany associations with understories that include thickspike wheatgrass, prairie junegrass, bluegrasses, western yarrow, asters, and milkvetch. On well-drained, weakly developed, shallow, gravelly soils, shrub woodlands, dominated by Rocky Mountain and Utah juniper, predominate. Associated species include big sagebrush, low sagebrush, rabbitbrush, mountain mahogany, prickly pear, and a variety of grasses, phloxes, and goldenweeds.

Depending upon slope, aspect, and elevation, forested mountains may contain associations of pinyon-juniper, spruce-Douglas fir, ponderosa pine-lodgepole, or a mixture of evergreen-aspen. Understory species include snowberries, blueberries, mountain mahogany, pine reedgrass, lupines, mountain brome, and

## SOILS AND VEGETATION

various grasses. Broadleaf forests, consisting mainly of willow and cottonwood with grass understories, are limited mainly to floodplains along perennial streams. Barren areas associated with rock outcrops have a limited vegetation cover of mountain mahogany, serviceberry, wild buckwheats, big sagebrush, saltbushes, and prairie junegrasses.

**Threatened and Endangered Plants.** Field surveys of specific tracts within the region found no federally listed threatened or endangered plants or sensitive or rare plant species (BLM 1983b), but 18 species are proposed for such listing. Appendix 3 lists threatened, endangered, and proposed species that could occur in this region.

**Reclamation Potential.** The reclamation potential of disturbed land varies greatly within the region. Limited precipitation and areas of shallow and strongly saline and alkaline soils are the main reclamation problems. Most soils within the area have a fair to good reclamation potential and would provide suitable plant growth material to reclaim surface-mined land. By using the best reclamation technology, the limitations of soil and precipitation can be reduced. Each specific location of land disturbance will require separate evaluations (BLM 1983b).

### Uinta-Southwestern Utah Region

**Setting.** The Uinta-Southwestern Utah Region has extremes in both topography and climate. The region includes 10 MLRAs, but the coal areas occur mainly in MLRA 34--Central Desertic Basins, Mountains, and Plateaus; MLRA 35--Colorado and Green River Plateaus; MLRA 48--Southern Rocky Mountains; and MLRA 47--Wasatch and Uinta Mountains. The part in MLRA 34 has broad intermountain basins with elevations of 5,700 to 6,800 feet. Average annual precipitation ranges from 6 to 12 inches, and average frost-free periods range from 80 to 100 days.

The part in MLRA 35 generally consists of gently sloping to strongly sloping plains, interrupted by scarps, deep incised canyons, and abruptly rising volcanic plugs. Average annual precipitation ranges from 5 to 14 inches, and the average frost-free period ranges from 110 to 180 days. The part of the region in MLRAs 47 and 48A lies in the foothills portion of the strongly sloping to steep mountains, where the average annual precipitation ranges from 14 to 30 inches and the average frost-free period ranges from 60 to 100 days. Many of the coal deposits are in the flanks of the major peaks and plateaus at intermediate elevations.

**Soils.** Soils where coal most commonly occurs in the basin area (MLRA 34) and plains area (MLRA 35) are mainly well drained, neutral and moderately alkaline, nonsaline to moderately saline sandy loam, loams, and clay loams. These soils are forming in materials derived mainly from sedimentary rocks. In much of this area, high evapotranspiration rates have caused salt concentrations. Salts are generally more concentrated in soils on flat valley floors and closed basins, and where they are forming from shale with inherent high concentrations of salts. The more productive soils most commonly are on benches, alluvial fans, and floodplains. Soils on the low mountain foot slopes and foothills (MLRAs 47 and 48A) are moderately deep to deep, well drained, neutral to mildly alkaline sandy loams and loams containing varying amounts (10 to 50 percent and more) coarse fragments.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Vegetation. Native vegetation ranges, often within a few miles, from cold desert through pinyon-juniper woodland to montane coniferous forest. Narrow belts of streamside vegetation transect all major vegetation types. MLRA 34 supports mainly grass-shrub type vegetation with needle and thread, Indian ricegrass, western wheatgrass and big sage as the dominant species. Scattered Rocky Mountain juniper commonly grows on shallow soils on steeper slopes. MLRA 35 supports desert shrub and woodland vegetation at higher elevations. At lower elevations are galleta grass, alkali sacaton, Indian ricegrass, bottlebrush squirreltail, and needle grasses intermixed with fourwing saltbush and winterfat. Greasewood and shadscale are part of the plant community on saline soils.

MLRAs 47 and 48A support grasses, mountains shrub, sagebrush-grass, pinyon-juniper, conifer, and aspen vegetation. Big sagebrush and bluebunch wheatgrass are dominant sagebrush-grass species. Gambel oak, curleaf and birch leaf mountain mahogany, chokecherry, snowberry, bluebunch wheatgrass, and mountain brome are dominant species in the mountain shrub area in mountain foothills.

Threatened and Endangered Plants. Surveys in central Utah have found the candidate endangered species Hymenoxys helenioides, Hydysarum occidentale variety canone within the region. Although several listed species occur within the region (Appendix 3) no other officially listed or candidate threatened or endangered species are known to exist on or near any of the existing leased tracts. Appendix 3 lists threatened, endangered, and proposed species that could occur in this region.

Reclamation Potential. Low precipitation and areas of strongly saline and alkaline soils are this region's main reclamation problems. Most soils in the region have a fair to good reclamation potential, but each specific location of land disturbance would require separate evaluation. Most coal mining in this region is subsurface (BLM 1984c).

### San Juan River Region

Setting. The San Juan River Region consists of a basin with mesas, rolling plains, and badlands that are lower than the surrounding mountain ranges. The region is located in seven MLRAs. The areas of coal occur mainly in MLRA 36--New Mexico and Arizona Plateaus and Mesas; MLRA 37--San Juan River Valley, Mesas and Plateaus; MLRA 39--Arizona and New Mexico Mountains; and a portion of MLRA 48A--Southern Rocky Mountains. MLRA 36 has foothills with plateaus and mesas, including broad basins, valleys, and alluvial fans. Intermittent drainageways (washes and arroyos) are common. Elevations range from 4,200 to 8,600 feet; average annual precipitation ranges from 8 to 11 inches; and the average frost-free period ranges from 180 to 240 days.

MLRA 39 has steep to very steep mountains, including associated foothills, mountain meadows, and narrow floodplains. Elevations range from 4,800 to 8,600 feet; annual precipitation ranges from 16 to 25 inches; and the average frost-free period ranges from less than 70 days at higher elevations to 115 days at lower elevations.

MLRA 37 consists of gently sloping broad valleys and plains bordered by deeply dissected bands of steep slopes. Mesas and isolated mountain ranges also

## SOILS AND VEGETATION

occur. Elevations range from 4,550 to 6,100 feet; average annual precipitation ranges from 6 to 12 inches; and the average frost-free period is 140 to 165 days.

**Soils.** Where the region's coal most commonly occurs, soils are well drained, neutral to strongly alkaline loams and clay loams. Areas of saline soils are also common. Deep, loamy alluvial soils occur along the floodplains and on alluvial fans and make up only a small percentage of the region. Deep and moderately deep soils occur on the gently to strongly sloping dissected uplands and make up the largest portion of the region. Strong calcium carbonate horizons within 12 to 40 inches of the surface are common in many of the soils in the region.

**Vegetation.** This region consists of three major vegetation types: grassland and desert shrub (lower elevations); pinyon-juniper (5,000 to 7,000 feet) and mixed conifer (above 7,000 feet). Major grass species include Indian ricegrass, blue grass, alkali sacaton, sand dropseed, and galleta. Shadscale, big sagebrush, greasewood, winterfat, and fourwing saltbush commonly occur in bottomlands, valleys, and uplands. Pinyon-juniper woodland along with mountain mahogany and western wheatgrass occurs at higher elevations. Mixed conifers consisting mainly of ponderosa pine, some Douglas fir, and spruce occur on steep-sloping north-facing mountain slopes.

**Threatened and Endangered Plants.** No populations of federally listed threatened or endangered plants are known to occur within the area covered by the San Juan River Regional Coal EIS (BLM 1983e). Potential habitat for Sclerocactus mesae verdea associated with Mancos shale occurs within the area. The New Mexico State Heritage Program identified Astragalus wingatas, a state sensitive species and proposed federal threatened and endangered species occurring within the region (BLM 1983e). Appendix 3 lists threatened, endangered, and proposed species that could occur in this region.

**Reclamation Potential.** Low precipitation and strongly saline and alkaline soils in the San Juan River Region are site characteristics that strongly affect reclamation. Most of the region's soils have a fair to good reclamation potential and would provide adequate suitable plant growth materials for reclaiming surface mining disturbance. Information on site-specific elevations would be needed to conduct proper reclamation procedures. The potential to reclaim and revegetate land is favorable with proper and timely use of effective reclamation, erosion control, and revegetation measures (BLM 1984c).

### Alabama Subregion

**Setting.** The Alabama Subregion is located in three MLRAs. The region has a moist, temperate climate with an average annual precipitation ranging from 52 to 56 inches and an average frost-free period ranging from 170 to 210 days but reaching 240 days in some valleys. Elevations range from 600 to 2,500 feet.

**Soils.** The subregion's soils are mainly well drained to moderately well drained, mildly to moderately acid, and low in organic matter and have subsurface horizons of clay accumulations. Soil depths range from shallow on the steep sandstone and shale ridges to very deep in the nearly level to gently sloping valleys and on the sloping uplands. Included are small poorly

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

drained and somewhat poorly drained low wetlands. The soils are generally low in fertility and are susceptible to a moderate to severe water erosion hazard.

**Vegetation.** This region consists mainly of mixed hardwood-pine forest vegetation (Kuchler 1979). Major overstory species are loblolly pine, shortleaf pine, slash pine, pitch pine, longleaf pine, sweet gum, yellow poplar, red oak, and white oak. Dogwood, sourwood, huckleberries, little bluestem, Elliott bluestem, native lespedezas and low panicums are common understory species. Aquatic and riparian vegetation occurs along perennial and intermittent streams.

**Threatened and Endangered Plants.** Alabama has no official list or legislation dealing with protected plants.

**Reclamation Potential.** The natural productivity, combined with a favorable climate gives the Alabama Subregion a high potential for reclamation. Land disturbed by coal mining can be readily reclaimed. Ground cover of grasses and legumes could be established within 1 year, and trees could reach a size suitable for harvesting within 30 years (BLM 1981d).

### IMPACTS

The following general discussion of soil and vegetation impacts applies to all regions, alternatives, and production levels.

This section addresses the amount of land in each coal region that would be disturbed annually by mining and coal beneficiation from 1990 to 2000 at each production level for each alternative. Other land disturbances associated with transportation, conversion, and consumption facilities cannot be measured because they would occur at an unknown level and location.

Land disturbance impacts to soils and vegetation would depend on the physical setting and conditions at each specific site. Since specific sites are not known, land disturbance impacts are discussed quantitatively only to the extent possible. Table 4-13 shows estimated average annual land disturbance of coal mining at projected production levels.

### Reclamation Potential and Effectiveness

All surface coal mining under each alternative, including No New Federal Leasing, would be regulated by the reclamation requirements of the Surface Mining Control and Reclamation Act (SMCRA) (see Appendix 5). The only variations in reclamation requirements among the alternatives would involve the number of acres requiring reclamation and the differing intensity of reclamation efforts for the type of land being disturbed.

The basic purposes of SMCRA that pertain to reclamation are as follows (1) to assure that surface mining is not allowed if the required reclamation is not feasible, (2) to assure that reclamation be as contemporaneous with mining as possible, and (3) to promote reclamation of abandoned mine areas. The main reclamation requirements are in the environmental protection performance standards (Section 515 of SMCRA), which require mined land to be restored to a condition equal to or better than its premining condition.

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TABLE 4-13  
AVERAGE ANNUAL LAND DISTURBANCE  
(acres)

Fort Union Region									
Production Level	No New Federal Leasing			Preference Right and Emergency Leasing***			Proposed Action***		
	Existing	New	Total	Existing	New	Total	Existing	New	Total
	Mines	Mines	Mines	Mines	Mines	Mines	Mines	Mines	Mines
<b>1990</b>									
Low	1,169			--			--		
Medium	1,169			--			--		
High	1,169			--			--		
<b>1995</b>									
Low	1,607			--			--		
Medium	1,607			--	(146)	1,753	--	(146)	1,753**
High	1,607			--	(195)	1,802	--	(195)	1,802
<b>2000</b>									
Low	1,461	(146)	1,607**	--	(292)	1,753**	--	(292)	1,753**
Medium	1,461	(146)	1,607**	--	(584)	2,045**	--	(682)	2,143**
High	1,461	(146)	1,607**	--	(584)	2,045**	--	(1,023)	2,484**
Powder River Region									
Production Level	No New Federal Leasing			Preference Right and Emergency Leasing***			Proposed Action***		
	Wyoming	Montana	Total	Wyoming	Montana	Total	Wyoming	Montana	Total
	Mines	Mines	Mines	Mines	Mines	Mines	Mines	Mines	Mines
<b>1990</b>									
Low	2,190	742	2,932	--	--	--	2,172	--	2,914
Medium	2,190	742	2,932	--	--	--	2,172	--	2,914
High	2,842	760	3,602	2,806	760	3,566	2,806	760	3,566
<b>1995</b>									
Low	2,299	760	3,059	--	--	--	--	--	--
Medium	2,769	815	3,584	2,715	796	3,511	2,715	796	3,511
High	2,896 (1,121) 4,018**	815	4,833	2,896 (1,050) 3,946**	815	4,761	2,896 (1,050) 3,946**	815	4,761
<b>2000</b>									
Low	2,896 (181) 3,077**	796	3,873	2,860 (163) 3,023**	796	3,818	2,896 (127) 3,023**	796	3,819
Medium	2,896 (724) 3,620**	905	4,525	2,896 (670) 3,566**	887	4,453	2,896 (634) 3,530**	887	4,417
High	2,896 (1,665) 4,561**	941 (362) 1,303**	5,864	2,896 (1,901) 4,797**	941 (416) 1,357**	6,154	2,896 (2,715) 5,611**	941 (217) 1,158**	6,769

Note: Numbers in parentheses represent acres disturbed by new mines.

\*\*Includes North Dakota with small amounts in Montana.

\*\*Acres that would be disturbed by existing and new mines

\*\*\*Figures are shown only where they differ from those for No New Federal Leasing.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-13 (continued)  
AVERAGE ANNUAL LAND DISTURBANCE  
(acres)

Green River-Hams Fork Region									
Production Level	No New Federal Leasing			Preference Right and Emergency Leasing*			Proposed Action*		
	Wyoming	Colorado	Total	Wyoming	Colorado	Total	Wyoming	Colorado	Total
<b>1990</b>									
Low	1,460	1,043	2,243	--	783	2,243	1,390	783	2,174
Medium	1,529	719	2,248	--	--	--	--	--	--
High	1,529	719	2,248	--	--	--	--	--	--
<b>1995</b>									
Low	1,529	788	2,387	--	--	--	--	--	--
Medium	1,877	788	2,665	--	--	--	--	--	--
High	1,877	788	2,665	--	--	--	--	--	--
<b>2000</b>									
Low	1,738	858	2,596	--	--	--	--	--	--
Medium	2,155	858	3,013	--	--	--	--	--	--
High	2,433	1,414	3,847	2,294	1,206	3,499	2,085	1,067	3,152
Uinta-Southwestern Utah Region									
Production Level	No New Federal Leasing			Preference Right and Emergency Leasing*			Proposed Action*		
	Colorado	Utah	Total	Colorado	Utah	Total	Colorado	Utah	Total
<b>1990</b>									
Low	28	121	149	--	--	--	--	--	--
Medium	28	121	149	--	--	--	--	--	--
High	33	121	154	--	--	--	--	--	--
<b>1995</b>									
Low	33	143	176	--	--	--	--	--	--
Medium	33	149	182	--	--	--	--	--	--
High	38	154(6)	198	--	154(9)	204	--	154(9)	204
<b>2000</b>									
Low	38	154	192	--	--	--	--	--	--
Medium	38	165	203	--	--	--	--	--	--
High	55	182	237	38	182 (38) 220**	258	38	182 (38) 220**	258

Note: No land disturbance from new mines is projected for the Green River-Hams Fork Region. Numbers in parentheses represent acres disturbed by new mines in the Uinta-Southwestern Utah Region.

\*Figures are shown only where they differ from those for No New Federal Leasing.

\*\*Acres that would be disturbed by existing and new mines.



## SOILS AND VEGETATION

TABLE 4-13 (concluded)  
AVERAGE ANNUAL LAND DISTURBANCE  
(acres)

San Juan River Region***			
Production Level	No New Federal Leasing	Preference Right and Emergency Leasing*	Proposed Action*
<b>1990</b>			
Low	1,151	--	-- (82) 1,233**
Medium	1,151	--	-- (82) 1,233**
High	1,151	--	-- (82) 1,233**
<b>1995</b>			
Low	1,151 (247) 1,398**	--	--
Medium	1,151 (411) 1,562**	--	--
High	1,151 (534) 1,685**	-- (493) 1,644**	-- (493) 1,644**
<b>2000</b>			
Low	1,151 (370) 1,521**	--	--
Medium	1,151 (740) 1,891**	--	--
High	1,151 (822) 1,973**	1,151 (1,151) 2,302	1,151 (1,151)
<b>2,302**</b>			
Alabama Subregion			
	No New Federal Leasing	Preference Right and Emergency Leasing*	Proposed Action*
<b>1990</b>			
Low	2,514 (1,608) 4,122**	--	--
Medium	2,933 (1,877) 4,810**	--	--
High	2,933 (1,877) 4,810**	--	--
<b>1995</b>			
Low	2,123 (1,340) 3,463**	--	--
Medium	3,134 (2,011) 5,145**	--	--
High	3,134 (2,011) 5,145**	--	--
<b>2000</b>			
Low	2,123 (1,340) 3,463**	--	--
Medium	3,335 (2,145) 5,480**	--	--
High	3,335 (2,145) 5,480**	--	--

Note: Numbers in parentheses represent acres that would be disturbed by new mining.

\*Figures are shown only where they differ from those for No New Federal Leasing.

\*\*Acres that would be disturbed by existing and new mines.

\*\*\*Mining in the San Juan Region would occur mostly in New Mexico.

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This section addresses the reclamation potential and problems expected for the coal-producing regions. Because specific sites to be mined or reclaimed are not known at this level of analysis, the discussion is necessarily general. Determining reclamation potential requires detailed information specific to the sites to be reclaimed. Coal development in all regions could affect lands with varying potentials for reclamation. Therefore, at this general level of analysis, alternatives will vary by the differing amount of land that would require reclamation.

Reclamation potential depends upon climate, inherent chemical and physical properties of the overburden, availability of suitable plant growth material, and the biological character of the area. Among the factors that would affect reclamation success are type, toxicity, depth, and fertility of the soils; amounts and frequency of precipitation; erosion potential; slope and aspect of the land; choice of plants used in revegetation; timing of seeding or planting; and proposed use of the reclaimed area. See Appendix 5 for a more detailed discussion.

Water availability would directly influence the revegetation potential in all coal regions but would not be a major problem in the Alabama Subregion. In the western coal regions, rainfall patterns are extremely variable, and in some areas rainfall is consistently low. Arid and semiarid lands--particularly in the Green River-Hams Fork, Uinta-Southwestern Utah, and San Juan River regions--have areas with an average annual rainfall of 8 inches or less. Although the amount of water needed to sustain revegetation varies with species requirements, areas receiving less than 10 inches of annual rainfall would require intensive reclamation and revegetation measures. Applying irrigation water, where available, during the period of seeding establishment is an effective measure that enhances vegetation establishment in low rainfall areas (see Appendix 5).

Soil conditioning and amendments may be required in any of the regions. Included among the most common conditioning techniques are topsoiling, adding fertilizer, spreading chemical additives for soil neutralization, and mulching. Topsoil may need to be added to overcome specific problems or to provide a proper medium for plant growth.

The Office of Technology Assessment (OTA) is conducting an assessment of "Technologies for Western Surface Mine Reclamation." The OTA project staff is gathering and reviewing the substantive analysis and will prepare the final report, which is due to the Technology Assessment Board in June 1985. The assessment will examine the following:

- (1) the methods of predicting and evaluating the success of reclamation practices, including an analysis of the kinds and levels of uncertainty;
- (2) the status of monitoring and research on mined land reclamation in the western United States and how monitoring and other data (academic research, state and federal data bases) are being used to support reclamation;
- (3) the encouragement given to the development and use of innovative and emerging reclamation techniques;

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(4) the relation between preleasing and postleasing technology or methodology requirements for environmental protection, including an evaluation of the fate of lease stipulations intended to implement the environmental protection requirement of the Federal coal leasing program; and

(5) technical and policy options for improving the prospects for successful reclamation on Western Federal land, including research and development work (Robison 1984).

Planned reclamation and revegetation of land disturbed by surface mining would be difficult in the coal regions in the West. But with disturbed land being reclaimed in stages concurrently with mining and the intensive use of effective erosion control, reclamation, and revegetation measures tailored to existing conditions, planned reclamation is expected generally to be successful throughout the six coal regions. A strong compliance program and effective monitoring and maintenance program, however, are needed to ensure timely and effective action and proper follow-up. See Appendix 5 for discussion of reclamation concerns, experiences, and success.

The goals of reclamation are now broader than ever. Regulations call not only for reducing the steepness of the final surface and establishing a cover of mainly perennial native vegetation but for restoring the land for specific land uses, achieving plant diversity, and reintroducing biological and ecological processes. Research and monitoring of specific sites have found that current reclamation objectives can be met when the reclamation effort is designed and followed on the basis of site-specific needs and when existing technology is used (Narten and others 1983).

Soils. Surface mining would (1) remove favorable plant growth materials (surface soils) and overburden, (2) stockpile these materials, (3) remove the coal, (4) replace the overburden, (5) bury any toxic materials and (6) regrade the surface. During stripping and stockpiling, the natural (genetic) soil profile, including soil horizons, structure, and horizon arrangement, would be completely altered and mixed, except for the topsoil and subsoil. The saving of topsoil and favorable plant growth materials for use in reclamation, however, would increase the productivity potential of mined lands. Overburden removal would also bring to the surface unfavorable plant growth and in some cases toxic materials. During surface mining, soils and soil materials would be exposed to wind and water erosion. Surface mining could harm soils in various ways, ranging from minor short-term disturbances to a significant long-term reduction in productive capacity.

The impact to soils would depend on the effectiveness of restoring soil productivity. The parts of Section 406(a) and Section 508(a)(s) of SMCRA that pertain to topsoil handling and soil restoration provide for reducing potentially adverse soil impacts caused by lack of topsoil stockpiling and proper replacement, improper overburden handling, and improper soil reconstruction. The preconstruction natural (genetic) soil profile cannot be completely restored, but soil productivity is expected to be reclaimed to preconstruction levels and in some cases possibly enhanced if an intensive soil reconstruction and reclamation program is followed (McCormack 1974, 1976). Where unfavorable soil material (strongly alkaline or saline) that originally was on the surface can be replaced by more suitable soil material, productivity should improve. At the least, reclamation would ensure that

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cover is reestablished over the disturbed areas. Some small localized areas would require continued follow-up to ensure adequate erosion control and revegetation. (See Appendix 5 for a more detailed discussion.)

The reclamation plan for a particular leasehold must include detailed soil surveys provided by the lessee. Such surveys identify physical and chemical characteristics and the geographic extent of leasehold soils to provide the basis for an effective reclamation plan.

A major concern relating to soil reconstruction is if an area has enough suitable plant growth material to cover the regraded surface mine area. Where mines are located in dominantly shallow and moderately deep soils, suitable plant growth materials must be carefully selected and stored. Most areas where extensive coal occurs have enough suitable plant growth materials, but availability of suitable materials would depend on site-specific conditions.

Soils would mostly be disturbed for short periods. Enforcement and compliance with regulations and use of effective erosion control and reclamation measures would preclude significant soil erosion and reduction in soil productivity.

In surface mined areas, even though efforts would be made to return land surfaces to near-original contours, some changes in topography and aspect would occur, changing microclimates and strongly affecting plant communities. Preconstruction plant density needing specialized microenvironments could not be reestablished on the reclaimed areas, which would be a significant adverse impact. Shrubs and trees would be most significantly affected. The loss of the natural intricate vegetation diversity due to changes in soils, topography, and microclimate would not reduce production but would change the area's suitability for wildlife habitat and change the area's aesthetic value. The effect on vegetation diversity would not be extensive but localized, occurring mainly in foothill, mountain, and wooded draw areas.

Vegetation. The success of revegetation depends on the success of restoring soil productivity and how well proposed reclamation and revegetation programs are implemented. Revegetation potential would be the greatest in areas of higher precipitation. Grasses and forbs are expected to be adequately established within 5 years after seeding. In zones with precipitation of less than 10 inches, the revegetation time is more likely to exceed 5 years. But with more intensive use of effective seedbed preparation, planting techniques, adapted species, and soil protection, a cover of grasses and forbs could be established to stabilize the land surface.

Density of the cover and overall plant productivity would vary with climatic conditions. Reclaimed areas having 10 inches or less precipitation and a high evaporation rate would support less vegetation, just as they did before mining. See Appendix 5 for more detailed discussion on revegetation.

Threatened and Endangered Plants. As described in the Affected Environment section and identified in Appendix 3, threatened or endangered plant species occur within some of the federal coal regions. Any type of development and associated population increases would threaten the identified species. Direct impacts and surface disturbance would not be as likely to pose a threat as would the increased use of areas by greater numbers of people.

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Section 7, Consultation Procedures, of the Endangered Species Act would require a survey before any land disturbance for all federally approved projects. If a species is expected to be affected, measures would be developed to protect that species. The coal unsuitability criteria (Appendix 1) would serve to identify and protect potential threatened or endangered species.

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The six coal regions lie within six land resource regions (LRRs), described by the Soil Conservation Service (SCS 1981). Map 4-2 shows the locations of LRRs and MLRAs within each region. The five western coal regions lie within the following four LRRs.

D--Western Range and Irrigated Region. Much of the land in this semidesert region of plateaus, plains, and isolated mountain ranges is used for range, but small areas of irrigated cropland lie along streams and rivers. The main crops consist of feed for livestock.

E--Rocky Mountain Range and Forest Region. Rugged mountains are the dominant features of this region, which also has some broad valleys and remnants of high plateaus. Grazing is the leading land use in the valleys and mountains, and lumbering occurs in some of the forested mountains. Recreation is important throughout this region. Irrigated crops are grown in some valleys, and dry farming occurs in others. Some orchards also occur where climate is favorable.

F--Northern Great Plains Spring Wheat Region. The fertile soils and dominantly level topography of this region are favorable for farming, but the low precipitation and a short growing season limit the crops that can be grown. Dry-farmed spring wheat is the major crop. Corn, flax, and sugar beets are irrigated crops.

G--Western Great Plains Range and Irrigated Region. This section of the Great Plains consists of a rolling upland whose soils are underlain by shale, siltstone, sandstone, and (locally) thick alluvium. Most of this region is in rangeland, but some wheat is dry-farmed and feed grain for livestock is the main irrigated crop. Potatoes, sugar beets, and corn are important locally.

The Alabama Subregion lies within in the following two LRRs:

N--East and Central Farming and Forest Region. This borderland region between the north and south includes the Appalachian Mountains, valleys, and dissected plateaus. Small general farms occur throughout, and much of this region is in forests.

P--South Atlantic and Gulf Slope Cash Crop, Forest, and Livestock Region. This region consists of the gently sloping to rolling southern piedmont and the upper coastal plains. Forests make up the major land use.

See the Soils and Vegetation section for descriptions of settings by MLRAs.

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### Fort Union Region

Most of the north and east parts of the Fort Union Region (MLRAs 53A, 53B, and 54) are in farms and ranches. About half to two-thirds of these areas are dry-farmed with spring wheat, flax, oats, barley, and alfalfa. Some small areas along rivers and major drainageways are irrigated with alfalfa, corn, and small grains. Wheat farms tend to be large, averaging over 1,000 acres. The more sloping areas are in native range and used for livestock grazing. More than 85 percent of the south and west parts of this region (MLRAs 58A and 58C) are in native grasses and shrubs grazed by cattle and sheep. Forage production on native rangelands varies from 6 to 18 acres per animal unit month (AUM). Cow-calf operations are the main livestock enterprise. The rest of this area is mainly dry-farmed in wheat. Narrow strips of land along rivers and major tributaries are irrigated for sugar beets, alfalfa, other hay crops, and corn for silage.

Cash-grain and livestock farms predominate in the north and east parts of the region, whereas livestock operations predominate elsewhere. Prime farmlands occur on alluvial valley floors, but no such lands occur in federal leasing areas.

### Powder River Region

Nearly 80 percent of this region is in native grasses and shrubs grazed by cattle and sheep. The more gently sloping areas of deeper soils, which make up about 5 percent of the region are dry-farmed to wheat. Narrow strips of land along rivers and their larger tributaries are irrigated for alfalfa, other hay crops, feed grains, sugar beets, and corn for silage. Some of the land is used for pasture. The upper slopes and tops of some of the higher buttes and foothill areas consist of open woodland.

The cattle industry is important to this region. Ranches are large, averaging over 7,000 acres in Campbell and Converse counties, Wyoming. Most of these ranches are self-contained, but on some ranches cattle and sheep are moved from their base ranges to summer ranges on public lands. Most ranches use some state or federally owned surface rights. Forage production on native rangelands varies from 10 to 24 acres per AUM.

### Green River-Hams Fork Region

Most of this region is used for cattle and sheep grazing, and 2 to 5 percent of the region, mostly along the large streams, is irrigated, mainly for livestock forage. Some small grains, mainly winter wheat, are grown in areas of higher precipitation on mesas and foothill slopes.

In much of the region, especially in areas of low precipitation (MLRA 37), grazing lands are sparsely vegetated with grasses and shrubs and are moderately low in production. Forage production ranges from 10 to 24 acres per AUM.

### Uinta-Southwestern Utah Region

About 80 percent of this region is rangeland grazed by sheep and cattle. The small area of cropland (1 to 5 percent) is irrigated and occurs mainly along

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the floodplains of major streams. Alfalfa, small grains, and corn are the main crops. Eight percent of the region supports juniper and pinyon-juniper woodland. Some orchards occur in the Grand Junction area.

The grazing lands in much of this region (MLRAs 34 and 35) are sparsely vegetated and have low forage production (10 to 22 acres per AUM) due to low precipitation.

### San Juan River Region

The largest portion of the San Juan River Region consists of native rangeland used for cattle and sheep grazing. Five percent of the area is cropland. Irrigated cropland occurs along rivers and major tributaries, where alfalfa, hay, and small grains are grown for livestock feed. Some dry-farmed cropland is also used to grow small grains and hay. Forage production on native rangelands varies from 10 to 30 acres per AUM.

### Alabama Subregion

About 82 percent of the land cover in the Alabama Subregion consists of forest. Agriculture occurs on small areas (averaging less than 160 acres) in 14 percent of the subregion, and only a small area near existing mines is farmed. The major crops are cotton, soybeans, corn, wheat, and hay. Pastures are used mostly for beef cattle, some dairy cattle, and hogs. Controlling soil erosion is the major management concern.

### IMPACTS

The adoption of any of the program alternatives would affect agriculture. Surface mining, subsurface mining, and coal beneficiation would require the use of agricultural lands. Without knowing the specific agricultural lands that might be disrupted by coal development, this agricultural impact can only be generally discussed. (See the Employment Opportunities discussion of General Impacts in the Socioeconomic section of Chapter 4 for a discussion of impacts on agricultural employment.)

Table 4-13 shows projected land disturbance from coal mining by alternative and region, and Table 4-14 shows the percentage of land disturbance by land cover. Most land disturbance would be short term. Completed and ongoing research has found that agricultural productivity (cropland and rangeland) of mined land would be restored. See Appendix 5 and the Reclamation Potential and Effectiveness discussion in the Soils and Vegetation section of Chapter 4.

The short-term losses of cropland production and rangeland forage would not significantly reduce regional agricultural production. In most cases, losses would amount to less than 5 percent of the total regional production (BLM 1983a). Individual farmers and ranchers, however, could be severely affected, depending on the actual location of leases. Impacts on directly affected farmers and ranchers would be mitigated to the extent that ranchers and farmers are compensated for their losses. Compensation from rental, bonus, royalty, and damage payments on the average would exceed losses in agricultural income.

The amount of cropland does not necessarily imply a similar amount of prime farmland, which can be determined only after the completion of soil surveys

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TABLE 4-14  
PERCENT LAND DISTURBANCE BY LAND COVER\*

Coal Region	Cropland	Range	Woodlands	Wetland
Fort Union	49	42	4	5
Powder River	6	90	2	2
Green River-Hams Fork	6	85	8	1
Uinta-Southwestern Utah	5	78	17	0
San Juan River	4	81	15	0
Alabama Subregion	18	--	78	4

Source: Regional Coal EISs, supplemented by SCS 1981 and Conservation Needs Inventories, conducted by Soil Conservation Service.

\*Estimated percentage of land uses allocated are for areas within coal regions where the coal resource occurs and only for the land use identified.

\*\*Cropland includes lands used as pasture (hay and grazing).

for the prime farmlands designation. Most good cropland, including prime farmland, usually occurs on alluvial valley floors. Once mining sites are identified and surveyed for prime farmland, specific options for mining would be selected. Impacts on prime farmland would be reduced in compliance with the prime farmland and alluvial valley floor provisions of the Surface Mining Control and Reclamation Act (SMCRA) and the land unsuitability criteria (see Chapter 1, Major Federal and State Laws Mitigating Coal-Related Impacts). Section 5.10(B)5A of SMCRA provides for protecting alluvial valley floors. Another potential impact to cropland would be the conversion of cropland to urban uses for coal-related population increases. Land disturbance resulting from population increases cannot be measured because it would occur at unknown levels and locations in response to coal development at undetermined sites. From 0.05 to 0.13 acres per capita would be converted to urban uses (ERS 1970). Less than 2 percent of the cropland is expected to be converted, and conversion would not significantly reduce regional agricultural production.

In the western coal regions, the dominant postmining land use would not change from livestock grazing because of the difficulties of overcoming low annual precipitation. Cropland use is also expected to remain the same.

Areas of dry-farmed and irrigated cropland are expected to be effectively reclaimed (Appendix 5). Some areas with supplemental water would be used as irrigated cropland.

In the Alabama Subregion, forest is expected to be reduced. The closeness of coal areas to population centers would allow an opportunity for increasing land values by establishing recreational facilities and second home communities on reclaimed land.



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#### AFFECTED ENVIRONMENT

##### Fort Union Region

This region's mid-tall grass, mid-grass, and mid-short grass prairies (see Vegetation section for a description of these habitats) support about 70 species of mammals, 247 species of birds, 80 species of fish, and 21 species of reptiles and amphibians (BLM 1979a, Stebbins 1966). The region's big-game species include mule deer, whitetail deer, and pronghorn. Small-game animals include the cottontail rabbit, snowshoe hare, and gray and fox squirrels. Many small mammal species serve as prey for larger furbearers and predators. Five important game bird species are also found here: ring-necked pheasant, sage grouse, sharp-tailed grouse, Hungarian partridge, and wild turkey.

A large variety of raptors inhabit or migrate through this prairie area, including the bald and golden eagle, osprey, harrier, prairie falcon, peregrine falcon, and several owl species.

The region's extensive wetlands, occurring mainly as potholes, form part of the primary waterfowl-producing area of North America--the Central Flyway. Because most waterfowl raised in the prairie pothole region inhabit Canada, the United States, and Mexico, these birds are of national and international importance. The pothole areas generally lie north of any expected coal development.

The main game fish species in the Fort Union Region's reservoirs and streams include walleye, sauger, northern pike, white bass, yellow perch, largemouth bass, channel catfish, and bullheads. Nongame species include a large variety of shiners, suckers, and minnows.

At least six endangered animal species occur or have been reported in the region: northern kit fox, peregrine falcon, black-footed ferret, whooping crane, bald eagle, and Tule white-fronted goose. Appendix 3 gives the Fish and Wildlife Service listing of threatened, endangered, or proposed species that could occur in this region.

##### Powder River Region

The Powder River Region is part of the short-grass prairie, whose sagebrush component is essential to sage grouse and highly important to pronghorn and many ground-nesting birds. The region has an estimated 70 species of mammals, 247 species of birds, 21 species of reptiles and amphibians, and 80 species of fish (BLM 1979a; Stebbins 1966; Burt and Grossenheider 1964; Robbins and others 1966; Wyoming Game and Fish Department 1977). Hunting and wildlife sightseeing are important economic factors in this area.

Mule deer and pronghorn are the region's main big-game animals. Existing mines, access roads, railroads, and associated fencing severely restrict deer and antelope movement throughout the region.

Sharp-tailed grouse are abundant in the Montana part of the region and are common in the northern half of Carbon County, Wyoming. Sage grouse are the

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most common upland game bird in the Wyoming part and also occur in the Montana part.

Many raptors occur in this area, and many golden eagle nests and prairie falcon eyries exist on or near active mines or areas leased for further development.

The region's endangered wildlife include the black-footed ferret, whooping crane, bald eagle, and American peregrine falcon. Some species, though not endangered throughout their range, have remnant populations in danger of being eliminated in local areas. Such populations have prompted some states to develop "rare and endangered" species lists. The Powder River Basin includes locally sensitive populations of the meadow jumping mouse, burrowing owl, milk snake, wood frog, shovelnose sturgeon, and silvery minnow, all of which occur within this region (Wyoming Game and Fish Department 1977). See Appendix 3.

### Green River-Hams Fork Region

Four major vegetative (habitat) types occur in this region: sagebrush, saltbush-greasewood, mountain shrub, and conifer (see Soils and Vegetation section for a brief description of these habitat types). The region's habitats support a large variety of wildlife--an estimated 68 species of mammals, 189 species of birds, 22 species of reptiles and amphibians, and 22 species of fish (Colorado Division of Wildlife 1978a,b,c; Wyoming Game and Fish Department 1977). The region is noted for its big-game hunting, as many mule deer, elk (Wapiti), pronghorn, moose, and bighorn sheep are found here as well as cougar and black bear. An estimated 20 percent of the world's pronghorn and a major portion of the world's sage grouse occur in this region. In addition, many bald eagles congregate in this region during the winter, and golden eagles nest and live year round in this region.

Feral horses are found in small concentrated areas and are estimated to be increasing at a rate of 15 to 30 percent annually (BLM 1979b).

In this region, one species of fish (Kendall Warm Springs dace), three species of birds (peregrine falcon, bald eagle, and whooping crane), and two species of mammals (black-footed ferret and Rocky Mountain wolf) are listed as endangered species. See Appendix 3.

### Uinta-Southwestern Utah Region

Because this region has life zones ranging from the Lower Sonoran to the Canadian, it has a large variety of wildlife species. The Utah Division of Wildlife Resources (Dalton and others 1978), and the Colorado Division of Wildlife (1978a,b,c) estimate that this region has 90 species of mammals, 270 species of birds, 26 species of reptiles, 9 species of amphibians, and 25 species of fish.

Four vegetative (habitat) types occur in this region: montane forest, woodland-brushland, pinyon-juniper, and cold desert (see Soils and Vegetation section for a description of these habitat types).

The region's wildlife is of great economic and recreation importance, consisting of an estimated 7 big-game species (mule deer, elk, moose,

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pronghorn, bighorn sheep, black bear, and cougar), 3 small-game mammal species (cottontail rabbit, snowshoe hare, and pine squirrel), 7 upland game bird species (ring-necked pheasant, Gambel's quail, sage grouse, blue grouse, sharp-tailed grouse, chukar, and mourning dove), 27 migratory waterfowl species, 16 furbearer species, 64 nongame mammal species, 28 raptor species, and at least 270 nongame bird species. Game and nongame contribute to an intense public interest in the region's wildlife because they provide many opportunities for hunting, fishing, observation, and scientific study.

This region encompasses a wide variety of wildlife habitats because of its range in altitude. These habitats vary from critical big-game winter ranges to sage grouse strutting grounds. Some or all of these habitats could be disturbed by coal mining.

This region is not a high waterfowl production area, but hunters pursue resident and migrant ducks and geese.

Twenty-eight raptor species are known or suspected to inhabit this region. Because of high public interest, special consideration must be given to raptor protection, especially during courting, breeding, and nesting.

Such small mammals as mice, rats, squirrels, shrews, moles, gophers, and bats occur throughout the region. These populations are subject to extreme, short-term fluctuations in numbers due to weather, food supplies, predation, and disease.

Twenty-five fish species inhabit waters in the region. The more common game species include rainbow, cutthroat, brown, and brook trout; channel catfish; and largemouth bass.

Eight federally listed endangered or threatened species inhabit the region either year round or seasonally: bald eagle, peregrine falcon, Utah prairie dog, black-footed ferret, whooping crane, Colorado squawfish, humpback chub, and woundfin. The Virgin River spinedace and Virgin River roundtail chub have been recommended for endangered designation. The razorback sucker is on the Colorado endangered list. Additionally, Colorado cites the river otter as endangered, and Utah cites the spotted bat as unique. See Appendix 3.

### San Juan River Region

The San Juan River Region consists of three major vegetative (habitat) types: grassland-shrub, pinyon-juniper, and conifer. The region's wildlife include an estimated 100 species of mammals, 116 species of birds, and 63 species of reptiles and amphibians (Burt and Grossenheider 1964, Stebbins 1966, BLM 1979a, Robbins and others 1966).

The region's big-game animals include pronghorn, mule deer, elk, and black bear. Game birds include Gambel's quail, sage grouse, and mourning dove. Common raptors include red-tailed and ferruginous hawks, great horned owls, and long-eared owls.

The region's federally listed endangered species include Mexican duck, bald eagle, whooping crane, peregrine falcon, thick-billed parrot, and gray wolf. (See Appendix 3.) In addition to the federally listed species, the State of

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New Mexico has its own endangered species law, and species on the state list found in this region are also listed in Appendix 3.

### Alabama Subregion

The major wildlife habitat type in this subregion is the southeastern mixed forest. A wide variety of forest and understory vegetation, a good mixture of terrestrial and aquatic habitat types, and an abundant water supply give the subregion all the needed food and cover for a great variety of wildlife: more than 244 species of birds, 48 species of mammals, 85 species of reptiles and amphibians, and 243 species of fish (BLM 1979a; Conant 1975; Robbins and others 1966; Burt and Grossenheider 1964). The subregion's main game species include whitetail deer, black bear, and ruffed grouse. Many nongame birds and mammals also occupy this habitat type. The subregion's rivers and lakes support such game fish as bass, trout, crappie, bluegill, pike, pickerel, muskellunge, and catfish and such nongame fish as carp, shad, chub, shiner, and sculpin.

Eight animal species within the Alabama Subregion are listed as endangered under the Endangered Species Act of 1973: the bald eagle, peregrine falcon, Bachman's warbler, red-cockaded woodpecker, Florida panther, gray bat, Indiana bat, and watercress darter. Although no federally listed threatened or endangered plants occur within the region, several are proposed for listing and are under consideration by the Fish and Wildlife Service. (See Appendix 3.) Proposed species are included for planning purposes only. Although they have no legal status under the Endangered Species Act, they should be considered in planning and assessing future individual mine plans.

### IMPACTS

#### General Impacts

Because the specific coal tracts that might be leased are not now known, the exact habitats that would be affected cannot be determined. Estimated habitat disturbance from coal mining represents less than 1 percent of the available habitats in the regions, but, depending on location, the percent of habitat disturbed could be far greater. Mining in crucial wildlife areas might disturb much more than 1 percent of the habitat, depending upon the mine location. Wildlife impacts cannot be measured at the program level because the locations of tracts on big-game winter ranges, breeding areas, and migration routes are not known. Estimates of poaching and illegal hunting losses due to human population increases related to coal development can be calculated using the techniques developed for the Fish and Wildlife Service.

Existing legislation and criteria designate some areas as unsuitable for mining and also protect sensitive habitats, such as endangered species critical habitats, alluvial valley floors, wetlands, national wildlife refuges, national wilderness areas, wilderness study areas, high-priority migratory bird habitats, raptor nests and roosting sites, and habitats for high-interest resident species.

The general impacts common to all coal regions from increased coal development include primary disturbance and destruction of vegetative habitat types and wildlife populations. In addition to direct impacts, secondary impacts would

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result from increased human population growth and changes in plant and animal communities. Disturbances and modifications of wildlife habitats next to the mined areas would lessen as the distance from the mine increases, but this area of influence could be up to five times as large as the directly disturbed areas (BLM 1979a). This area of influence varies by species and type of impact.

Intensified travel in remote areas for exploration and development could adversely affect wintering big-game herds, disturbing breeding behavior and resulting in direct losses of some species.

Vegetative habitat destroyed during site preparation would result in the loss of normal site productivity for wildlife. Vegetation removal would increase erosion and sedimentation, might introduce pollutants into nearby waterways, and would disturb nearby habitats and animals. Wildlife would be adversely affected by the loss of food and cover.

In addition, reclamation of mined out areas does not mean, in all cases, that remaining wildlife habitat would be restored. For example, browse ranges are destroyed by mining and reclaimed with grass species. Although grass furnishes habitat for wildlife, species re-inhabiting the grass habitat would differ from those that formerly inhabited the browse habitat.

The initial impacts would be greatest to small burrowing mammals, ground-nesting birds, and less mobile species such as reptiles and amphibians. The rapid population turnover and high reproductive rates of such species, however, would make them likely to be the first to repopulate reclaimed areas, although species diversity could be lower than that before development.

Although direct mortality of larger, more mobile wildlife species would be rare, loss or disturbance of habitat would result in increased competition for food, cover, and breeding sites, which could reduce these populations over the long term. Wildlife species dependent on seasonal habitats would be harmed by activities that remove or modify these habitats. If coal development reduces habitats that now limit the size of a migratory wildlife population, that population would also be reduced in other habitat areas. Additionally, secondary impacts could be felt by predators, their prey, and other links in the food chain of that species. Coal development would reduce total wildlife habitat and create increased crowding and stress on nearby populations. If they exceed a habitat's carrying capacity, these populations would eventually decline to a level equal to or below that carrying capacity.

Wildlife habitats removed from the immediate mining area could be temporarily or permanently disturbed by noise, air, and water emissions from community expansion, increased human activities, and plant and mine operations.

Other secondary impacts of coal development would also harm wildlife. Fences built along rights-of-way or around areas under construction or rehabilitation would restrict the movement of large mammals. Increased vehicular traffic would result in higher numbers of road kills, and coal mining could change migration patterns and grazing movements through changes in the amount and quality of forage and water.

Development near surface waters would also disturb aquatic life by introducing materials into the water by runoff. This runoff could contain organic and

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

inorganic matter from decayed vegetation and from the soil itself. Runoff could also leach minerals from exposed soils or might carry residues (oil, grease, pesticides) used during construction or present in the soil.

Increased consumptive uses of wildlife (hunting, fishing, and trapping) arising from human population increases could force state wildlife management agencies to greatly alter their game and fish management strategies by the year 2000. Current game management strategies are generally based on orderly expansion of human populations and are usually placed in strategic plans set in 5-year periods. A large industry (such as coal development) moving into wildlife areas adds people and creates conditions generally not anticipated in the formulation of current strategic plans. Because of unexpected problems caused by coal development, wildlife priorities, direction for operating plans, and budget planning would have to be changed. The following management changes might be required: (1) shortening of hunting seasons, (2) reducing bag limits, and (3) limiting the number of hunters during certain seasons. More restrictive hunting seasons could lead to an increase in illegal and wanton killing.

Another serious wildlife management impact of coal-related population increases is the increase in free-roaming domestic dogs. Many people allow their pet dogs to run free, and because many coal areas are also in prime wildlife areas, the loss of wild animals through direct killing and harassment can reach alarming numbers. Data collected in Virginia revealed that free-running uncontrolled dogs killed more deer than were taken legally by hunters during the open season (Bowers 1953).

Table 4-13, Average Annual Land Disturbance, estimates the acres of wildlife habitat that would be disturbed under each alternative at each production level. The disturbances and losses of habitat by 1990 would represent less than 1 percent of the total wildlife habitat in each coal region, but this figure could increase to 1.25 percent by 2000. These percentages are assumed to represent the loss of wildlife carrying capacity, and this capacity might be further reduced, depending upon the specific locations of disturbances and habitat losses.

In the Fort Union Region, increases in poaching and other illegal hunting under Preference Right and Emergency Leasing and the Proposed Action would exceed such increases under the No New Federal Leasing for all three target years under all levels of production. Such increases are expected because of coal-related population increases in these areas. Human populations are not expected to increase under No New Federal Leasing.

In the Powder River Region, poaching and illegal activities are not expected to increase at the medium production level for all target years and alternatives because human populations are expected to increase only slightly if at all. Under the high production level, poaching would remain constant under the No New Federal Leasing and Preference Right and Emergency Leasing by 1990. Poaching would increase in 1995 and 2000 under Preference Right and Emergency Leasing and for all three target years under the Proposed Action.

These illegal activities are not expected to increase for any of the target years, alternatives, or production levels in the Green River-Hams Fork Region.

## VISUAL RESOURCES

In the Uinta-Southwestern Utah Region, poaching and other illegal hunting would not increase for any of the target years, production levels, or alternatives except at all production levels in 1990 under the Proposed Action. Poaching would not increase for any of the target years under any production levels for any of the alternatives in either the San Juan River Region or the Alabama Subregion.

### VISUAL RESOURCES

#### AFFECTED ENVIRONMENT

The visual resources of an area are based upon a set of physical characteristics that establish a scenic quality as seen by the viewer. An area's visual resources are determined by how the viewer feels about visible change within the area, the number of viewers, and how distant the viewers are from what is being viewed. The "sense" of the region in visual resource terms is present in an individual's mind, either from first-hand observation of the physical characteristics of landform, vegetation, and visible man-caused modification or from an impression created in a person's mind through secondary sources such as movies, reading, or other forms of information gathering.

The purpose of visual resource management is twofold: (1) to be aware of the quality of the visual resource and permit only those types of landscape changes that the public will accept and (2) to reduce the visual impact of development such as coal mining, so that as few changes as reasonable are made to the landscape. These objectives can only be ensured by the greatest coordination between a proposed land use and the existing visual condition of an area to be changed.

The scenic quality varies dramatically among some of the six coal regions, reflecting the diversity in landform, vegetation, and influence of man's presence upon the landscape. The actual physical characteristics of the regions can best be described by dividing the landscape into homogeneous units termed physiographic provinces (Fenneman 1931). The provinces include an extensive portion of the landscape that portrays similar qualities of soil, rock, slope, and vegetation of the same geomorphic origin. Therefore, visual characteristics of these provinces tend to be repetitive and act as a basis for defining scenic quality for impact prediction.

The six coal regions mainly lie within seven of these physiographic provinces: Great Plains, Colorado Plateaus, Wyoming Basin, Southern Rocky Mountains, Basin and Range, Appalachian, and Coastal Plain. The western five regions generally represent areas of diverse landform, typified by a contrast in open desert and plain and highlighted by dramatic relief of severely eroded mountain ranges and plateaus. Vegetation is generally low-growing and sparse, except in isolated growths of conifer and hardwoods. As a result, views are generally open and unrestricted by landform or vegetation. The character of these regions tends to be natural-appearing, with interspersed signs of mineral and energy development (including surface mining); ranching; and associated highways, roads, utility systems, and rural communities.

The Alabama Subregion, in contrast, generally has an older landscape of less diverse features, containing narrow ridgetops, steep slopes, and narrow

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hollows with nearly level bottomlands. Vegetation consists of southern pines, upland hardwoods, and croplands. The three-county area is basically rural, with the city of Tuscaloosa and the towns of Jasper and Fayette. Views tend to be more limited and enclosed by hilly terrain covered by continuous vegetation patterns, except in the more open plains and crop-covered areas.

The natural character of the landscape has been highly changed by man and includes extensive, visible evidence of coal mining; rural residences; and communities, utilities, roads, and farming.

The scenic quality throughout the six coal regions is generally defined by features that are fairly common to the physiographic province in which they occur. Occasional and isolated outstanding landscape features are scattered throughout all regions, especially in the southwestern regions where many national parks and monuments are located in more diverse landscapes. Visual sensitivity, or how a landscape is viewed, tends to be a mixture of medium to low viewer sensitivity, especially in coal mining areas where the viewers are more accustomed to such mining. Within all regions are interstate and other highways and communities of high viewer sensitivity toward landscape changes.

### IMPACTS

#### General Impacts

The visual resources of the coal regions could undergo various types of generalized impacts. Impacts could result from surface and underground mining or from new infrastructures being built to support mining. The type and degree of visual impact would depend upon site-specific considerations, including the region involved, the type of landform and vegetation, and the visual sensitivity of the viewing public.

Surface mining and onsite development could severely modify the landform, visually dominate the landscape, and change the scenic character of the landscape from a natural or near-natural to a man-dominated, industrial setting until mining and rehabilitation are complete. Although surface mining might interest some viewers, many viewers would consider it an unacceptable visual intrusion.

Subsurface mine development would normally be less obvious than surface mine development. Generally, the only disturbance would consist of mine facilities, which in many instances could be placed away from sensitive or highly scenic areas to maintain the natural-appearing landscape or blend in with existing development. Visual impacts would be similar through all mining years. Development of new portals and such facilities as conveyors, buildings, access roads, and transmission lines, if not carefully placed, could degrade an area's visual character. If carefully placed away from sensitive or high scenic quality areas, the facilities might not be obvious intrusions.

Other landscape intrusions would result from the building of offsite support services, such as access roads, rail spurs, power lines, pipelines, and other types of urban and infrastructure development and expansion. Such expansion could well involve highly sensitive viewing areas near communities or along heavily traveled highways, causing a higher degree of visual impact. Regions



## VISUAL RESOURCES

that would undergo large population growth would require many new services and facilities, including housing. Some if not most of this type of disturbance would not be reclaimed.

If new coal mining occurs near, next to, or as an expansion of existing mines, developments and disturbances would be similar to existing disturbances. The basic elements of form, line, color, and texture would be changed as the landform and vegetation are changed or structures are built.

Mining in new areas would create similar impacts, but these could be more disturbing because the public might more readily notice the changes and would not be conditioned by existing visual intrusions. The greatest visual impacts would occur where areas to be mined are bisected by the regions' major transportation routes such as heavily traveled interstate systems or major state and federal highways. Mining near communities would also greatly disturb visual resources. Because visual resource impacts are closely related to surface disturbance, Table 4-13, Average Annual Land Disturbance, provides a general idea of the amount of visual disturbance. No additional impacts would occur in Alabama under any of the leasing alternatives or the Proposed Action.

### No New Federal Leasing

Additional significant impairment to the visual resources of the regions could occur under No New Federal Leasing. Growth and development might continue within the regions, and visible impacts similar to those already evident within the regions would persist. The visual character of the regional landscape would most likely remain, although the extent of development and visible impacts could expand within the regions, depending upon where new mining occurs. Specific locations cannot be predicted.

### Preference Right and Emergency Leasing

No additional significant impacts to the visual resources of the regions are expected under this alternative. Little more land disturbance is expected in any region, and some areas might undergo less than average disturbance in some years and at some production levels. Visible disturbance could occur in a few new areas because preference right leases would generally involve new mines. One cannot now predict the locations of these new mines and disturbances. Most disturbance under emergency leasing would occur in old mining areas and would probably not affect an area's visual quality. More disturbances would occur as a result of infrastructure expansion to serve expected population growth, but affected areas cannot now be determined to enable the prediction of impact locations and significance.

The visual character of the regions would most likely persist. The increased modification of landforms, changes in vegetation, and addition of structures would remain visually consistent with existing development within the regions.

Fort Union Region. No more land disturbance for the 1990 period is expected over what would occur under No New Federal Leasing. For the 1995 period, 146 more acres would be disturbed at the medium production level of the alternative, as would 195 more acres at the high production level.

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In the year 2000, 146 more acres would be disturbed at the low production level and 438 acres at the medium and high production levels. None of the additional acreages disturbed would be significant.

**Powder River Region.** The only change in acreage disturbed for the 1990 period as compared to No New Federal Leasing would be a decrease of 36 acres at the high production level. For 1995, decreases of 73 acres at the medium production level and 72 acres at the high production level are expected. For the year 2000, decreases of 59 and 72 acres respectively would occur at the low and medium production levels, but 290 more acres would be disturbed at the high production level than under No New Federal Leasing. The decreased acres disturbed would benefit visual resources, and the 290-acre increase would be an insignificant adverse visual impact, given the 5,864 acres disturbed under the baseline.

**Green River-Hams Fork Region.** The only change in the visual resources disturbed under Preference Right and Emergency Leasing would be 348 fewer acres disturbed at the year 2000 high production level than would be disturbed under No New Federal Leasing.

**Uinta-Southwestern Utah Region.** Only insignificant visual resource changes would occur in this region. In 1995, 6 more acres would be disturbed at the high production level and only 21 more acres at the year 2000 high production level.

**San Juan River Region.** As in the other regions, this alternative would not significantly affect visual resources. At the high production level in 1995, 41 fewer acres would be disturbed than under No New Federal Leasing. At the year 2000 high level production, 329 more acres would be disturbed than under No New Federal Leasing, but these acreages would involve new mines. Without knowing the locations and other conditions, the extent of visual resource impacts would be difficult to predict.

**Alabama Subregion.** Visual resource impacts under Preference Right and Emergency Leasing in the Alabama Subregion would be the same as under No New Federal Leasing.

### Proposed Action

Generally, no significant visual resources impacts are expected under the Proposed Action, except as described below for each region. Any new visual disturbances would be similar to existing conditions.

The visual character of the regions would most likely remain the same. The increased modification of landforms, changes in vegetation, and the addition of structures would remain consistent with existing development. In some cases, impacts would be reduced in that fewer acres would be disturbed under the Proposed Action. Visual resources would thus improve relative to the baseline.

More disturbance would occur as a result of infrastructure expansion to serve expected population growth, but affected areas cannot now be determined to allow prediction of impact locations and significance.

## VISUAL RESOURCES

Fort Union Region. Under the Proposed Action, 146 more acres would be disturbed in new lease areas at the 1995 medium production level, and 195 more acres would be disturbed at the high production level than would be disturbed under No New Federal Leasing. For the year 2000, more acres would be disturbed at the low, medium, and high production levels--146, 536, and 877 acres respectively. These acreages would generally not create more significant visual disturbance within the region. Depending upon specific locations of the new mines, local impacts could occur, especially at the year 2000 medium and high production levels.

Powder River Region. Most of the Proposed Action impacts for various periods and production levels would benefit visual resources because fewer acres would be disturbed than under No New Federal Leasing. For the 1990 period, 18 fewer acres would be disturbed at the low and medium production levels, and 36 fewer acres would be disturbed at the high production level. In addition, 59 fewer acres would be disturbed at the year 2000 low production level, and 108 fewer acres would be disturbed at the medium production level. Significant impacts to the visual resource could occur, however, for the new lease areas, where 905 acres are predicted to be disturbed at the year 2000 high production level, depending upon specific mine locations. The regional landscape character is not likely to be affected under the Proposed Action because of existing mining.

Green River-Hams Fork Region. The Proposed Action would disturb visual resources much less than would No New Federal Leasing. Fewer acres would be disturbed at all three production levels. For the 1995 period, 69 fewer acres would be disturbed in new mine areas at the low and medium production levels, and for the year 2000, 695 fewer acres in new mine areas would be disturbed at the high production level. All of the disturbed areas would involve surface mining, which would make the impact significantly beneficial.

Uinta-Southwestern Utah Region. The greater acreage that would be disturbed under the Proposed Action would not be a significant regional visual resource impact. Only 6 more acres would be disturbed in new areas at the year 1995 high production level and 21 more acres at the year 2000 high production level. These acres would be associated with subsurface mining, decreasing the chance for visible disturbance.

San Juan River Region. Most of the impacts under the Proposed Action would adversely affect visual resources. For the 1990 period, all production levels would disturb 82 more acres in new mine areas than under No New Federal Leasing, which most probably could be absorbed by the regional landscape with little impact. At the 1995 high production level, 41 fewer acres would be disturbed than under No New Federal Leasing. Depending upon the location of the more 329 acres to be disturbed in new areas at the year 2000 high production level, visual resources could be significantly degraded. The regional landscape character, however, is not likely to be affected by the increase.

Alabama Subregion. The Proposed Action would have the same effects on the Alabama Subregion as would No New Federal Leasing.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

### RECREATION RESOURCES

#### AFFECTED ENVIRONMENT

Three types of recreation could be affected by the Proposed Action and alternatives: (1) nonfacility-related activities or extensive recreation, such as backcountry hiking, hunting, or fishing; (2) rural facility-related recreation or intensive recreation, such as camping or picnicking in established areas; and (3) urban recreation, such as recreation center activities, tennis, and swimming.

The high percentage of federal land throughout the five western coal regions opens most of the area to nonfacility-related recreation opportunities. The most popular activities include backpacking, river running, big- and small-game hunting, fishing, winter sports, sightseeing by automobile, camping, and off-road vehicle use (BLM 1983l). Because most land in the Alabama Subregion is privately owned, outdoor activities in areas lacking facilities is limited mainly to casual use for hunting (BLM 1983c).

Many outdoor recreation facilities exist in the five western regions in national parks and monuments, national recreation areas, national forests, national wildlife refuges, and state parks and local recreation areas. Also used for public recreation are lakes, rivers, reservoirs, and highly scenic natural areas under all jurisdictions, including private facilities. The Alabama Subregion, in contrast, has few public or private recreational facilities (BLM 1983d), but two national forests and a few state parks lie within a few hour's driving distance.

Other types of existing or proposed recreation facilities and experiences in the five western regions include a national system of trails, rivers, and natural landmarks. These designations are a continuing effort by the federal and state governments to formally recognize trails with historic, recreation, or other values; rivers of national, scenic, or recreational significance; and natural landmarks that display unique physical characteristics or relationships that should be preserved for future generations as part of the nation's natural heritage. No such areas, either designated or under study, are believed to be included in the Alabama Subregion.

Most communities in which populations are likely to expand because of an increase in coal mining have some type of urban recreation program and facilities, including community parks and picnic areas. These facilities are provided either by private enterprise or by the municipalities. In the smaller communities, many of which would need to support the increased populations involved with coal mining, these facilities are a focal point for the community through softball and other youth and adult recreation programs.

Urban recreation in larger communities is usually more diversified in types of facilities and in types of organized programs and impromptu activities offered to residents. Some areas have formed recreation districts to fund a broad-based program and keep up with development to meet growing demands. On the other hand, other communities, both large and small, often cannot keep up with demand, creating a shortfall in activities and facilities. Those demands

## RECREATION RESOURCES

that tend not to be kept up with include picnicking, swimming, tennis, golf, bicycling, hiking, baseball and softball, and municipal park areas. Most communities in all regions rely upon school playgrounds, high school playing fields, fairgrounds, and city and county facilities as major urban public facilities for year-round recreation. In some communities, churches, organizations, and community-sponsored activities also help meet recreation needs (BLM 1983b).

### IMPACTS

#### General Impacts

The main impact on recreation resources resulting from the Proposed Action and alternatives would be the increase in the recreation demand caused by population increases. These increases, beyond normal population growth that would occur without more coal leasing, are expected to occur only at certain production levels in all five western coal regions. Population increases could cause overcrowding and overuse of existing facilities and use areas, a decrease in the quality of recreation requiring facilities or solitude, increased administrative costs, and increased vandalism (BLM 1978a). No coal-related population changes would occur in the Alabama Subregion. Secondly, areas disturbed during mining could not be used for recreation until the land is reclaimed, but this impact would generally not be significant.

Coal-related population decreases under the Proposed Action and Preference Right and Emergency Leasing would occur in the Powder River, Green River-Hams Fork, and San Juan River regions and would benefit recreation resources. The increased demand for recreation facilities and areas of use would also cause more conflicts between private land owners and recreationists. The increased number of people engaged in backcountry hiking, camping, and other outdoor experiences could reduce the quality of primitive-type recreation on large areas of public lands in the five western coal regions (BLM 1979a). Although the Surface Mining Control and Reclamation Act (SMCRA) Section 522(e) prohibits new surface mining on certain types of recreation lands or within 300 feet of any public park and provides other such restrictions, these areas could still be adversely affected by nearby mining or public overuse.

Urban recreation becomes more important as populations increase because social, health, and economic benefits are realized through recreation close to home. Resident demand for urban recreation would increase proportionately to population changes. Demand for many activities would increase at a faster rate than the population (BLM 1983b). Demands would be placed on communities to provide needed urban recreation facilities, programs, and parks. The shortages of some recreation opportunities, however, would not be fulfilled for several years because of a lag in need identification and acquisition or construction. Lack of needed funds for such facilities might be the main roadblock.

Expansion of coal mining could also benefit recreation. Part of the greater tax revenue generated by increased mining and population could be used to help alleviate pressure on existing municipal facilities. Mining could open up new

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

roads and trails to off-road vehicle use (BLM 1978a), and reclamation efforts might increase wildlife habitat and wildlife for hunting and viewing. Where coal-related populations would increase less under the Proposed Action and Preference Right and Emergency Leasing than under No New Federal Leasing, recreation resources would benefit.

The actual extent of impacts to recreation cannot be assessed without first knowing the exact location of future coal mining and where the population increases would occur. Moreover, detailed information on existing recreation resources and present demand would be needed, as would a prediction of the new recreation demands needed by the increased coal-related population. Because much of this information is not known, especially for the local level, impacts can be only generally projected. Percent change in coal-related population between the alternatives and No New Federal Leasing (baseline condition) is used to predict impacts to recreation. For purposes of comparison, population increases under 10 percent are not considered significant.

### No New Federal Leasing

No New Federal Leasing would not significantly affect recreation resources. Ongoing growth and development that cause population increases within the regions, however, might continue to expand the demand for recreation facilities and programs. Such demands might or might not be kept up with by public and private sources. As a result, the quality of the recreation experience demanded by users might deteriorate, causing a shift in the type of user or experience sought. Impacts of a continued increase in demand for recreation cannot now be predicted for either urban or rural recreation resources.

### Preference Right and Emergency Leasing

This alternative would significantly affect recreation resources at some production levels, but the amount of surface disturbance would generally not affect the recreation resource base of facilities or programs. Most population increases would not create a significant new demand for recreation facilities or areas at most production levels unless the whole increase is placed upon the small population base of a single community. Normally, an increase in demand would be spread over a variety of recreation uses and areas. Population increases or decreases for affected regions are described below. See Table 4-15 for the projected percent change in coal-related population relative to No New Federal Leasing.

**Fort Union Region.** At the 1995 medium and high production levels and the year 2000 low, medium, and high production levels, the coal-related population increases (from 12 to 30 percent) would significantly affect recreation resources. If the 30 percent increase occurs within one community, the impacts could be severe, especially to municipal and facility-related recreation. Spread over several communities, the impacts would be much less severe. Under Preference Right and Emergency Leasing, the percentage of coal-related population increases would be the greatest for the Fort Union Region.

## RECREATION RESOURCES

Powder River Region. Though coal-related population would increase by 3 percent at the 1995 high production level and by 8 percent at the year 2000 high production level, neither increase would significantly affect recreation resources, especially if spread throughout the region. At all other production levels, coal-related population would decrease or not change, causing the Preference Right and Emergency Leasing Alternative to benefit recreation resources more than would No New Federal Leasing.

Green River-Hams Fork Region. No coal-related population increases would occur under this alternative. Population would decrease by 2 and 8 percent at the high production level for 1995 and 2000 respectively. This population loss could result in less use of recreation opportunities.

Uinta-Southwestern Utah Region. Coal-related population would increase at the high production level in 1990, 1995, and 2000. Only in 2000 would the increase (10 percent) significantly affect recreation resources. Coal-related population would not grow at the other production levels or periods.

San Juan River Region. Impacts would be similar to those described for the Uinta-Southwestern Utah Region, with the increase being 18 percent under the year 2000 high production level.

Alabama Subregion. Impacts to recreation resources would be the same as under No New Federal Leasing.

### Proposed Action

For most regions and at most production levels, the Proposed Action would not significantly affect recreation resources. Impacts that would occur would generally be distributed throughout the regions and would be insignificant. For many regions and at many production levels, coal-related population would be smaller than under No New Federal Leasing, thus benefiting recreation. Recreation resources, however, would be significantly affected at the higher production levels for the year 2000 and in the Fort Union Region.

If coal-related population increases in two or three smaller communities that already have a higher demand for recreation than they can supply by 1990, the impacts could be severe. In rural areas, fishing and hunting would be most affected, with an expected lowering of success in each sport. Recreation sites and areas would be degraded because of increased use and vandalism. And the demand for recreation sites and maintenance and operating costs would increase (BLM 1981b).

Population increases or decreases for affected regions are described below. See Table 4-15 for the predicted percent change in coal-related population relative to No New Federal Leasing.

Fort Union Region. Under the Proposed Action, recreation resources are expected to be more affected in this region than in any other. Coal-related population would increase at the medium and high production levels for 1990 and at the low production level for 1995, but these increases would be

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TABLE 4-15  
PERCENT COAL-RELATED POPULATION CHANGE  
FROM NO NEW FEDERAL LEASING

Production Levels	Coal Regions				
	Fort Union	Powder River	Green River-Hams Fork	Uinta-SW Utah	San Juan River
<b>Preference Right and Emergency Leasing</b>					
1990					
Low	0	0	0	0	0
Medium	4	-1	0	0	0
High	5	-1	0	1	-1
1995					
Low	3	-1	0	0	0
Medium	17	-2	0	0	0
High	17	3	-2	4	3
2000					
Low	12	-2	0	0	0
Medium	30	-1	0	0	0
High	30	8	-8	10	18
<b>Proposed Action</b>					
1990					
Low	0	0	-2	0	4
Medium	4	-2	-2	0	4
High	5	-1	0	1	2
1995					
Low	3	-1	0	0	0
Medium	18	-3	0	0	0
High	32	9	-4	4	3
2000					
Low	12	-2	0	0	0
Medium	38	-2	0	0	0
High	63	23	-15	10	18

Note: The Alabama Subregion is omitted from the table because no changes from the No New Federal Leasing Alternative would occur under either alternative.



## RECREATION RESOURCES

insignificant. Population increases at the medium and high production levels for 1995 and at all production levels for the year 2000 could significantly affect recreation. The high production level for 2000, which could increase coal-related population by 63 percent over No New Federal Leasing, would create the greatest impacts for the Proposed Action in any region. Municipal, facility-related, and nonfacility-related recreation opportunities would be affected, especially if impacts are not spread across the region.

Powder River Region. At all but two production levels, the coal-related population for the region would either stay the same or decrease in relation to No New Federal Leasing, resulting in a relatively beneficial effect on recreation. At the 1995 and 2000 high production levels, coal-related population would increase by 9 and 23 percent respectively. Both increases could be significant because the impacts could be limited to two or three smaller communities that would already have greater demand for recreation than they can meet (BLM 1981b).

Green River-Hams Fork Region. This region is the only one in which the coal-related population under the Proposed Action would either remain the same or decline at all production levels, including the high production level. In fact, coal-related population would decline by 15 percent by the year 2000. The result would be an eased demand upon recreation resources and opportunities that may already be experiencing excessive demand from other populations within the region.

Uinta-Southwestern Utah Region. Few additional impacts would be placed on the recreation resource in this region under the Proposed Action. At most production levels and in most periods, the coal-related population would not increase over the baseline level or would only slightly increase. Only at the year 2000 high production level would coal-related population significantly increase (10 percent or more). Depending on the location of the increase, the significant impacts to recreation might include increased demand for hunting and fishing experiences and a lowering of success in each sport (BLM 1983i).

San Juan River Region. The impacts for this region would be similar to those described for the Uinta-Southwestern Utah Region. The only significant impact would occur at the year 2000 high production level, at which coal-related population would increase by 18 percent.

Alabama Subregion. The Proposed Action would affect recreation resources in the Alabama Subregion the same as would No New Federal Leasing.

## WILDERNESS

### AFFECTED ENVIRONMENT

Wilderness concerns within the six coal regions consist of one of two types: (1) officially designated wildernesses under the Wilderness Act of 1964 (Public Law 80-577) and (2) roadless areas being considered for their wilderness values by federal agencies under a number of public laws, agency policies, and court orders. Examples of the areas being considered include BLM wilderness study areas (WSAs) required by the Federal Land Policy and

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Management Act of 1976 (Public Law 94-579, Sec. 603), and Forest Service areas identified in Roadless Area Review and Evaluation II (RARE II) decisions. RARE II areas are being re-evaluated in ongoing land use plans and EISs as a result of a 1982 Ninth Circuit Court decision (California v. Block). Other wilderness studies are being conducted by the National Park Service and the Fish and Wildlife Service.

Many designated wildernesses and areas being studied for wilderness values lie within the five western coal regions. In a few situations, the areas being considered for wilderness designation overlie coal resources that may be made available for leasing. In Montana, Terry Badlands WSA lies within the Fort Union Region, and Zook Creek and Buffalo Creek WSAs lie within the Powder River Region. In the Uinta-Southwestern Utah Region, WSAs on the Kaiparowitz Plateau and in the Book Cliffs area overlie portions of known coal resources. In the San Juan River Region, coal resources are overlain by portions of Eagle Peak, Mesita Blanca, Ignacio Chavez, and Ah-shi-sle-pah WSAs. The actual relationship between resources cannot be known until tracts to be leased are identified.

No wilderness resources have been officially designated or are under study within the Alabama Subregion, but the Sipsey and Cheaha wildernesses lie within a 1- and 3-hour drive respectively of the subregion.

Studies being conducted for BLM WSAs may or may not recommend the WSAs to Congress for wilderness designation. The studies should be completed by 1991, so that any wilderness resources that would conflict with coal development would be known.

Wilderness use and acres of designated wilderness have increased in recent years, and some of the most popular areas, particularly near trailheads, are congested during high-use periods (BLM 1984d).

### IMPACTS

#### General Impacts

Three types of impacts could occur to wilderness areas as a result of mining within the six regions: (1) mining within established wildernesses or areas under consideration for wilderness designation, (2) adverse changes of outside sights and sounds caused by mining or coal-related activities near wilderness areas, and (3) increased demand for use of wilderness areas by increased coal-related populations.

No direct impacts are expected from mining within designated wildernesses or areas under consideration for wilderness designation. Designated wildernesses are protected under law from new mining, and areas under study for wilderness designation are protected by interim management, which protects wilderness characteristics until a designation determination is made. No impacts would occur in the Alabama Subregion because it has no wilderness areas.

The impacts of outside sights and sounds on wilderness areas are difficult to determine without knowing exactly where future mining would occur. Some impacts might occur, but the type and significance of these impacts cannot be

## WILDERNESS

predicted without knowing the specific locations of mining and other details. The Alabama Subregion would be unaffected because no wilderness areas occur within the subregion.

Secondary impacts that could affect designated or potential wilderness areas as a result of increased demand for wilderness resources would affect some of the regions, as described below. A coal-related population increase and a growing awareness of wilderness areas and values would increase the use of and demand for wilderness. On the other hand, as more acres of wilderness are formally designated, formal wilderness capacity would expand, and the needs of more wilderness users would be more easily met in the affected regions. The uncertainty of wilderness designation and lack of knowledge of where populations would grow make it difficult to predict impacts to wilderness resources as a result of increased coal production.

Without knowing where coal mining would occur under the Proposed Action and alternatives, no direct impacts can be discussed. Secondary impacts can generally be determined by looking at the increase, decrease, or lack of change in projected coal-related population. (See Table 4-15 for the predicted change in coal-related populations under No New Federal Leasing for each region.) Specific impacts are described below.

### No New Federal Leasing

Coal mining would not significantly affect regional wilderness resources under No New Federal Leasing. Continued development of existing federal coal leases could cause more impacts, but the impacts are expected to be similar to existing impacts and of small magnitude. Ongoing growth and development within the regions could continue to expand the demand for wilderness use, in some cases lessening the quality of wilderness user experiences. The type of user or the areas used might shift, but new management practices--such as permit systems that spread or limit use--would mostly alleviate the expected impacts.

### Preference Right and Emergency Leasing

In some regions at certain production levels, this alternative could cause new significant impacts that would not occur under No New Federal Leasing. Coal-related population increases at certain production levels could result in greater demand for wilderness experiences. Where new or existing mining could occur next to a wilderness area, either could diminish wilderness experiences within the wilderness area by reducing the quality of sights and sounds perceived by the user. As a result of a change in coal-related population, each region except the Alabama Subregion would in some way, however slight, undergo a change in wilderness use or experience.

Fort Union Region. At the 1995 medium and high production levels, coal-related population increases would significantly degrade wilderness resources. A 17 percent population increase in 1995 and a 30 percent increase in 2000 would create an increased demand for this resource, but one cannot predict the affected areas without a knowledge of where population increases would occur within the region. Under the Preference Right and Emergency Leasing Alternative, coal-related population would increase the most in this region.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Powder River Region. The greatest projected coal-related population increase at any production level would be only 8 percent (year 2000, high production level), which would not significantly affect wilderness resources, especially if the population is spread throughout the region. At all other production levels, coal-related population would either decrease or remain the same. Either case could lessen the demand for wilderness.

Green River-Hams Fork Region. No coal-related population increases would occur under Preference Right and Emergency Leasing. Population decreases of 2 and 8 percent are expected at the high production levels for 1995 and 2000 respectively, which may result in less use of and demand for wilderness.

Uinta-Southwestern Utah Region. Coal-related populations could increase at all three high production levels, but only a 10 percent population increase in 2000 would place significant pressure on the wilderness resource. Coal-related population would not grow during any of the other periods at any production level.

San Juan River Region. Impacts in this region would be similar to those described for the Uinta-Southwestern Utah Region, with an 18 percent increase in coal-related population expected at the year 2000 high production level.

Alabama Subregion. Preference Right and Emergency Leasing would have the same impacts on wilderness resources as would No New Federal Leasing.

### Proposed Action

In most regions and at most production levels, the Proposed Action is not expected to significantly affect wilderness resources. For many regions and at many production levels, a population smaller than under the No New Federal Leasing is expected, which would result in less demand for wilderness and possible benefits. The wilderness resource, however, would be significantly affected at higher production levels for the year 2000 and in the Fort Union Region. In these instances, outside sights and sounds of nearby mining might significantly diminish an area's wilderness character.

Fort Union Region. Impacts to the wilderness resource are expected to be the greatest for this region under the Proposed Action. Some coal-related population increases would occur at the medium and high production levels for 1990 and at the low production level for 1995, but these increases would not be significant. At the medium and high production levels for 1995 and at all levels for 2000, impacts could be significant because of increased user demand upon the wilderness resource. The high production level for the year 2000 could see a 63 percent increase in coal-related population over the No New Federal Leasing--the greatest projected impact for the Proposed Action in any region.

Powder River Region. At all but two of the production levels and target years, the region's coal-related population would either remain constant or decrease in relation to No New Federal Leasing, resulting in a decrease in wilderness demand. Population increases at the 1995 and 2000 high production

## CULTURAL RESOURCES

levels would amount to 9 and 23 percent respectively. Both increases could significantly affect the wilderness resource unless the demand occurs far enough away from wilderness areas.

**Green River-Hams Fork Region.** This region is the only one in which coal-related population would either remain the same or decline at all production levels. At the year 2000 high production level, coal-related population would decline by 15 percent, resulting in an eased demand for wilderness-related experiences and a possible decrease in visible or audible infringements upon such values.

**Uinta-Southwestern Utah Region.** Few additional significant impacts to wilderness would occur in this region under the Proposed Action. At most production levels, coal-related population would either not increase over the baseline level or would only slightly increase. Only at the year 2000 high production level would a significant increase (10 percent or more) occur. Depending upon where the population is located within the region, the demand for wilderness opportunities could significantly increase.

**San Juan River Region.** The impacts to wilderness resources in this region would be similar to those described for the Uinta-Southwestern Utah Region. The only significant impact would occur at the year 2000 high production level, where an 18 percent increase in coal-related population could significantly increase demand for wilderness.

**Alabama Subregion.** The Proposed Action would have the same impacts as would No New Federal Leasing.

## CULTURAL RESOURCES

### AFFECTED ENVIRONMENT

The areas that could be affected by the federal coal management program show evidence of human activities from 12,000 years ago to the present. Within this time span, population patterns have fluctuated according to environmental and social changes and have been assigned by prehistorians to several culture periods. Variations, identified by prehistorians as culture areas and cultural traditions, also occur among the areas.

Five broad culture periods are represented among the coal production regions. (Dates for these periods are all approximate.)

1. The Paleo-Indian period occurred from 8,000 to 12,000 years ago. Sites from this period, characterized by bifacially flaked, lanceolate projectile points, have been found throughout the regions.
2. The Archaic or Desert Culture period occurred from 1,000 to 10,000 years ago. Many campsites representing this period occur throughout the coal regions.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

3. The Horticultural period occurred from 800 to 1,200 years ago. It is represented in the Fort Union Region by the Late Prehistoric Culture, in the Uinta-Southwestern Utah Region by the Fremont Culture, in the San Juan River Region by the Anasazi Culture, and in the Alabama Subregion by the Mississippian Culture. In the Fort Union, Powder River, and Green River-Hams Fork Regions, an essentially Archaic lifestyle persisted contemporaneously with the Fremont, Anasazi, Late Prehistoric, and Mississippian developments.
4. The Proto-Historic period occurred in the regions from about A.D. 1200 to 1540, when nomadic hunters from the high plains replaced the horticulturalists of earlier time in the western coal regions. The horse was introduced by the Spanish from Mexico into the western regions in the late 1600s and early 1700s. The Proto-Historic period ended in the regions with Spanish exploration and conquest from the South and English and French exploration and conquest from the east and north.
5. The beginning of the Historic period was marked by the Southwest Coronado expedition in 1540. The founding of the United States on the eastern seaboard in 1776 stimulated the westward expansion of Euro-American activities, including exploration and trapping, agriculture, communications and transportation, and mining.

### IMPACTS

#### General Impacts

The type of impacts on cultural resources would not vary among the No New Federal Leasing, Preference Right and Emergency Leasing, Proposed Action, or Leasing by Application alternatives. The size and number of impacts would vary by the amount of surface disturbance and population increase.

This section summarizes expected impacts and their causes. The information provided here summarizes or directly presents the most recent regional coal EIS data for the particular region considered. The regional EISs are ongoing; initiation of new round EISs for regions depend upon program decisions that may be made after the final supplemental EIS is published. The ongoing regional statements include a broad analysis of environmental impacts of current and potential coal development and site-specific analyses of mine plans and right-of-way permits for which administrative actions are proposed. These statements also address related coal development not requiring specific Department of the Interior approval, such as mine-mouth electrical generating or energy conversion facilities, and the expansion of existing communities or the building of new communities to meet the needs of coal-related population increases (BLM 1979a).

The size and number of impacts on cultural resources could be determined only by inventories, which would be required before surface disturbance is authorized. As cultural resource sites are identified, they will be evaluated for significance and possible inclusion on the National Register of Historic Places in compliance with regulations in 36 CFR 800 and other historic preservation legislation. Appropriate mitigation procedures would be developed at the same time.

## CULTURAL RESOURCES

Development of leased coal in the regions would cause land modifications and probable population increases. Population increases would likely result in increased off-road vehicle use and other activities, ultimately causing land modification, vandalism, relic collecting, and disturbance of many identified and some previously unidentified cultural resources within the regions.

Coal development would affect cultural resources by destroying or altering the resources and the surrounding environment. Development would displace artifacts and introduce visual, audible, and atmospheric elements out of character with the present environment. These impacts would lessen scientific and cultural information and diminish the resource base for future research. A particular concern for all regions would be the loss of buried sites discovered during dirt moving. Some loss would occur under these discovery conditions even though mining would be immediately halted. Because cultural resources, once lost, are nonrecoverable, the loss of any information could significantly hamper efforts to understand past cultures or to reconstruct prehistory and history. Values thus may be diminished if removed from original sites.

### Fort Union Region

The number and type of sites for all alternatives should present few obstacles to surface mining. Sites already known and others likely to be found, however, might require special attention, preservation, or mitigation to preserve important and irreplaceable scientific information (BLM 1982a). Regional sampling has been insufficient to determine the nature of the cultural resource base, and a valid regional perspective on impacts cannot be offered.

### Powder River Region

Although over 250 cultural sites are known, until each coal tract has been inventoried, potential impacts cannot be accurately measured. Salvage of cultural resources would allow recovery of some of the scientific data, but under current research methods and priorities, sites or potential data within sites that would have been important to future research might be overlooked. Moreover, some sites not selected for salvage might be destroyed and only preliminary data recovered. In this way, valuable cultural resources could be lost (BLM 1984d).

### Green River-Hams Fork Region

Because no reliable estimates exist of cultural resources per acre in this region, the scale of adverse impacts cannot be predicted. Development under all alternatives would damage a wide range of prehistoric and historic resources, both directly through development of particular projects and indirectly as a result of population growth. Mitigation requirements under federal and state laws, however, are likely to significantly reduce potential adverse impacts (BLM 1983b).

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

### Uinta-Southwestern Utah Region

The total number and significance of affected cultural sites are unknown. Although building of surface facilities for underground mining could inadvertently disturb or destroy historic and prehistoric cultural resources, most of such effects could be avoided by proper facility placement. Where impacts could not be avoided, data recovery would mitigate most adverse effects (BLM 1983i).

### San Juan River Region

Many areas within this region lack enough cultural inventory data to allow adequate analysis of potential impacts. Where inventory has found sites, the mining will require special actions to protect sites such as federally managed Chacoan outlier sites (BLM 1984c). On the basis of unsuitability and planning criteria, the USDA Forest Service has denied consent to BLM to lease a portion of the Chimney Rock Archaeological Area (A National Register Chacoan outlier).

The Pierre's Ruin Community (Chacoan outlier) is surrounded by a 440-acre protective boundary and enjoys other protective measures. This site is protected under Public Law 96-550 and has been nominated to the National Register of Historic Places. Prehistoric Chacoan roads pass through some potential coal areas (BLM 1984c).

Judgmental rather than formal statistical procedures have estimated that between 1,727 and 2,295 sites occur in minable areas. If salvage excavation of threatened sites is required, data would be preserved, but sites or parts of sites would be lost (BLM 1984c).

Coal development could speed up the accumulation of cultural resource knowledge before disturbance. This acceleration would be tempered by the fact that, despite mitigation through modern techniques, many sites could be lost for future research (BLM 1984c), and increased access could increase the potential for vandalism. Moreover, not all sites located through inventory at the mine plan stage are likely to be amenable to mitigation through data recovery.

### Alabama Subregion

The 1978a BLM Class II 10 percent sample field inventory found that historic and prehistoric resources in some minable areas in this subregion are small and relatively insignificant properties. Known minable areas have no listed or nominated National Register of Historic Places properties, but National Register eligibility for all known sites on all known minable areas has not yet been determined (BLM 1983c).

Impacts cannot be evaluated before inventory, which is required to identify National Register properties, but inventory areas cannot be determined until mining plans are submitted. Therefore, definitive statements concerning environmental consequences to cultural resources from the coal program must wait (BLM 1983c).



## CULTURAL RESOURCES

### Cultural Resource Impacts by Alternative and Region

Increased cultural resource impacts may be roughly correlated to increased surface disturbance. See Table 4-13, Average Annual Land Disturbance, for a general idea of cultural resource disturbance by production level and year.

**No New Federal Leasing.** More significant impacts to the regions' cultural resources could occur if the No New Federal Leasing is adopted. Growth and development might continue to expand within the regions, and cultural resource impacts similar to those already evident within the regions would persist. The extent of development and site impacts could expand within the regions, depending upon mining locations, which are not predictable.

**Preference Right and Emergency Leasing.** Under Preference Right and Emergency Leasing, significant impacts to cultural resources in most cases are likely to be fewer than under No New Federal Leasing. Little more land disturbance is expected in any of the regions, and some areas would have less land disturbed at some production levels and in some years.

**Fort Union Region.** This alternative would disturb no more land in 1990 than is expected under No New Federal Leasing. For the 1995 period, however, 146 more acres (a 9 percent increase over No New Federal Leasing) would be disturbed at the medium production level, as would 195 acres (a 12 percent increase over No New Federal Leasing) at the high production level. For the year 2000, 146 more acres would be disturbed at the low production level, and 438 more acres would be disturbed at the medium and high production levels (a 27 percent increase over No New Federal Leasing).

**Powder River Region.** The only change in acreage disturbed for 1990 would be a 1 percent decrease of 36 acres from No New Federal Leasing at the high production level. For 1995, 2 percent decreases of 73 acres at the medium production level and 72 acres at the high production level are expected. For the year 2000, decreases of 59 (-1 percent) and 72 (-2 percent) acres would occur at the low and medium production levels respectively. At the high production level, however, acreage disturbed would increase by 290 acres (5 percent) over No New Federal Leasing.

**Green River-Hams Fork Region.** Preference Right and Emergency Leasing would have the same effects on cultural resources as would No New Federal Leasing but would disturb 348 fewer acres (-9 percent) at the high production level in 2000.

**Uinta-Southwestern Utah Region.** In 1995, 6 more acres (3 percent) would be disturbed at the high production level than under No New Federal Leasing, and in 2000, 21 more acres (9 percent) would be disturbed at the high production level. (See Chapter 5, Table 5-1, Comparative Analysis.)

**San Juan River Region.** Land disturbed would be the same as under No New Federal Leasing, with two exceptions: at the high production levels in 1995 and 2000, 41 fewer acres (-2 percent) and 29 fewer acres (-17 percent) respectively would be disturbed.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Alabama Subregion. Disturbance in this subregion would be the same as under No New Federal Leasing.

Proposed Action. The Proposed Action would disturb fewer acres than would No New Federal Leasing except as described below.

Fort Union Region. Under the Proposed Action, 146 more acres (an increase of 9 percent over the No New Federal Leasing) would be disturbed in new lease areas at the 1995 medium production level, and 195 more acres (an increase of 12 percent over the No New Federal Leasing) would be disturbed at the high production level. For the year 2000, more acres would be disturbed at all production levels in new areas to be mined. At the low production level, disturbance would increase by 146 acres (9 percent) over that of No New Federal Leasing; at the medium production level, disturbance would increase by 536 acres (33 percent); and at the high production level, disturbance would increase by 877 acres (55 percent).

Powder River Region. Most of the land disturbance in various years and at various production levels would be less under the Proposed Action than under No New Federal Leasing. For 1990, 18 fewer acres (-1 percent) would be disturbed at the low and medium production levels, and 36 fewer acres (-1 percent) would be disturbed at the high production level. At the low production level in 2000, 54 fewer acres (-1 percent) would be disturbed, and at the medium production level in 2000, 108 fewer acres (-2 percent) would be disturbed. At the high production level in 2000, 905 more acres (15 percent) would be disturbed.

Green River-Hams Fork Region. The amount of land disturbed under the Proposed Action would be less than or equal to that disturbed under No New Federal Leasing. For 1995, 69 fewer acres (-3 percent) would be disturbed at the low and medium production levels, and for the year 2000, 695 fewer acres (-18 percent) would be disturbed at the high production level.

Uinta-Southwestern Utah Region. Acres disturbed under the Proposed Action would be the same as under No New Federal Leasing with two exceptions. In 1995, 6 more acres (3 percent) would be disturbed under the Proposed Action, and in 2000, 21 more acres (9 percent) would be disturbed (same as under Preference Right and Emergency Leasing).

San Juan River Region. In 1990 at all three production levels, the Proposed Action would disturb 82 more acres (7 percent) than would No New Federal Leasing, and in 1995 at the high production level, the Proposed Action would disturb 41 fewer acres (-2 percent) than would No New Federal Leasing. At the high production level for the 2000, the Proposed Action would disturb 329 more acres (17 percent) than would No New Federal Leasing.

Alabama Subregion. In the Alabama Subregion, the Proposed Action would disturb the same amount of land as would No New Federal Leasing.

## MINERAL AND PALEONTOLOGICAL RESOURCES

### MINERAL AND PALEONTOLOGICAL RESOURCES

#### AFFECTED ENVIRONMENT

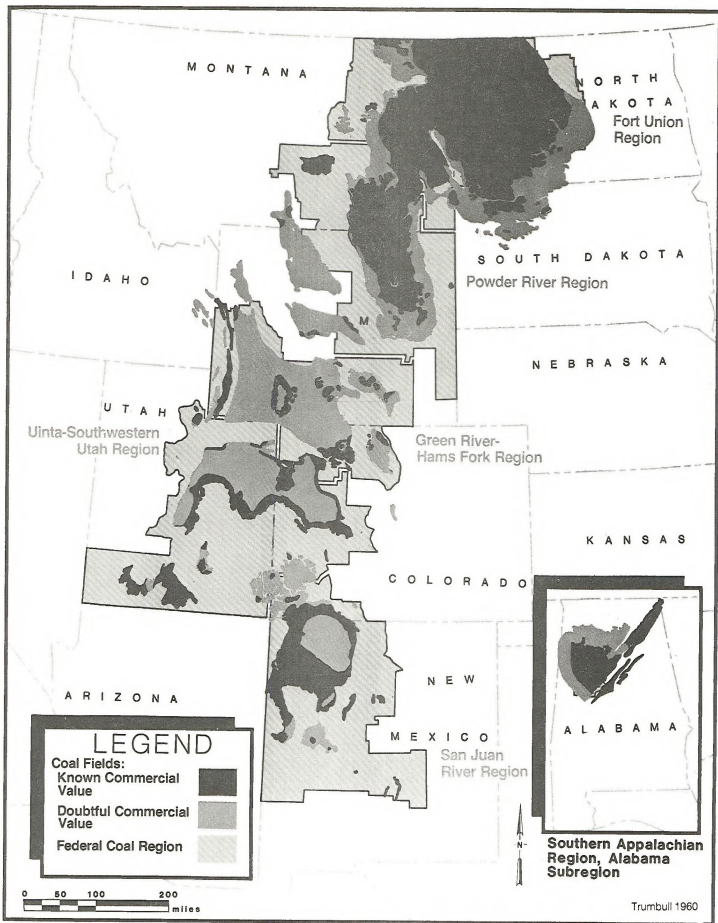
Fort Union Region. Map 4-3 shows the location of coal fields in the Fort Union Region, areas with known commercially valuable coal, and areas of doubtful commercial value because of coal quality, bed thickness, overburden depth, or a lack of coal information. Coal of lignite rank occurs within members of the Tertiary Fort Union formation in the Williston structural basin. The Fort Union is a sedimentary formation consisting of interbedded shale, siltstone, sandstone, limestone, and lignite. The lignite beds are nearly horizontal and continue over large areas, being interrupted only by occasional stream channels. Bed thickness ranges from 5 to 20 feet, and many areas have more than one minable bed.

Other materials that occur within the coal field include leonardite, oil, gas, bentonite, sand, gravel, and clinker. Oil and gas occur in formations much deeper than the coal. In some areas, extensive oil and gas fields are developed where minable coal exists, but generally only scattered wells or small fields occur where coal is being mined. Bentonite (clay) is widespread in the region but not extensively developed. Leonardite (oxidized lignite) is mined in a few places at the lignite outcrop or in very shallow beds above the minable lignite. In some places, leonardite companies collect the oxidized lignite at coal mines where it is considered overburden. Most sand and gravel deposits occur along stream channels. Clinker (baked, clayey overburden) occurs at shallow depths above the coal beds and is used for road surfacing in the place of gravel. Development of all of these materials has dropped sharply in the last few years.

Plant and invertebrate fossils occur in the Tertiary rocks, including the coal beds themselves. Vertebrates and other significant fossils are generally lacking. Most fossils that have been documented are common and do not have exceptional scientific value.

Powder River Region. Map 4-3 shows the location of coal fields in the Powder River Region, areas with known commercially valuable coal, and areas of doubtful commercial value because of coal quality, bed thickness, overburden depth, or a lack of coal information. Coal of subbituminous rank occurs within members of the Tertiary Fort Union and Wasatch formations in the Powder River Basin. The Fort Union and Wasatch are sedimentary formations consisting of interbedded shale, siltstone, sandstone, limestone, and coal. The coal beds are nearly horizontal and continue over large areas, being interrupted only by occasional stream channels. Beds have been reported to be as thick as 200 feet, and many areas have more than one minable bed.

Other materials that occur within the coal field include oil, gas, bentonite, sand, gravel, and clinker. Oil and gas occur in formations much deeper than the coal. In some areas extensive oil and gas fields are developed where minable coal exists, but generally only scattered wells or small fields occur where coal is actively being developed. Bentonite (clay) is widespread in the region but not extensively developed. Most sand and gravel deposits occur along stream channels. Clinker occurs at shallow depths above the coal beds



MAP 4-3 COAL FIELDS OF THE FEDERAL COAL REGIONS

## MINERAL AND PALEONTOLOGICAL RESOURCES

and is used for road surfacing in the place of gravel. Development of all of these materials has dropped sharply in the last few years.

Plant and invertebrate fossils occur in the Tertiary rocks, including the coal be. Vertebrates and other significant fossils are generally lacking. Most fossils that have been documented are common and do not have exceptional scientific value.

Green River-Hams Fork Region. Map 4-3 shows the location of coal fields in the Green River-Hams Fork Region, areas with known commercially valuable coal, and areas of doubtful commercial value because of coal quality, bed thickness, overburden depth, or a lack of coal information. Coal of subbituminous, bituminous, and occasionally anthracite rank occur within members of the Cretaceous Mesa Verde Group, Lance Frontier, and Advaille formations, and the Tertiary Fort Union and Wasatch formations. These sedimentary formations consist of interbedded shale, siltstone, sandstone, limestone, and coal. The coal-bearing strata occur in many basins and uplifts, including the overthrust belt of western Wyoming. The minable beds usually occur around the edges of these structural features where they are steeply dipped. These beds become very deep within a relatively short distance. Bed thickness is up to 120 feet, and many areas have more than one minable bed.

Other materials that occur within the coal field include methane gas, oil, gas, bentonite, sand, and gravel. Oil and gas occur in formations much deeper than the coal. In some areas, extensive oil and gas fields are developed where minable coal exists, but generally only scattered wells or small fields occur where coal is actively being developed. Bentonite (clay) is widespread in the region but not extensively developed. Some coal beds have potential for yielding methane gas. Data on the size of this resource is limited, but methane is being produced at isolated locations in the United States. Most sand and gravel deposits occur along stream channels. Development of all of these materials has dropped sharply in the last few years.

Vertebrate, invertebrate, and plant fossils occur within the upper Cretaceous and Tertiary coal-bearing deposits of the Green River-Hams Fork Region. The region has not been intensively inventoried for paleontological resources, but completed surveys have found significant and highly significant fossils. A significant factor in the geologic setting is the contact point between Cretaceous and Tertiary sediments, which marks the period of transition from dinosaurs to mammals. As inventories continue, more significant and scientifically important fossils are likely to be discovered.

Uinta-Southwestern Utah Region. Map 4-3 shows the location of coal fields in the Uinta-Southwestern Utah Region, areas with known commercially valuable coal, and areas of doubtful commercial value because of coal quality, bed thickness, overburden depth, or a lack of coal information. Coal of bituminous and subbituminous rank occurs within members of the Cretaceous Ferron, Emery, Straight Cliffs, and Blackhawk formations. These sedimentary formations consist of interbedded shale, siltstone, sandstone, limestone, and coal. The beds are moderately to steeply dipped and are not continuous over large areas. Beds are up to 30 feet thick, and many areas have more than one minable bed.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Other materials that occur within the coal field include methane gas, oil, gas, bentonite, sand, and gravel. Oil and gas occur in formations much deeper than the coal. In some areas, extensive oil and gas fields are developed where minable coal exists, but only scattered wells or small fields generally occur where coal is actively being developed. Bentonite (clay) is widespread in the region but not extensively developed. Some coal beds have potential for yielding methane gas. Data on the extent of this resource is limited, but methane is being produced in isolated locations in the western United States. Most sand and gravel deposits occur along stream channels. Development of all these materials has dropped sharply in the last few years.

Vertebrate, invertebrate, and plant fossils occur within the upper Cretaceous and Tertiary coal-bearing deposits of the Uinta-Southwestern Utah Region. The region has not been intensively inventoried for paleontological resources, but completed surveys have found significant and highly significant fossils. A significant factor in the geologic setting is the contact point between the Cretaceous and Tertiary sediments, which is also the period of transition from dinosaurs to mammals. As inventories continue, more significant and scientifically important fossils are likely to be discovered.

### San Juan River Region

Map 4-3 shows the location of coal fields in the San Juan River Region, areas with known commercially valuable coal, and areas of doubtful commercial value because of coal quality, bed thickness, overburden depth, or a lack of coal information. Coal of subbituminous and bituminous rank occurs within members of the Cretaceous Dakota Sandstone, Mesa Verde, Fruitland, and Crevasse Canyon formations. These sedimentary formations consist of interbedded shale, siltstone, sandstone, limestone, and coal. The coal-bearing strata occupy the San Juan structural basin, with dip angles varying from nearly level in the center of the basin to 90 degrees along some of the edges. Beds are up to 40 feet thick, and many areas have more than one minable bed.

Other materials that occur within the coal field include methane gas, oil, gas, bentonite, sand, and gravel. Oil and gas occur in formations much deeper than the coal. In some areas, extensive oil and gas fields are developed where minable coal exists, but generally only scattered wells or small fields occur where coal is actively being developed. Bentonite (clay) is widespread in the region but not extensively developed. Some coal beds have potential for yielding methane gas. Data on the extent of this resource is limited, but coal bed methane is being produced in a few locations in the western United States. Most sand and gravel deposits occur along stream channels. Development of all of these materials has dropped sharply in the last few years.

Vertebrate, invertebrate, and plant fossils occur within the upper Cretaceous and Tertiary coal-bearing deposits of the San Juan River Region. The region has not been intensively inventoried for paleontological resources, but completed surveys have found significant and highly significant fossils. A significant factor in the geologic setting is the contact point between the Cretaceous and Tertiary sediments, which marks the period of transition from dinosaurs to mammals. As inventories continue, more significant and scientifically important fossils are likely to be discovered.

## MINERAL AND PALEONTOLOGICAL RESOURCES

### Alabama Subregion

Map 4-3 shows the location of coal fields in the Alabama Subregion, areas with known commercially valuable coal, and areas of doubtful commercial value because of coal quality, bed thickness, overburden depth, or a lack of coal information. Coal of bituminous rank occurs within members of the Pennsylvanian Pottsville formation. The Pottsville is a sedimentary formation consisting of interbedded shale, siltstone, sandstone, limestone, and coal. The coal-bearing strata occur in the Warrior Basin, are commonly faulted, and have a gentle dip. Beds are up to 75 inches thick, and many areas have more than one minable bed.

Other materials that occur within the coal field include methane gas, oil, gas, sand, and gravel. Oil and gas occur in formations much deeper than the coal. In some areas, extensive oil and gas fields are developed where minable coal exists, but generally only scattered wells or small fields occur where coal is actively being developed. Clay is widespread in the region but not extensively developed. Methane gas occurs in coal beds of this region. Data on the extent of this resource is lacking, but methane is being taken from the Mary Lee coal seam. Most sand and gravel deposits occur along stream channels. Development of all of these materials has dropped sharply in the last few years.

Fossils are generally lacking in the shallow geologic units. Some localized fossiliferous zones occur, but no significant localities are known.

### IMPACTS

#### General Impacts

**Mineral Resources.** Under all alternatives, the amount of coal mined would increase over existing mining. With present mining technology, generally 85 to 90 percent of a coal deposit is recovered in surface mines and 50 to 60 percent in subsurface mines. Unrecovered coal would be lost for future use.

Coal in all of the regions is interspersed between private and federal ownership. Federal ownership varies from 36 percent in the Fort Union Region to 87 percent in the Uinta-Southwestern Utah Region (BLM 1979a). Under No New Federal Leasing, a checkerboard ownership pattern would mean that mining would have to bypass federal coal and coal mining would thus be more expensive. As mining progresses, unleased federal coal in the mining path would have to be passed over, in many places creating islands of unmined coal. Under today's economic conditions, returning at a later date to mine this coal would be uneconomical, and the coal would thus be lost for future use. Moreover, skipping over areas would increase mining costs and energy costs for consumers. These impacts would not occur under either the Proposed Action or Preference Right and Emergency Leasing.

The removal of overburden and replacing it as spoils would affect the stratigraphy. The depositional environments recorded in this stratigraphy would be disrupted and lost with respect to recording the geologic history. The bearing strength of the spoils would also be lower than that of the original overburden, which would cause some settling to occur for a few years after spoils replacement.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Sand and gravel could be used by the mining industry. Where sand and gravel occur in the path of a mine, they might be used at the mine. Other mineral resources that occur in these regions are developed on a small scale or are in areas where coal development is not likely under any of the alternatives. Underground mining would not significantly affect any other mineral resources.

Paleontological Resources. Where paleontological resources exist, the removal of overburden and coal could disrupt them. Fossils would be damaged or destroyed by mining and the building of haul roads and surface facilities. In addition, mining could disrupt geologic strata in which the fossils occur making the recording of fossil locations difficult or impossible.

New mines, however, operate under rules that require mitigation in the form of surface paleontological inventories and watching for and investigating paleontological resources found during mining. These regulations allow for the study and sampling of paleontological resources that might not normally be studied otherwise. This study would greatly accelerate the rate of paleontological inventory in many areas. Without monitoring by experienced people, however, most fossils would probably be overlooked or not recognized and would be lost in the spoils.

Population increases within regions and more or upgraded roads would increase access to paleontological sites, which would increase unauthorized collection and vandalism of fossils.

Paleontological impacts could be either beneficial or adverse, depending upon what agreement is worked out between the coal industry and the regulatory agency. These impacts would occur under all alternatives for both private and federal coal. The effect would be the same for all levels of coal production, but the scale would increase with increased production.

### No New Federal Leasing

Fort Union Region. Federal coal ownership averages about 36 percent (BLM 1979a) in the Fort Union Region. Under No New Federal Leasing, at all production levels this checkerboard ownership pattern would mean that mining would have to bypass federal coal, causing a loss of coal resource, a loss of coal revenues, and an increase in mining and energy costs for consumers.

Oil and gas development occurs in many coal areas within the Fort Union Region in the form of fields and scattered wells. Conflict between coal and oil and gas development may result in some loss of coal but should not cause a significant problem at any level of production.

Because of the limited extent and significance of paleontological resources in the Fort Union Region, impacts should be insignificant.

Powder River Region. Federal coal ownership averages about 80 percent (BLM 1979a) in the Powder River Region. Under No New Federal Leasing at the low production level, a checkerboard ownership pattern could force mining to bypass federal coal, possibly causing a loss of coal resources and coal revenues and an increase in mining and energy costs for consumers. With the high percentage of federal coal in this region, this impact would be slight because mining plans could not get started without federal leases.



## MINERAL AND PALEONTOLOGICAL RESOURCES

Oil and gas development occurs in many coal areas within the Powder River Region in the form of fields and scattered wells. Conflicts between coal and oil and gas development might result in some loss of coal but should not cause a significant problem at the low production level.

Because of the limited extent and significance of paleontological resources in the Powder River Region, impacts should be insignificant.

Impacts to mineral and paleontological resources at the medium and high production levels would be similar to those at the low production level. An increase in coal production would increase the likelihood of land ownership conflicts and oil and gas conflicts.

Green River--Hams Fork Region. Federal coal ownership averages about 42 percent (BLM 1979a) in the Green River--Hams Fork Region. Under No New Federal Leasing at the low production level, a checkerboard ownership pattern could force mining to bypass federal coal, causing a loss of coal, loss of coal revenues, and an increase in mining and energy costs for consumers.

Oil and gas development occurs in many coal areas within the Green River--Hams Fork Region in the form of fields and scattered wells. Conflicts between coal and oil and gas development might result in some loss of coal but should not cause a significant problem at the low level of production.

A potential for conflict exists between coal and methane gas production. Besides the physical aspects of the conflict, the gas cannot be pumped by a coal lessee unless the lessee also has an oil and gas lease. But gas must be vented in order to safely mine the coal. In the past this conflict has resulted in a loss of methane gas in mining coal. The conflict does not now exist in many coal fields, but it is gaining in significance as industry seems to be getting more interested in recovering methane gas.

Impacts to fossils could be highly significant, but this supplemental EIS cannot assess impacts because of a lack of inventory, a lack of knowledge of mining locations, and a lack of knowledge of detailed mitigation. Because fossils of significant value do occur in coal areas of this region, some undiscovered fossil locations are likely to be lost and others found during mining. By requiring and closely enforcing mitigation procedures, the losses can be reduced and discoveries increased. Even if fossils are discovered and investigated before they are mined through, some knowledge may be lost by investigating than rather than waiting for improved knowledge and techniques in the future.

Impacts to mineral and paleontological resources at the medium and high production levels would be similar to those at the low production level. An increase in coal production would increase the likelihood of land ownership, methane gas, oil and gas, and paleontological conflicts.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Uinta-Southwestern Utah Region. Federal coal ownership averages about 87 percent (BLM 1979a) in the Uinta-Southwestern Utah Region. Under No New Federal Leasing at the low production level, a checkerboard ownership pattern could force mining to bypass federal coal, possibly causing a loss of coal and coal revenues and increasing mining and energy costs for consumers. With the high percentage of federal coal in this region, this impact would be slight because mining plans could not get started without federal leases.

Oil and gas development occurs in many coal areas within the Uinta-Southwestern Utah Region in the form of fields and scattered wells. Conflict between coal and oil and gas development might result in some loss of coal but should not cause a significant problem at the low level of production.

A potential for conflict exists between coal and methane gas production. Besides the physical aspects of the conflict, the gas cannot be pumped by a coal lessee unless the lessee also has an oil and gas lease. But gas must be vented in order to safely mine the coal. In the past this conflict has resulted in a loss of methane gas in mining coal. The conflict does not now exist in many coal fields, but it is gaining in significance as industry seems to be getting more interested in recovering methane gas.

Impacts to fossils could be highly significant, but this supplemental EIS cannot assess impacts because of a lack of inventory, a lack of knowledge of mining locations, and a lack of knowledge of detailed mitigation. Because fossils of significant value do occur in coal areas of this region, some undiscovered fossil locations are likely to be lost and others found during mining. By requiring and closely enforcing mitigation procedures, the losses can be reduced and discoveries increased. Even if fossils are discovered and investigated before they are mined through, some knowledge may be lost by investigating them now rather than waiting for improved knowledge and techniques in the future.

Increases in population and more or improved roads would result in better access to paleontological sites, probably increasing unauthorized collection and vandalism.

Impacts to mineral and paleontological resources at the medium and high production levels would be similar to those at the low production level. Increased coal production would increase the likelihood of land ownership, oil and gas, methane gas, and paleontological conflicts.

San Juan River Region. Federal coal ownership averages about 80 percent (BLM 1979a) in the San Juan River Region. Under No New Federal Leasing at the low production level, a checkerboard ownership pattern could force mining to bypass federal coal, possibly causing a loss of coal resource and coal revenues and an increase in mining and energy costs for consumers. With the high percentage of federal coal in this region, this impact would be slight because mining plans could not get started without federal leases.

Oil and gas development occurs in many coal areas within the San Juan River Region in the form of fields and scattered wells. Conflict between coal and oil and gas development may result in some loss of coal but should not cause a significant problem at the low level of production.

## MINERAL AND PALEONTOLOGICAL RESOURCES

A potential for conflict exists between coal and methane gas production. Besides the physical aspects of the conflict, the gas cannot be pumped by a coal lessee unless the lessee also has an oil and gas lease. But gas must be vented in order to safely mine the coal. In the past this conflict has resulted in a loss of methane gas in mining coal. The conflict does not now exist in many coal fields, but it is gaining in significance as industry seems to be getting more interested in recovering methane gas.

Impacts to fossils could be highly significant, but this supplemental EIS cannot assess impacts because of a lack of inventory, a lack of knowledge of mining locations, and a lack of knowledge of detailed mitigation. Because fossils of significant value do occur in coal areas of this region, some undiscovered fossil locations are likely to be lost and others found during mining. By requiring and closely enforcing mitigation procedures, the losses can be reduced and discoveries increased. Even if fossils are discovered and investigated before they are mined through, some knowledge may be lost by investigating them rather than waiting for improved knowledge and techniques in the future.

Increases in population and more or improved roads will result in better access to paleontological sites, probably increasing unauthorized collection and vandalism.

Impacts to mineral and paleontological resources at the medium and high production levels would be similar to those at the low production levels. Increased coal production would increase the likelihood of ownership, methane gas, oil and gas, and paleontological conflicts.

Alabama Subregion. Federal coal ownership averages about 12 percent (BLM 1979a) in the Alabama Subregion. Under No New Federal Leasing, a checkerboard ownership pattern could force mining to bypass federal coal, possibly causing a loss of coal resources and coal revenues and an increase in mining and energy costs for consumers.

Oil and gas development occurs in coal areas within the Alabama Subregion in the form of fields and scattered wells. Conflict between coal and oil and gas development may result in some loss of coal but should not cause a significant problem at the low level of production.

There has been and probably will continue to be a loss of methane gas in order to mine coal safely. Future technology may allow recovery of the gas to avoid wasting this resource.

Because of the limited extent and significance of paleontological resources in the Alabama Subregion, impacts should not be significant.

Impacts to mineral and paleontological resources at the medium and high production levels would be similar to those at the low production levels. Increased coal production would increase the likelihood of ownership, methane gas, and oil and gas conflicts.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

### Preference Right and Emergency Leasing

Fort Union Region. Impacts to mineral resources at the low production level of Preference Right and Emergency Leasing would be similar to those under No New Federal Leasing except that emergency leasing would eliminate the impact of bypassing unleased federal coal. Although this alternative would allow BLM and industry to plan mining areas in the short term and eliminate the loss of bypassed coal, potential mine areas would still tend to be limited to areas with predominantly private or state coal ownership.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts at the medium and high production levels would be similar to impacts described for the low production level. In 1995 and 2000, these types of impacts would be greater or spread over a larger area than under No New Federal Leasing because production would be higher.

Powder River Region. Impacts to mineral resources at the low production level would be similar to those under No New Federal Leasing except that emergency leasing would eliminate the impact of bypassing unleased federal coal. Although Preference Right and Emergency Leasing would allow BLM and industry to plan mining areas in the short term and would eliminate the loss of bypassed coal, potential mine areas would still tend to be limited to areas with predominantly private or state coal ownership.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts at the medium and high production level would be similar to impacts described for the low production level. In 1995 and 2000, these types of impacts would be smaller or spread over a smaller area than under No New Federal Leasing because production would be lower. At the high production level, coal production would be lower in 1995 but would rise sharply in 2000. Impacts would thus decrease for a time and then increase.

Green River-Hams Fork Region. Impacts to mineral resources at the low production level would be similar to those under No New Federal Leasing except that emergency leasing would eliminate the impact of bypassing unleased federal coal. Although this alternative would allow BLM and industry to plan mining areas in the short term and would eliminate the loss of bypassed coal, potential mine areas would still tend to be limited to areas with predominantly private or state coal ownership.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts at the medium and high production levels would be similar to impacts described for the low production level. In 2000 at the high production level, these types of impacts would be smaller or spread over a smaller area than under No New Federal leasing because production would be lower.

## MINERAL AND PALEONTOLOGICAL RESOURCES

Uinta-Southwestern Utah Region. Impacts to mineral resources at the Preference Right and Emergency Leasing low production level would be similar to those under No New Federal Leasing except that emergency leasing would eliminate the impact of bypassing unleased federal coal. Although this alternative would allow BLM and industry to plan mining areas in the short term and would eliminate the loss of bypassed coal, potential mine areas would still tend to be limited to areas with predominantly private or state coal ownership.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts at the medium and high production levels would be similar to impacts described for the low production level. In 2000, at the high production level, these types of impacts would be smaller or spread over a smaller area than under No New Federal Leasing because production would be lower.

San Juan River Region. Under Preference Right and Emergency Leasing, impacts to mineral resources at the low production level would be similar to those under No New Federal Leasing Alternative except that emergency leasing would eliminate the impact of bypassing unleased federal coal. Although this alternative would allow BLM and industry to plan mining areas in the short term and would eliminate the loss of bypassed coal, potential mine areas would still tend to be limited to areas with predominantly private or state coal ownership.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts at the medium and high production level would be similar to impacts described for the low production level. In 2000, however, these types of impacts would be larger or spread over a larger area because production would be higher.

Alabama Subregion. Impacts to mineral resources at the low production level would be similar to those of No New Federal Leasing except that emergency leasing would eliminate the impact of bypassing unleased federal coal. Although this alternative allows BLM and industry to plan mining areas in the short term and would eliminate the loss of bypassed coal, potential mine areas would still tend to be limited to areas with predominantly private or state coal ownership.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts at the medium and high production levels would be similar to impacts described for the low production level.

### Proposed Action

Fort Union Region. Impacts to mineral resources at the Proposed Action low production level would be similar to those under No New Federal Leasing except that unleased federal coal would not be bypassed. A leasing program would

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

give industry and BLM the ability to plan for future mining areas and make interspersed federal coal available for lease. The Proposed Action differs from Preference Right and Emergency Leasing in that future mining areas could be planned well in advance of mining. Moreover, areas of predominantly federal coal, which may contain the more attractive coal resource, can be considered for development along with predominantly private and state coal areas.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts to mineral and paleontological resources at the medium and high production levels would be similar to impacts described for the low production level. In 1995 and 2000 these types of impacts would be larger or spread over a larger area than under No New Federal Leasing because production would be higher.

Powder River Region. Impacts to mineral resources at the low production level would be similar to those under No New Federal Leasing except that unleased federal coal would not be bypassed. A leasing program would give industry and BLM the ability to plan for future mining areas and make interspersed federal coal available for lease. The Proposed Action differs from Preference Right and Emergency Leasing in that future mining areas could be planned well in advance of the mining. Moreover, areas of predominantly federal coal, which may contain the more attractive coal resource, can be considered for development along with predominantly private and state coal areas.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts to mineral and paleontological resources at medium and high production levels would be similar to impacts described for the low production level. In 1995 and 2000 these types of impacts would be smaller or spread over a smaller area than under No New Federal Leasing because production would be lower. At the high production level, coal production would decrease under the Proposed Action in 1990 and 1995 and would then rise by 15 percent in 2000. Impacts would thus decrease for the immediate future but then greatly increase over the long term.

Green River-Hams Fork Region. Impacts to mineral resources at the low production level would be similar to those under No New Federal Leasing except that unleased federal coal would not be bypassed. A leasing program would give industry and BLM the ability to plan for future mining areas and to make interspersed federal coal available for lease. The Proposed Action differs from Preference Right and Emergency Leasing in that the future mining areas could be planned well in advance of mining. Moreover, areas of predominantly federal coal, which may contain the more attractive coal resource, can be considered for development along with predominantly private and state coal areas.

Impacts to paleontological resources would be similar to those described under the No New Federal Leasing Alternative.

## MINERAL AND PALEONTOLOGICAL RESOURCES

Impacts to mineral and paleontological resources at the medium and high production levels would be similar to impacts described for the low production level. In 2000 at the high production level, these types of impacts would be smaller or spread over a smaller area than under No New Federal Leasing because production would be lower.

Uinta-Southwestern Utah Region. Impacts to mineral resources at the low production level would be similar to those under No New Federal Leasing except unleased federal coal would not be bypassed. A leasing program would give industry and BLM the ability to plan for future mining areas and make interspersed federal coal available for lease. The Proposed Action differs from Preference Right and Emergency Leasing in that future mining areas could be planned well in advance of mining. Moreover, areas of predominantly federal coal, which may contain the attractive coal resource, can be considered for development along with predominantly private and state coal areas.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts to mineral and paleontological resources at medium and high production levels would be similar to impacts described for the low production level. In 1995 and 2000 at the high production level, these types of impacts would be greater or spread over a larger area than under No New Federal Leasing because production would be higher.

San Juan River Region. Impacts to mineral resources at the low production level would be similar to those under No New Federal Leasing except that unleased federal coal would not be bypassed. A leasing program would give industry and BLM the ability to plan for future mining areas and make interspersed federal coal available for lease. The Proposed Action differs from Preference Right and Emergency Leasing in that future mining areas could be planned well in advance of mining. Moreover, areas of predominantly federal coal, which may contain the more attractive coal resource, can be considered for development along with predominantly private and state coal areas. Production would increase slightly in 1990, which might increase impacts. In 1995 and 2000, production would be the same as under No New Federal Leasing.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing. Impacts in 1990 would be slightly greater than under No New Federal Leasing but not in 1995 and 2000.

Impacts to mineral and paleontological resources at the medium and high production levels would be similar to impacts described for the low production level. In 1990 and 2000 at the high production level, these types of impacts would be greater or spread over a larger area than under No New Federal Leasing because production would be higher.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Alabama Subregion. Impacts to mineral resources at the low production level would be similar to those under No New Federal Leasing except that unleased federal coal would not be bypassed. A leasing program would give industry and BLM the ability to plan for future mining areas and make interspersed federal coal available for lease. The Proposed Action differs from Preference Right and Emergency Leasing in that future mining areas could be planned well in advance of the mining. Moreover, areas of predominantly federal coal, which may contain the more attractive coal resource, can be considered for development along with predominantly private and state coal areas.

Impacts to paleontological resources would be similar to those described for No New Federal Leasing.

Impacts to mineral and paleontological resources at the Proposed Action medium and high production levels would be similar to impacts described for the low production level.

### WATER RESOURCES

#### AFFECTED ENVIRONMENT

##### Fort Union Region

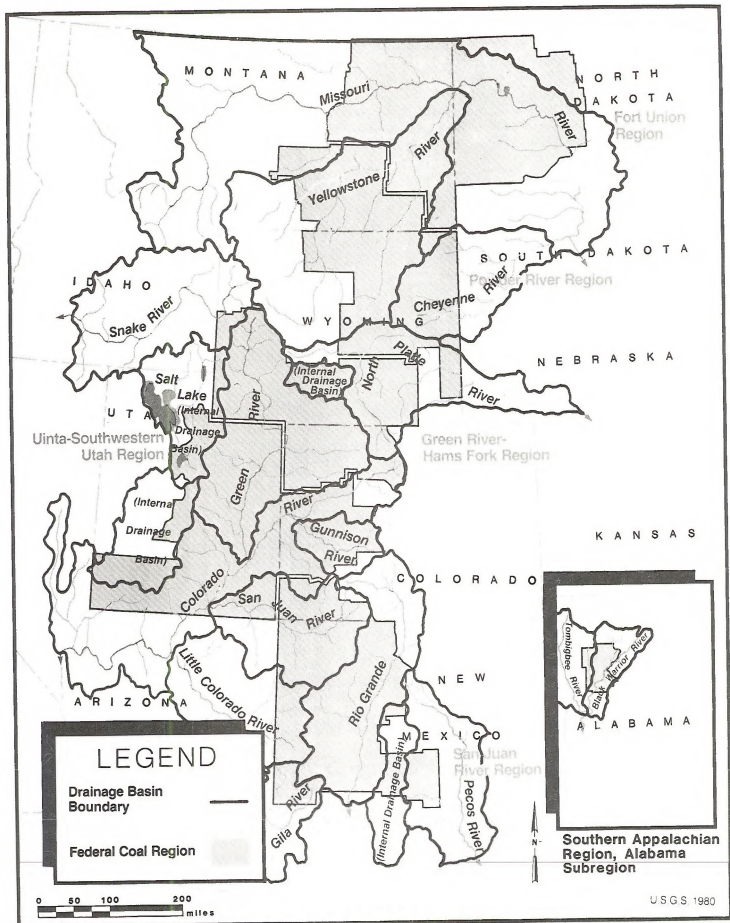
In the Fort Union Region, annual precipitation ranges from 10 to 18 inches. Most precipitation falls as rain during the spring and early summer. Intense thunderstorms are common in summer, and long periods of low temperatures and occasionally large snowfall are common in winter.

Surface water drains from the region through the Yellowstone and Missouri rivers (Map 4-4). Locally in the coal fields, runoff flows through ephemeral or intermittent streams into these rivers. The topography is rolling with occasional breaks; land cover consists of grassland or dryland crops and soils are predominantly fine grained. Summer thunderstorms produce rapid runoff with brief, high-peak flows. Snowmelt, on the other hand, produces a more even runoff over a longer time and larger area. Table 4-16 shows typical mean annual runoff for the Fort Union Region.

Ground water occurs in the near-surface sandstone and lignite beds. Minable coal generally occurs near the local water table level. The lignite may vary from saturated to unsaturated or partially saturated conditions over short distances. Lower aquifers occur in sandstone units that are well below minable coal levels. Recharge to this system occurs at outcrops from excess precipitation or ponded surface water. Aquifers also occur in alluvium along stream channels and in buried glacial channels in the northern part of the region. Yields are generally lowest in the shallow lignite aquifers and higher in the deep sandstone and buried glacial channel aquifers.

Water quality is characterized by low suspended sediment and moderate total dissolved solids (TDS) concentrations. Water that passes through the main stem of the Missouri-Yellowstone River System has the better quality. Ground water can have high TDS levels, and streams passing through the breaks country have high suspended sediment concentrations. Table 4-16 shows typical water quality values for the Fort Union Region.





MAP 4-4 DRAINAGE BASINS OF THE FEDERAL COAL REGIONS

# DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

TABLE 4-16  
TYPICAL SURFACE AND GROUND WATER CHARACTERISTICS FOR  
THE SIX COAL REGIONS

Region (Reference)	Surface Water		Ground Water	
	Mean Annual Runoff (Acre-feet/ square mile/year)	Total Dissolved Solids Conc. (milligram/liter)	Yield (gallons per minute)	Total Dissolved Solids Conc. (milligram/liter)
Fort Union (BLM 1983a)	43.9	600-3,000	up to 500	1,000-3,000
Powder River (BLM 1983d)	32.5*	200-4,500*	up to 1,000	800-8,000
Green River-Hams Fork (BLM 1983b)	34.7	200-7,000	up to 700	135-2,800
Uinta-Southwestern Utah (BLM 1983i)	57.0	200-10,000	up to 500	500-3,000
San Juan River (BLM 1984c)	29.0	200-4,500	up to 500	300-15,000
Alabama Subregion (BLM 1983d)	1064.0	60-2,000**	up to 100	50-400

\*Source: USGS 1977-1982.

\*\*Source: Puente, Newton, and Hill 1980.

All other data is from individual regional EISs.

Surface water is used for livestock, wildlife, municipal, industrial, and irrigation purposes. The major streams have larger amounts and better quality water than the smaller streams and are used as sources for industry and irrigation. Irrigated agriculture occurs mostly on the valley bottoms of the major streams, but a common practice for irrigating small upland areas is to divert flood runoff from ephemeral or intermittent streams. Industrial water, used mainly for the energy industry, is taken from the larger streams. Larger cities use surface water for municipal supplies. Small reservoirs are common in rangeland areas for livestock watering and are also used by wildlife. Perennial streams provide water for riparian wildlife habitat.

Ground water is used mainly for domestic, livestock, and municipal purposes. Most farms and ranches in coal areas depend upon ground water for their domestic supply. The lignite itself often forms the aquifer that is a source of domestic water. Ground water is also commonly pumped into stock tanks to augment surface water for livestock. Many small towns in the coal areas use ground water for their municipal supplies or to augment surface water supplies.

### Powder River Region

In the Powder River Region, annual precipitation ranges from 6 to 16 inches. Most precipitation falls as rain during spring. Intense thunderstorms are common in summer, and long periods of low temperatures and occasionally large snowfalls are common in winter.

## WATER RESOURCES

Surface water drains from the region through the Cheyenne, Yellowstone, and North Platte river systems (Map 4-4). Locally in the coal fields, runoff flows through ephemeral or intermittent streams into these major rivers. The topography is rolling with occasional breaks; land cover consists of grassland or sagebrush; and the soils are predominantly fine grained. Summer thunderstorms produce rapid runoff with brief, high-peak flows. Snowmelt produces a more even runoff over a longer time and larger area. Table 4-16 shows typical mean annual runoff for the Powder River Region.

Ground water occurs in the near-surface sandstone and coal beds. The minable coal generally occurs near the local water table level. The coal may vary from saturated to unsaturated or partially saturated conditions. Lower aquifers occur in limestone and sandstone units well below minable coal levels. Recharge to this system occurs at sand or clinker outcrops from excess precipitation or ponded surface water. Aquifers also occur in alluvium along stream channels. Yields are generally lowest in the shallow coal aquifers and higher in the deep sandstone and limestone aquifers.

Water quality is characterized by high suspended sediment and moderate TDS concentrations. Water that originates in the surrounding mountainous areas typically has better quality. Ground water varies from fairly good near recharge areas to higher total dissolved solids levels as the water moves further into the system. Table 4-16 shows typical water quality values for the Powder River Region.

Surface water is used for livestock, wildlife, municipal, industrial, and irrigation purposes. Irrigated agriculture occurs mostly on the valley bottoms of the major streams, but a common practice for irrigating small upland areas is to divert flood runoff from ephemeral or intermittent streams. Industrial water, used mainly for the energy industry, is taken from ground water and the larger streams. Larger cities use surface water for municipal supplies. Most of such use, however, occurs along the mountain fronts where the higher quality mountain runoff is used. Small reservoirs are common on rangeland for livestock watering and are also used by wildlife. Perennial streams provide water for riparian wildlife habitat.

Ground water is used mainly for domestic, livestock, and municipal purposes. Most farms and ranches in coal areas depend upon shallow ground water for their domestic supply. The coal itself often forms the aquifer that is a source of domestic water. Ground water is also commonly pumped into stock tanks to augment surface water for livestock. Many small towns in the coal areas use shallow and deep ground water for their municipal supplies or to augment surface water supplies.

### Green River-Hams Fork Coal Region

In the Green River-Hams Fork Region, annual precipitation ranges from 6 to 16 inches. Most precipitation falls as rain during the spring and early summer. Intense thunderstorms are common in summer, and long periods of low temperatures and occasionally large snowfalls are common in winter.

Surface water drains from the region through the North Platte and Green rivers. The north-central part of the region has internal drainage (Map 4-4). Locally in the coal fields, runoff flows through ephemeral or

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

intermittent streams into these major rivers. The topography is rolling with occasional breaks; land cover consists of grassland or dryland crops, and soils vary from sandy to loam. Summer thunderstorms produce rapid runoff with brief, high-peak flows. Snowmelt, on the other hand, produces a more even runoff over a longer time and larger area. Table 4-16 shows typical mean annual runoff for the Green River-Hams Fork Region.

Much of the minable coal in this region occurs along the upturned edges of the sedimentary basin. At these sites, the sandstone, limestone, and coal beds are dipped at steep angles and receive recharge from excess precipitation or ponded surface waters. This recharge moves until it hits a relatively impermeable rock layer or is intercepted by a surface valley where it may form a seep. These conditions produce a perched ground water situation in the potential coal development areas. Just below this impermeable layer the rocks are dry. Regional ground water systems are deeper.

Aquifers also occur in alluvium along stream channels. Yields are generally lowest in the shallow perched aquifers and higher in the deep aquifers.

Water quality is characterized by high suspended sediment and moderate TDS concentrations. Most of the water volume that leaves this region originates in the surrounding mountains, and most of the salt load originates within the coal basin area. Ground water can have high TDS levels, but it will be lower in perched aquifers and in areas with greater rainfall. Table 4-16 shows typical water quality values for the Green River-Hams Fork Region.

Surface water is used for livestock, wildlife, municipal, industrial, and irrigation purposes. The major streams with larger amounts of water are used as sources for industry and irrigation. Irrigated agriculture occurs mostly on the valley bottoms of the major streams, but a common practice for irrigating small upland areas is to divert flood runoff from ephemeral or intermittent streams. Industrial water, used mainly for the energy industry, is taken from the larger streams. Larger cities use surface water for municipal supplies. Small reservoirs are common in rangeland areas for livestock watering and are also used by wildlife. Perennial streams provide water for riparian wildlife habitat.

Ground water is used mainly for domestic and livestock purposes. Most farms and ranches in coal areas depend upon ground water for their domestic supply. The coal generally is not an important aquifer zone. Ground water is also commonly pumped into stock tanks to augment surface water for livestock.

### Uinta-Southwestern Utah Region

In the Uinta-Southwestern Utah Region, annual precipitation ranges from 8 to 24 inches. Most precipitation falls as rain during the spring and early summer. Intense thunderstorms are common in summer, and periods of low temperatures and occasional snowfalls are common in winter.

Surface water drains from the region through the Green and Colorado rivers. The north central part has internal drainage (Map 4-4). Locally in the coal fields, runoff flows through ephemeral or intermittent streams into these major rivers. The topography is rolling with occasional breaks; land cover consists of grassland or dryland crops, and the soils are variable from sandy

## WATER RESOURCES

to loam. Summer thunderstorms produce rapid runoff with brief, high-peak flows. Snowmelt, on the other hand, produces a more even runoff over a longer time and larger area. Table 4-16 shows typical mean annual runoff for the Uinta-Southwestern Utah Region.

Ground water occurs in the near-surface sandstone, limestone, and coal beds. Minable coal generally occurs near or below the local water table level. The coal may vary from saturated to unsaturated or partially saturated conditions. Recharge to this system occurs at outcrops from excess precipitation or ponded surface water. Aquifers also occur in alluvium along stream channels. Yields are generally lowest in the coal and shale aquifers and higher in the sandstone and limestone aquifers.

Water quality is characterized by high suspended sediment and high TDS concentrations. Water that passes through the main stem of the Colorado River system often has the worst quality. Ground water can have very high TDS levels. Table 4-16 shows typical water quality values for the Uinta-Southwestern Utah Region.

Surface water is used for livestock, wildlife, municipal, industrial, and irrigation purposes. The major streams have larger amounts of water and are used as sources for industry and irrigation. Irrigated agriculture occurs mostly on the valley bottoms of the major streams and the flanks of the higher country, but a common practice for irrigating small upland areas is to divert flood runoff from ephemeral or intermittent streams. Industrial water, used mainly for the energy industry, is taken from the larger streams. Larger cities use surface water for municipal supplies. Small reservoirs are common in rangeland areas for livestock watering and are also used by wildlife. Perennial streams provide water for riparian wildlife habitat.

Ground water is used mainly for domestic and livestock purposes. Most farms and ranches in coal areas depend upon ground water for their domestic supply. The coal itself may form the aquifer that is a source of domestic water. Ground water is also commonly pumped into stock tanks to augment surface water for livestock. Many small towns in the coal areas use ground water for their municipal supplies or to augment surface water supplies.

### San Juan River Region

In the San Juan River Region, annual precipitation ranges from 6 to 14 inches. Most precipitation falls as rain during summer. Intense thunderstorms are common in summer, and periods of low temperatures and occasional snowfalls are common in winter.

Surface water drains from the region through the San Juan, Rio Grande, and Little Colorado rivers, and the region's north-central part has internal drainage (Map 4-4). Locally in the coal fields, runoff flows through ephemeral or intermittent streams into these major rivers. The topography is rolling with occasional breaks; land cover consists of sagebrush, grassland, or pinyon-juniper; and soils vary from coarse to fine grained. Summer thunderstorms produce rapid runoff with brief, high-peak flows. Snowmelt produces a more even runoff over a longer time and larger area. Table 4-16 shows typical mean annual runoff for the San Juan River Region.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Ground water occurs in the sandstone and coal beds. The coal may vary from saturated to unsaturated or partially saturated conditions. Lower aquifers occur in sandstone units that are well below minable coal. Recharge to this system occurs at outcrops from excess precipitation or ponded surface water. Discharge is to streams and wells in the central part of the basin. Aquifers also occur in alluvium along stream channels. Yields are generally lowest in the coal aquifers and higher in the sandstone aquifers.

Water quality is characterized by high suspended sediment and high TDS concentrations. Ground water can have high TDS levels. Table 4-16 shows typical water quality values for the San Juan River Region.

Surface water is used for livestock, wildlife, municipal, industrial, and irrigation purposes. The major streams have larger amounts of water and are used as sources for industry and irrigation. Irrigated agriculture occurs mostly on the valley bottoms of the major streams, but a common practice for irrigating small upland areas is to divert flood runoff from ephemeral or intermittent streams. The limited industrial water use involves mainly the energy industry. Larger cities use surface water for municipal supplies. Small reservoirs are common on rangeland for livestock watering and are also used by wildlife. Perennial streams provide water for riparian wildlife habitat.

Ground water is used mainly for domestic, livestock, industrial, and municipal purposes. Most farms and ranches in coal areas depend upon ground water for their domestic supply. The coal itself sometimes forms the aquifer that is a source of domestic water. Ground water is also commonly pumped into stock tanks to augment surface water for livestock. Many small towns in the coal areas use ground water for their municipal supplies or to augment surface water supplies. Ground water is used for industrial purposes mostly at mines.

### Alabama Subregion

In the Alabama Subregion, annual precipitation ranges from 52 to 54 inches and falls as rain throughout the year. Large volumes of water can fall during a single storm.

Surface water drains from the region through the Tombigbee and Black Warrior rivers. Locally in the coal fields, runoff flows through intermittent streams into these major rivers. The topography consists of ridgetops with steep slopes down to narrow hollows; land cover consists of forests, grassland, or cropland; and soils are silty to sandy. Summer thunderstorms produce large amounts of runoff with high peak flows. Table 4-16 shows typical mean annual runoff for the Alabama Subregion. Ground water occurs in the near surface coal-bearing strata. The minable coal generally occurs near the local water table level. This system is recharged from excess precipitation or ponded surface water. Discharge is to streams and wells.

Water quality is characterized by low suspended sediment, low TDS concentrations, and low alkalinity. In some areas water quality has already been degraded by mining and other human activities. Ground water can have high TDS levels but generally is adequate for domestic use. Table 4-16 shows typical water quality values for the Alabama Subregion.

## WATER RESOURCES

Surface water is used for municipal and industrial purposes. Many cities use both surface and ground water for municipal supplies.

Ground water is used mainly for domestic and small public and industrial supplies. Aquifers in the Pottsville formation are the main, and in many areas, the only source of ground water. Many towns in the coal areas use ground water for their municipal supplies or to augment surface water supplies.

### IMPACTS

#### General Impacts

Impacts to water resources are summarized from the regional EISs except where noted. These general impacts could occur in all of the coal regions, under all production levels, and as a result of the mining of both private and federal coal. As production levels increase, the nature of impacts would not change, but the impacts would occur over a larger area.

Surface coal development would adversely affect surface water by disrupting local watersheds and withdrawing water for use. During mining, stream channels and watersheds would be disrupted as mine pits are opened. In the disturbed area, runoff would increase, and water quality would be degraded. Suspended sediment and dissolved solids concentrations could be many times their normal predisturbance levels (Ringen and others 1979). Strip mining laws, however, require that all surface runoff be impounded and treated until it meets specified water quality standards.

Water flowing into the mine area would be diverted around the disturbance area. Detaining water in impoundments would allow more runoff to evaporate or seep into the ground and result in less runoff leaving the mine area. Impounded water would be treated to lower suspended sediment levels but not total dissolved solids. Water discharged from impoundments to surface waters outside the mine area would have increased total dissolved solids. Generally these impacts would affect only streams below a mine until they are diluted by larger streamflows from undisturbed areas. The impoundment structures, designed to accommodate the 25-year precipitation event, can handle runoff only up to their designed capacity. If this runoff is exceeded, sedimentation would also enter the stream below the mine area, a low-probability occurrence.

Once the mined area is reclaimed, surface water quality should return to its approximate predisturbance conditions. The replaced spoils may at first be more porous than unmined overburden, resulting in some lowering of peak flows. Experience is lacking as to whether such change in flows would be significant.

Ground water disruption from surface mining would begin as overburden and coal are removed. Water wells where the pit is dug would be removed, and in many areas aquifers would be removed. While the pit is open, the mine operator might also have to pump water out of the pit to be able to work. Open pits below the water table level place drawdown stress on adjacent aquifers, lowering water levels in any nearby wells finished at that level and reducing flow from nearby springs draining the aquifer. The distance from an open pit that this drawdown and reduced springflow would occur would depend on the depth of the open pit and the characteristics of the aquifer.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

When overburden spoils are returned to the pit, water would return to its approximate premine level. Water in wells that were lowered would also return to their approximate premine levels, but springflows might never return to premine conditions. Because the bedding character of the overburden is not replaced in the spoils, new routing would occur that could permanently dry up old springs and start new springs at other locations. The hydrologic characteristics of the resaturated spoils would differ from the premining bedded shale, sandstone, and coal. The significance of the change would depend upon the mining operations and the geohydrology of the area.

The quality of water that recharges the spoil aquifer could be significantly degraded. Overburden previously deeply buried would be brought closer to the surface and to larger amounts of oxygen. The result would be spoil material more easily dissolvable in water. This oxidation of fine-grained overburden, a natural process, would be greatly accelerated by mining. Increases in dissolved solids concentrations of shallow ground water around mines have been reported by investigators in a few regions (Groenewold and others 1980; Van Voast and Hedges 1975; Colorado School of Mines 1976). The amount of change in dissolved solids would be variable and cannot be accurately predicted.

The degraded water from the saturated spoils would continue to flow through the hydrologic system and down gradient to the surrounding undisturbed aquifers. In the surrounding areas the altered water would be diluted by relatively fresh water, but water wells, springs, and streams near the mine might still receive degraded water.

Because of the relatively small amount of water and its slow movement in the shallow coal area aquifers, these effects would develop slowly and only in and around the immediate mine area. Little is known about the duration of these conditions, but as salts are leached from an area the increased dissolved solids levels should gradually drop. Because movement of water through these systems is typically slow, hundreds or thousands of years might be needed in many areas for water quality to regain premining conditions.

Many rural water wells would be destroyed or degraded, but state and federal laws require that mine operators provide a replacement water supply. Supplies can generally be replaced by installing new wells that tap deeper aquifers unaffected by mining. Although the water source would be replaced, the water user would have the increased operation and maintenance costs of a deeper well.

Underground mining could disturb surface water conditions as a result of subsidence and water use. Subsidence in underground mine workings could result in streams being diverted underground or springs drying up or being formed in new locations. Where these ground water-surface water interactions are significantly altered, streamflow might locally change. On a regional basis, however, no water would be lost; it would just have a different flow routing. Such changes could be significant in the area of a mine but would not be significant on a regional scale.

Coal beds minable by underground methods may be aquifers or may occur within or beneath aquifers. As coal is removed, water may be pumped from the open rooms, creating a drawdown on the surrounding aquifer and lowering water levels of wells near the mine. The extent of the lowered water levels would depend upon the aquifer properties, pumping rates, and the layout of the



## WATER RESOURCES

mine. When mining and related water pumping cease, water levels should return to premining conditions. The hydrologic characters of the aquifer that previously contained the coal bed would change, and the water would move much more freely.

Subsidence during and after mining could create fractures up through aquifers above the mined coal or even to the surface. Subsidence would thus introduce new paths for mixing of water from different aquifers or between surface water and ground water. This intermixing of water can potentially degrade the quality of the fresher water body.

Coal production involves two types of water use--water used at mines to mine coal and water used by coal-related populations. Water used by populations is usually associated with municipal supply areas. Table 4-17 projects both types of water use, but does not assess water use by powerplants or other facilities. Most of the water use estimated for this supplemental EIS occurs as a result of coal-related population. Appendix 4, Methodologies, presents the methodology used to derive these numbers.

Water use in the western regions is a controversial issue. Many of the major streams cross more than one region and more than one state. For some rivers the states involved have formed commissions to resolve water supply problems.

The distribution of water is the responsibility of the government of the state in which the water occurs. Differing laws exist for different states, and many interstate agreements exist for rivers that cross more than one state. For these reasons, this assessment cannot predict how water will be appropriated.

Another consideration is the future use of coal slurry pipelines to carry coal to markets around the country. No projections exist for how much coal would move by this means. Such pipelines are controversial because of the water needed to move coal from the generally dry coal area. About 729 acre-feet of water would be needed to move a million tons of coal (BLM 1979a). Water may exist for coal slurry pipelines, but a rearrangement of water appropriations in western states may be needed to permit its use to carry coal.

### No New Federal Leasing

Fort Union Region. Impacts to water resources at all three production levels in the Fort Union Region would occur most significantly to ground water quality. But because of mitigation required by state and federal strip mining laws, changes in surface water quality outside mine boundaries would be insignificant. Reduced runoff would be significant only immediately below the sediment detention reservoirs. On a regional bases, the mined areas would be too small to significantly affect surface runoff quality.

Many coal beds in the region act as aquifers. Ground water quality could change within and near areas where overburden is removed for coal mining. Where these lignite beds form shallow aquifers, rural residents commonly use it as a water source. Generally, mining would temporarily disrupt this source of supply and draw down water levels in and near surface mines. Over the long term, mining would degrade water quality, but replacement water supplies could be obtained from deeper aquifers unaffected by mining.

DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 4-17  
COAL-RELATED WATER USE\*  
(acre-feet/year)

Production Level	No New Federal Leasing			Preference Right and Emergency Leasing**			Proposed Action**		
	Mining	Population	Total	Mining	Population	Total	Mining	Population	Total
<b>Fort Union Region</b>									
1990									
Low	314	728	1,042	--	--	--	--	--	--
Medium	314	728	1,042	--	754	1,068	--	754	1,068
High	341	806	1,147	341	767	1,081	--	767	1,081
1995									
Low	432	780	1,212	--	806	1,238	--	806	1,238
Medium	432	780	1,212	472	910	1,382	472	923	1,395
High	432	780	1,212	485	910	1,395	485	1,027	1,512
2000									
Low	432	780	1,212	472	871	1,343	472	871	1,343
Medium	432	780	1,212	550	1,014	1,564	576	1,079	1,655
High	432	780	1,212	550	1,014	1,564	668	1,274	1,942
<b>Powder River Region</b>									
1990									
Low	7,938	11,774	19,712	--	--	--	7,889	11,745	19,634
Medium	7,938	12,963	20,901	--	12,789	20,727	7,889	12,760	20,649
High	9,751	16,907	26,658	9,653	16,675	26,328	9,653	--	26,560
1995									
Low	8,281	13,833	22,114	--	13,688	21,969	--	13,688	21,969
Medium	9,702	16,182	25,884	9,506	15,892	25,398	9,506	15,834	25,340
High	13,083	21,257	34,340	12,887	21,837	34,724	12,887	22,229	36,116
2000									
Low	10,486	17,023	27,509	10,339	16,675	27,014	10,339	16,675	27,014
Medium	12,250	19,865	32,115	12,054	19,575	31,629	11,956	19,372	31,328
High	15,876	25,317	41,193	16,660	27,260	43,920	18,326	31,059	49,385

\*For methodology, see Appendix 4

\*\*Figures for alternative shown only where they differ from those for No New Federal Leasing.

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TABLE 4-17 (continued)  
COAL-RELATED WATER USE\*  
(acre-feet/year)

Production Level	No New Federal Leasing No Action			Preference Right and Emergency Leasing**			Proposed Action**		
	Mining	Population	Total	Mining	Population	Total	Mining	Population	Total
<b>Green River-Hams Fork Region</b>									
1990									
Low	871	5,875	6,746	--	--	--	847	5,739	6,586
Medium	895	6,283	7,178	--	--	--	871	6,174	7,045
High	895	6,283	7,178	--	--	--	--	--	--
1995									
Low	944	6,446	7,390	--	--	--	--	--	--
Medium	1,041	6,936	7,977	--	--	--	--	--	--
High	1,041	7,317	8,358	--	7,181	8,222	--	6,990	8,031
2000									
Low	1,016	6,772	7,788	--	--	--	--	--	--
Medium	1,162	7,507	8,669	--	--	--	--	--	--
High	1,452	9,194	10,646	1,331	8,486	9,817	1,210	7,779	8,989
<b>Uinta-Southwestern Utah Region</b>									
1990									
Low	419	23,323	23,742	--	--	--	--	--	--
Medium	419	23,492	23,911	--	--	--	450	26,189	26,639
High	434	24,559	24,993	--	--	--	496	28,269	28,765
1995									
Low	496	26,864	27,360	--	--	--	--	--	--
Medium	419	27,707	28,126	--	--	--	--	--	--
High	558	30,292	30,850	574	31,416	31,990	574	31,416	31,990
2000									
Low	543	29,055	29,598	--	--	--	--	--	--
Medium	574	30,685	31,259	--	--	--	--	--	--
High	667	35,462	36,129	729	38,947	39,676	729	38,947	39,676

\*Figures are shown only where they differ from those for No New Federal Leasing.

\*\*For methodology, see Appendix 4.

# DESCRIPTION OF THE ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

TABLE 4-17 (concluded)  
COAL-RELATED WATER USE\*  
(acre-feet/Year)

Production Level	No New Federal Leasing No Action			Preference Right and Emergency Leasing**			Proposed Action**		
	Mining	Population	Total	Mining	Population	Total	Mining	Population	Total
<b>San Juan River Region</b>									
1990									
Low	2,128	3,270	5,398	a	a	a	2,280	3,404	5,684
Medium	2,128	3,377	5,505	a	a	a	2,280	3,511	5,791
High	2,128	3,457	5,585	a	3,430	5,558	2,280	3,538	5,818
1995									
Low	2,584	3,698	6,282	a	a	a	a	a	a
Medium	2,888	4,154	7,042	a	a	a	a	a	a
High	3,116	4,395	7,511	3,040	4,529	7,569	3,040	4,529	7,569
2000									
Low	2,812	3,966	6,778	--	--	--	--	--	--
Medium	3,496	4,824	8,320	--	--	--	--	--	--
High	3,648	4,985	8,633	4,256	5,869	10,125	4,256	5,869	10,215
<b>Alabama Subregion</b>									
1990									
Low	7,492	10,011	17,503	--	--	--	--	--	--
Medium	8,740	10,088	18,822	--	--	--	--	--	--
High	8,740	10,082	18,822	--	--	--	--	--	--
1995									
Low	8,123	10,058	18,181	--	--	--	--	--	--
Medium	8,801	10,082	18,883	--	--	--	--	--	--
High	8,801	10,082	18,883	--	--	--	--	--	--
2000									
Low	8,123	10,058	18,181	--	--	--	--	--	--
Medium	8,861	10,082	18,943	--	--	--	--	--	--
High	8,861	10,082	18,943	--	--	--	--	--	--

\*For methodology, see Appendix 4.

\*\*Figures are shown only where they differ from those for No New Federal Leasing.

## WATER RESOURCES

Coal-related water use would vary from 1,042 to 1,212 acre-feet/year (Table 4-17) and would cause no significant problems in this region.

**Powder River Region.** Impacts to water resources at the low production level in the Powder River Region would occur most significantly to ground water quality. But because of mitigation required by state and federal strip mining laws, changes in surface water quality outside mine boundaries would be insignificant. Reduced runoff would be significant only immediately below the sediment detention reservoirs. On a regional basis, the mined areas would be too small to significantly affect surface runoff quality.

Many coal beds in the region act as aquifers. Ground water quality could change within and near areas where overburden is removed for coal mining. Where these coal beds form shallow aquifers, the rural residents commonly use them as a water source. Generally, mining would temporarily disrupt this source of supply and draw down water levels in and near a surface mine. Over the long term, mining would degrade water quality, but replacement water supplies could be obtained from deeper aquifers unaffected by mining. Coal-related water use would vary from 19,712 to 27,509 acre-feet/year (Table 4-17) but would not cause a significant problem in this region.

The impacts at the medium and high production levels would be the same as those at the low production level, but production rates would be larger and impacts would be spread over a larger area.

**Green River-Hams Fork Region.** Impacts to water resources at the low production level in the Green River-Hams Fork Region would occur most significantly to surface and ground water quality. But because of mitigation required by state and federal strip mining laws, changes in surface water sedimentation outside mine boundaries would be insignificant. Reduced runoff would be significant only immediately below the sediment detention reservoirs. On a regional basis, the mined areas would be too small to significantly affect surface runoff.

Many coal beds in the region act as aquifers. Ground water quality could change within and near areas where overburden is removed for mining. Where these coal beds form shallow aquifers, rural residents sometimes use them for a water source. Generally, mining would temporarily disrupt this source of supply and draw down water levels in and near a surface mine. Over the long term, mining would degrade water quality, but replacement water supplies could be obtained from deeper aquifers unaffected by mining.

Coal-related water use would vary from 6,746 to 7,788 acre-feet/year (Table 4-17). Because most waters of this region are fully appropriated, coal-related water supplies would generally have to be purchased from other users. Acquiring water for mining would slightly shift types of water use and stress an already stretched water supply as more of the limited unappropriated water is put into use.

The Colorado River Basin has large areas of low annual precipitation and highly saline geology. The influx of people and growth of irrigation and energy development in the area over the last century have made already scarce water supplies even more critical. The use of the river system's water has resulted in a national and international water quality and salinity problem.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

In addition, some mines have been or in the future may be concentrated in relatively small areas. The cumulative impacts of small increases in surface and ground water salinity and increased water use by mines and expanded populations could create significant regional problems.

The impacts at the medium and high production levels would be similar to those at the low production level but would be spread over a larger area and might involve an overall increase in regional salinity. Coal-related water use would increase to as much as 8,669 acre-feet/year at the medium production level and 10,646 acre-feet/year at the high production level.

Uinta-Southwestern Utah. At the low production level, impacts to water resources from underground mining would occur most significantly because of subsidence. Where coal has been removed underground, overburden tends to fracture and subside. This subsidence could significantly divert the flow path of surface water underground and could cause ground water to more rapidly move through aquifers. In addition, the flow of springs and level of well water may be decreased or increased, depending upon the specific location of coal mining.

Surface disturbance at underground mines generally covers a small area and does not disturb the overburden. Changes in sediment rates and salinity due to mine-mouth development should be insignificant. Water use is estimated to be from 23,742 to 29,598 acre-feet/year (Table 4-17).

Impacts at the medium and low production levels would be similar to those described for the low production level except that more coal would be mined and impacts would occur over a slightly larger area. Water use for the mines and associated populations would also increase (Table 4-17).

San Juan River Region. At all three production levels, impacts to water resources in the San Juan River Region would occur most significantly to ground water. But because of mitigation required by state and federal strip mining laws, changes in surface water quality outside the mine boundaries would be insignificant. Reduced runoff would be significant only immediately below sediment detention reservoirs. On a regional basis, the mined areas would be too small to significantly affect surface runoff.

Many coal beds in the region are aquifers. Ground water quality could change within and near areas where overburden is removed for mining. Where these coal beds form shallow aquifers, rural residents sometimes use aquifers as water sources. Generally, mining would temporarily disrupt this source of supply and draw down water levels in and near a surface mine. Over the long term, mining would degrade water quality, but replacement water supplies could be obtained from deeper aquifers unaffected by mining.

Coal-related water use would vary from 5,398 to 6,778 acre-feet/year (Table 4-17). Because water in the region is fully appropriated, any increase in use would have to be obtained from other water users. Meeting water needs for mining would require a rearrangement of water uses or the importing of water from outside the region.

The Colorado River Basin has large areas of low annual precipitation and highly saline geology. The influx of people and growth or irrigation and

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energy development in the area over the last century has made already scarce water supplies even more critical. The use of the river system's water has resulted in a national and international water quantity and salinity problem. The cumulative impacts of small increases in ground and surface water salinity, and increased water use by mines and expanded populations could create significant regional problems.

**Alabama Subregion.** Impacts to water resources in the Alabama Subregion would occur most significantly to ground water quantity and water quality. But because of the mitigation required by state and federal strip mining laws, changes in surface water quality would be significant only in the mine area and the tributaries to major streams. Locally, changes in surface water quality would include increased mineralization and acidity or alkalinity, depending upon the geology. Sediment impacts should be slight downstream from mines because of mitigation regulations.

The coal-bearing strata in most of the subregion acts as an aquifer. Changes in quality and availability of ground water could occur within and next to the areas where overburden is removed for coal production. In many places the only source of ground water would be altered. Generally, mining would temporarily disrupt this source of supply and draw down water levels in and near open mine pits. Over the long term, mining would degrade water quality.

Underground mining is not expected to significantly affect surface water because of the depth of coal and competence of the overlying strata. Such mining could change the flow characteristics of ground water by opening new paths of water movement, which could lower or raise water levels and increase yields, depending upon where coal is mined.

Coal-related water use would range from 17,503 to 18,181 acre-feet/year (Table 4-17) but would not cause a significant problem in the subregion.

Impacts at the medium and high production levels would be similar to those described for the low production level except that more coal would be mined and impacts would occur over a slightly larger area. Water use for the mines and associated populations would also increase (Table 4-17).

### Preference Right and Emergency Leasing

**Fort Union.** Impacts would be similar to those discussed for No New Federal Leasing except that by 1995 and 2000 production rates would be higher. At higher production rates, the impacts would be similar to those under No New Federal Leasing, but they would occur over a larger area (Table 4-13). In addition, coal-related water use would increase from 0 to 29 percent (Table 4-17), an insignificant change for the Fort Union Region.

**Powder River Region.** Impacts would be similar to those discussed for No New Federal Leasing except that rates would be lower at the low and medium production levels by 1995 and 2000. At high production levels, the production rate would decrease in 1990 and 1995 and then rise sharply in 2000. For different production rates, the impacts would be similar but would occur over a different size area (Table 4-13). Coal-related water use would likewise vary from a decrease of 2 percent to an increase of 7 percent (Table 4-17), an insignificant change for the Powder River Region.

## DESCRIPTION OF THE ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

Green River-Hams Fork Region. Impacts would be the same as those discussed for No New Federal Leasing except that at high production levels, production would be lower and impacts would be spread over a smaller area (Table 4-13). In addition, decreases in coal-related water use would range from 0 to 8 percent (Table 4-17).

Uinta-Southwestern Utah. Impacts would be similar to those discussed under No New Federal Leasing except that at the high production level, production rates would be higher in the year 2000. At the higher production levels, impacts would be similar but would occur over a larger area (Table 4-13). In addition, increases in coal-related water use would range from 0 to 17 percent (Table 4-17), possibly increasing the stress on the already limited water supply.

San Juan River Region. Impacts would be similar to those discussed for No New Federal Leasing except that at the high production level, coal production would be higher in 1995 and 2000. At higher production rates the impacts would be similar, but they would occur over a larger area (Table 4-13). In addition, increases in coal-related water use would range from 0 to 10 percent (Table 4-17).

Alabama Subregion. Impacts under this alternative would be the same as under No New Federal Leasing.

### Proposed Action

Fort Union. Impacts would be similar to those discussed for No New Federal Leasing except that by 1995 and 2000 production rates would be higher. At higher production rates the impacts would be similar, but they would occur over a larger area (up to 55 percent) (Table 4-13). In addition, coal-related water use would increase from 0 to 60 percent (Table 4-17), but this change would be insignificant for this region.

Powder River Region. Impacts would be similar to those discussed for No New Federal Leasing except that at the low and medium production levels by 1995 and 2000, production rates would be lower. At the high production level, the production rate would decrease in 1990 and 1995 and then rise sharply in 2000. For different production rates the impacts would be similar, but they would occur over a larger area (up to 55 percent) (Table 4-13). Coal-related water use would likewise vary from a decrease of 2 percent to an increase of 20 percent (Table 4-17). This change would not be significant for this region except at the high production level for the year 2000.

Green River-Hams Fork Region. Impacts would be similar to those discussed for No New Federal Leasing except that by 1995 and 2000, production rates would be lower. For lower production rates, the impacts would be similar to those under No New Federal Leasing, but they would occur over a smaller area. In addition, coal-related water use would decrease from 0 to 15 percent (Table 4-17).

Uinta-Southwestern Utah. Impacts would be similar to those discussed under No New Federal Leasing except that at the high production level, production rates in 2000 would be higher. Also at all leasing levels, production would

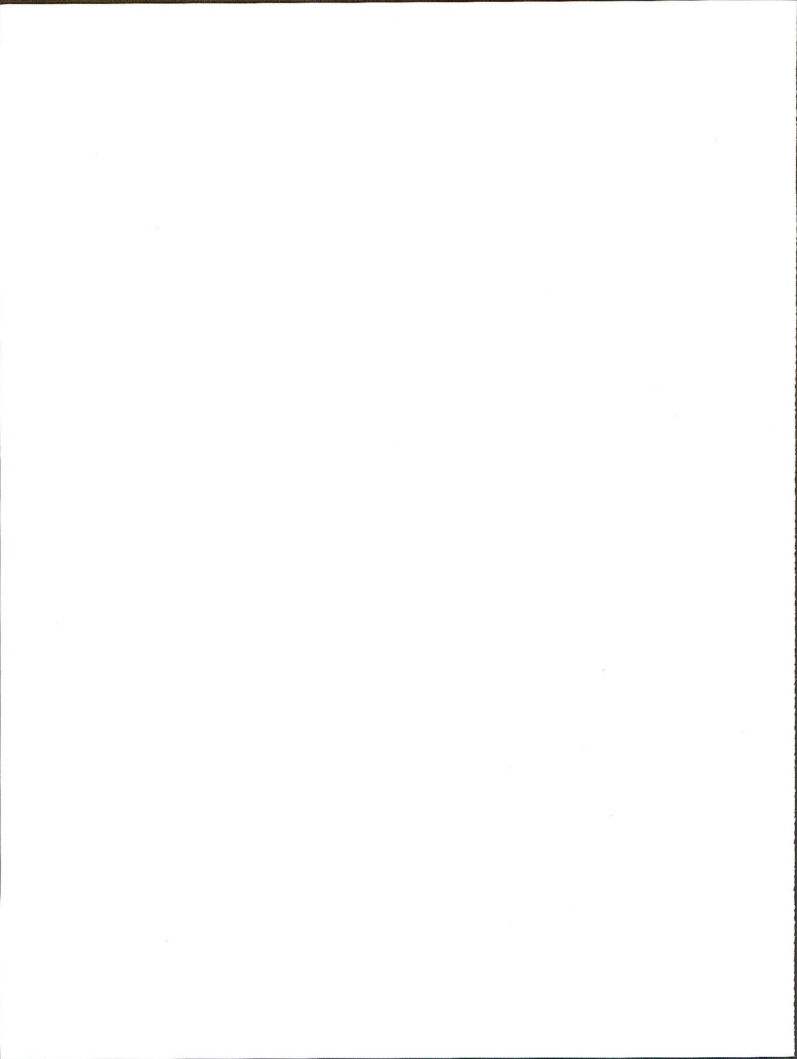


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jump in 1990 but return to the same level as No New Federal Leasing by 1995. At higher production rates, the impacts would be similar but would occur over a larger area (Table 4-13). In addition, coal-related water use would increase from 0 to 17 percent (Table 4-17), increasing the stress on the already limited water supply.

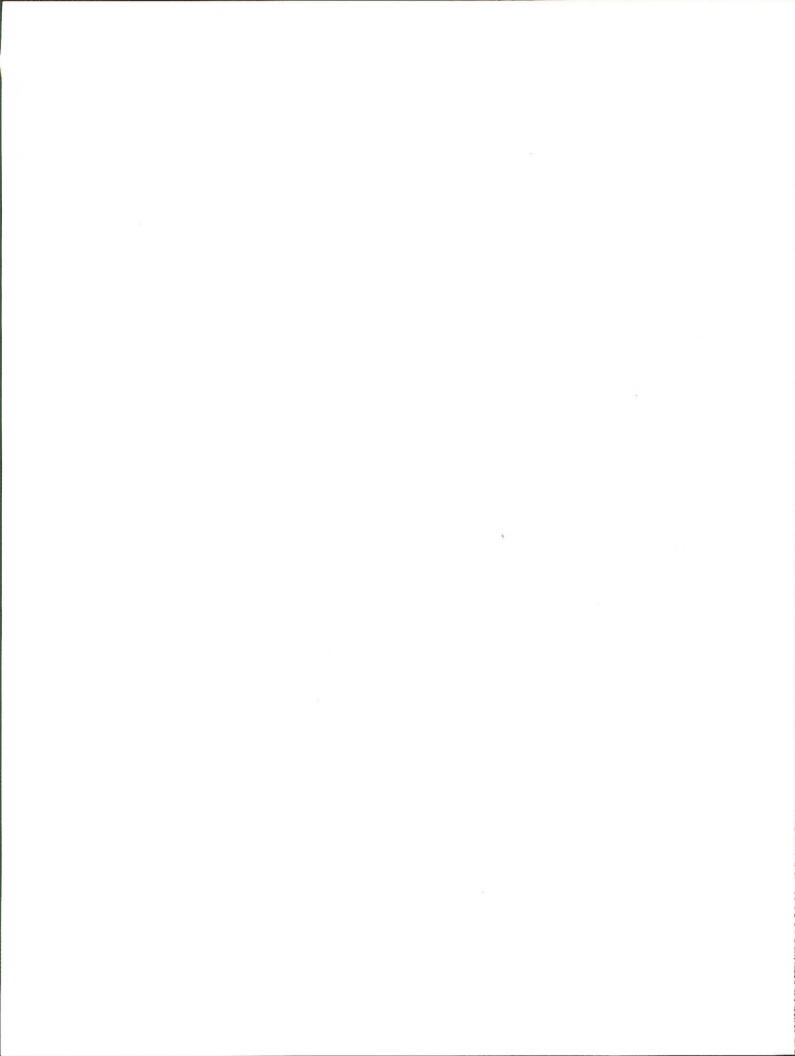
**San Juan River Region.** Impacts would be similar to those discussed for No New Federal Leasing except that by 1995 and 2000 at the high production level production rates would increase. For higher production rates, impacts would be similar, but they would occur over a larger area (Table 4-13). In addition, coal-related water use would increase by 0 to 10 percent (Table 4-17).

**Alabama Subregion.** Impacts under the Proposed Action would be the same as under No New Federal Leasing.



**CHAPTER 5**  
**Comparative**  
**Analysis**





Chapter 5 compares the environmental impacts of No New Federal Leasing (no action baseline) to the impacts of Preference Right and Emergency Leasing and the Proposed Action. Because coal production estimates are the same for Leasing by Application as for the Proposed Action, impacts for the two are assumed to be the same, and Leasing by Application is not presented in Table 5-1 or further discussed in this chapter. Table 5-1 shows numerically by region, production level, and year, how impacts under the Proposed Action and Preference Right and Emergency Leasing would differ from impacts under No New Federal Leasing. Dashes (--) represent no change from No New Federal Leasing.

Although Table 5-1 provides a comparison of measurable impacts, the narrative discussion focuses on the high production level in 2000, where the greatest differences occur. A similar discussion was not presented for other production levels and time periods since it would tend to be confusing or redundant, due to small or no differences between alternatives in most regions. No comparison by alternative is given for the Alabama Subregion because impacts would not differ among alternatives. The same type of impacts were assumed to result from the development of private, state, and Indian-owned coal as from the development of federally owned coal. Chapter 5's final section presents a more generalized comparison between No New Federal Leasing and the Proposed Action for the three major aggregated coal-producing regions in the United States--Appalachian, Midwestern, and Western.

The impacts used in the comparison are those associated with coal production for socioeconomic (population), health and safety (accidents), air resources (total suspended particulates--TSP), soils and vegetation (acres disturbed), mineral resources (annual coal production), and water use (acre-feet of water used per year). Because the supplemental EIS provides a program-level analysis, wildlife, visual resources, recreation resources, wilderness resources, cultural resources, and paleontological resources are compared only in the narrative. Transportation impacts would not significantly differ by alternative and are thus not discussed.

#### SOCIOECONOMICS

At the Preference Right and Emergency Leasing high production level in 2000, population changes from the No New Federal Leasing baseline would range from a decrease of 2,600 in the Green River-Hams Fork Region to increases of 6,200 in the Uinta-Southwestern Utah Region and of 6,700 in Powder River Region. At the Proposed Action high production level in 2000, the population change would range from a decrease of 5,200 in the Green River-Hams Fork Region to an increase of 19,800 in the Powder River Region.

## CHAPTER 5

TABLE 5-1  
COMPARATIVE ANALYSIS

Fort Union Region						
Production Level	Socioeconomics (total population)	Health & Safety (accidents)	Air Quality (TSP--tons/year)	Soils & Vegetation (acres disturbed)	Minerals (coal mined--million tons/year)	Water Use (acre-feet/year)
<b>No New Federal Leasing</b>						
<b>1990</b>						
Low	5,600	142	28,800	1,169	24	1,042
Medium	5,600	142	28,800	1,169	24	1,042
High	5,600	142	28,800	1,169	24	1,042
<b>1995</b>						
Low	6,000	196	39,600	1,607	33	1,212
Medium	6,000	196	39,600	1,607	33	1,212
High	6,000	196	39,600	1,607	33	1,212
<b>2000</b>						
Low	6,000	196	39,600	1,607	33	1,212
Medium	6,000	196	39,600	1,607	33	1,212
High	6,000	196	39,600	1,607	33	1,212
<b>Preference Right and Emergency Leasing</b>						
<b>1990</b>						
Low	--	--	--	--	--	--
Medium	5,800 (+200)	--	--	--	--	1,068 (+26)
High	5,900 (+300)	--	--	--	--	1,081 (+39)
<b>1995</b>						
Low	6,200 (+200)	--	--	--	--	1,238 (+26)
Medium	7,000 (+1,000)	213 (+17)	43,200 (+3,600)	1,753 (+46)	36 (+3)	1,382 (+170)
High	7,000 (+1,000)	219 (+23)	44,400 (+4,800)	1,802 (+195)	37 (+4)	1,395 (+183)
<b>2000</b>						
Low	6,700 (+700)	213 (+17)	43,200 (+3,600)	1,753 (+146)	36 (+3)	1,243 (+131)
Medium	7,800 (+1,800)	249 (+33)	50,400 (+10,800)	2,045 (+438)	42 (+9)	1,564 (+352)
High	7,800 (+1,800)	249 (+33)	50,400 (+10,800)	2,045 (+438)	42 (+9)	1,564 (+352)
<b>Proposed Action*</b>						
<b>1990</b>						
Low	--	--	--	--	--	--
Medium	5,800 (+200)	--	--	--	--	1,068 (+26)
High	5,900 (+300)	--	--	--	--	1,081 (+39)
<b>1995</b>						
Low	6,200 (+200)	--	--	--	--	1,238 (+26)
Medium	7,100 (+1,100)	213 (+17)	43,200 (+3,600)	1,753 (+46)	36 (+3)	1,395 (+183)
High	7,900 (+1,900)	219 (+23)	44,400 (+4,800)	1,802 (+195)	37 (+4)	1,512 (+300)
<b>2000</b>						
Low	6,700 (+700)	213 (+17)	43,200 (+3,600)	1,753 (+146)	36 (+3)	1,243 (+131)
Medium	8,300 (+2,300)	261 (+65)	52,800 (+13,200)	2,143 (+536)	44 (+11)	1,655 (+443)
High	9,800 (+3,800)	302 (+106)	61,200 (+21,600)	2,484 (+877)	51 (+18)	1,942 (+730)

Notes: Numbers for the Proposed Action and Preference Right and Emergency Leasing and Proposed Action are shown only where they differ from No New Federal Leasing. Numbers in parentheses represent change from No New Federal Leasing.  
\*These impacts would also apply to the Leasing by Application Alternative.

## COMPARATIVE ANALYSIS

TABLE 5-1 (continued)  
COMPARATIVE ANALYSIS

Powder River Region							
Production Level	Socioeconomics (total population)	Health and Safety (accidents)	Air Quality (TSP--tons/year)		Soils and Vegetation (acres disturbed)	Minerals (coal mined-- million tons/year)	Water Use (acre-feet/ year)
			Wyoming	Montana			
No. New Federal Leasing							
1990							
Low	40,600	960	145,200	49,200	2,932	162	19,712
Medium	44,700	960	145,200	49,200	2,932	162	20,901
High	58,300	1,180	188,400	50,400	3,602	199	26,658
1995							
Low	47,700	1,002	152,400	50,400	3,059	169	22,114
Medium	55,800	1,174	183,600	54,000	3,584	198	25,884
High	73,300	1,583	266,400	54,000	4,833	267	34,340
2000							
Low	58,700	1,269	204,000	52,800	3,873	214	27,509
Medium	68,500	1,482	240,000	60,000	4,525	250	32,115
High	87,300	1,921	302,400	86,400	5,864	324	41,193
Preference Right and Emergency Leasing							
1990							
Low	--	--	--	--	--	--	--
Medium	44,100 (-600)	--	--	--	--	--	20,727 (-174)
High	57,500 (-800)	1,168 (-12)	186,000 (-2,400)	--	3,566 (-36)	197 (-2)	26,328 (-330)
1995							
Low	47,200 (-500)	--	--	--	--	--	21,969 (-145)
Medium	54,800 (-1,000)	1,150 (-24)	180,000 (-3,600)	52,800 (-1,200)	3,511 (-73)	194 (-4)	25,398 (-486)
High	75,300 (+2,000)	1,559 (-24)	261,600 (-4,800)	--	4,761 (-72)	263 (-4)	34,724 (+384)
2000							
Low	57,500 (-1,200)	1,251 (-18)	200,400 (-3,600)	--	3,819 (-54)	211 (-3)	27,014 (-495)
Medium	67,500 (-1,000)	1,458 (-24)	236,400 (-3,600)	58,800 (-1,200)	4,453 (-72)	246 (-4)	31,629 (-486)
High	94,000 (+6,700)	2,015 (+94)	318,000 (+15,600)	90,000 (+3,600)	6,154 (+290)	340 (+16)	43,920 (+2,727)
Proposed Action*							
1990							
Low	40,500 (-100)	954 (-6)	144,000 (-1,200)	--	2,914 (-18)	161 (-1)	19,634 (-78)
Medium	44,000 (-700)	954 (-6)	144,000 (-1,200)	--	2,914 (-18)	161 (-1)	20,649 (-252)
High	57,500 (-800)	1,168 (-12)	186,000 (-2,400)	--	3,566 (-36)	197 (-2)	26,560 (-85)
1995							
Low	47,200 (-500)	--	--	--	--	--	21,969 (-145)
Medium	54,600 (-1,200)	1,150 (-24)	180,000 (-3,600)	52,800 (-1,200)	3,511 (-73)	194 (-4)	25,340 (-544)
High	80,100 (+6,800)	1,559 (-24)	261,000 (-5,400)	--	4,761 (-72)	263 (-4)	36,116 (+1,776)
2000							
Low	57,500 (-1,200)	1,251 (-18)	200,400 (-3,600)	--	3,819 (-54)	211 (-3)	27,014 (-495)
Medium	66,800 (-1,700)	1,446 (-36)	234,000 (-6,000)	58,800 (-1,200)	4,417 (-108)	244 (-6)	31,328 (-787)
High	107,100 (+19,800)	2,217 (+296)	372,000 (+70,000)	76,800 (-10,000)	6,769 (+905)	374 (+50)	49,385 (+8,192)

Note: Numbers in parenthesis represent change from No New Federal Leasing.  
\*These impacts would also apply to the Leasing by Application Alternative.

## CHAPTER 5

TABLE 5-1 (continued)  
COMPARATIVE ANALYSIS

Green River-Hams Fork Region							
Production Level	Socioeconomics (total population)	Health and Safety (accidents)	Air Quality (TSP--tons/year)		Soils & Vegetation (acres disturbed)	Minerals (coal mined--million tons/year)	Water Use (acre-feet/year)
			Wyoming	Colorado			
No New Federal Leasing							
1990							
Low	21,600	324	25,200	14,800	2,243	36	6,746
Medium	23,100	358	26,400	14,000	2,248	37	7,178
High	23,100	358	26,400	14,000	2,248	37	7,178
1995							
Low	23,700	370	27,600	14,000	2,387	39	7,390
Medium	25,500	393	32,400	14,000	2,665	43	7,977
High	26,900	393	32,400	14,000	2,665	43	8,358
2000							
Low	24,900	387	30,000	16,400	2,596	42	7,788
Medium	27,600	423	37,200	16,400	3,013	48	8,669
High	33,800	494	42,000	26,000	3,847	60	10,646
Preference Right and Emergency Leasing							
1990							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	--	--	--	--	--	--	--
1995							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	26,400 (-500)	--	--	--	--	--	8,222 (-136)
2000							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	31,200 (-2,600)	464 (-30)	39,600 (-2,400)	22,400 (-3,600)	3,499 (-348)	55 (-5)	9,817 (-829)
Proposed Action <sup>a</sup>							
1990							
Low	21,100 (-500)	318 (-6)	24,000 (-1,200)	--	2,174 (-69)	35 (-1)	6,586 (-160)
Medium	22,700 (-400)	352 (-6)	25,200 (-1,200)	--	2,179 (-69)	36 (-1)	7,045 (-133)
High	--	--	--	--	--	--	--
1995							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	25,700 (-1,200)	--	--	--	--	--	8,031 (-327)
2000							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	28,600 (-5,200)	435 (-59)	36,000 (-6,000)	20,000 (-6,000)	3,152 (-700)	50 (-10)	8,989 (-1,657)

Note: Numbers in parenthesis represent change from No New Federal Leasing.  
<sup>a</sup>These impacts would also apply to the Leasing by Application Alternative.



## COMPARATIVE ANALYSIS

TABLE 5-1 (continued)  
COMPARATIVE ANALYSIS

Winta-Southwestern Region							
Production Level	Socioeconomics (total population)	Health and Safety (accidents)	Air Quality (TSP--tons/year)		Soils and Vegetation (acres disturbed)	Minerals (coal mined-- million tons/year)	Water Use (acre-feet/ year)
			Colorado	Utah			
No New Federal Leasing							
1990							
Low	41,500	905	2,000	8,800	149	27	23,742
Medium	41,800	905	2,000	8,800	149	27	23,911
High	43,700	939	2,400	8,800	154	28	24,993
1995							
Low	47,800	1,073	2,400	10,400	176	32	27,360
Medium	49,300	1,106	2,400	10,800	182	33	28,126
High	53,900	1,207	2,800	11,600	198	36	30,850
2000							
Low	51,700	1,174	2,800	11,200	192	35	29,598
Medium	54,600	1,241	2,800	12,000	203	37	31,259
High	63,100	1,442	4,000	13,200	237	43	36,129
Preference Right and Emergency Leasing							
1990							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	44,000 (+300)	--	--	--	--	--	--
1995							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	55,900 (+2,000)	1,241 (+34)	--	12,000 (+400)	204 (+6)	37 (+1)	31,990 (+1,140)
2000							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	69,300 (+6,200)	1,576 (+134)	2,800 (+1,200)	16,000 (+2,800)	258 (+21)	47 (+4)	39,676 (+3,547)
Proposed Action*							
1990							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	44,000 (+300)	--	--	--	--	--	--
1995							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	55,900 (+2,000)	1,241 (+34)	--	12,000 (+400)	204 (+6)	37 (+1)	31,990 (+1,140)
2000							
Low	--	--	--	--	--	--	--
Medium	--	--	--	--	--	--	--
High	69,300 (+6,200)	1,576 (+134)	2,800 (+1,200)	16,000 (+2,800)	258 (+21)	47 (+4)	39,676 (+3,547)

Note: Numbers in parenthesis represent change from No New Federal Leasing.  
\*These impacts would also apply to the Leasing by Application Alternative.

## CHAPTER 5

TABLE 5-1 (concluded)  
COMPARATIVE ANALYSIS

San Juan River Region						
Production Level	Socioeconomics (total population)	Health and Safety (accidents)	Air Quality (TSP--tons/year)	Soils & Vegetation (acres disturbed)	Minerals (coal mined-- million tons/year)	Water Use (acre-feet/ year)
No New Federal Leasing						
1990						
Low	12,200	166	33,600	1,151	28	5,398
Medium	12,600	166	33,600	1,151	28	5,505
High	12,900	166	33,600	1,151	28	5,585
1995						
Low	13,800	202	40,800	1,398	34	6,282
Medium	15,500	225	45,600	1,562	38	7,042
High	16,400	243	49,200	1,685	41	7,511
2000						
Low	14,800	219	44,400	1,521	37	6,778
Medium	18,000	273	55,200	1,891	46	8,320
High	18,600	285	57,600	1,973	48	8,633
Preference Bids and Emergency Leasing						
1990						
Low	--	--	--	--	--	--
Medium	--	--	--	--	--	--
High	12,800 (-100)	--	--	--	--	5,558 (-27)
1995						
Low	--	--	--	--	--	--
Medium	--	--	--	--	--	--
High	16,900 (+500)	237 (-6)	48,000 (-1,200)	1,644 (-41)	40 (-1)	7,569 (+58)
2000						
Low	--	--	--	--	--	--
Medium	--	--	--	--	--	--
High	21,900 (+3,300)	332 (+47)	67,200 (+9,600)	2,302 (+329)	56 (+8)	10,125 (+1,492)
Proposed Action*						
1990						
Low	12,700 (+500)	178 (+12)	36,000 (+2,400)	1,233 (+82)	30 (+2)	5,684 (+286)
Medium	13,100 (+500)	178 (+12)	36,000 (+2,400)	1,233 (+82)	30 (+2)	5,791 (+286)
High	13,200 (+300)	178 (+12)	36,000 (+2,400)	1,233 (+82)	30 (+2)	5,818 (+233)
1995						
Low	--	--	--	--	--	--
Medium	--	--	--	--	--	--
High	16,900 (+500)	237 (-6)	48,000 (-1,200)	1,644 (-41)	40 (-1)	7,569 (+58)
2000						
Low	--	--	--	--	--	--
Medium	--	--	--	--	--	--
High	21,900 (+3,300)	332 (+47)	67,200 (+9,600)	2,302 (+329)	56 (+8)	10,125 (+1,492)

Note: Numbers in parenthesis represent change from No New Federal Leasing.  
\*These impacts would also apply to the Leasing by Application Alternative.

## COMPARATIVE ANALYSIS

### HEALTH AND SAFETY

Annual accidents at the Preference Right and Emergency Leasing high production level in 2000 would exceed those under No New Federal Leasing by 47 in the San Juan River Region and by 134 in the Uinta-Southwestern Region. The Green River-Hams Fork Region, however, would have 30 fewer accidents under Preference Right and Emergency Leasing. At the Proposed Action high production level in 2000, the Green River-Hams Fork Region would have 59 more accidents, the Uinta-Southwestern Utah Region would have 296 more accidents, and the Powder River Region would have 296 more accidents than under No New Federal Leasing.

### AIR RESOURCES

At the Preference Right and Emergency Leasing high production level in 2000, the Green River-Hams Fork Region would have 3,600 fewer annual tons of total suspended particulates (TSP) than under No New Federal Leasing, the Fort Union Region would have 10,800 more tons of TSP, and the San Juan River Region would have 9,600 more tons of TSP. At the Proposed Action high production level in 2000, annual TSP would range from 10,000 fewer tons per year than under No New Federal Leasing in the Powder River Region to 21,000 more tons per year in the Fort Union Region.

### SOILS AND VEGETATION

Potential impacts to soils and vegetation have been compared by examining the acres of land disturbance. Land disturbance is also the basis for comparing impacts to wildlife, visual resources, and cultural resources.

At the Preference Right and Emergency Leasing high production level in 2000, 348 fewer acres would be disturbed in the Green River-Hams Fork Region than under No New Federal Leasing, whereas in the Powder River, San Juan River, and Fort Union regions, 290, 329, and 438 more acres respectively would be disturbed. At the Proposed Action high production level in 2000, 877 more acres would be disturbed in the Fort Union Region and 905 more acres would be disturbed in the Powder River Region than under No New Federal Leasing. The Uinta-Southwestern Utah Region would have only 21 more disturbed acres under either Preference Right and Emergency Leasing or the Proposed Action because projected coal production would involve only subsurface mining.

### WILDLIFE

Wildlife habitat disturbed by coal mining under the Proposed Action and Preference Right and Emergency Leasing would be essentially the same as are noted in the soils and vegetation column of Table 5-1 because vegetation is a habitat component. Generally, the more coal production and acres disturbed, the more habitat disturbed.

Poaching, illegal hunting, and wanton killing would also increase as human populations increase in the coal regions (see socioeconomic column in Table 5-1 for population increases). A straight-line projection can thus be used to predict increases in these illegal activities resulting from human population increases. Additionally, direct killing, harassment, and stress to wildlife species would increase due to an increase in free roaming dogs.

## CHAPTER 5

### VISUAL RESOURCES

Some alternatives would significantly affect visual resources in some regions. Visual resource impacts are related to the amount of surface disturbed (see soils and vegetation column of Table 5-1). Generally, the more coal mined, the greater the impact on visual resources. The impacts of any particular alternative, however, are not considered significant on a regional basis because they would be similar to existing visual intrusions. Where more mining occurs (particularly surface mining), landform and vegetation change would increase, and more structures would be built, similar to existing development and in the same general areas.

### RECREATION RESOURCES

The main impact to recreation of any alternative would involve changes in recreation demand caused by changes in coal-related population. Generally, population changes would not significantly differ among alternatives. Some contrast, however, would be noticed among regions where more mining would occur or population increases could be concentrated in a few small communities whose existing demands for recreation already exceed the supply. Fishing and hunting would be most affected, with increased demand for recreation site maintenance and operating funds. Few impacts if any would occur to recreation facilities or sites under any alternative because such areas have previously been determined to be unsuitable for mining under unsuitability regulations.

### WILDERNESS

Coal mining would not significantly affect regional wilderness resources under No New Federal Leasing. Preference Right and Emergency Leasing could cause some new significant impacts in each region except Alabama. Wilderness would not be significantly affected in most regions and at most production levels under the Proposed Action, but would be significantly affected at higher production levels for the year 2000 and in the Fort Union Region. The uncertainty of wilderness designation and lack of knowledge of where population would grow make it difficult to predict impacts to wilderness resources as a result of increased coal production. No direct impacts are expected from mining within designated wildernesses or areas under consideration for wilderness designation. Designated wildernesses are protected under law from new mining, and areas under study for wilderness designation are protected by interim management procedures, which protect wilderness characteristics until a designation determination is made. No impacts would occur in the Alabama Subregion because it has no wilderness areas. Moreover, it is impossible to tell if outside sights and sounds would occur near the boundaries of most wilderness study areas because specific areas have not been selected for mining. The secondary impacts of increased coal-related populations using existing or proposed wilderness areas are also difficult to predict for the same reason. Increased populations, however, are expected to be small enough so as to cause few noticeable impacts to the areas and so as not to diminish the level of experience for wilderness users other than noted in the Wilderness section of Chapter 4.

## COMPARATIVE ANALYSIS

### CULTURAL RESOURCES

The type of impacts on cultural resources would not vary among the Proposed Action and alternatives. The size and number of impacts would vary by the amount of surface disturbance and population increase, but these impacts cannot be determined until inventories are conducted.

To develop a comparative analysis for cultural resources, the average cultural resource site density per acre and site distribution should be known. These factors can then be used as a multiplier for estimating sites disturbed for each region. As noted in Chapter 4, Cultural Resource Impacts, these factors are not known. A general idea of relative site disturbance among alternatives may be obtained by examining the acres of land disturbance under the soils and vegetation column in Table 5-1. One can generally assume that the more acres disturbed, the more sites disturbed. On the basis of regional information in Chapter 4, Cultural Resource Impacts, the San Juan River Region has the most cultural sites and is expected to sustain more impacts than the other regions under the Proposed Action or alternatives.

### MINERAL RESOURCES

Table 5-2 uses the change in estimated annual coal production to compare impacts to mineral resources by alternative. At the Preference Right and Emergency Leasing high production level in 2000, the Green River-Hams Fork Region would produce 5 million fewer tons of coal than under No New Federal Leasing, and the San Juan River, Fort Union, and Powder River regions would produce 8, 9, and 16 million tons more of coal respectively. At the Proposed Action high production level in 2000, the Green River-Hams Fork Region would produce 10 million fewer tons of coal than under No New Federal Leasing, the Fort Union Region would produce 18 million more tons, and the Powder River Region would produce 50 million more tons.

### PALEONTOLOGICAL RESOURCES

Paleontological impacts could be either beneficial or adverse, depending upon what agreement is worked out between the coal industry and the regulatory agency. These impacts would occur under the Proposed Action and all alternatives and would vary by region depending upon the increased level of coal production and the significance of paleontological resources in the region (See Chapter 4, Paleontological Resource Impacts). The Green River-Hams Fork, San Juan River, and the Uinta-Southwestern Regions have the most significant paleontological resources.

Two of the three regions whose production would increase--Fort Union and Powder River--have less significant fossils. The Uinta-Southwestern Utah Region, whose coal production would increase at the 1990 medium and high production levels under the Proposed Action, has more significant fossils. In this region, adverse impacts under the Proposed Action would slightly increase from mining and population increases. These increased impacts would diminish by 1995, and the Proposed Action would then affect paleontological resources the same as would No New Federal Leasing.

## CHAPTER 5

### WATER RESOURCES

Under Preference Right and Emergency Leasing and the Proposed Action, coal-related water use at the high production level in 2000 would exceed such use under No New Federal Leasing baseline in all regions except the Green River-Hams Fork Region and Alabama Subregion. The increased water use would range from 730 acre-feet/year in the Fort Union Region to 8,192 acre-feet/year in the Powder River Region. Water use would fall below the baseline by 1,657 acre-feet/year in the Green River-Hams Fork Region and would not differ among alternatives for the Alabama Subregion. Increased water use at the high production level in 2000 would be the same under Preference Right and Emergency Leasing and the Proposed Action in the San Juan River Region (1,492 acre-feet/year) and in the Uinta-Southwestern Utah Region (3,547 acre feet/year).

### COMPARISONS AMONG MAJOR REGIONS

Coal production forecasts for the United States and three major aggregated coal-producing regions (Western, Midwestern, and Appalachian) under No New Federal Leasing and the Proposed Action are given in Tables 3-1 and 3-7 along with a brief assessment of the regional shifts in coal production. The states making up the three regions are also given in Chapter 3.

Nationally and for these three aggregated regions, production forecasts are the same at the low production level for 1990 and 1995, and impacts would not significantly differ although they would occur on different lands. The same statement would apply at the medium production level for 1990 and 1995. At the medium production level for 2000, a projected 5 million tons of coal production would shift from the Midwestern regions (No New Federal Leasing) to the Western regions (Proposed Action). Impacts would increase in the Western regions, mostly in the five federal coal regions (Fort Union, Powder River, Green River-Hams Fork, Uinta-Southwestern Utah, and San Juan River). These impacts are assessed in detail in Chapter 4.

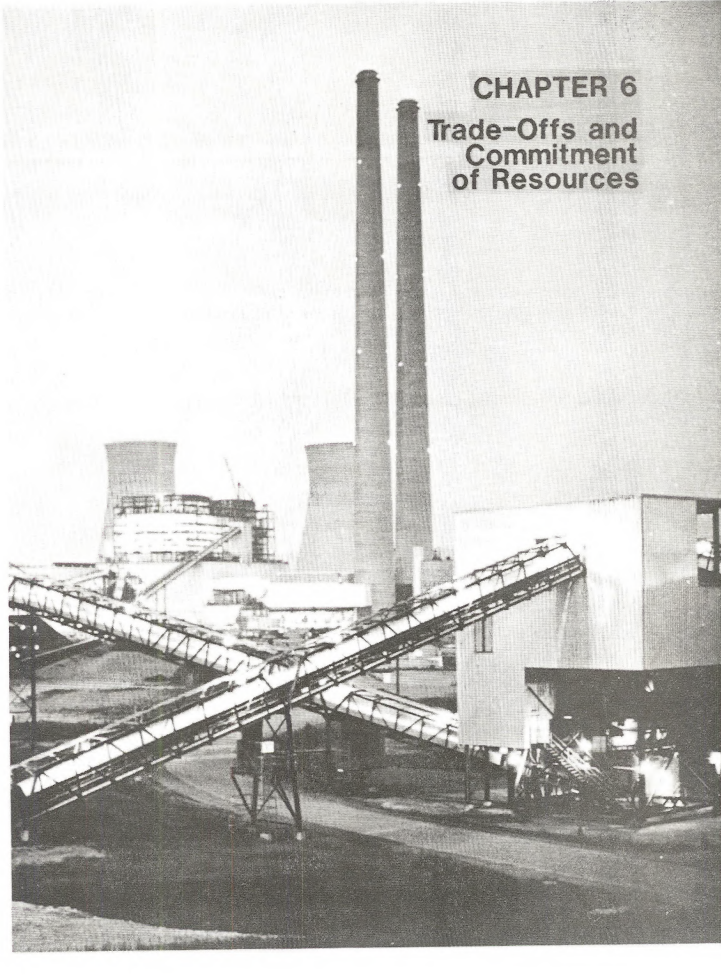
Nationally and for the three aggregated regions, coal production forecasts for the 1990 and 1995 high production level are the same, and impacts would not significantly differ. In the year 2000, substantial changes in production and significant regional shifts in impacts are projected. From a national perspective, overall impacts are assumed to be less for No New Federal Leasing than for the Proposed Action in 2000 because 25 million fewer tons of coal are projected to be mined. Under the Proposed Action in 2000, coal production is projected to exceed that of No New Federal Leasing by 65 million tons in the Western regions but to drop below that of No New Federal Leasing by 30 million tons in the Midwestern regions and by 10 million tons in the Appalachian regions. The increased production in the Western aggregated regions would result from increased national production and production shifts from the Midwestern regions. Conversely, the 10-million-ton increase in coal production in the Appalachian regions under No New Federal Leasing would occur mainly in eastern Kentucky and West Virginia. The impacts of increased production would be similar to current impacts because the projected increase would also involve underground mining.

## COMPARATIVE ANALYSIS

Because most increased coal production in the West comes from the five federal coal regions, the impacts of increased production for the Western regions under the Proposed Action would essentially be an aggregation of the impacts of the five regions assessed in Chapter 4. Conversely, under No New Federal Leasing in 2000, the 30 million increase in coal production in the Midwestern regions (compared to the Proposed Action) would cause impacts similar to those in the Western regions because the increased production would occur mostly at surface mines. The largest impacts would occur in Illinois and Texas. Lesser impacts would occur in Iowa, Kansas, and Indiana and would impinge on different land ownerships than in the West, mainly nonfederal lands.







**CHAPTER 6**  
**Trade-Offs and**  
**Commitment**  
**of Resources**



As described in Chapter 2, the Proposed Action calls for continuing the existing program for leasing federal coal reserves. Adopting this program would not automatically result in the irreversible or irretrievable commitment of resources or set into motion any long-term environmental consequences, but it is the initial step in a process that could lead to such commitments. The level of leasing determined under the program and the location of leasing would establish the level of actual resource commitment and of long-term environmental consequences. These impacts would be analyzed in more detail and specificity in the regional coal EISs, resource management plan EISs, and other site specific National Environmental Policy Act (NEPA) compliance procedures that would precede actual mining. Chapter 6 discusses resource commitments that would occur on the basis of assumed levels of coal production given in Chapter 3 and assessed in Chapter 4.

Because of the general nature of the program-level analysis, no distinction is made between the Proposed Action and Alternatives for related general trade offs and commitment of resources. Detailed consideration of these items on a regional or local basis will be analyzed in NEPA compliance documents to follow this EIS (see Chapter 1), when it will be possible to quantify benefits and trade-offs associated with specific resource commitment under various alternatives. For example, regional coal EISs will address projected production levels from specific sites and identify resource impacts as to quantity, severity, and location. Implementing the Proposed Action or any of the alternatives could result in short-term impacts on all resources discussed and long-term effects on all resources except for soils (with successful reclamation), agricultural production affected by mining, air quality, and surface water (Table 6-1).

#### TRADE-OFFS

The following trade offs could result from implementing the Proposed Action or any of the alternatives.

- Increased or continued coal production associated with new leasing could increase employment and related economic activities for selected local communities and maintain community stability, depending upon where specific tracts are leased and developed. On the other hand, communities affected by coal development could be temporarily harmed if housing and support services are inadequate for increased populations.
- Mining would cause some short-term losses of agricultural commodities and forage until land is restored to long-term productivity.

## CHAPTER 6

TABLE 6-1  
SHORT-TERM AND LONG-TERM IMPACTS RESULTING FROM THE  
FEDERAL COAL MANAGEMENT PROGRAM

	Irreversible Impacts	Irretrievable Impacts	Short-Term	Long-Term
Socioeconomics	NO	NO	YES	YES
Wildlife				
Terrestrial	YES	YES	YES	YES
Aquatic	YES	YES	YES	YES
Soils and Vegetation	NO	YES	YES	NO <sup>1,2</sup>
Agriculture	NO	YES	YES	NO <sup>3</sup>
Visual Resources	NO	NO	YES	YES
Cultural Resources	YES	YES	YES	YES
Recreation Resources	NO	NO	YES	YES
Wilderness	NO	NO	YES	YES
Air Quality	NO	NO	YES	NO
Water Resources				
Surface Water	NO	NO	YES	NO
Ground Water	NO <sup>4</sup>	NO <sup>4</sup>	YES	YES
Water Use	NO	NO	YES	YES
Minerals	YES	YES	YES	YES
Paleontology	YES	YES	YES	YES

<sup>1</sup>Vegetation would be restored to a productive condition for grazing and long-term productivity. Diversity of vegetation types would be lost where changes in topography have affected microclimates.

<sup>2</sup>Long-term soil productivity would not be impaired with successful soil reconstruction and reclamation. Soil erosion would be controlled and return to normal rates as revegetation and soil stabilization occur.

<sup>3</sup>Loss of crop and forage production due to mining would be temporary, but, mining would disrupt grazing and cropland farming, creating a long term-impact in certain areas for individual farms and ranches.

<sup>4</sup>Degraded ground water quality would gradually return to premining conditions, but the process would be slow, perhaps taking hundreds of thousands of years, depending upon the location.

## TRADE-OFFS AND COMMITMENT OF RESOURCES

- Diversity of vegetation types would be lost where topographic changes alter microclimates.
- Mining would disrupt grazing and farming, adversely affecting some individual farmers and ranchers over the long term, especially where disturbed land cannot be replaced by alternative tracts to restore operating units. (Compensation to private surface owners would normally offset economic losses.)
- Wildlife forage disturbed during mining would eventually be reclaimed, but reclamation to premining production levels could take several decades, depending upon the area. This disturbance could affect wildlife populations and species composition in certain locales and also affect hunting.
- Human population increases could cause croplands and rangelands to be converted to urban uses, reducing long-term production of agricultural commodities and causing losses of wildlife dependent upon these habitats for food and cover.
- Air quality impacts (potential Prevention of Significant Deterioration standard violations) would constitute a short-term use of air resources that could affect local residents and restrict other nearby developments.
- Visual contrasts created by mining (especially surface mining), facility structures, and construction of access roads and transmission lines could intrude on the natural landscape and impair its visual resources over the long term.
- Cultural resource sites or artifacts could be disturbed by land disturbance associated with mining.
- Fossils may be destroyed during mining, but mining may also expose and allow recovery of fossils that could otherwise never be found or studied.

### COMMITMENT OF RESOURCES

The Proposed Action, Preference Right and Emergency Leasing, and Leasing by Application could all irreversibly or irretrievably commit certain natural resources. An irreversible commitment cannot be changed once it occurs; an irretrievably committed resource cannot be recovered or reused. Some resources might be adversely affected only temporarily.

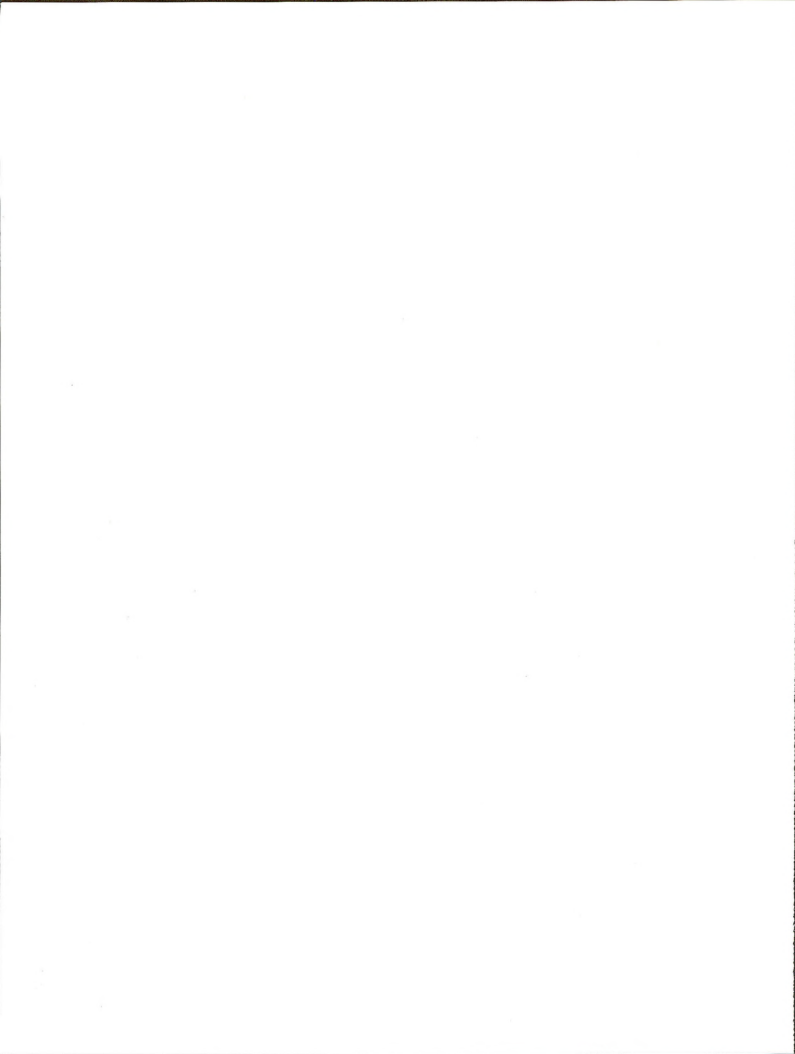
Implementing a federal coal management program under the Proposed Action or the two action alternatives could lead to leasing and production that could irreversibly and irretrievably affect terrestrial and aquatic wildlife, cultural resources, minerals, and paleontological resources. Lands covered by project structures would irreversibly lose wildlife forage. The loss of agricultural land to nonagricultural uses as a result of population increases would be irretrievable.

## CHAPTER 6

Because large areas would be disturbed during mining, some cultural and paleontological resources are likely to be destroyed, and others are likely to be discovered. Coal, once used, would not be available for later needs. Other mineral resources might also be precluded from future use because of coal mining operations or facilities. Table 6-1 summarizes the resource commitments that would be involved in implementing the Proposed Action and alternatives.

**CHAPTER 7**  
**Consultation and**  
**Coordination**







### SUMMARY OF PROJECT SCOPING

The first step in preparing an environmental impact statement (EIS) is called "scoping." The scope of an EIS is the range of actions, alternatives, and impacts to be included in the document. The purpose of scoping is to determine the significant issues related to a proposed action that should be included in the EIS. The basic goal of scoping is to make EISs more concise and worthwhile for Federal Government decisionmakers as well as for the reader.

### METHOD OF SCOPING

The scoping process for the Federal Coal Management Program consisted of agency meetings, a published Notice of Intent in the Federal Register to solicit comments, and five public meetings. The Federal Register notice was published on September 4, 1984, and the public meetings were held during the following weeks: on September 25 in Denver, Colorado; October 2 in Washington, D.C.; October 9 in Salt Lake City, Utah; and October 10 in Billings, Montana and Santa Fe, New Mexico.

With the assistance of federal and state agencies, industry, environmental groups, agricultural protection groups, and individuals, the significant issues and concerns were identified for analysis in the supplemental EIS. Insignificant issues were identified and removed from the scope of the EIS. Table 7-1 lists organizations and individuals who provided written scoping comments.

Additional oral comments were provided at the scoping meetings by the following individuals:

Denver, Colorado 9/25/84

Mrs. John E. Begay, Montmore, New Mexico  
Carolyn Johnson (NRDC)

Santa Fe, New Mexico 10/9/84

Dorothy James  
Ronald Goodman  
Bert Mescal  
Joel Medlin  
Bruce Stockton  
Russ Butcher  
Mamie Lopez  
Jimmy Begay  
Lenore Begay  
Kathy Albrecht  
Larry Frank

## CHAPTER 7

TABLE 7-1  
LIST OF ORGANIZATIONS AND INDIVIDUALS  
PROVIDING WRITTEN SCOPING COMMENTS

### Environmental Organizations

1. Sierra Club, Washinton, D.C.  
Comments delivered by Brooks Yeager at Washington, D.C. Scoping Meeting
2. Sierra Club, Montana Chapter (Daryle Murphy)
3. Sierra Club, Rio Grande Chapter  
Comments delivered by Jonathan Teague at Santa Fe, New Mexico, Scoping Meeting
4. Natural Resources Defense Council
5. National Wildlife Federation  
Comment read by Karl Gawell at Washington, D.C. Scoping Meeting
6. Environmental Defense Fund, Berkeley, California
7. Western Organization of Resource Councils
8. Northern Plains Resource Council, Billings Chapter
9. Northern Plains Resource Council, Sheridan, Wyoming
10. Western Organization of Resource Councils, Billings, Montana
11. Dawson Resource Council, Glendive, Montana
12. Southwest Research and Information Center, Albuquerque, New Mexico  
(Allison Monroe)

### Energy Companies and Trade Associations

1. Mobil
2. Getty Mining Co.
3. Coastal States
4. NERCO
5. National Coal Association/American Mining Congress (joint letter)
6. Western Regional Council

### Federal Agencies

1. EPA (Office of External Affairs, Washington, DC)
2. U.S. Fish and Wildlife Service (Albuquerque, New Mexico)

### Indian Tribes and Organizations

1. Navajo Nation
2. The Three Affiliated Tribes (Fort Berthold Reservation)

### State Governments

1. State of New Mexico, Energy and Minerals Department
2. DeWitt John (speaking for Colorado); Lorin Nielsen (speaking for six western coal-producing states)

### Individuals

1. Earl Neller
2. Jennie Blackgoat, et al.
3. Jeff Radford
4. David Masselli (as WORC attorney)
5. Lillian Tenopyr
6. John R. Swanson
7. James Jones

### Others

1. Western Network (Santa Fe, New Mexico)

## CONSULTATION AND COORDINATION

### RESULTS OF SCOPING

The results of the scoping process and further contributions from agency specialists and managers identified the issues of greatest concern for a supplemental EIS on the federal coal management program. The extent to which this supplemental EIS analyzes a resource was partially determined by the concerns raised during scoping. The items and concepts suggested for inclusion in the analysis were organized and evaluated to set the framework for the supplemental EIS .

Many comments received during scoping were concerned with the federal coal management program itself rather than the EIS scope. Other comments were suggested for the supplemental EIS but were actually about the program. The following are the key issues that emerged during scoping.

- The relationship of the supplemental EIS to ongoing changes to the federal coal management program.
- Extent of the market analysis.
- Assessment of reclamation success on surfaced mined western coal lands.
- Impacts of the Department of the Interior's policy to pursue coal exchanges.
- Programmatic alternatives that the Department of the Interior should analyze in its supplemental EIS.

For more information on scoping, see the Decision on the Scope of the Supplement to the 1979 FES for the Federal Coal Management Program (Appendix 6).

### PUBLIC INVOLVEMENT

While preparing the draft EIS supplement for the federal coal management program, BLM consulted with many federal, state, and local agencies; elected representatives; environmental and citizens groups; industry; and individuals. Many of these people participated during scoping. The following agencies will receive a copy of the draft supplemental EIS for formal review. Detailed information on others to whom the supplemental EIS is being sent may be obtained from Jack Edwards, BLM, Division of EIS Services, 555 Zang Street, 1st Floor East, Lakewood, Colorado 80228.

#### FEDERAL GOVERNMENT AGENCIES

Advisory Council on Historic Preservation  
Department of Agriculture  
    Forest Service  
    Soil Conservation Service  
Department of the Army  
    Corps of Engineers  
Department of Energy  
Department of the Interior  
    Bureau of Indian Affairs  
    Bureau of Mines  
    Bureau of Reclamation  
    Fish and Wildlife Service

## CHAPTER 7

Geological Survey  
Minerals Management Service  
National Park Service  
Office of Surface Mining Reclamation and Enforcement  
Department of Transportation  
Federal Highway Administration  
Environmental Protection Agency  
Interstate Commerce Commission

### STATE A-95 CLEARINGHOUSES

Alabama Office of State Planning and Federal Programs  
Colorado Department of Management and Budget  
Montana Office of Budget and Planning  
New Mexico Department of Finance and Administration  
North Dakota State Intergovernmental Clearinghouse  
Utah State Planning Coordinator, Office of the Governor  
Wyoming State Planning Coordinator, Office of the Governor

### LOCAL GOVERNMENTS

Various government agencies within the affected areas.

### COPIES MAY BE INSPECTED AT THE FOLLOWING BUREAU OF LAND MANAGEMENT OFFICES:

BLM Washington Office  
Office of Public Affairs  
18th & C Streets, NW, Room 5614  
Washington, D.C. 20240

BLM Division of EIS Services  
555 Zang Street, 1st Floor East  
Lakewood, Colorado 80228

BLM Colorado State Office  
Division of Lands and Renewable Resources  
2020 Arapahoe Street, 10th Floor  
Denver, Colorado 80205

BLM Eastern States Office  
Public Room  
350 South Pickett Street  
Alexandria, Virginia 23304

BLM Montana State Office  
Office of Public Affairs  
222 N 32nd Street, 1st Floor  
P.O. Box 36800  
Billings, Montana 59107

BLM New Mexico State Office  
Joseph M. Montoya Federal Building  
3rd Floor, Room 313  
South Federal Place  
P.O. Box 1449  
Santa Fe, New Mexico 87501

BLM Utah State Office  
CFS Financial Center  
324 South State, Suite 301  
Salt Lake City, Utah 84111-2303

BLM Wyoming State Office  
Public Information Office  
2515 Warren Avenue, 4th Floor  
P.O. Box 1828  
Cheyenne, Wyoming 82001

APPENDIXES





APPENDIX 1  
COAL UNSUITABILITY CRITERIA

---

A May 24, 1977, presidential memorandum instructed the Secretary of the Interior to lease only those areas where coal mining is environmentally acceptable and compatible with other land uses. In addition, the Surface Mining Control and Reclamation Act of 1977 (SMCRA) required the Secretary to review federal lands to determine whether they contained areas unsuitable for all or certain types of surface coal mining. SMCRA also requires the states to undertake a similar program for nonfederal lands if they wish to assume primary regulatory authority under the act. A list of standards to be used by the states is presented in Section 522(a)(3) of SMCRA. These same standards must also be applied to federal lands as well as to private surface lands overlying federal coal.

The coal unsuitability criteria were developed to implement SMCRA, other federal laws, and the directives in the President's Environmental Message of May 23, 1979. The criteria aid land managers in identifying those areas with key features and environmental sensitivities that cannot properly be protected if subjected to mining. Applying the unsuitability criteria ensures that the most sensitive and valuable environmental features of federal lands are protected in a consistent, uniform, and objective manner so that coal development planning is concentrated in areas where environmental conflicts are less likely to add delay, cost, or conflict to production efforts.

The unsuitability criteria (exceptions and exemptions not listed) protect the following lands and resources:

1. All federal land included in the following land systems or categories: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, national recreation areas, lands acquired with money derived from the Land and Water Conservation Fund, and federal lands in incorporated cities, towns, and villages.
2. Federal lands within rights-of-way or easements or included in surface leases for residential, commercial, industrial, or other public purposes.
3. Lands within 100 feet of the outside line of the right-of-way of a public road; within 100 feet of a cemetery; within 300 feet of any public building, school, church, community, or public park; or within 300 feet of an occupied building.
4. Federal lands being reviewed for possible wilderness designation.
5. Scenic federal lands designated by visual resource management analysis as Class 1 (areas of outstanding scenic quality or high visual sensitivity).

## APPENDIX 1

6. Federal lands under permit by the surface management agency that are being used for scientific studies involving food and fiber production, natural resources, or technology demonstrations and experiments (except where mining could be conducted in such ways as to enhance, not jeopardize, the purposes of the study).
7. All publicly owned districts, sites, buildings, structures, and objects of historic, architectural, archaeological or cultural significance on federal lands that are listed on the National Register of Historic Places, and an appropriate buffer zone around the designated property.
8. Federal lands designated as natural areas or as national natural landmarks.
9. Federally-designated critical habitat for threatened or endangered plant or animal species and habitat for federal threatened or endangered species that is determined by the U.S. Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented.
10. Federal lands with habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened.
11. An active bald or golden eagle nest site on federal lands and an appropriate buffer zone around the nest site.
12. Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering.
13. Federal lands containing an active falcon (excluding kestrel) cliff-nesting site and a buffer zone of federal land around the nesting site.
14. Federal lands that are high priority habitat for migratory bird species of high federal interest on a regional or national basis as determined jointly by the surface management agency and the U.S. Fish and Wildlife Service.
15. Federal lands that the surface management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and that are essential for maintaining these priority wildlife species.
16. Federal lands in riverine, coastal, and special floodplains (100-year recurrence interval) where mining could not be undertaken without substantial risk of loss of life or property.
17. Federal lands that have been committed by the surface management agency to use as municipal watersheds.
18. Federal lands with national resource waters as identified by states in their water quality management plans and a 1/4-mile wide buffer zone of federal land.



## COAL UNSUITABILITY CRITERIA

19. Federal lands identified by the surface management agency in consultation with the state as alluvial valley floors where mining would interrupt, discontinue, or preclude farming.

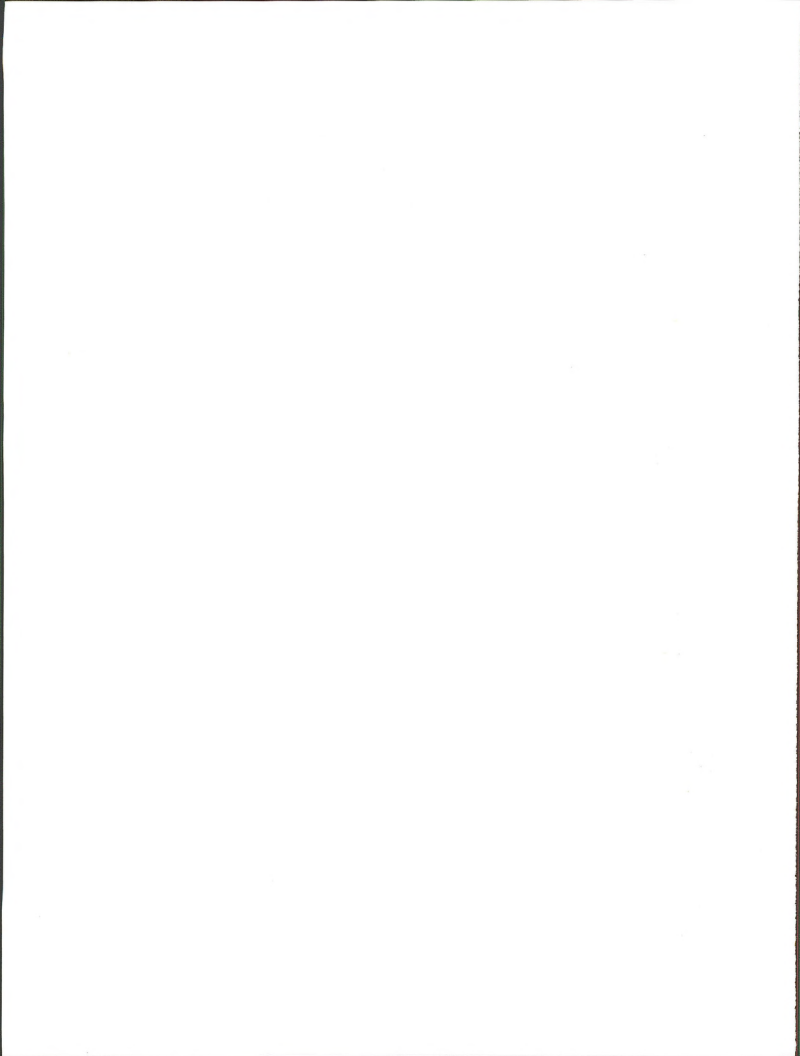
20. Federal lands in a state to which applies a criterion (1) proposed by that state and (2) adopted by rulemaking by the Secretary of the Interior.

SMCRA mandates that the Secretary of the Interior review all federal lands for unsuitability and that citizens be allowed to petition for and against designation of lands as unsuitable. Consequently, under SMCRA, the Department of the Interior has procedures to apply unsuitability criteria both as part of a comprehensive federal lands review and as part of a petition process.

Unsuitability criteria are applied for unleased lands during land use planning and for leased lands during surface mining permit application, as described in Chapter 1. SMCRA has one more unsuitability criterion that is not included in the regulations. Section 522(a)(2) requires that lands be deemed unsuitable for all or certain types of surface coal mining if reclamation under the requirements of SMCRA is not technologically and economically feasible. In the decision that established the coal program after completion of the 1979 FES, Secretary of the Interior Andrus determined that this criterion is most efficiently and appropriately applied at the surface mining permit application stage rather than during land use planning. Reclaimability is, in fact, considered at various points throughout land use and activity planning. The formal review under Section 522(a)(2), however, is encompassed within the surface mining permit review process. As SMCRA requires, federal lands review is conducted during land use planning to the extent possible, and the remaining portion is conducted during the surface mining permit application review.

The Office of Surface Mining Reclamation and Enforcement (OSM) has the responsibility of administering the statutory unsuitability petition process. OSM will make a formal designation of federal lands as unsuitable only in response to a petition to designate under Section 522(c) of SMCRA. Anyone can submit either of two kinds of petitions. One is a petition to designate land unsuitable for mining. The other is a petition to terminate a designation of unsuitability. Section 522 of SMCRA requires that the petitioner be adversely affected by potential mining of the lands in question and provide facts supporting the allegation.

Petitions submitted will be reviewed by OSM in consultation with the surface managing agency and then returned with recommendations to the authorized surface management agency. A public hearing will later be held to present to the public the reviews of the OSM and the surface management agency. These reviews will describe (1) potential coal resources of the area; (2) the demand for coal resources; and (3) the impact of such designation on the environment, the economy, and the supply of coal. A decision to designate land unsuitable, to reject the petition, or to terminate a prior designation will occur within 60 days of the hearing.



CHARTER

FEDERAL-STATE COAL ADVISORY BOARD

Bureau of Land Management  
United States Department of the Interior

1. Official Designation: Federal-State Coal Advisory Board.
2. Objectives and Scope: The board and its subcommittees advise the Secretary of the Interior and Director, Bureau of Land Management, regarding the Federal coal management program in accordance with the provisions of the charter and Title 43 of the Code of Federal Regulations Part 3400 (43 CFR Part 3400). The board will have a national focus and play a key role in developing and reviewing the Department's long-range coal planning schedule and the various coal leasing policies of the Department. The board's subcommittees (regional coal teams) will serve as the Secretary's major tools for balancing regional and national interests as a way of assuring that both Federal and State concerns are given proper consideration.
3. Period of Time Necessary for the Board's Activities: Since the board's functions are related to policies established by regulation for Federal-State cooperation in the management of Federal coal resources, the need for the board and its regional coal teams (RCTs) is expected to continue into the foreseeable future. However, continuation of the board and its responsibilities for Federal coal management advice will be subject to review and biennial renewal as required by Section 14 of the Federal Advisory Committee Act.
4. Official to Whom the Board Reports: Secretary of the Interior through the Director, Bureau of Land Management. The Secretary shall accept the recommendations of the RCTs except in the case of an overriding national interest or in the case that he accepts the advice of the Governor(s) pursuant to 43 CFR 3420.4-3(c). In cases where an RCT's advice is not accepted, a written explanation of the reasons will be provided to the RCT and to the public.
5. Board Officers: The Director, Bureau of Land Management, or his/her designated representative will chair the board.
6. Administrative Support: Administrative support for activities of the board will be provided by the Director, Bureau of Land Management, or his/her designee.
7. Duties of the Board and the RCTs:
  - a. The board will have a national focus. It will review and make recommendations, on an annual basis, on the Department's proposed long-range coal planning schedule and the steps and resources needed to achieve such a

Attach. 1-1

## APPENDIX 2

schedule. It will also assist in developing appraisal methodologies. The board, in its review of the proposed long-range schedule, will consider the advice provided by the RCTs on regional schedules and possible environmental, social, and economic consequences.

b. The RCTs shall guide all phases of the coal activity planning process for regional competitive coal leasing in accordance with 43 CFR 3400, and shall serve as the Secretary's major tools for Federal-State regional conflict resolution so that both Federal and State concerns are given proper consideration. Specifically, each RCT shall:

(1) Transmit to the Secretary, through the Director, alternative leasing levels and a proposed action leasing level (all in ranges of tons of recoverable coal to be offered for lease);

(2) Guide tract delineation and preparation of site-specific analyses of delineated tracts;

(3) Rank delineated tracts, select tracts that meet the leasing level established by the Secretary, and identify the proposed action and all alternative tract combinations to be analyzed in the regional lease sale environmental impact statement (EIS);

(4) Guide the preparation of the regional lease sale EIS;

(5) Utilize market assessments prepared by the Bureau and requested by the RCT and recommend a regional coal lease sale schedule to the Secretary, through the Director, including tracts to be offered and timing of the sale(s);

(6) Conduct a post-sale reassessment of the need for additional sales in the event of a phased sale;

(7) Recommend a lease sale schedule for reoffering tracts that were not sold in earlier lease sales;

(8) Solicit, to the maximum extent possible, the views of the public at each decision point;

(9) Consider, as a group with a regional perspective, comprehensive land use plans to be used for regional coal activity planning to determine data strengths and weaknesses and to identify additional data requirements and unresolved issues to be addressed during activity planning;

(10) Advise the Secretary, through the Director, of tracts lacking adequate information or analyses to support sound decisionmaking;

## FEDERAL-STATE COAL ADVISORY BOARD CHARTER

(11) Serve as the forum for Department-State consultation and cooperation in all other major Department coal management program decisions in the region, including preference right lease applications, public-body and small business set-aside leasing, emergency leasing, lease transfers and readjustments, and exchanges;

(12) Provide, on an annual basis, advice to the board on regional sale schedules and possible environmental, social, and economic consequences and serve as the Secretary's major tool for Federal-State regional conflict resolution so that both Federal and State concerns are given the proper consideration; and

(13) Take all necessary steps, including publication of newsletters, conducting information meetings, etc., needed to inform the public of decisions and issues before the RCT and solicit the views of the public at each key decision point. The RCT chairperson shall be responsible for ensuring that all documents prepared during activity planning or the relevant documents developed or prepared during land use planning are readily available to the public.

8. Board Composition: The board's membership will comprise the Bureau Director (or a designated alternate) who serves as board chairperson; a Bureau official and the Governor (or their designees) from each of the following States: Alabama, Colorado, Montana, New Mexico, North Dakota, Oklahoma, Utah, and Wyoming; and the chairperson of each RCT.

9. Subcommittees of the Board: Unless changed in accordance with 43 CFR 3400.5, the board will have as its subcommittees one RCT for each of the following regions: Green River-Hams Fork; Uinta-Southwestern Utah; Powder River; Fort Union; San Juan River; and Southern Appalachian (Alabama Subregion).

a. Membership. Membership of the RCTs will be as follows:

(1) Voting Members. To provide a membership that is balanced in terms of points of view represented and functions to be performed, each RCT will comprise three (for a one-State region) or five (for a two-State region) board members, who shall be voting members of the RCT, as follows:

(a) An RCT chairperson, designated by the Director, who will be the Bureau State Director with the greatest direct concern in the region ("lead State"). The chairperson will designate an alternate to serve in his or her absence, provided that the alternate is not an existing member of the RCT. The chairperson shall vote only in case of a tie;

(b) One or two Bureau officials, or their designated representatives, from the State(s) in the region. Each Bureau official shall be the State Director -- unless the State Director from the lead State is already the RCT chairperson, in which case an additional representative

## APPENDIX 2

shall be appointed as a voting member from that State. If the region is a multi-State region under the jurisdiction of one Bureau State Office, the State Director shall also designate a representative for the other State in the region; and

(c) One or two Governors, or their designated representatives, of the State(s) in the region.

(2) Non-Voting Members. Each RCT will also have a non-voting member who will be a Washington official responsible for articulating for the Secretary the national interest perspective for Federal coal leasing. In accordance with 43 CFR 3400, the RCT chairpersons may request assistance from appropriate representatives of affected Federal, State, and local agencies or governments.

(3) Alternates. The RCT members should, at the time of their appointment, designate in writing to the board and RCT chairpersons their alternates, who may represent the members at board and RCT meetings.

(4) Changes in Membership. The RCT members may be changed, provided that the State or Bureau official responsible for each RCT member assures that a substitute or replacement is always available to conduct the business of each RCT.

b. Working Groups. To ensure that a broad array of interests is represented in RCT deliberations, the RCTs are encouraged to use regional working groups that will include representatives of the various interests within the community.

c. Staff Support. Use of State staff support, on a sale-by-sale basis, is encouraged. Such assistance may be solicited from those agencies or governments with special expertise in issues being considered by a team or with direct responsibilities in areas that may be affected by the Federal coal management program.

10. Meetings: The board shall meet subject to the call of the chairperson or, with the approval of the chairperson, at the request of a majority of its members, but in no case less than once annually. Each RCT will meet at least once annually, but normally more frequently based on continuing program functions and/or special needs.

Meetings of the board will be called to acquire a national perspective for leasing Federal coal and to carry out the duties specified in paragraph 7a of this charter. Individual meetings of an RCT will be held to conduct the business specified in paragraph 7b of this charter. RCT chairpersons or their designees will call and attend all meetings of their respective RCTs.

All meetings of the board and the RCTs will be open to the general public and news media. Any organization, association, or individual may

## FEDERAL-STATE COAL ADVISORY BOARD CHARTER

attend, file a statement with, or appear before the board or an RCT regarding topics on a meeting agenda. All agendas will be formally approved in advance of board meetings by the board chairperson or his/her designee and in advance of RCT meetings by the RCT chairperson or his/her designee. To facilitate the orderly conduct of business, the board chairperson or his/her designee and the RCT chairperson or his/her designee may require prior notification by those desiring to be heard and set per-person presentation time limits.

Notice of each meeting of the board and each RCT normally will be published in the Federal Register and distributed to the news media 30 days in advance, will set forth clearly and precisely the issue(s) for which the meeting has been called and advice is being sought, and will identify the time for the public to be heard on the issues identified in the notice. Fifteen days advance notice of a meeting may be provided in emergency situations with reasons for the emergency exception explained in such notice.

11. Board Records and Proceedings: Subject to the Freedom of Information Act, detailed minutes of each meeting of the board and of each RCT including recommendations made and copies of all studies and reports received, issued, or approved in conjunction with activities of the board or the RCTs will be maintained and made available for public inspection and copying during regular business hours at the following office:

Division of Solid Mineral Leasing (650)  
Bureau of Land Management  
Department of the Interior  
18th and C Streets, N.W.  
Washington, D.C. 20240.

In addition, the same information for each RCT meeting will be maintained in the Bureau State Offices for the States included in the respective regions.

12. Estimated Operating Costs: Activities of the board will require an estimated \$50,000 annually (which includes 5 work months of Federal employee support, travel and per diem, and other expenses) for each board meeting; and an estimated \$150,000 (which includes 3 person-years of Federal support) for each RCT.

13. Reimbursement for Member Travel: Travel expenses for board and RCT voting members shall be paid by the Bureau. Travel expenses, including per diem (as authorized by Section 5703 of Title 5, U.S.C., for persons serving intermittently in the Government Service), may be authorized by the board chairperson or an RCT chairperson for representatives of local governments and agencies providing assistance to the board and/or RCTs, based on the need for such participation and an inability to meet associated costs independently.





APPENDIX 3  
ENDANGERED SPECIES ACT COMPLIANCE

---

Section 7 of the Endangered Species Act of 1973 requires that any federal agency planning any action that might affect endangered species must consult with the Fish and Wildlife Service (FWS) concerning the names of threatened or endangered species within the affected areas. This appendix presents the responses of FWS Regions 2, 4, and 6 (covering the six federal coal production regions) to BLM's request for the required Section 7 listing of threatened and endangered species. Table A-5-1 combines the FWS responses, listing species by coal region.

## APPENDIX 3



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE

POST OFFICE BOX 1306  
ALBUQUERQUE, NEW MEXICO 87103

NOV 16 1984

IN REPLY REFER TO:

SE

RECEIVED

NOV 21 1984

EIS OFFICE

Memorandum

TO: Chief, Division of EIS Services, Denver Service Center,  
Bureau of Land Management, Denver, Colorado

FROM: <sup>Acting Assistant</sup> Regional Director, Region 2 (AFF)

SUBJECT: Updated List of Threatened and Endangered Species for the  
1985 Federal Coal Management Program EIS Supplement for the  
San Juan Region

This responds to your September 21, 1984, request for an updated species list for the subject project. As discussed, it was mutually agreed to have this information to you prior to November 22, 1984. The following listed, proposed, and Candidate Category 1 species may be affected by coal management activities.

<u>Listed Species</u>	<u>Status</u>	<u>State, County</u>
Black-footed ferret	Endangered	NM, McKinley, Rio Arriba, Sandoval, San Juan
Bald eagle	Endangered	NM, Catron, Rio Arriba
Knowlton cactus	Endangered	NM, Rio Arriba, San Juan
Mesa Verde cactus	Endangered	NM, San Juan
Colorado squawfish	Endangered	NM, San Juan

Proposed Species

Mancos milk vetch ( <u>Astragalus humillimus</u> )	NM, San Juan
Rhizone fleabane ( <u>Erigeron rhizomatus</u> )	NM, Catron, McKinley

Candidate Category 1 - These candidate species have no legal protection under the Endangered Species Act, but are species for which the Service has substantial information to support their

ENDANGERED SPECIES ACT COMPLIANCE

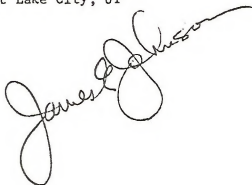
2

listing as endangered or threatened. The development and publication of proposed rules for such species is anticipated. They are included in this document for planning purposes only.

Pecos sunflower (Helianthus paradoxus) NM, Cibola

If we may be of further assistance, please call FTS 474-3972.

cc: Field Supervisor, Ecological Services, Albuquerque, NM  
Field Supervisor, Endangered Species, Salt Lake City, UT  
Regional Director, Region 6 (SE)

A handwritten signature in cursive script, appearing to read "James Johnson". The signature is written in black ink and is slanted upwards to the right.

## APPENDIX 3

OCT 18 1984

UNITED STATES GOVERNMENT

## memorandum

DATE: October 11, 1984  
 EIS OFFICE

REPLY TO  
 ATTN OF: Field Supervisor, FWS, SE, Jackson, Mississippi

SUBJECT: Updated List of Threatened, Endangered, or Proposed Species for the 1985 Federal Coal Management Program Supplement

TO: Chief, Division of Environmental Impact Statement Services, BLM, Denver, Colorado

The list for the Alabama Sub-region, Southern Apalachian Coal Region should be updated as follows:

Birds

1. delete Kirkland's warbler
2. peregrine falcon should be American peregrine falcon (E)
3. add Arctic peregrine falcon (T)

Mammals

1. delete Eastern cougar
2. add Florida panther (E)

Invertebrates

1. delete entire list, the freshwater mussels on this list that occur in Alabama are found in north-central or northeast Alabama not in the coal producing region.

Several candidate species occur in the Alabama sub-region. These species are undergoing status reviews and could be proposed in the future. These species are:

flattened musk turtle  
 Marshall's mussel  
 Curtis mussel  
 Judge Tait's mussel  
 stirrup shell mussel  
 penitent mussel

If you need any additional information, please let me know.

*Remmie B. Jordan*

ENDANGERED SPECIES ACT COMPLIANCE

FA/SE/BLH Informal

OCT 19 1984

MEMORANDUM

To: Chief, Division of EIS Services, Denver Service Center  
Bureau of Land Management, Denver, Colorado

From: <sup>2/2/85</sup> Regional Director, Region 6.  
U.S. Fish and Wildlife Service, Denver, Colorado

Subject: Updated List of Threatened, Endangered, or Proposed Species for the  
1985 Federal Coal Management Program EIS Supplement

This responds to your September 21, 1984, request for an updated species list for the subject program. From the very general map provided, we believe that the following species could be found in the coal regions or be affected by actions in the coal regions and therefore should be added to your 1979 list.

Fort Union Region  
North Dakota

Interior least tern (Sterna antillarum athalassos) (P)

Green River-Hams Fork Region

Colorado squawfish (Ptychocheilus lucius) (E)  
Humpback chub (Gila cypna) (E)  
North Park phacelia (Phacelia formosula) (E)  
Wyoming toad (Bufo hemiophrys baxteri) (E)

Uinta-Southwestern Utah Region

Bonytail chub (Gila elegans) (E)  
Dwarf bear poppy (Phacelia argillacea) (E)  
Purple-spined hedgehog cactus (Echinocereus engelmannii var. purpureus) (E)  
Spineless hedgehog cactus (Echinocereus triglochidiatus var. inermis) (E)  
Uinta Basin hookless cactus (Sclerocactus gnauvus) (T)  
Wright fishhook cactus (Sclerocactus wrightiae) (E)  
Siler pincushion cactus (Pediacactus sileri) (E)  
Heliotrope milk-vetch (Astragalus limnocharris var. montii) (P)  
Welsh's milkweed (Asclepias welshii) (P)  
Clay-loving wild-buckwheat (Eriogonum pelinophilum) (E)  
Maguire daisy (Erigeron maguirei var. maguirei) (P)  
Last Chance townsendia (Townsendia aprica) (P)

## APPENDIX 3

2

### San Juan River Region Colorado

Knowlton's hedgehog cactus (Pediocactus knowltonii) (E)  
Mesa-verde cactus (Sclerocactus mesae-verdae) (T)  
Mancos milk-vetch (Astragalus numillimus) (P)

We have only two deletions at this time including the gray wolf and the Tule white-fronted goose from the Fort Union coal region. The latter species is not a federally listed endangered or threatened species. The bald eagle and American peregrine falcon are listed in your 1979 table as only migratory species in the Green River-Hams Fork and the Uinta-Southwestern Utah Coal Region. We believe that these two species also nest in these two regions so would also be either summer or permanent residents.

The above listing includes the letters "P" for proposed species, "E" for endangered species, and "T" for threatened species. We hope this will help you with your update of the Federal Coal Management Program EIS.

/s/ Robert H. Shields

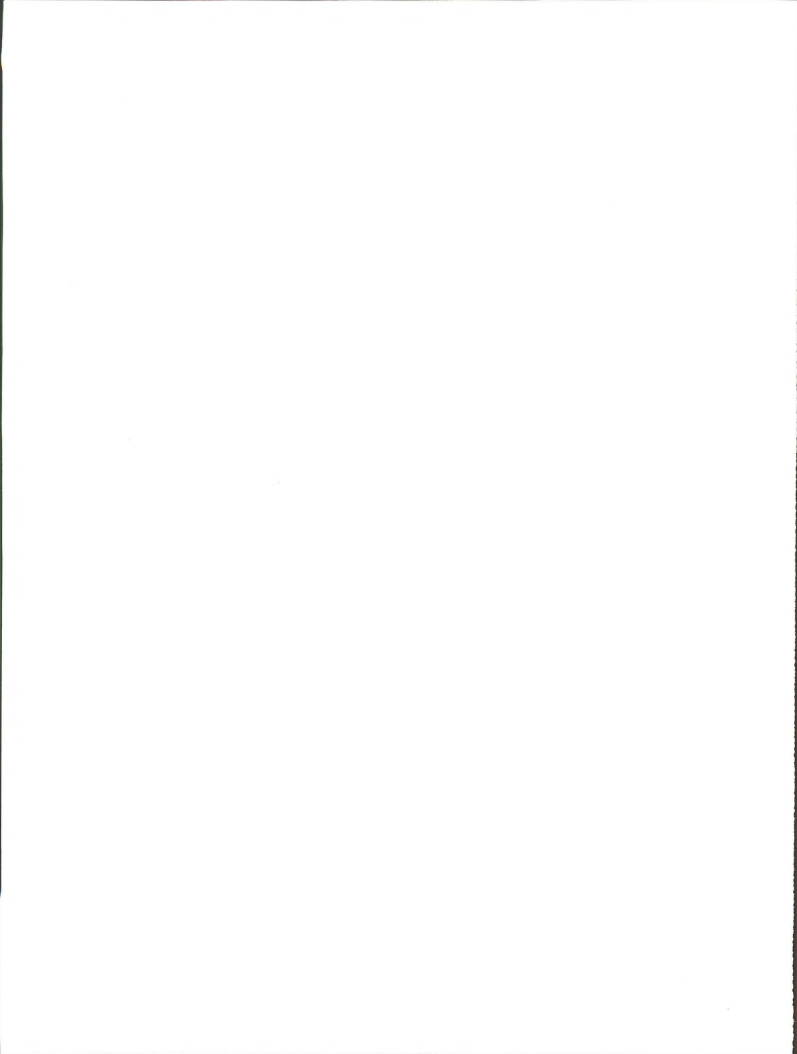
# ENDANGERED SPECIES ACT COMPLIANCE

TABLE A-3-1  
FEDERALLY PROTECTED SPECIES

Region	Fish	Reptiles and Amphibians	Birds	Mammals	Plants
Fort Union			Whooping crane (E) (2) Bald eagle (E)(2) American peregrine falcon (E)	Black-footed ferret (E)(1) Northern kit fox* (E)	
Powder River			Whooping crane (E)(2) Bald eagle (E)(1)  American peregrine falcon (E)(1)	Black-footed ferret (E)(1)	
Green River-Hans Fork	Kendall Warm Springs dace (E)(1) Colorado squawfish (E)(1) Humpback chub (E)(1)	Wyoming toad (E)(1)	Whooping crane (E)(2) (2) Bald eagle (E)(1) American peregrine falcon (E)(1)	Black-footed ferret (E)(1)	North park phacelia (E)(1)
Uinta-Southwestern Utah	Woundfin(E)(1) Humpback chub (E)(1) Colorado squawfish (E)(1) Bonytail chub (E)(1)		Whooping crane(E)(2) Bald eagle (E)(1) American peregrine falcon (E)(1)	Utah prairie dog (E) (1) Black-footed ferret (E)(1)	Rydberg mill vetch (T)(1)  <u>Phacelia argillacea</u> (E)(1) Dwarf bear poppy (E) (1) Purple-spined hedgehog cactus (E) (1) Spineless hedgehog cactus (E)(1) Wright fishhook cactus (E)(1) Siler pincushion cactus (E)(1) Clay-loving wild-buckwheat (E)(1) Uinta Basin hookless cactus (T)(1)
San Juan River	Apache trout (T)(1) Colorado squawfish (E)(1)		Whooping crane (E)(2) Thick-billed parrot (E)(1) Bald eagle (E)(1/2) American peregrine falcon (E)(2) Black-footed ferret (E)(1)	Gray wolf (E)(1)	Knowlton's hedgehog cactus (E)(1) Hesa Verde cactus (T)(1)
Alabama Sub-region	Watercress darter (E)(1)		Bachman's warbler (E) (2) Red-cockaded woodpecker (E)(1) Bald eagle (E) (1/2) American peregrine falcon (E) (2) Arctic peregrine falcon (T)(2)	Gray bat (E)(1) Indiana bat (E)(1) Florida panther (E) (1)	

\*Probably not a resident of study area, but one was trapped in Slope County in 1970.

(E) Endangered  
(T) Threatened  
(1) Permanent resident  
(2) Migratory species





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## APPENDIX 4

### SOCIOECONOMIC METHODOLOGIES

This section describes the data sources and methods used to analyze the socioeconomic impacts of more coal production. It is divided into the following subjects:

affected environment,  
general impacts,  
coal production,  
employment and population,  
royalties and severance taxes, and  
comparison with 1979 projections.

### AREAS OF INFLUENCE

No further coal development is expected in large portions of some coal regions during the period considered in this analysis (1983-2000). To make the socioeconomic analysis more meaningful, an area of influence is defined in each coal region, including only those counties in which coal development or related socioeconomic impacts are expected to occur. The following counties are included in the areas of influence:

#### Fort Union Coal Region

<u>Montana</u>	<u>North Dakota</u>
Carter	Burleigh
Custer	Dunn
Dawson	Golden Valley
McCone	McLean
Prairie	Mercer
Richland	Morton
Wibaux	Stark

#### Powder River Coal Region

<u>Montana</u>	<u>Wyoming</u>
Big Horn	Campbell
Musselshell	Converse
Powder River	Crook
Rosebud	Goshen
	Johnson
	Natrona
	Niobrara
	Platte
	Sheridan
	Weston

#### Green River-Hams Fork Coal Region

<u>Colorado</u>	<u>Wyoming</u>
Jackson	Carbon
Moffat	Lincoln
Rio Blanco	Sweetwater
Routt	Uinta

## METHODOLOGIES

### Uinta-Southwestern Utah Coal Region

<u>Colorado</u>	<u>Utah</u>
Delta	Carbon
Gunnison	Emery
Mesa	Garfield
Pitkin	Kane
	Sanpete
	Sevier

### San Juan River Coal Region

	<u>New Mexico</u>		<u>Arizona</u>
Catron		San Juan	Apache
Cibola		Socorro	
McKinley		Valencia	
Sandoval			

### Southern Appalachian Coal Region, Alabama Subregion

	<u>Alabama</u>	
Fayette		Tuscaloosa
Jefferson		Walker

## SOURCES

### Areas of influence definitions:

- Bolander, Ronald. 1984. BLM Utah State Office. Uinta-Southwestern Utah Coal Region.
- Brabson, Donald. 1984. BLM Wyoming State Office. Powder River Coal Region.
- Frey, William. 1984. BLM Montana State Office. Fort Union Coal Region, Powder River Coal Region.
- Jentgen, Russell. 1984. BLM New Mexico State Office. San Juan River Coal Region.
- Smith, Kenneth. 1984. BLM Colorado State Office. Green River-Hams Fork Coal Region, Uinta-Southwestern Utah Coal Region.

Population, earnings, personal income: U.S. Department of Commerce, Bureau of Economic Analysis 1984b.

Employment: U.S. Department of Commerce, Bureau of Economic Analysis 1984a.

Area: Newspaper Enterprises Association, Inc. 1983.

Other data: BLM 1982a; BLM 1983b; BLM 1983c; BLM 1983i; BLM 1984c; BLM 1984d

## APPENDIX 4

### GENERAL IMPACTS

Regardless of the location or amount of additional coal development, the same elements of the socioeconomic environment would be affected. The typical impacts to these elements are described in the General Impacts section. The size and significance of impacts would vary with the size of coal development in each location, the size and infrastructure of affected communities, and other concurrent developments in that location. These variations can be addressed only with the use of the site-specific data included in the separate EISs for each of the coal regions.

Sources of information used in the General Impacts section:

Briscoe, Maphis, Murray, and Lamont, Inc. 1978  
Chalmers and Anderson 1977  
Gilmore and others 1976  
Halstead and others n.d.  
Halstead and Leistritz 1983  
Leistritz and Maki 1981  
BLM 1983m.

### COAL PRODUCTION

Estimates of coal-related employment and population are made in two steps to allow for the portion of new coal mine employment that would be filled from local labor forces. The first step is to estimate 1983 (the latest year for which coal figures exist) employment and population. These estimates are needed because no statistics provide total primary and secondary coal-related employment and population. The second step is to estimate increases in employment and population between 1983 and each analysis year. In 1983, all coal-related employment was, by definition, part of the local labor forces. Future increases in employment, however, would be drawn partly from local labor forces and partly from immigrant workers. Therefore, the percent nonlocal (percent of primary jobs that could not be filled from the local labor force) multipliers are not used for the 1983 estimates but are used for the estimates in all future years.

Construction employment estimates are based on the projected change in a region's coal production. The need for construction depends only on additions to a region's coal production capacity, not on the capacity that is already in existence. Separate calculations were made for surface and subsurface production. Construction employment estimates for 2000 were kept at the 1995 level because production projections beyond 2000 were not available.

As described above, the two-step operation employment estimates are made from, respectively, 1983 coal production and the projected change in production from 1983 to the year of analysis. The two estimates are summed for the final employment projections.

## METHODOLOGIES

### EMPLOYMENT AND POPULATION

Primary employment (coal mining and beneficiation employment).

Method: coal production times multipliers.

Multipliers (employees per 100,000 tons coal production).

	<u>Surface Mining</u>		<u>Subsurface Mining</u>	
	Construction	Operation	Construction	Operation
Fort Union	4.4	3.4	NA	NA
Powder River	4.4	4.0	NA	NA
Green River-Hams Fork	4.4	8.3	9.2	25.0
Uinta-Southwestern Utah	4.4	10.2	9.2	26.8
San Juan River	4.4	7.5	9.2	25.0
Alabama Subregion	4.4	17.6	9.2	42.5

NA: Not applicable. The regions have no subsurface mines.

Sources (see References Cited): Mining Informational Services 1983  
 Hamilton, Kent. BLM Albuquerque District Office 1984.  
 Marks, Laurence. BLM Casper District Office 1984.  
 BLM n.d.; BLM 1983b; BLM 1983d; BLM 1983i; BLM 1984c; BLM 1984d

Construction multipliers are averages of those used in the separate regional coal EISs. Operation multipliers are those used in the regional EISs except for subsurface mining in the Uinta Southwestern Utah Region, whose multiplier is derived from current statistics on larger mines (2,000 tons or more annual production) in the Keystone Coal Industry Manual (Mining Informational Services 1983). The lower multiplier is believed to reflect the introduction of new mining technology (longwall and continuous mines) in the larger Utah mines. Because such technology requires both thick coal seams and favorable economies, a large scale increase in its use in the other regions appears unlikely in the near future (Moffitt 1984; Smith 1984).

### POPULATION

#### Method

Primary employment x % of primary employment that is nonlocal = nonlocal primary employment.

Nonlocal primary employment x secondary employment multiplier = secondary employment.

Primary and secondary employment x population multiplier = population.

## APPENDIX 4

### Multiplier

Percent nonlocal (percent of primary jobs that could not be filled from the local labor force).

Region	Surface Multiplier	Subsurface Multiplier
Fort Union	68	68
Powder River	100	100
Green River-Hams Fork	80	80
Uinta-Southwestern Utah	80	80
San Juan River	68	83
Alabama Subregion	0	10

### Secondary employment multipliers (all regions)

Construction	0.55
Operation	1.35

### Population multipliers (all regions)

Primary construction	1.80
Primary operation	2.60
Secondary	2.60

### Other assumptions

The socioeconomic analysis assumes that all secondary employment jobs would be filled from outside the local labor force. Reasons for this assumption are (1) secondary employment is generated only by nonlocal primary employment, implying that the existing local labor force has already been absorbed by primary jobs, and (2) results of a recent study showing few secondary jobs filled by local residents or the dependents of primary workers (Halstead and others 1984).

The above assumption is not followed in the Alabama Subregion, where the analysis assumes that all secondary jobs would be filled from the local labor force. Nonlocal primary employment in that area of influence is assumed to result from requirements for specialized skills not fully existing in the local labor force rather than from a labor shortage.

Sources: Percent nonlocal employment is derived from the regional coal EISs (see list under primary employment sources). Nonlocal employment in those EISs was determined by means of economic models. The implied percent was estimated by calculating total employment and population through the use of their multipliers and then comparing the calculated population with their population estimates.

## METHODOLOGIES

### Exceptions to this method:

Fort Union Region: Because exact population figures were not available, an average of the other four western regions was used.

Uinta-Southwestern Utah Region: Because the calculated percentage was much higher than in the adjacent regions, the percentage from the Green River-Hams Fork Region was used.

Alabama Subregion: The percent is given in the regional EIS.

Secondary employment and population multipliers were both derived in the same manner. An average was calculated from the multipliers used in the regional coal EISs (the same list under primary employment sources). A second average was obtained from a source (Halstead, and others 1984) that surveys a number of other impact analyses. The two averages were then averaged.

### ROYALTIES AND SEVERANCE TAXES

#### Method

Federal royalty = coal production x price x royalty rate x % federal coal ownership.

Annual growth in price is the projected increase in coal price relative to other prices. Royalty rates represent averages of the rates applied to surface and subsurface coal production, along with upward adjustments for other state and local taxes (excluding income and rates and use taxes) and downward adjustments for taxes that are deductible from the royalty rate base. Only half of the calculated royalty is shown in Table 4-5 because half is returned to the states.

State severance taxes: Coal production x price (if needed) x tax rate.

#### Prices and rates

The following tables show specific rates for federal coal royalties and state severance taxes.

## APPENDIX 4

### FEDERAL ROYALTIES

	Fort Union	Powder River	Green River-Hams Fork	Uinta-SW Utah	San Juan River	Alabama Subregion
Price per ton (1983),	\$6.00	\$11.00	\$20.00	\$ 26.00	\$15.00	\$35.00
Annual growth in price(%)	0.5	0.3	0.3	0.4	0.4	0
Royalty rate						
1990	0.110	0.080	0.100	0.075	0.110	0.075
1995	0.125	0.125	0.110	0.080	0.110	0.080
2000	0.125	0.125	0.120	0.080	0.120	0.080
Percent fed. coal ownership(%)	33	80	60	80	50	5

### STATE SEVERANCE TAXES

	Tax Rate	Basis
Alabama	\$00.37	per ton
Colorado	00.60	per ton
Montana	24.62%	percent taxable value
New Mexico	00.50	per ton
North Dakota	00.85	per ton
Wyoming	13.57%	percent taxable value

Prices are the same as those used for the federal royalty estimates.  
Source: Broderick 1984.

### COMPARISON WITH 1979 PROJECTIONS

Large differences occur between the projections of coal-related employment, population, and revenues made in the Federal Coal Management Program FES (BLM 1979a) and those in this EIS supplement. Part of the differences result from the inclusion of the impacts of coal transportation and conversion in the 1979 FES and their omission from this one. Others are caused by differences in the projection of coal production in the two documents and differences in the impact multipliers used. A further difference, however, occurs because of changes in the methods of estimating impacts used in the present analysis. This section provides a breakdown of the differences to show the relative importance of the four factors described above.



## METHODOLOGIES

Because many regions, years, alternatives, and production levels are included in both analyses, a breakdown for every combination would become too voluminous. Therefore, a single example is analyzed in depth. Comparative figures are then given that show the possible variations among the coal regions.

Some of the calculation detail behind the impact results in the 1979 FES are not available. Therefore, those calculations must be estimated with the use of the multipliers given in that document and the undetermined difference shown as a separate item.

Table A-4-1 provides a complete analysis of one example, covering all calculations from coal production to population. It shows that the major difference between 1979 and 1985 projections results from the handling of beneficiation employment. Although the multipliers used for mining in 1984 exceed those used in 1979 and their difference can be considered a beneficiation component, these multipliers fall far below the combined mining and beneficiation multipliers used in 1979. Methods used to derive the 1979 beneficiation multipliers were not described, making it impossible to evaluate them. Current statistics, however, show no employment factor of such size.

Other important differences in the employment projections result from the coal production amounts used and the adjustment for locally hired primary employment. Because the calculation process involves a sequence of multiplications, the differences are compounded at each step, resulting in the extreme difference between the final employment projections.

The main additional difference occurring in the population projections is the inclusion of conversion employment and its related population. The mining and beneficiation employment projections alone, however, account for more than half of the population differences.

Table A-4-2 compares mining and beneficiation employment multipliers for each region. In most cases the comparison is similar to that in the Fort Union Region. The 1985 multipliers for mining are higher than those for mining alone in 1979 but are far lower than the combined mining and beneficiation multipliers used in 1979.

Table A-4-3 compares the severance tax rates used in the two documents. Most of the rates have risen since 1979. Therefore, the differences shown in Table 4-5 result largely from the coal production amounts on which they are based. Estimates of the net impacts on local government expenditures are not included in this analysis because, even more than population and employment, those impacts are significant only in relation to the specific communities and other local governments that would be affected.

## APPENDIX 4

TABLE A-4-1  
COMPARISON OF 1979 AND 1985 PROJECTIONS, FORT UNION COAL REGION  
NO NEW FEDERAL LEASING, MEDIUM PRODUCTION LEVEL, 1990

Socioeconomic Factors	1979 FES				1985 EIS			
	Multiplier		Amounts		Multiplier		Amounts	
	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
Coal Production (100,000 tons)								
1983								
1990			510**					194**
1995								240**
Amount used for projection			510	510			66	230
Primary employment								
Mining	3.21	3.30	1,637	1,683	4.4	3.4	290	782
Beneficiation (composite)*	6.36	0.74	3,244	375				
Total			4,881	2,058			290	782
Nonlocal primary employment					0.86	0.86	248	743
Secondary employment	1.40	1.40	6,833	2,881				
Coal mining and beneficiation employment					0.55	1.35	136	1,003
Subtotal			16,653**					
Undetermined difference			687**					
Total			17,340**				2,711**	
Coal conversion employment			18,166	2,736				
Total			20,902**					
Total all employment			38,242**					
Population								
Married employees	0.75**		28,682**					
Family population	2.50**		71,705**					
Single employees	0.25**		9,560**					
Population related to nonlocal primary employment					1.80	2.60	466	1,932
Population related to secondary employment					2.60	2.60	354	2,608
Subtotal			81,265**					
Undetermined difference			1,335**					
Total			82,600**				5,340**	

\*Composite multiplier is derived from distribution of coal production by beneficiation methods in source document, p. H-113.  
\*\*Construction and operation combined.

Note: The secondary employment base equals primary employment in 1983 plus that portion of the 1983-1990 increase in primary employment that would immigrate from outside the region. (Local residents shifting from other jobs to coal jobs would not change secondary employment.) The secondary employment base for operation is calculated as follows:

1983 primary employment = 660  
1983-1990 primary employment increase (156) times  
nonlocal employment multiplier (0.68) =  $\frac{106}{766}$

Because construction employment is based only on 1990 construction, the secondary employment base for construction equals primary employment (396) times the nonlocal employment multiplier (0.68) = 269.

Source of 1979 projections: ELM 1979a

Primary employment: pp. 5-134, 5-136, 5-137, 5-138, H-74

Secondary employment: p. H-91

Population: pp. 5-128, H-91

### HEALTH AND SAFETY METHODOLOGY

Table A-4-4 compares accidents and fatality loading factors used in the 1979 FES and in this supplemental EIS.

#### DISABLING ACCIDENTS

##### Recovery and Extraction

Estimates of disabling accidents resulting in worker-days lost were developed (as shown below) for both underground and surface mining, on a national average through the use of U.S. Department of Labor, Mine Safety and Health Administration (1984) data.

## METHODOLOGIES

TABLE A-4-2  
COMPARISON OF EMPLOYMENT AND POPULATION MULTIPLIERS

	1979 FES		1985 FIS	
	Construction	Operation	Construction	Operation
<u>Primary employment (workers per 100,000 tons)</u>				
All regions				
<u>Mining construction</u>				
Surface	3.21		4.4	
Subsurface	4.8		9.2	
<u>Beneficiation</u>				
Crushing & receiving	7.8	0.9		
Mechanical	15.6	2.67		
<u>Mining Operation</u>				
Fort Union (surface)		3.3		3.4
Powder River (surface)				4.0
Montana		4.1		
Wyoming		4.0		
<u>Green River-Hams Fork</u>				
Surface		4.1		8.3
Subsurface		25.2		25.0
<u>Uinta-Southwestern Utah</u>				
Surface		6.0		10.2
Subsurface		19.7		26.8
<u>San Juan River</u>				
Surface		4.9		7.5
Subsurface		22.7		25.0
<u>Alabama Subregion</u>				
Surface		17.8		17.6
Subsurface		37.8		42.5
<u>Nonlocal primary employment (ratio to total primary employment)</u>				
Fort Union			0.68*	
Powder River			1.00*	
Green River-Hams Fork			0.80*	
Uinta-Southwestern Utah			0.80*	
San Juan River				
Surface			0.68*	
Subsurface			0.83*	
Alabama Subregion				
Surface			0.0*	
Subsurface			0.10*	
<u>Secondary employment (ratio to primary employment)</u>				
	1.4*		0.55	1.35
<u>Population</u>				
Married employees (ratio to total employment)	0.75*			
Population per family	2.50*			
Single employees (ratio to total employment)	0.25*			
Primary employment (population per employee)			1.8	2.6
Secondary employment (population per employee)			2.6	2.6

\*Construction and operation combined.

## APPENDIX 4

TABLE A-4-3  
COMPARISON OF SEVERANCE TAX RATES

	1979 FES	1985 EIS*	Basis
Alabama	\$ .335	\$ .37	Per ton
Colorado			
Surface mining	\$ .60	\$ .60	Per ton
Subsurface mining	\$ .30	\$ .60	Per ton
Montana	30.00	24.62	Percent of taxable value
New Mexico	\$ .38**	\$ .50	Per ton
North Dakota	\$ .60***	\$ .85	Per ton
Utah	None	None	
Wyoming	10.50	13.57	Percent of taxable value

\*Rates used for 1985 represent averages of rates for surface and subsurface coal and adjustments for other state and local taxes (excluding income, sales, and use taxes).

\*\*Rate for steam coal. Rate was \$.18 per ton for metallurgical coal.

\*\*\*Rate was scheduled to rise 1 cent per ton for each one-point increase in the wholesale price index with 1977 as the base year.

TABLE A-4-4  
COMPARISON OF ACCIDENT AND FATALITY  
LOADING FACTORS, 1979 FES AND 1985 EIS

	Recovery and Extraction (100,000 Tons)				Refining and Processing (100,000 Tons)	
	Underground Mining		Surface Mining		1979 FES	1985 EIS
	1979 FES	1985 EIS	1979 FES	1985 EIS		
Accidents	3.12	3.19	0.053	0.43	0.0204	0.16275
Fatalities	0.04	0.03	0.011	0.004	0.00025	0.00117

Underground Accidents = 10,467  
 Total Production = 328,610,350 tons  
 Rate =  $\frac{\text{Accidents}}{\text{Production}}$  - coal produced (expressed in 100,000 tons)

Rate =  $\frac{10,467}{3286.1} = 3.18523$   
 Use 3.19 accidents per 100,000 tons produced  
 Surface Mine Accidents = 2,082  
 Total Production = 482,961,122 tons  
 Rate =  $\frac{2,082}{4829.6} = 0.43109$   
 Use 0.43 accidents per 100,000 tons produced.

## METHODOLOGIES

### Refining and Processing

Loading factors were based on the following:

- Average hours worked to process 100,000 tons of coal = 7,787 hours (BLM 1979a).
- Average accident rate (from U.S. Department of Labor 1984) 2.09 accidents per 100,000 hours worked or  $2.09 \times 10^{-5}$  accidents per hour worked.
- Calculated national average accident rate from the above factors per 100,000 tons mined =  $7,787 \times (2.09 \times 10^{-5}) = 0.16275$ .

### FATALITIES

#### Recovery and Extraction

The average surface mining fatality rate is 0.004 fatalities per 100,000 tons mined; the average underground mining fatality rate is 0.03 per 100,000 tons mined.

Rates were calculated from the U.S. Department of Labor 1984 report as follows:

- Number of fatalities in underground mines = 83  
Total production = 328,610,350 tons  
Rate =  $\frac{\text{Number of fatalities}}{\text{100,000 tons}}$  - coal processed expressed in 100,000 tons  
 $83 \div 3.286.1 = 0.03$  fatalities per 100,000 tons mined
- Number of fatalities in surface mines = 20  
Total production = 482,961,122 tons  
Rate =  $20 \div 4,829.6 = 0.004$  fatalities per 100,000 tons mined.

#### Refining and Processing

Loading factors were based on the following:

- Average hours worked to process 100,000 tons = 7,787 hours (BLM 1979a).
- Average fatality rate (U.S. Department of Labor 1984) = 0.015 fatalities per 100,000 hours worked, or  $0.015 \times 10^{-5}$  fatalities per ton mined.
- Calculated from the factors shown above, the national average fatalities per 100,000 tons of raw coal processed =  $7,787 \times (0.015 \times 10^{-5}) = 0.0017$ .

### AIR QUALITY METHODOLOGY

Normalized emission rates specify the amount of fugitive dust produced per million tons of coal mined. Developing such rates for each mining dust source provides a means of comparing the relative amount of emissions for each source. It also provides a simple means of calculating an approximate

## APPENDIX 4

emissions inventory for any particular mine without detailed mine design information. If all emission rates are specified per million tons of coal produced, then a preliminary mine emissions inventory can be calculated from the annual production rate at the mine.

Although normalized emission rates are highly desirable for source magnitude comparisons and simple emissions inventories, their development is not straightforward. The emissions factors associated with each mine dust source required a variety of mine design parameters, such as overburden volume, haul road vehicle-miles, and exposed acreage. Because the values of these parameters vary from mine to mine depending on the design, it is difficult to develop a set of normalized emission rates that apply to all surface and subsurface coal mines.

Despite the great variability of mine design data for surface and subsurface coal mines, much of the variability among mines can be reduced to two key factors: (1) the coal production rate at the mine and (2) the mine design type. Variability in design parameter values due to the coal production rate can be reduced by using normalized data, that is, parameter values per million tons of coal produced (Morrison-Knudson Co. Inc. 1983).

Normalized emission rates have been conservatively calculated for each source of particulate matter at a typical surface and subsurface coal mine. The results of these calculations are presented in Table A-4-5. The emissions listed in this table provide a method of computing fugitive dust emissions for a typical surface and subsurface coal mine. The emissions given in Table A-4-5 are uncontrolled emission rates. Dust control strategies for an individual mine must be applied to each source to compute actual emission rates.

Because the emissions are normalized on the basis of mining 1 million tons of coal per year, actual mine emissions can be computed simply by multiplying by a predicted coal production rate factor. This calculation has been made using a multiplier of 1,200 tons per year (tpy) of particulates per million tons of coal produced for a surface mine and a multiplier of 400 tpy of particulates per million tons of coal produced for a subsurface mine. The multiplier for surface mines (1,200 tpy) used in this document is consistent with the multiplier (also 1,200 tpy) used for the 1979 FES (BLM 1979a). The 1979 FES did not break production into surface and subsurface, and thus no multiplier was used for subsurface mines.

### SOILS AND VEGETATION METHODOLOGY

#### ACRES DISTURBED

The land disturbance of surface and subsurface mining and coal beneficiation was calculated. The number of acres needed to produce 1 million tons of coal (by coal region) is based on land disturbance estimates from each of the regional coal EISs. Loading factors were derived from using land disturbance figures from the base and maximum coal production alternative observed in each regional coal EIS. The maximum coal production alternative was used to provide for a broader land disturbance sample opportunity. See Table A-4-6 for land disturbance loading factors for this EIS supplement and a comparison with the 1979 Coal EIS.

## METHODOLOGIES

TABLE A-4-5  
NORMALIZED FUGITIVE DUST EMISSIONS FOR REPRESENTATIVE  
SURFACE AND SUBSURFACE COAL MINES

Source	EPA Emission Factor <sup>a</sup>	Normalized Emissions (Tons per year)	
		Surface Mines	Subsurface Mines
Topsoil removal	0.38 lb/yd <sup>3</sup>	9.41	--
Overburden removal			
- Scraper	0.38 lb/yd <sup>3</sup>	123.92	--
- Shovel	0.039 lb/ton	88.66	--
- Dragline	0.053 lb/ton	--	--
Coal removal			
- Shovel	0.014 lb/ton	0.70	--
- Front-end loader	0.12 lb/ton	54.00	--
Overburden drilling	1.5 lb/hole	4.51	--
Coal drilling	0.22 lb/hole	0.30	--
Overburden blasting	85.3 lb/blast	8.53	--
Coal blasting	78.1 lb/blast	7.81	--
Stockpile handling			
- Overburden	None	--	--
- Topsoil	None	--	--
Coal stockpile Handling			
- Stacking	0.0002 lb/ton	0.01	0.01
- Dozer	b	25.38	25.38
- Reclaimer	c	--	--
- Front-end loader	0.12 lb/ton	6.00	6.00
Coal crusher load-in	0.007 lbs/ton	3.50	3.50
Coal crushing			
- Primary	0.02 lb/ton	10.00	10.00
- Secondary	0.06 lb/ton	30.00	30.00
Coal screening	0.1 lb/ton	50.00	50.00
Coal conveying	0.2 lb/ton	100.00	100.00
Coal stockpile wind erosion	d	15.66	15.66
Exposed area wind erosion	e	60.45	--
Haul roads			
- Overburden	f	160.55	--
- Coal	f	161.70	--
Access roads	f	137.28	137.28
Road maintenance			
- Grading	32 lb/hr	40.29	--
- Water truck	f	29.95	--
Railcar loading	0.0002 lb/ton	0.10	0.10
Railcar blowoff	d	1.57	1.57
- Grader	32 lb/hr	5.34	--
- Tilling	g	3.37	--
Facility site construction	None	--	--
Equipment exhaust			
- Diesel	h	29.01	--
- Light	h	9.73	3.86
<b>TOTAL</b>		<b>1,177.73</b>	<b>383.36</b>

## METHODOLOGIES

TABLE A-4-5  
NORMALIZED FUGITIVE DUST EMISSIONS FOR REPRESENTATIVE  
SURFACE AND SUBSURFACE COAL MINES

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- Shovel	0.039 lb/ton	88.66	--
- Dragline	0.053 lb/ton	--	--
Coal removal			
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Coal drilling	0.22 lb/hole	0.30	--
Overburden blasting	85.3 lb/blast	8.53	--
Coal blasting	78.1 lb/blast	7.81	--
Stockpile handling			
- Overburden	None	--	--
- Topsoil	None	--	--
Coal stockpile Handling			
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- Dozer	b	25.38	25.38
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Haul roads			
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- Coal	f	161.70	--
Access roads	f	137.28	137.28
Road maintenance			
- Grading	32 lb/hr	40.29	--
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Railcar blowoff	d	1.57	1.57
- Grader	32 lb/hr	5.34	--
- Tilling	g	3.37	--
Facility site construction	None	--	--
Equipment exhaust			
- Diesel	h	29.01	--
- Light	h	<u>9.73</u>	<u>3.86</u>
<b>TOTAL</b>		<b>1,177.73</b>	<b>383.36</b>



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TABLE A-4-5 (continued)

\*Emissions are based on EPA Region VIII emission factors and are normalized for a 1 million ton per year coal production.

<sup>a</sup>EPA does not specify an emission factor for each source listed.

$${}^b\text{Emission Factor} = (0.4) \frac{0.33}{(PE/100)^2} \text{ lb/ton throughput}$$

where: PE = Precipitation-evaporation index

$${}^c\text{Emission Factor} = \frac{0.0018 (g/5) (u/5)}{(M/2)^2 (Y/6)} \text{ lb/ton-throughput}$$

where: s = Silt content (%)  
 u = Wind speed (mph)  
 M = Moisture content (%)  
 Y = Bucket capacity (yd<sup>3</sup>)

Using standard values and a 2-yd<sup>3</sup> bucket gives EF = 0.002 lb/ton-throughput

$${}^d\text{Emission Factor} = 1.6 u \text{ lb/ac-hr}$$

where: u = Wind speed (m/sec)

using u = 4.47 m/s (10 mph) gives EF = 7.15 lb/ac-hr

$${}^e\text{Emission Factor} = \text{AIKCLV ton/ac-yr}$$

where all variables are identified in the emission factor summary section.  
 using standard values, EF = 0.13 ton/ac-yr

$${}^f \text{Emission Factor} = 0.6 (0.81 s) (S/30) (d/365) (w/4) \text{ lb/VMT for } \begin{matrix} 30 & S & 50 \\ & & 30 \end{matrix}$$

$$= 0.6 (0.81 s) (S/30)^2 (d/365) (w/4) \text{ lb/VMT for } \begin{matrix} S & 30 \\ & & 30 \end{matrix}$$

where s = Silt content (%)  
 S = Vehicle speed (mph)  
 d = Dry days/year  
 w = Number of wheels

Standard values used are s = 15%, S = 20 mph, d = 255. Value for w depends on truck.

$${}^g\text{Emission Factor} = \frac{1.4 s}{(PE/50)^2} \text{ lb/ac}$$

where: s = Silt content (%)  
 PE = Precipitation-evaporation index

Standard values give 20.19 lb/ac

<sup>h</sup>See table, Section XXII. For simplicity, the mix of diesel vehicles is represented by the average TSP exhaust emission factors for shovels/dragline and diesel trucks (a value of 0.654 gm/hp-hr). The mix of light vehicles is represented by the TSP exhaust emission factor for gasoline vehicles (3.16 gm/hp-hr).

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TABLE A-4-6  
LAND DISTURBANCE LOADING FACTORS  
FOR 1979 FES AND 1985 EIS

	1979 FES Loading factor (ac/100,000 tons)			1985 EIS Loading Factor*			
	Surface		Beneficiation	ac/1,000,000 tons		ac/100,000 tons	
	Surface	Subsurface	Beneficiation	Surface	Subsurface	Surface	Subsurface
<b>Fort Union</b>							
Short-Term	4.8	0	0.85				
Long-Term	0.5	0	0.25				
<b>Total</b>	<b>5.3</b>	<b>0</b>	<b>1.10</b>	<b>48.7</b>	<b>0</b>	<b>4.87</b>	<b>0</b>
<b>Powder River</b>							
Short-Term	2.2	0	0.85				
Long-Term	0.6	0	0.25				
<b>Total</b>	<b>2.8</b>	<b>0</b>	<b>1.10</b>	<b>18.1</b>	<b>0</b>	<b>1.81</b>	<b>0</b>
<b>Green River-Hams Fork</b>							
Short-Term	7.1	0	0.85				
Long-Term	1.3	0	0.25				
<b>Total</b>	<b>8.4</b>	<b>0</b>	<b>1.10</b>	<b>69.5</b>	<b>4.8</b>	<b>6.95</b>	<b>0.48</b>
<b>Uinta-Southwestern Utah</b>							
Short-Term	5.2	0	0.85				
Long-Term	1.1	0	0.25				
<b>Total</b>	<b>6.3</b>	<b>0</b>	<b>1.10</b>		<b>5.5</b>	<b>0</b>	<b>0.55</b>
<b>San Juan River</b>							
Short-Term	7.1	0	0.85				
Long-Term	2.2	0	0.25				
<b>Total</b>	<b>9.3</b>	<b>0</b>	<b>1.10</b>	<b>41.1</b>	<b>0</b>	<b>4.11</b>	<b>0</b>
<b>Alabama Subregion</b>							
Short-Term	11.4	0	0.85				
Long-Term	3.6	0	0.25				
<b>Total</b>	<b>14.0</b>	<b>0</b>	<b>1.10</b>	<b>335.1</b>	<b>0</b>	<b>33.51</b>	<b>0</b>

\*Land disturbance from coal beneficiation is combined with surface and subsurface mining land disturbance.

## METHODOLOGIES

### WATER RESOURCES METHODOLOGY

In general, impacts to water resources were summarized from the regional coal EISs. Coal-related water use was estimated by using multipliers from the regional EISs, Geological Survey Circular 1001 (Solley, Chase, and Mann 1983), and population estimates presented in the Socioeconomic section of this supplemental EIS.

One assumption made in estimating water use was that the most recent round of leasing or proposed leasing in each of the regions represented a typical combination of leasable coal reserves with typical projections of future population and water use. Considering the production levels proposed in this EIS, one can reasonably assume that this production will occur near the areas scrutinized by these most recent rounds of the federal coal leasing program. Therefore, this supplemental EIS relied heavily on per-ton multipliers developed from the regional EISs for water use by mine operations. The population estimates were also based on this assumption and are presented in the Socioeconomic section. These multipliers are presented in Table A-4-7 where they are compared to similar multipliers developed for the Federal Coal Program FES (BLM 1979a).

The population water use figures were derived from Geological Survey Circular 1001, Estimated Use of Water in the United States in 1980 (Solley, Chase, and Mann 1983). All coal-related water use was assumed to occur in an urban situation and the water would be supplied through a municipal system. Circular 1001 lists municipal water use by state. To obtain regionalized numbers, an average of water use by states in the region was figured, weighted by the projected coal production from each state. The regionalized per capita water use was then multiplied by the population projections presented in the Socioeconomic section to arrive at the additional water use by coal-related populations.

Water requirements for surface and underground mines were derived from numbers presented in the regional coal EISs. The maximum development alternative presented in the most recent round of regional environmental analyses was considered to be representative of the water required for mining. A per-million-ton estimate of water required was calculated for each region for surface and underground mining. These multipliers were then used with the projected coal production for the alternatives and production levels to determine water required for mining.

Table A-4-8 compares projected total water requirements per million tons of coal mined for the 1979 FES and this supplemental EIS. The figures are one or two orders of magnitude larger for the 1979 FES because the 1979 FES considered powerplant facilities and this supplemental EIS does not. To a small degree, differences are due to some water use factors varying more by region in this supplemental EIS than in the 1979 FES.

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TABLE A-4-7  
COMPONENT WATER REQUIREMENT MULTIPLIERS  
AND COMPARISON WITH 1979 FES

	1979 FES			1985 EIS		
	Pop. GPD*	Surface Mine AF/MTon**	Subsurface Mine AF/MTon**	Pop. GPD*	Surface Mine AF/MTon**	Subsurface Mine AF/MTon**
	Fort Union	125	62.9	--	116	13.1
Powder River	125	57.1	--	259	49.0	--
Green River-Hams Fork	125	50.5	36.8	243	24.2	24.2
Uinta-Southwestern Utah	125	60.8	36.8	503	--	15.5
San Juan River	125	60.8	36.8	240	76.0	46.0
Alabama Subregion	125	44.6	58.8	210	60.3	376.0

\*GPD = gallons per day per capita.

\*\*AF/MT = acre-feet of water required per million tons of coal mined.

TABLE A-4-8  
TOTAL REGIONAL WATER REQUIREMENT MULTIPLIERS  
AND COMPARISON WITH 1979 FES

	Acre-Feet/Million Tons Coal	
	1979 FES	1985 EIS
Fort Union	2,700	39
Powder River	370	136
Green River-Hams Fork	850	212
Uinta-Southwestern Utah	2,400	803
San Juan River	1,400	170
Alabama Subregion	13,200	458

APPENDIX 5  
RECLAMATION AND EROSION CONTROL  
ON SURFACE-MINED LANDS

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INTRODUCTION

Reclamation of mined lands began in the 1920s as experimental programs to establish quick-growth forests on ungraded spoils. That forests could be reclaimed successfully was shown in West Virginia. Soon thereafter, strip-mined land in Indiana was successfully reclaimed to pasture and row crops. Following these early demonstrations, state-mined land reclamation laws were enacted in West Virginia (1939), Illinois, Indiana, Pennsylvania, and Ohio (1940s), and Kentucky (1954). Under these early laws, regulation was limited to requiring revegetation of mined land and in some cases reducing spoil-pile slopes. In the 1950s and 60s, more states enacted mined-land reclamation laws, and the scope of regulation requirements was enlarged to include soil conservation, roads, bank stabilization, prompt revegetation, and onsite water pollution control. In the late 1960s, the Department of the Interior issued surface protection regulations (43 CFR, Part 23) requiring reclamation of land disturbed by mineral activities.

In the 1970s, many federal and state environmental laws were enacted, including the Federal Water Pollution Control Act of 1972 and the Clean Air Act of 1970. Before the enactment of the Federal Surface Mining Control and Reclamation Act (SMCRA) on August 3, 1977, the Federal Government did not regulate mining and reclamation of state and privately owned (fee) coal except via the Federal Water Pollution Control Act, the Clean Air Act, and the Federal Mine Safety and Health Act. Of the 37 states producing coal, 31 had some form of regulation for surface coal mining of state-owned coal; most of these states applied their regulations to fee and federal coal. Before SMCRA's enactment, the extent to which individual states regulated coal mining varied greatly, ranging from few to extensive and detailed requirements for reclamation, revegetation, and pollution control.

With SMCRA, Congress established a nationwide program to protect society and the environment from the adverse effects of surface coal mining. Recognizing the diversity in terrain, climate, biological, chemical, and other physical conditions across the United States, Congress established minimum national standards for the conduct of coal mining and reclamation operations but vested the main governmental responsibility for regulating the coal mining industry with individual states. SMCRA established the Office of Surface Mining Reclamation and Enforcement (OSM) in the Department of the Interior as the main federal agency for implementing and administering its provisions.

RECLAMATION OBJECTIVES

National mined-land reclamation objectives identified in SMCRA are to assure (1) that coal mining is not conducted where reclamation is not feasible; (2) that adequate procedures are used to reclaim surface areas as

## APPENDIX 5

contemporaneously as possible and to reclaim surface areas to the uses they were capable of supporting before mining; (3) that coal mining is conducted so as to protect the environment; (4) that the rights of surface landowners are fully protected from coal mining; and (5) that public participation is an integral part of the developing and administering of federal and state programs regulating coal mining under SMCRA.

To effect these objectives, Congress charged the Secretary of the Interior, acting through OSM, with the following tasks:

- to develop and issue federal regulations needed to carry out the purposes and provisions of SMCRA (Title 30, CFR, Chapter VII);
- to technically and financially assist the states in developing programs for surface coal mining and reclamation that both meet the objectives and minimum standards of SMCRA and reflect local requirements and environmental and agricultural conditions;
- to review and approve or disapprove state programs for controlling mining and reclamation on nonfederal and non-Indian lands within the state; and
- to enter into cooperative agreements with states that have approved state programs for regulating coal mining on federal lands within the state.

Congress also identified specific minimum national standards for mining and reclamation, established to assure that all coal mining:

- fully uses and conserves the coal resource;
- restores the land to a condition that can support its premining uses;
- backfills, compacts, and grades disturbed areas to restore the approximate original contour;
- stabilizes and protects disturbed areas to control erosion and attendant air and water pollution;
- removes topsoil before mining and replaces it after mining and reclamation grading;
- stabilizes and revegetates all areas associated with disposal of mine wastes, tailings, coal processing, and other wastes;
- segregates and replaces all soil horizons in prime farmland and restores this land to an equal or higher level of production;
- preserves throughout the mining and reclamation process the essential hydrologic functions of alluvial valley floors in arid and semi-arid areas;

## RECLAMATION AND EROSION CONTROL ON SURFACE-MINED LANDS

- reduces disturbance to the hydrologic balance and prevents material damage to the hydrologic balance outside the permit area; and
- ensures that all mining and reclamation proceeds in an environmentally sound manner and that reclamation proceeds as contemporaneously as practicable with mining.

### REGULATORY PROGRAMS

Though the particulars of individual state regulatory programs vary, each state program adheres to certain concepts and requirements set forth in SMCRA and the 30 CFR Chapter VII regulations of OSM. These concepts and requirements are as follows:

- designation of lands unsuitable for mining
- permitting of mining operations
- performance bonds
- performance standards
- monitoring of environmental effects
- inspection and enforcement
- public participation

### DESIGNATION OF LANDS UNSUITABLE FOR MINING

Anyone having an interest that is or may be adversely affected by coal mining has the right to petition OSM to designate areas of federal land as unsuitable for all or certain types of mining on the basis that reclamation would not be technologically and economically feasible. After extensive analysis of a petition, including consideration of the potential coal resources and public comments, the Secretary of the Interior may designate such lands as unsuitable for mining.

### PERMITTING OF MINING OPERATIONS

No one can engage in coal mining in a state without obtaining a permit from the state agency that administers the state coal mining regulatory program. This agency can issue a permit only if it finds, on the basis of information in the permit application, that the application is complete and accurate and that the applicant has complied and will comply with all requirements of SMCRA and the state regulatory program.

SMCRA's requirements for what a permit application must contain are extensive and detailed. An applicant must provide legal, financial, and compliance information including (1) records of its past permits and violations of those permits, (2) identification of surface and subsurface owners, leaseholders, and purchasers of property in and next to the proposed permit area, (3) documentation that the applicant has the legal right to enter and operate on the proposed permit area, (4) a statement confirming whether the permit area is within an area designated or being considered for designation, as unsuitable for coal mining, (5) identification of the phases of mining that would occur over the life of the mine, and (6) evidence of liability insurance.

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In addition, SMCRA requires that a permit application contain comprehensive descriptions and data for the environmental resources in the permit area and an operations and reclamation plan that states the applicant's proposed procedures for mining and processing of coal and for reclaiming areas that have been disturbed by mining. The environmental resource information provides the basis for determining postmining land uses and reclamation success and for developing the operation and reclamation plan. The applicant must provide site-specific maps, inventories, and descriptions of soils, vegetation, cultural resources, and land uses in the permit area as well as such climatological, fish and wildlife, hydrologic, and geologic information as the regulatory authority requires.

The operations and reclamation plan component of a permit application consists of several interrelated but discrete plans. These plans must describe virtually every aspect of the proposed mining and reclamation operations in great detail. Specifically, they must address operations, reclamation, air pollution control, water management, blasting, and protection of the hydrologic balance, fish and wildlife, and cultural resources. The operations plan details the applicant's designs for the mining and facilities, including impoundments, roads, waste-disposal sites, and other structures. The reclamation plan details the proposed postmining land uses to be established; backfilling, soil stabilization, and grading techniques; how topsoil would be removed, stored, and redistributed; the schedule of revegetation; the species and amounts per acre of seeds and seedlings to be used; methods to be used for planting; and measures to be used to determine revegetation success.

A permit application is reviewed by the regulatory authority to ensure that it shows that the applicant's operation complies and will comply with the performance standards and requirements of the state regulatory program. A permit application can be approved only after the applicant has shown and the regulatory authority has found that the operation will comply with all aspects of the state regulatory program. A permit, however, cannot be issued and operations cannot begin until the applicant provides the regulatory authority a performance bond.

Before surface coal mining and reclamation can begin on federal land, a mining plan must be approved and a permit issued. Through a state-federal cooperative agreement, the Secretary of the Interior can delegate authority to a state to issue permits on federal lands, but the Secretary must approve the mining plan, which includes the operations and reclamation plan required by the Mineral Leasing Act of 1920, as amended. The federal decision on the mining plan must be made in accordance with the National Environmental Policy Act, the Endangered Species Act, the National Historic Preservation Act, and other federal laws, regulations, and executive orders.

### PERFORMANCE BOND

To ensure that the land surface disturbed during coal mining will be reclaimed and that mining will be conducted in accordance with the requirements of a state regulatory program, the approved mining plan, the permit, and a performance bond for these activities must be posted with the regulatory



## RECLAMATION AND EROSION CONTROL ON SURFACE-MINED LANDS

authority. The bond must (1) be a large enough amount to assure that all disturbances proposed in the approved permit application will be reclaimed and (2) reflect the probable difficulty of reclamation. Bonds may not be released until the permittee has shown reclamation success, the regulatory authority approves the permittee's application for bond release, and the public has been notified of the pending bond release and provided an opportunity to comment on it.

### PERFORMANCE STANDARDS

Extensive standards specify performance for virtually every aspect of mining and reclamation that could affect the environment. These standards are the criteria by which all mining-related activities--from applying for a permit through actual conduct of mining and reclamation to release of bond--are measured. Mining and reclamation activities controlled by standards include disposal of excess spoil, roads, utility installations, support facilities, water management facilities, coal and noncoal waste disposal, subsidence, temporary and permanent cessation of operations, backfilling and grading, revegetation, and postmining land use. Activities required by the standards include posting of mine identification signs and permit boundary markers, casing and sealing of openings, removing and replacing topsoil and subsoil, protecting the hydrologic balance, preventing water quality degradation, creating buffer zones around perennial streams, maximizing coal recovery, protecting fish and wildlife, and engaging in contemporaneous reclamation.

### MONITORING OF ENVIRONMENTAL EFFECTS

An operator is required to monitor the environmental effects of mining. Each permit application must contain a ground water and surface water monitoring plan, and the permittee must both monitor according to these plans and report quarterly on the results of this monitoring.

The regulatory authority must review each permit during the first half of the permit term and may require reasonable revision of a permit at any time to ensure compliance with the applicable regulatory program.

### INSPECTION AND ENFORCEMENT

A further check to ensure compliance provides that the regulatory authority inspect the operation and enforce the requirements of the program and the terms and conditions of the permit and any federal leases in the permit area. The regulatory authority is required to conduct periodic unannounced inspections of permitted operations and to issue to the permittee notices of any violations. Inspectors finding any condition, practice, or violation that is imminently dangerous to the health or safety of the public or that is causing or can reasonably be expected to cause significant, imminent environmental harm to land, air, or water resources, must immediately order a halt to the operation or the dangerous portion of it. Civil penalties of up to \$5,000 per day may be assessed for violations; civil penalties of not less than \$750 per day must be assessed for each day a violation has not been abated after the time specified for abatement in the notice of violation.

## APPENDIX 5

If the regulatory authority determines that a permittee has a pattern of willful violation of a state regulatory program or the permit, the regulatory authority must issue an order to a permittee to show why the permit and right to mine should not be suspended or revoked.

Persons who willfully violate the provisions of state regulatory program or the permit or who fail or refuse to comply with enforcement orders are subject to criminal prosecution and penalties of up to \$10,000 and 1 year imprisonment. Persons who knowingly make a false statement, representation, or certification or knowingly fail to make a statement, representation, or certification required under the state regulatory program are subject to the same criminal penalties.

### PUBLIC PARTICIPATION

Both SMCRA and the state regulatory program provide for public participation in the regulatory process for a coal mine. Public notices must be published during the permit application review before approval of permit applications and during the review of applications for bond release.

Persons who may be adversely affected by proposed mining may petition the regulatory authority to designate certain lands unsuitable for coal mining before the submittal of an application for a permit to mine on those lands. Or persons who might be so affected may request informal conferences or hearings during the permitting process. Such conferences and hearings are open to the public. Any one may request to inspect an operation if a violation is believed to exist. If an inspection is conducted as a result of that request, the requestor must be allowed to accompany the inspector on the inspection.

### SITE CHARACTERISTICS THAT AFFECT RECLAMATION

Site characteristics believed to most significantly affect revegetation success are discussed below by both their effects on the total reclamation process and by operating procedures used to enhance their beneficial effects. Because reclamation deals with an interrelated system of plants, soils, topography, and climate, a procedure used to change any one characteristic is likely to affect all.

### CLIMATE

Of the site characteristics affecting reclamation, climate is the most important and the least controllable. The main climatic factors affecting plant growth are precipitation, temperature, and wind. Separately or in combination, these factors affect the germination, growth, and distribution of plant life. Although temperature extremes and the frost-free growing season affect the time and rate of growth and the yield (biomass) potential and although wind may bury and abrade seeds and plants or expose them to desiccation, the amount of moisture available to plants is the governing factor in successful revegetation. Because of the high evaporation rates in the western coal areas, the availability of soil moisture is the critical element in seed germination, early growth of plants, establishment of transplants, and continued growth.

## RECLAMATION AND EROSION CONTROL ON SURFACE-MINED LANDS

No realistic way exists to modify adverse effects of climate except by adding moisture through irrigation, but a variety of procedures have been used to reduce unfavorable conditions at the microclimatic level. Ground temperatures that affect seed germination and growth can be modified by using mulches or temporary cover crops, by altering slope aspect, or by establishing other shading devices, such as rows of trees and shrubs, rock piles, or snow fences. These procedures also reduce wind and water erosion and conserve soil moisture.

### LANDFORM

The federal coal regions extend over several landform types, including high plateaus, dissected plateaus, and mountainous foothills. Elevations range from 1,200 feet to more than 6,000 feet. Steepness of slope, length of slope, land shape, and aspect are important site characteristics that strongly affect reclamation procedures and success.

### OVERBURDEN

The chemical and physical characteristics of the geologic material overlying coal-- called overburden-- or lying between coalbeds where more than one bed is to be mined--called interburden--are important to reclamation success. These characteristics are especially important where spoils make up all or part of the new growth media because they control internal drainage and contribute harmful or plant growth-limiting materials.

Clayey materials generally present the greatest problem in western reclamation because they are slow to absorb moisture and often have high salt content; these properties are responsible for poor revegetation success at many sites. Sodium-rich expanding clays particularly impede seed germination and growth. Where both sandy and clayey materials occur in the overburden, they can be intermixed in the stripping process to reduce the undesirable characteristics of the clayey materials.

The greatest technical challenge occurs when the entire overburden has a harmful character, such as in the sodic clay sequences in some of the North Dakota lignite coal fields. The salvage and replacement of topsoil has been generally effective in overcoming harmful overburden. The use of plant species tolerant to sodium-rich soils would not offer a complete solution because plant diversity would be limited. Most raw spoils have low inherent nutrients and little biological activity to make plant nutrients available.

Nitrogen levels are also low. Adding fertilizers is usually a short-term solution, even though it may help plants become established. In some cases, the annual plant debris does not decompose, and nutrients do not recycle into the soil. The addition of topsoil to the raw spoil aids in the reestablishing of soil microorganisms whose biological activity returns nitrogen to the spoils. Thus, OSM's general requirements for topsoiling should help to ensure reestablishing of the nutrient-recycling needed for revegetation and soil development.

## APPENDIX 5

### SOILS

The replaced growing medium for revegetation is important in all stages of reclamation and is probably one of the most significant factors in long-term successful reclamation. The original soils are a product of the long-term interaction of the climate, parent material, landform, vegetation, and animal life that developed on and in them. Soils form a critical part of the ecological system; they contain a living system of their own. Their chemistry, texture, and thickness are adjusted to the land surface slope, and to elevation, temperature, and exposure. In theory, the replacement of the original soils with a reconstructed soil or similar characteristics would be a requirement for long-term successful restoration. Complete restoration of the genetic (natural) soil profile, however, is not an achievable goal in reclamation because it is technically impractical. The enormous complexity of dealing with ecological systems can be seen by examining a soils map of a mining property.

The use of original soils materials on newly shaped mined lands, even if mixed during salvage, is generally preferable to raw spoil materials for revegetation. Original soil materials (1) provide a seedbed with more desirable physical properties; (2) introduce more plant-available nutrients; (3) act as a better medium to absorb and hold moisture; (4) provide a source of native seeds and native plants; and (5) provide bacteria, algae, fungi, and other forms of soil flora and fauna that can theoretically reestablish the soil-forming process.

### BIOLOGICAL FACTORS

Biological factors affecting revegetation exist both above and below the surface. The importance of subsurface biological components such as bacteria, fungi, and arthropods was briefly discussed in the preceding discussion of soil. These components are believed to be needed in establishing a self-sustaining vegetation community where large areas are disturbed by mining (Cundell 1977).

The greatest biological detriment to reclamation is overgrazing by livestock. Allowing cattle and sheep into planted areas before they are fully established has destroyed some plantings and has greatly weakened others (Schumacher and others 1977). Most coal mining companies do not permit grazing on land they are trying to reclaim during the period of mining.

Reclamation success is also affected by wildlife. The initial effect of wildlife on revegetation is loss of seeds and the overbrowsing of young woody plants, particularly where these plants are sparse. Most mine demonstration and test plots that are not fenced are being heavily browsed by wildlife. Berg (1975) has stated that where deer and elk are plentiful, revegetation of some species could be difficult because of overbrowsing. Seeded or planted woody species can be protected from overbrowsing if they are surrounded by herbaceous vegetation.

## RECLAMATION AND EROSION CONTROL ON SURFACE-MINED LANDS

### VEGETATION

The natural vegetation in the western coal regions is typically western zonal, responding to precipitation, latitude, altitude, and aspect. Overall, plant species and density are closely related to soil characteristics and climate. The lands to be mined are grassland, shrubland, or mixtures of the two and in places grade into open woodland. The trees are largely pinyon and juniper in the south and ponderosa pine in the north. Some coal lands are covered by mixed aspen-oak brush and mixed high-altitude shrubs called mountain brush. Spruce fir forests cover the land over some of the subsurface coal mines of Utah and Colorado.

Except in North Dakota, the vegetation of the western coal regions is mostly native and is interrupted only occasionally by pasture and cropland. In North Dakota much of the land overlying coal areas is planted in grain or hay. By far, the dominant use of land is for livestock range. The federal lands are managed under a multiple-use policy for both livestock grazing and wildlife habitat. The planned postmining uses are basically the same as those that existed before mining, whether the land is owned privately or by the Federal Government.

### RECLAMATION RESEARCH ON SURFACE MINED LAND

Three basic questions are most commonly asked by the public, managers, and staff people involved in the coal leasing program: (1) Can the area be effectively reclaimed? (2) What are the major characteristics and problems involved in reclaiming the area? and (3) What reclamation measures and techniques are needed to reestablish the desired postmining conditions? To answer these and related questions on reclamation and to develop appropriate reclamation policies and practices in the diverse environments of the coal regions of the United States requires adequate technical information gained from experience and research.

Research on reclamation of strip-mined land especially in dry regions has accelerated greatly in the last 10 years. Before the 1960s, essentially no efforts were made to reclaim mined land, and practically no specific research was conducted. Research began in the 1960s at a few scattered locations, usually applying almost strictly a field approach of comparing species adaptability, surface configuration, and other such practices. Until early in the 1970s, little of this research was supported by laboratory analysis of the soils, overburden, vegetation, and water.

Including analytical data added a new dimension to reclamation research by defining the nature and properties of the resources being used in reclamation. Analytical data allowed the defining of the major problems in reclamation and provided a scientific basis for interpreting results. Previously, most reclamation research was by trial and error without adequate definition of problems or interpretation of results.

Also in the early 1970s, researchers began extensive hydrological and geologic studies, applying the best scientific techniques. These aspects of reclamation research are rapidly proceeding at many locations. Funding for this research has also greatly increased.

## APPENDIX 5

Various aspects of reclamation research are being conducted by many scientists employed by several organizations, mining companies, and government agencies throughout the United States and Canada. This appendix does not attempt to review all these studies but to identify some of the recent studies by some of the leading U.S. authorities in this field.

### EMRIA STUDIES

BLM has actively funded coal development studies and research through its Energy Minerals Rehabilitation Inventory and Analysis (EMRIA) program conducted from 1974 to 1982. Table A-5-1 lists EMRIA reports, and Map A-5-1 shows the locations of EMRIA studies.

The EMRIA program was established to expedite information acquisition on reclamation potential needed for selecting coal mine lease sites and for developing stipulations to assure the achieving of realistic reclamation goals.

The EMRIA studies are a multidisciplinary integration of field and literature data to obtain the information needed to evaluate surface mining reclamation. Data included are geology, visual resources, overburden, hydrology, climate, soils, vegetation, and land use. The studies identified site-specific problems affecting reclamation potential and recommended reclamation measures. The potential impacts of coal development are real, but with progress and leadership such as the BLM EMRIA effort, mitigating measures can be developed.

The following are some findings from the EMRIA reports: (1) reclamation in the lower precipitation areas (less than 8 inches) is difficult; (2) successful reclamation can be accomplished by intensive use of effective reclamation measures; (3) mine spoils should be routinely sampled and analyzed to determine proper reclamation techniques; (4) where the availability of topsoil and other favorable plant growth material is a concern, and extreme care is needed in selecting and storing suitable material; (5) follow-up and monitoring is essential; (6) some small areas would require special reclamation techniques; and (7) on most grazing areas, forage production could be enhanced.

### OTHER RESEARCH

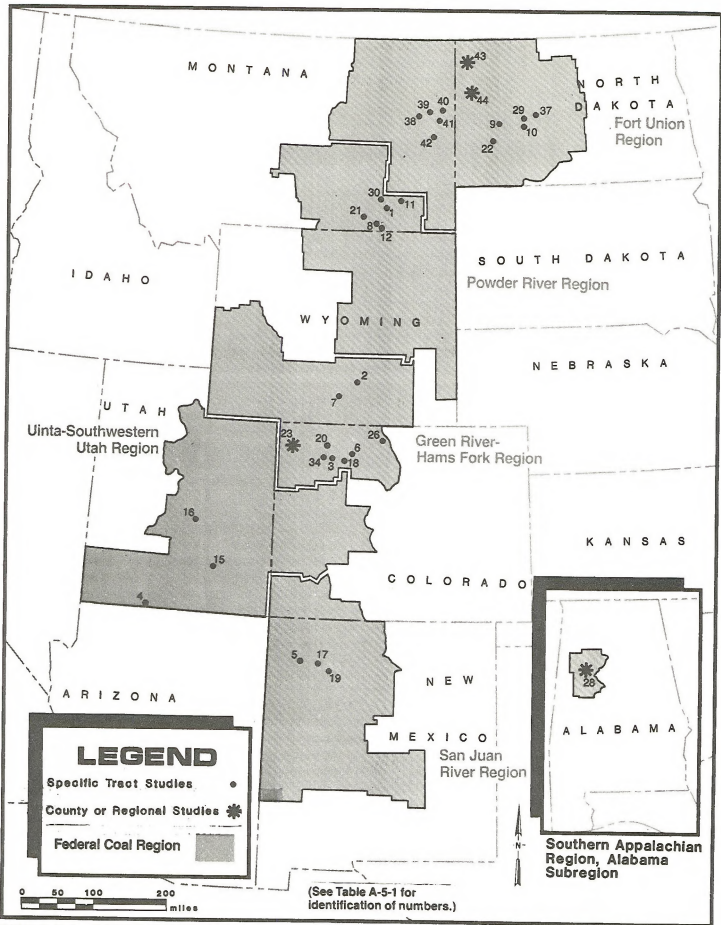
The Surface Environment and Mining Program (SEAM) was established by the Forest Service to research and apply new technology to help maintain a quality environment while meeting the Nation's mineral needs. SEAM is a partnership of research, land management, mining industries, universities, and political jurisdictions at all levels (FS 1979). From 1973 to 1979, SEAM sponsored more than 150 research and development projects. Together, the projects have greatly added to the body of knowledge on managing land that has some potential for mining.

To get the knowledge to land managers, planners, and other people in the field, the SEAM program prepared guides that focused on specific disciplines that might be affected by mining. The guides identify the results of research and provide a common starting point to ensure that impacts are reasonably mitigated and that reclamation meets up-to-date performance standards.

# RECLAMATION AND EROSION CONTROL ON SURFACE-MINE LANDS

TABLE A-5-1  
EMRIA RECLAMATION STUDY AREA REPORTS

Number Year	Title, State	Distributed by (BLM State Office)	Status
1-75	Otter Creek, MT	Montana	Reprinted
2-75	Hanna Basin, WY	Wyoming	Published
3-75	Taylor Creek, CO	Colorado	9/15/81 Reprint
4-75	Alton, UT	Utah	Published
5-76	Bisti, NM	New Mexico	Published
6-76	Foidel Creek, CO	Colorado	Published
7-76	Red Rim, WY	Wyoming	Published
8-76	Bear Creek, MT	Montana	Reprinted
9-76	Horse Nose Butte, ND	Montana	Reprinted
10-77	Beulah Trench, ND	Montana	Published
11-77	Pumpkin Creek, MT	Montana	Published
12-77	Hanging Woman, MT	Montana	Published
13-77	White Tail Butte, WY	Wyoming	Published
14-77	Potter Mountain, WY	Wyoming	Not Available
15-77	Henry Mountain, UT	Utah	Published
16-77	Emery, UT	Utah	Published
17-77	Kimбето, NM	New Mexico	Published
18-77	Fish Creek, CO	Colorado	Published
19-78	Ojo Encino, NM	New Mexico	Published
20-78	Lay Creek, CO	Colorado	Published
21-78	Prairie Dog Creek, MT	Montana	Published
22-78	Rattlesnake Butte, ND	Montana	Published
26-79	McCallum, CO	Colorado	Published
27-79	Arkoma, OK	New Mexico	Draft
28-79	Overburden Analysis, AL	Eastern States	Published
29-79	North Beulah Study Area, ND	Montana	Published
30-79	Cook Mountain, MT	Montana	Published
34-80	Collum Gulch, CO	Colorado	Published
36-80	Fattig Study Area, MT	Montana	Published
37-80	Garrison, ND	Montana	Published
38-80	Circle 2, MT	Montana	Published
39-80	Thirteen Mile Creek, MT	Montana	Published
40-80	Woodson PRLA, MT	Montana	Published
41-80	Burns Creek, MT	Montana	Published
42-80	S.W. Glendive, MT	Montana	Published
43-80	Williams County, MT	Montana	Published
44-80	McKenzie County, MT	Montana	Published



MAP A-5-1 EMRIA STUDY AREAS



## RECLAMATION AND EROSION CONTROL ON SURFACE-MINED LANDS

Extensive research programs have been conducted by leading authorities at local universities. Much of the research has been applied to mines in cooperation with mining companies. This research covers studies related to climate, soils and soil reconstruction, overburden, revegetation, and supplemental water.

The study of 22 western coal mines at 17 locations in North Dakota, Montana, Wyoming, Colorado, Utah, Arizona, and New Mexico (Map A-5-2) conducted by scientists from the U.S. Geologic Survey, BLM, OSM, and the Forest Service concluded that specific long-term results of reclamation cannot be predicted with certainty. Guidelines, however, exist for determining the potential for reclamation success. Moreover, observations reveal that land can be successfully revegetated under a planned reclamation program. Land productivity, however measured, can eventually be returned to nearly the original level for soil of a given character (Narten and others 1983).

### RECLAMATION PROCESS AND ESTIMATES OF RECLAMATION AND EROSION CONTROL EFFECTIVENESS

Reclamation is best planned and implemented on a case-by-case basis. No single planning method is suitable for all mines. Although the widest differences are regional, adjacent mines within the same district or even different parts of a single mine may present distinct reclamation challenges and require individual adjustments tailored to the differences in soil materials, elevation, slope, aspect, time and amount of precipitation, and growing season. Ignorance of site-specific characteristics of mined areas has often hampered revegetation, caused inaccurate statements, and required excessive expenditures (Narten and others 1983).

### LAND SHAPING AND GRADING

The reshaped form of the mined land surface strongly influences the potential for reclamation success. In the past, this surface included (1) the nearly vertical highwalls that remained at the end of the mine pit area and (2) mine pits or other depressions that would be perennially or seasonally flooded. Most of the other disturbed ground consisted of piles of spoil that formed coalescing hills and ridges with steep slopes and loose materials.

Erosion is greater on steep slopes and on long slopes where seeds or seedlings, even if they can be established, are likely to be washed away or buried by eroding material. Even if they consist of porous material, steep slopes are dry because the rainfall rapidly runs off them.

Aspect, the direction that a slope faces relative to the sun, also affects plant growth. North- and east-facing slopes are cooler and more moist and are usually easier to revegetate. South- and west-facing slopes are hotter, drier, and generally more difficult to revegetate. Seed mixes tailored to slope aspect have not been widely used in reclamation.

Most surface manipulations that help catch and conserve moisture also reduce erosion. Regulations now require that the new surface be generally similar to the premining surface and that the slope of the highwalls be reduced.

## LEGEND

- 1 - Indian Head Mine
- 2 - Absloka Mine
- 3 - Rosebud (Colstrip) Mine
- 4 - Big Sly Mine
- 5 - West Dector Mine
- 6 - Belle Ayr South Mine
- 7 - Dave Johnston Mine
- 8 - Rosebud (Hanna), Medicine Bow, Seminoe 1 and 2 Mines
- 9 - Elkai-Sorenson Mine
- 10 - Energy 1, 2 and 3 Mines
- 11 - Seneca 1 and 2 Mines
- 12 - Weber and Chappell Mines
- 13 - Helco and Reminger Mines
- 14 - Navajo Mine
- 15 - San Juan Mine
- 16 - Black Mesa and Kayenta Mines
- 17 - McKinley Mine

IDA H

MONTANA

NORTH  
DAKOTA  
Fort Union  
Region

SOUTH DAKOTA  
Powder River Region

WYOMING

NEBRASKA

UTAH

Uinta-Southwestern  
Utah Region

Green River-  
Hams Fork Region

KANSAS

COLORADO

ARIZONA

NEW

MEXICO

San Juan  
River Region

ALABAMA

## LEGEND

Federal Coal Region



Southern Appalachian  
Region, Alabama  
Subregion

MAP A-5-2 WESTERN COAL MINES ASSESSED IN USGS-BLM-OSM-FS RECLAMATION STUDY (NARTEN AND OTHERS 1983)

## RECLAMATION AND EROSION CONTROL ON SURFACE-MINED LANDS

### SOIL RECONSTRUCTION

Surface mining completely alters original soil profile characteristics, requiring soils to be reconstructed during land restoration and reshaping. Concerns related to soil reconstruction include availability of favorable plant growth material and the varying amounts and sizes of rock fragments.

Reconstructed soils on reclaimed areas have properties that depend upon (1) the amount of favorable plant growth material from the soil types affected and (2) the process of effectively using those materials in reshaping and regrading. Reconstruction soils often consist of deep, unconsolidated, overburden mantled with a surface layer of original surface soil and favorable plant growth material averaging 12 inches or more thick. Even though this reconstructed soil has no structure, the texture and rock fragments allow for favorable water infiltration, permeability, and water-holding capacity. (Soil-water relationships are expected to be enhanced over the preconstruction condition on soils shallow over bedrock.) Soil organic matter and nutrient levels could be most strongly affected by soil reconstruction. Adding such organic matter as crop residues, manure, and wood fiber improves the soil organic matter level. Applying commercial fertilizers containing nitrogen and phosphorous is effective in maintaining soil fertility, especially in areas receiving higher amounts of normal precipitation.

One of the major concerns in soil reconstruction is contamination from toxic materials or unfavorable plant growth materials, which would affect soil reclamation potential. Onsite testing and reclamation expertise are essential in mitigating this concern.

The reclamation potential of the reconstructed soil and landscape is expected generally to be suitable if overburden and favorable plant growth materials are effectively used in soil reconstruction and land reclamation.

The premining natural (genetic) soil profile cannot be completely restored, but the soil productivity can be reclaimed to premining levels and in some cases enhanced if an intensive soil reconstruction and reclamation program is followed (McCormack 1974, 1976).

### REVEGETATION

As well as being the final objective, revegetation is also an integral element of the reclamation process. Quick-growing, short lived species are planted to provide temporary cover on stockpiled material and occasionally to provide shade and mulch for slower growing, more permanent species. A permanent, all-season cover, however, requires perennial plants.

The main goal of early reclamation attempts was to stabilize spoils to reduce erosion. Perennial grasses planted at that time were mostly nonnative (introduced) species that were tough and adaptable but not necessarily useful for grazing or conducive to establishing a diverse native plant community. Later, the grass species being planted were upgraded to more productive strains and more palatable species and included native species. Legumes (alfalfa, white clover, and yellow clover) were also included. The broadened objective then became both erosion control and establishment of grazing areas for livestock.

## APPENDIX 5

More recently, seedlings or seeds of woody browse species are being planted. Introducing fourwing saltbush by seeding has been particularly successful on saline sites. The two objectives of ground cover-erosion control and biological productivity have stayed much the same; the additional goal of a diverse, effective, and permanent vegetation cover has come under OSM regulation. OSM's measure of success is made by comparing the ground cover and above ground productivity with that of adjacent undisturbed reference areas (OSM 1979).

Recreating the original vegetation communities could be extremely difficult and virtually impossible in some localized areas of intricate vegetation types, given the changes in landforms and soils. The goal of the regulatory authorities, however, is to reestablish native plant communities to the greatest degree possible.

Much work has been done and is being done in selecting better plants for use in reclamation. Many researchers have reported on the variables, made recommendations, and identified problems in planting (Monsen and Plummer 1978), but only limited research has been done on selecting and improving native plant species to support the needs of local wildlife. Many of the grasses now used in reclamation planting are nonnative cultivars selected for their adaptability over wide areas and under adverse conditions. In the western states, many of these grasses have been selected by the Soil Conservation Service's Plant Material Centers (Power 1978). The Forest Service has established an arid land shrub selection and experimental breeding program (Monsen and Plummer 1978), in addition to its long standing research on both native and nonnative grasses for coal mine reclamation.

The Plant Materials Centers make the selections for testing on the basis of each plant's expected widespread adaptability to the type of site; its persistence after establishment; and its intended use, such as for wildlife or livestock forage. Because the evaluation technique is based on monocultures of the tested plant, the behavior of the plant when competing with other species is unknown (Power 1978). Although nonnative plant selections were found to produce significantly more range forage (but provide less soil cover) than the native plants (Packer and others 1982), the nonnative species have a tendency to be displaced by native plants over time in all types of western reclamation.

The Plant Materials Centers disseminate plant selections through cooperating federal and state organizations to see that the plants get into the commercial seed markets. The centers also prepare lists of the seed sources for distribution by the Soil Conservation Service. The centers have collectively published a summary handbook on plants suitable for reclamation work in arid and semi-arid regions (Thornburg 1982). Some 200 plants, about 50 percent of them native species, have been selected. Attention is now being concentrated on native plants, which make up 70 to 75 percent of most recent selections. In addition, forbs (nongrass herbaceous plants) and shrubs are now being selected for testing.

Seed has been sown in a variety of ways in western reclamation- by aerial and ground broadcasting, seed drills, and hydro-seeding with mulch.

## RECLAMATION AND EROSION CONTROL ON SURFACE-MINED LANDS

According to Packer and Aldon (1978), there are preferred times and depths at which to sow different kinds of seeds and plants for the best results. One of the problems facing reclamation personnel has been locating adequate sources of seed or planting materials of many native and naturalized species.

Ensuring adequate soil moisture for plants has been approached in several ways, not only to enhance seed germination and early seedling survival but also to provide deeper, continued sources of moisture as plants mature.

Seeds are usually sown to take advantage of peak precipitation and soil moisture periods. To improve soil moisture absorptions and retentions and to protect newly germinated seeds, straw or hay mulch is commonly added to the new soil surface. In most places such mulching must be partially buried to keep it from blowing away. A variety of slurried spray-on mulching exists, and some types have been tested and used in mine reclamation. Mulching is now a general requirement, but it can be omitted under certain circumstances.

Such techniques as building of terraces and small scattered depressions and using continuous deep grooves or furrows along the contour of the land have been developed to increase the amount of moisture stored in reworked soils and spoils. The latter techniques, termed deep chiseling, effectively concentrate water in the root zone.

Chiseling was also effective in reducing wind destruction of small seedlings that grew only in the 12-inch-deep grooves. Most of these surface manipulation techniques serve the dual purpose of reducing the amount and speed of water runoff and therefore are useful in erosion control. According to Jensen and Schaefer (1979), both replaced soils and spoils tend to have reduced capacity to absorb water because of a reduction in porosity. Topsoiling, however, has proved to be an effective procedure for increasing water infiltration because the topsoil layer acts like a sponge.

### RECLAIMED AREA MANAGEMENT

Proper management of reclaimed areas will improve reclamation success. One management problem is overgrazing by livestock. Allowing cattle and sheep into planted areas before they are fully established will destroy some plantings and greatly weaken others. After vegetation has been established, however, properly managed grazing has been shown to improve vegetation productivity and diversity.

Reclamation success is also affected by wildlife. The initial effect of wildlife on revegetation is loss of seeds and the overbrowsing of young woody plants, particularly where these plants are sparse. Where deer and elk are plentiful, revegetation of some species can be difficult because of overbrowsing. Seeded or planted woody species can be protected from overbrowsing if they are surrounded by herbaceous vegetation.

## APPENDIX 5

### SUPPLEMENTAL WATER

Irrigation allows planting over a greater time period and assures the highest percentage of seed germination and initial plant survival. Irrigation was observed as an operating procedure only at the Navajo and San Juan mines in New Mexico where powerplant cooling water is readily available. Irrigation has also been experimentally used at other mine reclamation sites (Ries and Day 1978). Sprinkler irrigation has proved to be the most satisfactory method under field conditions (Aldon and others 1976). Irrigation must be scheduled, however, so that when it is discontinued some plants will survive without it (Curry 1975). On some irrigated mine spoils in New Mexico vegetation thinned out significantly after irrigation ended.

### COMPLIANCE AND PROPER PRACTICE IMPLEMENTATION

To ensure reclamation practice effectiveness, practices and techniques must be implemented in a proper and timely manner. A strong compliance program is paramount in achieving effective implementation of reclamation techniques.

### FOLLOW-UP MONITORING AND MAINTENANCE

A monitoring and maintenance program is needed to ensure successful reclamation. Effective maintenance and monitoring programs identify problem areas (those with adverse weather conditions during restoration periods) or small localized areas with adverse soil properties. Such programs would also provide corrective measures to ensure erosion control and successful reclamation.

### REGULATORY PROGRAMS

Recent reclamation efforts have been guided by both existing and proposed federal and state regulations (Imhoff and others 1976). In the 1970s, government agencies, working in part with universities, developed much of what is now known about western reclamation technology. The state of the art is now believed to be advanced enough so that the emphasis can change from research and development to assuring that reclamation technology is available to users (Scholz 1978). Much of the results of the SEAM program and other similar government and university research (Burbank 1978) has been applied through experimental techniques at mines in cooperation with mining companies. Mining companies are also conducting tests and experiments on their own as new techniques are developed or are mandated by government regulations.

The Surface Mining Control and Reclamation Act (SMCRA) provides administration and control of surface mining and reclamation. SMCRA also assists and monitors programs for the research and development of improved surface mining and reclamation techniques designed to reduce adverse environmental and social effects.

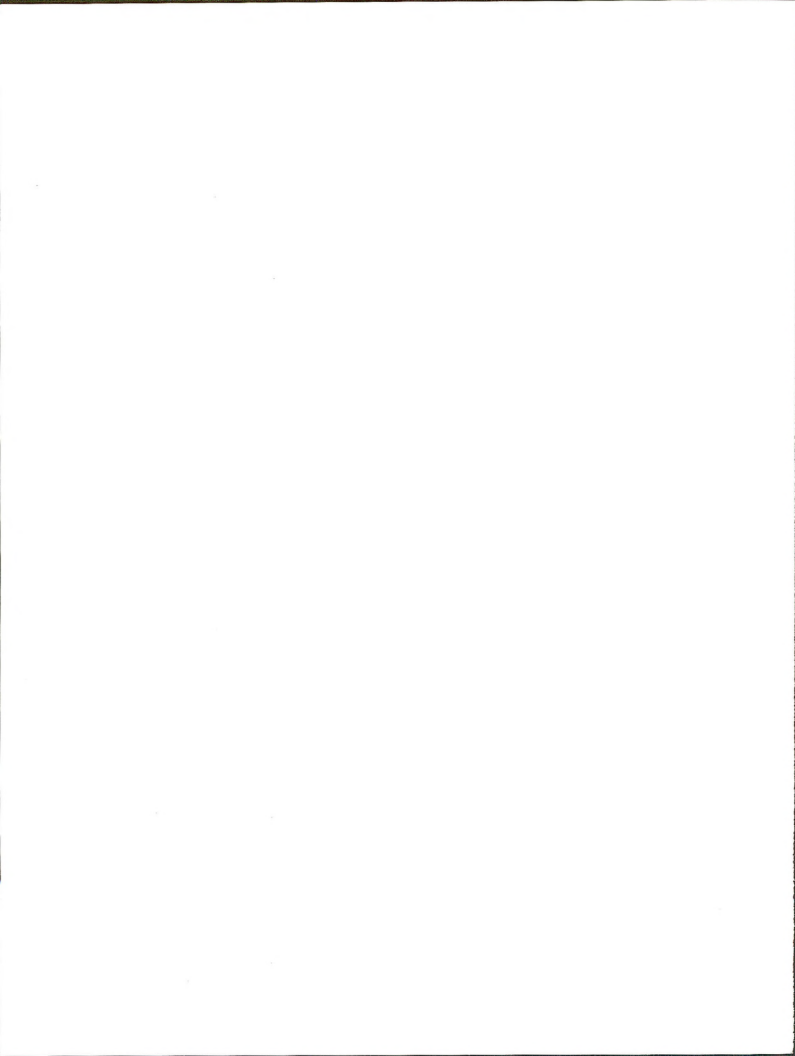
## RECLAMATION AND EROSION CONTROL ON SURFACE-MINED LANDS

An essential feature of SMCRA is its calling for cooperative development of legislation and for technical organizations at the state level to support enforcement of Federal Government regulations. Compliance with regulatory programs has strongly improved reclamation efforts and has been instrumental in achieving successful reclamation.

### SUMMARY

Successful erosion control, land restoration, reclamation, and revegetation are generally expected to be achieved through the federal coal regions if the coal industry implements effective measures and practices tailored to the kinds of land disturbance and conditions found. A strong compliance program, accompanied by an effective monitoring and maintenance program, is needed to ensure that measures are applied in a timely and effective manner and that follow-up measures are carried out. Adverse impacts to soils and their potential to produce vegetation and crops at preconstruction levels, however, would be significant if erosion control, soil reconstruction, and reclamation measures are not implemented in noncompliance with approved plans.

The results of studies, research, and experiences reveal that current reclamation objectives can be met when the reclamation effort is designed on the basis of site-specific need and when existing technology is used (Narten and others 1983). Continuing research designed to meet specific needs will also enhance efforts to ensure successful reclamation.





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# PROPOSED COAL PROGRAM CHANGES

3420.34 (651)

3420.34 (651)

**BINDING OF NO SIGNIFICANT IMPACT  
FOR PROPOSED REVISIONS TO THE FEDERAL COAL MANAGEMENT  
RULES AND PROCEDURES  
AND DECISION DOCUMENT**

**ENVIRONMENTAL ASSESSMENT  
FOR  
PROPOSED REVISIONS TO THE FEDERAL COAL MANAGEMENT  
RULES AND PROCEDURES**

The attached environmental assessment has been prepared in accordance with 40 CFR Parts 1500-1508. The purpose of this assessment is to determine whether the proposed revisions to the rules and procedures under which the Federal coal management program operates represent a major Federal action that significantly affects the quality of the human environment. The assessment evaluates the environmental effects directly and indirectly attributable to the proposed changes. Regional and/or site-specific environmental documents will continue to be prepared for all coal-related leasing activities as set forth in the existing regulations.

As a result of this analysis, the Department of the Interior has determined that there are no significant environmental impacts attributable to these proposed revisions because these revisions would not result in any significant changes in the level or types of impacts of the continuing program as determined in the Final Environmental Statement: Federal Coal Management Program (1977 PA-10), April 1979. Therefore, the Department determines that these revisions do not constitute a major Federal action significantly affecting the quality of the human environment and that no detailed statement pursuant to section 102(2)(C) of the National Environmental Policy Act of 1969 (42 U.S.C. 4322(C)(1)) is required.

The proposals described in Tables 1-7 of this environmental assessment are adopted to the extent that rulemaking is not required. The Bureau of Land Management shall develop specific details to implement these proposals. For those proposals that require rulemaking, proposed rules shall be developed and published for public comment.

Introduction

The potential impacts of the Federal coal management program were analyzed in the Final Environmental Statement: Federal Coal Management Program (1977 PA-10). Thereafter called the Programmatic EIS, dated April 1979. That final statement forms the basis for the environmental assessment contained in the present report. This assessment also incorporates by reference the Environmental Assessment for Revisions to the Federal Coal Management Rules - 13 CFR 3400 and 30 CFR 3111, dated May 1987; Environmental Assessment for Revisions to the Federal Coal Management Rules - 43 CFR 3401.101, May 1983, and the Environmental Assessment for Revisions to the Federal Coal Management Rules and Procedures, June 1984. This new assessment is intended to identify and analyze the additional potential impacts, if any, resulting from the proposed changes in rules and procedures as described below. These proposals are still under consideration and may be revised, based on public comments and internal review. In that event, this environmental assessment will be revised if necessary.

Because of the many revisions already made to the original coal program rules and procedures, and because market conditions which determined the assumptions in the analysis of the Programmatic EIS may have changed, the Department is currently preparing a supplement to that EIS. The draft is expected to be available in February 1985. The proposed action in this supplement is to continue the program as revised by the proposals made in response to the Commission on Fair Market Value Policy for Federal Coal Leasing (the Linowes Commission), analyzed in the June 1984 EA, and the proposals analyzed in this EA.

I. Purpose and Need

In July 1983, Congress directed the Office of Technology Assessment (OTA) to provide a study of the Federal Coal Management Program. Because an advisory commission was to study fair market value for Federal coal leasing, the Linowes Commission this OTA study was to be limited to environmental issues. In November 1983, the Secretary issued recommendations on the study. In May 1984, the Secretary has independently reviewed the Department's past policies and procedures and has made a number of proposals in response to the OTA report. These proposals were presented in Review of Planning Considerations in Federal Coal Leasing (July 9, 1984).

DEC 8 1984

Date

Date

*[Signature]*  
Director, Bureau of Land Management

*[Signature]*  
Deputy Assistant Secretary - Land and Minerals Management

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The purpose of these proposals is to improve overall procedures and operations of the Federal coal leasing program. The Department's objectives are:

- o increase public participation in the land use planning and activity planning processes.
- o enhance the role of the regional coal teams and provide them with better facilities for decisionmaking.
- o protect the environment to the fullest extent possible while promoting the Nation's interest and reducing our foreign energy dependence.

The procedures for implementing these proposals are being prepared for public review and comment prior to the Secretary's final decision in 1985. Draft rulemaking is scheduled for publication in April 1985. Proposed changes through instruction memorandums are expected to be published in the Federal Register for comment in early 1985.

II. Description of Proposed Action and Alternatives

The proposed action is to implement the several proposals made in response to the OTA recommendations. These are summarized in Tables 1-7. The alternative of not making these changes is the No Action Alternative.

A. Proposed Action

OTA identified ten options for the Secretary's consideration:

- o Reduce lease rates
- o Decentralize decisionmaking authority
- o Improve the effectiveness of public participation
- o Increase comprehensive area planning in completed before a lease offering
- o Develop a means of improving the data base and access to it
- o Provide meaningful guidelines and standards for assessing the adequacy of the data base
- o Incorporate cumulative impact assessments in pre-sale planning decisions
- o Establish policies and procedures for environmental lease exchanges
- o Evaluate policies and procedures for leasing on public estate and checkerboard lands
- o Establish uniform procedures for environmental evaluation of FRLAs

The Secretary of the Interior proposes several revisions in the rules and procedures, through amendments to 43 CFR 3400, Manuals, and instruction memorandums, in response to these options. These revisions are summarized in Table 1-7 and explained briefly below. Specific details of how each would be implemented will be described in Federal Register notices.

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1. Land Use Planning. One proposal would supplement a recommendation on long-range schedules made in response to the Linowes Commission report by having the BLM consider time and other constraints in developing regional schedules. These schedules, while specific for the coal program, are dependent upon the completion of land use planning. Proposals would also commit the Department to completing resource management plans before beginning Green River - New York II, Powder River II, San Juan River I, Uinta - Southwestern Utah II, and Southern Appalachia (Alabama III) would not be affected. In areas outside coal production regions and where existing regions are being abolished, leasing by application could use amendments to management framework plans where no RFP has been completed. Procedures for applying the four coal areas would be refined to be more efficient and meaningful to the public.

At the beginning of land use planning, BLM calls for coal resource information. A proposal would add mineral resource information to this call, and the public would be invited to participate. Information gathering as a result of this call would be used along with other information available to BLM to determine lands for further consideration from leasing if they have a large number of resource conflicts and limited data for use in resolving the limited and little potential for development because of little interest or few resource conflicts may not be known until substantial amounts of areas have been analyzed, and the subsequent use of the results of the call would allow conflicts earlier in the planning stage than under current procedures.

Early in land use planning, the public would be provided with a calendar of land use planning and coal leasing activities, as well as the pre-sale of Land Management (RLM) and in this sense would include leases by application as well as regional leasing. In this document, however, as in the Secretary's response to OTA, "activity planning" refers only to regional leasing as defined in 43 CFR 3420.

2. Activity Planning. Program-specific steps following the completion of land use planning are generally termed "activity planning." The pre-sale of Land Management (RLM) and in this sense would include leases by application as well as regional leasing. In this document, however, as in the Secretary's response to OTA, "activity planning" refers only to regional leasing as defined in 43 CFR 3420.

One proposal would have activity planning begin only after an RCF meeting to review a market analysis (as proposed in response to the Linowes Commission recommendation) to determine the need for a new round of leasing. This summary would be a single document containing a summary of the data and decisions made at all land use plans to be used as a basis for that round of coal leasing. This proposal

would also have the notice of this BCT meeting announce the availability of this market analysis report and land use planning summary at least 45 days prior to the meeting. This would clarify that those reports which will be the subject of major discussion (i.e., agency issues) by the BCT will be available to the public for sufficient time for review before the BCT meeting.

As part of the proposal to review a summary of land use planning, the Department also proposes that BCTs will use these land use plans to identify leases which were not resolved during land use planning and to identify data which will be needed to evaluate tract areas during activity planning. This step would necessarily be part of the first BCT meeting in order to precede tract delineation, which immediately follows the completion of the call for expressions of interest, which currently is the first step in activity planning.

Several other data review procedures would be added throughout activity planning. Tract profiles would include an assessment of the available data for the coal and noncoal resources as well as an assessment of data needs, if any, for an adequate evaluation of the tract. This would make data needs more explicit in the early environmental analysis. Any additional inventories or surveys to correct data inadequacies would be site-specific on tracts already delineated, rather than on the entire land use planning area, and would be completed before the preparation of the final regional EIS. As a specific data analysis step, the BCTs would review data in the tract profiles and rank any tract as less desirable if it has large amounts of data to be collected or drop the tract completely from any further consideration for leasing in that tract.

In preparing the cumulative analysis in the regional coal leasing EIS, the BCTs would consider any threshold analysis performed during land use planning. It may be appropriate to expand the land use planning threshold analysis to include the entire region. While thresholds have been implicitly part of the cumulative analysis in the regional EIS, this would explicitly tie any such analysis to that of the land use planning document. Another proposal would have the experimental use of science advisors to assist the BCT in evaluating data, discussed further in the section on BCT structure.

Another proposal would require certain elements to be included in decision documents used for coal leasing decisions, specifically, the decision itself, the factors used in making the decision, and the information on which the decision was based. BLM has not had a standard format for decision documents on BCT recommendations through the Director to the Secretary, and this proposal would standardize such documents and make the BCT recommendations more understandable to the public and to the Department. Along with this is another proposal to have the BCTs identify in their final recommendations for lease all those tracts the BCT is not recommending because of data inadequacies. This would be coal and noncoal resource data needed to

standards and guidelines for data adequacy, prepared in consultation with other agencies affected by or involved in the coal program. Another proposal calls for the involvement of the Office of Surface Mining and Reclamation (OSM) in reviewing tract data, to assure that data are sufficient to determine that tracts offered and leased have a reasonable chance of meeting BODMA requirements in subsequent mine plans. The use of a joint BLM-OSM working group to develop ways of utilizing mine plan data and the investigation of new data sources such as coal exploration licenses for hydrology or soils data are also proposed.

**6. Miscellaneous.** These proposals would provide by regulation a minimum time period of 30 days for public review of any document used for land use or activity planning decisions, a reinstatement of thresholds in the coal regulations, and monthly reports on the PMAs. A proposal that the status of PMAs be confirmed by the BCTs in developing leasing level recommendations was also part of the Department's response to the Lincoln Commission recommendations.

**7. Proposals Not Analyzed in this EA.** Generally, these proposals are a restatement of certain actions also proposed in response to recommendations by the Lincoln Commission. This group includes proposals that the Department is leaving to Congress, namely the issues of split estate and general lease authority.

#### B. No Action

The Federal coal management regulations and procedures would not be revised by the proposals described above.

#### C. Alternatives Not Considered

Several alternatives which include some but not all of the proposals could be developed. The Department felt, however, that there is considerable overlap of proposals so that deleting some would diminish the effectiveness of those proposed in such an alternative. No alternative including any combination other than the entire group was considered for this EA.

### III. Affected Environment

The physical and human environment ultimately affected by changes in the coal program rules and regulations was described in the Programmatic EIS.

#### IV. Environmental Consequences

##### A. Proposed Action

Under these proposals, procedures for public involvement, resource management decisions, and activity planning procedures would be standardized throughout

adequately assess the tract and would exclude data normally not required until the mine permitting stage. These omissions of tracts in the BCT recommendations would be made regardless of the alternative in which the tracts were analyzed in the regional EIS and regardless of the leasing level used as the proposed action.

The proposal that the Department would accept BCT recommendations unless a clear reason exists for not doing so and to explain such reason in writing has been implemented through the revised charter for the Federal-State Coal Advisory Board. This group consists of the members of all BCTs and is chaired by the BLM Director. It is chartered under the Federal Advisory Committee Act and makes recommendations to the Secretary through the BLM Director.

**3. BLM Procedures Review.** These proposals call for a review of BLM's experience with the changes in the process of applying the 20 unsuitability criteria (20 USC 3601), using input from interested parties. This review would also include a report on whether revisions are needed in the process. These proposals call for a review of the BLM Land Exchange Manual sections dealing with land and lease exchange and for steps to ensure better coordination with the Forest Service. This would affect those regions in which coal to be considered for leasing is within the National Forest System. A proposal also provides that BLM would work with other agencies to refine the threshold concept. Any changes or detailed guidelines that might be prepared for the field would be available first for public comment. A proposal calls for the preparation of supplemental guidance to assist the field in the understanding requirements of the coal program in land use planning.

**4. Structure of Regional Coal Teams.** Regional activity planning is conducted under the direction of a regional coal team, comprised of the Governors of the States in the region (or their representatives) and the BLM Director from a State outside the region (except the Alaska BLM, which was chaired by a BLM Washington Office official). One proposal in this group is to have it chaired by the BLM State Director in the State primarily involved. This State Director would then appoint another BLM official to represent his state as a voting member. This change has already been implemented through the revised charter for the Federal-State Coal Advisory Board, referred to above. Another proposal to use three science advisors (specialists in renewable resources, in mineral resources, and in reclamation and mitigation techniques) to advise the BLM on data problems would be tried on a test basis. Another proposal would have the BCTs use working groups made up of members of all segments in the community, to advise the BCT or develop information as needed.

**5. Data Adequacy.** This group of proposals would call for the BLM to review the data sources already available to it and refine and integrate the several computerized data sources and data handling systems in BLM automated data systems currently used for resource projects (the acronym used in Table 1 are defined in the list following the rest of this document). They also call for the review of potential new sources of data. These proposals would provide

the BLM. Some offices would be required to initiate new procedures, but other offices already using these procedures would not be affected. No significant environmental impacts would be expected from this change.

Where areas are identified at the onset of activity planning as having significant data gaps, the choices will be 1) to drop the area from the lands to be considered further in activity planning, 2) to gather the data during a normal activity planning schedule, or 3) to conduct a special survey allowed for activity planning if too short for the data to be obtained for analysis in the final regional EIS, to extend the schedule for activity planning on that activity because data can be obtained more quickly using this method. The rest of the tracts before activity planning is completed. In the first choice, some intra-regional shifts may occur as a result of dropping specific areas from further consideration, but these areas cannot be identified at this time. The analysis of this area are not expected to be significant and will, in any event, be analyzed in the regional EIS.

Currently, when data are incomplete for a tract to be offered for sale, the resource is protected through a stipulation requiring the lessee to conduct a survey and consider the results in the proposed mine plan. The proposed action would move data-gathering to the pre-lease stage but would not preclude a requirement for post-lease surveys for information appropriate for the mine permitting process. While any additional surface disturbance may be encountered if surveys are carried out both before and after leasing, no significant environmental impacts are anticipated. In any event, this would be analyzed in the site-specific tract profiles and regional EIS.

These inventories of surveys for site-specific data would supplement the screen by which tracts which have inadequate data for assessment are identified, now in the Secretary's decision at the end of activity planning, with BCT review at the onset of activity planning and in the preparation of the regional EIS.

If implemented, the proposals to increase opportunities for public participation could provide for earlier resolution of conflicts. The procedures would result in a better-informed public and a better-informed Department, through the mutual exchange of information and concerns. This is not expected to have significant potential impacts on the environment.

These proposals would also enhance the Department's sensitivity to State concerns early in the activity planning process. Many of the proposals could expand the time given to analyzing the tracts, improve the focus of study and eliminate some areas from further consideration for leasing earlier in the process.

# PROPOSED COAL PROGRAM CHANGES

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Ultimately, the final decision on which tracts would be offered for sale and leased and approval of a mine plan granted would not be affected. None of these proposals would change the annual production rate or the way in which coal would be mined. The basic framework in which noncoal resources are considered in the pre-lease planning process would be strengthened but not altered. No inter-regional shifts in coal leasing and production are expected. There may be intra-regional readjustments, but those cannot be identified until the specific land areas are identified. Through the Department's tiering process, any intra-regional shifts would be analyzed in a specific regional coal leasing EIS.

**E. No Action**

The impacts of the program if not changed by these proposals are described in the documents referenced above.

**V. Unavoidable Adverse Impacts**

None can be anticipated from either alternative.

**VI. Relationship Between Short-Term Uses and Long-Term Productivity**

No significant change in land use patterns on a national scale can be expected. If there are any intra-regional shifts, they will be identified and analyzed in the appropriate regional EIS.

**VII. Irreversible or Irrevocable Commitment of Resources**

No significant commitments can be identified for either alternative.

**VIII. Agencies Consulted**

The Department has coordinated with the Forest Service in the preparation of this assessment.

Table of Acronyms

1. ALMS -	Automated Land and Minerals Record System: an automated system for recording, maintaining and retrieving land and mineral information.
2. BLM -	Bureau of Land Management, U.S. Department of the Interior.
3. ESIS -	Ecological Site Inventory System: an automated system that provides soils and vegetative inventories and identifies potential, based upon plant succession to a climax stage.
4. GIS -	Geographic Information System: an automated information system in which spatial data are stored, retrieved, displayed, and analyzed.
5. IHCS -	Integrated Habitat Inventory and Classification System: an automated system that delineates wildlife habitat areas and provides for storage, retrieval, and analysis of wildlife resource data.
6. MFP -	Management Framework Plan: a comprehensive land use plan to be replaced by a Resource Management Plan.
7. OSM -	Office of Surface Mining, U.S. Department of the Interior.
8. OTA -	Office of Technology Assessment.
9. PMLA -	Preference Right Lease Application: an application for a non-competitive lease.
10. RCT -	Regional Coal Team: a panel of BLM and State representatives that guides the regional activity planning process.
11. RMP -	Resource Management Plan: a comprehensive land use plan prepared pursuant to the Federal Land Policy and Management Act of 1976.
12. SMRA -	Surface Mining Control and Reclamation Act of 1977.

Table 1. Land Use Planning

Option	Summary of Proposal	Result
1	RMA will consider available resources and magnitude of data gathering and analysis needed to resolve issues when developing long-range schedules.	Long-range schedules would reflect realistic workloads and public and State concerns.
4	BLM will expeditiously complete RMPs and initiate new coal activity planning only in areas where RMPs have been completed. For areas outside coal production regions, and where regions are established, MFP coal amendments may be used for coal leasing decisions where RMP is completed.	This would provide a uniform standard for initiating future coal activity planning and also provide a priority for the scheduling of RMPs in each State.
4	A summary of the decisions made to each MFP will be available.	Final land use planning decisions would be more accessible to the public.
3	BLM will develop and release land use planning and activity planning calendars, identifying points for public involvement.	This would give advance notice to the public to better anticipate when and how they may participate.
6	At the beginning of land use planning, BLM will include a call for other resource information, to aid in evaluating lands for possible lease sale.	More data on noncoal resources would be available for resource management decisions.
3	The public will be invited to participate in the call for coal and other resource information at the onset of land use planning.	More data would be available to the Department for early resource management decisions.

Table 1. Land Use Planning (cont.)

Option	Summary of Proposal	Result
6	Information from the call for resource information, along with BLM data bases, will be used to eliminate lands of little interest for development or that have limited coal resource but appear to have a large number of resource conflicts and limited data to resolve them.	This would avoid the possibility of unnecessarily considering tracts with substantial resource conflicts and low coal priority.
7	BLM will apply the four coal screens sequentially from the top down, except where it appears to be more efficient to apply them in another order.	Applying the screens in sequence would be understandable to the public. The flexibility to apply a screen out of sequence would eliminate the unnecessary application of some screens to land which would be eliminated by a later screen.
3	Public comments on the application of unsuitability criteria will be specifically solicited.	This would remove the misperception that the Department does not allow comment on the application of the unsuitability criteria.
3	Availability of maps and other information describing the application of the unsuitability criteria will be announced to the public.	Maps effectively illustrate the results of applying the unsuitability criteria. Advertising their availability would result in a better-informed public.

## APPENDIX 6

Table 2. Activity Planning

Option	Summary of Proposal	Result
3	Activity planning will begin with an NCT meeting to review a market analysis and the summary of the land use planning data and decisions.	Initial direction for activity planning would come from the NCT.
6	A single summary of all land use plans to be used in a round of regional coal activity planning will be prepared for the initial NCT meeting and be available to the public before the meeting.	This would tie together all the planning decisions in the region and serve as a bridge between land use planning and activity planning.
3	The notice for the first NCT meeting in activity planning will also announce the availability of the market analysis report and summary information at least 45 days before the NCT meeting.	This would provide explicit notice to the public and allow enough time to review the balance between planning issues and market analysis before the meeting.
4	Before tract delineation, NCTs will use existing land use plans as a base to identify issues to be addressed and data to be gathered as part of activity planning.	Issues which were unresolved during land use planning, as well as areas where data could be a problem, would be noted. Only those areas where missing data could be obtained before the final regional IIS for that round would be considered for tract delineation.
6	Tract profiles will include assessments of the coal and noncoal information and of additional data, if any, needed for an adequate evaluation of the tract.	This would give ELM an early warning to plan efforts to acquire the data before the end of activity planning.
6	NCTs will use the data assessments in the Tract Profiles in routing tracts prior to their selection for the regional coal leasing IIS. Tracts lacking large amounts of data will be ranked as less desirable and may be dropped altogether.	Potential problems due to data inadequacies would be placed in proper perspective. Tracts with good coal resources but poor data on noncoal resources would not be ranked high. This would avoid the needless consideration of tracts with data problems which cannot be resolved in a timely manner.

Table 3. ELM Procedures Review

Option	Summary of Proposal	Result
3	ELM will prepare supplemental program guidance to clarify program-specific resource management planning requirements.	This would provide the broad framework of ELM policy and the role of the coal program in land use planning.
3	ELM will review its experiences with the changes in the process of applying suitability criteria, seeking interested parties for their concerns and for information of the effects of the changes, and report on the need for revisions.	This would provide a thorough study of past problems, if any, and propose action to correct the problems.
7	ELM will work with other organizations to refine the threshold concept and make any proposed guidance available for public comment.	This would clarify the concept and provide an opportunity for the public to help define the way it can be used.
8	The Department will direct a thorough review of the ELM Land Exchange Manual and, if necessary, provide more detailed guidelines on the process of land and lease exchanges.	This would standardize the treatment of ELM policy and all ELM offices.
4	ELM will take the necessary steps to ensure better coordination with the Forest Service.	This would help assure that resource decisions are made with consideration of all cumulative effects considered on all Federal coal in the region, and the effects considered on both the environment and the market.

Table 2. Activity Planning (cont.)

Option	Summary of Proposal	Result
7	In their review of cumulative impacts of coal development, the NCTs will consider any threshold analysis performed during land use planning and will spend this analysis, where appropriate, to the broader area.	This would explicitly link pertinent thresholds, if any, in the land use plans with activity planning and related environmental analysis.
6	In their final recommendations, NCTs will separately identify any tracts not recommended because data were insufficient to adequately assess the tract (except data normally acquired at the mine permitting stage).	This would avoid the possibility of offering a tract without sufficient data to evaluate it.
6	NCTs will identify tracts with data problems without consideration of the EIS alternative(s) in which the tract was analyzed or of the effect its deletion would have on the recommended leasing level.	The choice of tracts would be determined by the availability of data needed to make a responsible resource management decision, rather than by the leasing level, which was established as a guide for the EIS.
2	The Department will accept NCT recommendations unless a clear reason exists not to do so, and will explain this reason in writing.	This would enhance the role of the NCT. Decisions would reflect more regional interests and concerns.
3	All decision documents will specify the nature of the decision, the key factors leading to its supporting information (or a reference to the document containing it), and an easily understood summary.	This would make decision information more accessible to the public and make NCT recommendations more understandable to the Department.

Table 4. NCT Structure and Organization

Option	Summary of Proposal	Result
2	The NCT Chairman will be the ELM State Director from the State primarily involved.	This would increase sensitivity to the concerns of the State most heavily involved in coal activity for that round.
3	NCTs will use representative working groups, including all segments of the community, to develop information for NCT consideration.	This would involve the public more directly in coal activity planning.
6	Three science advisors will be appointed by the NCT Chairman, after consulting the other members, to serve as an officio members on a test basis, to assist the NCT in evaluating data.	This would provide explicit advice from specialists in the resources of major concern in that region.

## PROPOSED COAL PROGRAM CHANGES

Table 5. Data Adequacy

Option	Summary of Proposal	Result
5	BLM will prepare, in consultation with other agencies, data adequacy standards and guidelines.	This would provide BLM field staff with more specific guidance on the nature and level of data needed for coal leasing decisions.
3	BLM will investigate new sources of data, such as exploration licenses for hydrologic and soils data.	This would provide more site-specific data in a more timely manner.
5	A BLM/ODM working group will suggest ways to search, extract, and apply mine plan data.	This would allow a more extensive use of existing data.
5	BLM will refine and integrate various systems (such as ADMS, GIS, IHS, IMIS) to increase their availability and accessibility.	This would facilitate the use of existing data.
6	ODM will assist BLM in evaluating data, to assure that tracts leased will have a high probability of meeting SMCA requirements.	This would provide for decisions made on resource data and provide the potential lessee a better assurance that the tracts offered have no serious obstacles to development.

Table 6. Miscellaneous

Option	Summary of Proposal	Result
3	BLM Manuals and regulations will specify minimum timeframes for public comments, which will be no less than 30 days for a land use planning or activity planning document.	This would provide an explicit standard for public review periods.
7	BLM will reinstate the consideration of threshold analysis in the coal management regulations.	This would reinforce the provisions found in the Planning regulations and remove the misperception that NM is not considering thresholds in the land use planning process for coal.
10	BLM will prepare monthly reports to document the status of each PMA.	This would provide a tracking system for the RCTs, the Department and the public.

Table 7. Proposals Not Analyzed in This EA

Option	Summary of Proposal	Reason
1	Decisions on leasing levels and final sale offerings will be based on a variety of factors, including market conditions and environmental concerns.	This was already addressed in the response to Linores recommendation III-1 and analyzed in that EA.
1	Market conditions and environmental concerns are to be weighed by the RCTs in making recommendations to the Department.	This was already addressed in the response to Linores recommendation III-1 and analyzed in that EA.
1	Smaller and more frequent sales, to gauge the market better and obtain information to use in subsequent sale decisions.	This was already addressed in the response to Linores recommendation III-1 and analyzed in that EA.
6	BLM will improve coordination with other Federal agencies, State and local governments and private organizations.	This was already addressed in the response to Linores recommendation III-1 and analyzed in that EA.
8	The Department will explore, with Congress, the possibility of providing the Secretary with general lease exchange authority.	This is not being proposed initially by the Department and will be considered at the time when Congress may act on this.
9	Review of split estate and checkerboard lands issue should be sponsored by Congress.	This was already addressed in the response to Linores recommendations in Chapter VII and was analyzed in that EA.
10	RCTs will receive a copy of the PMA monthly report and will consider the amount of coal in PMAs in making regional coal leasing recommendations.	This was already addressed in the response to Linores recommendation III-6 and analyzed in that EA.

## REGIONAL COAL LEASING LEVEL

The development of a regional leasing level for coal production regions is accomplished during the coal activity planning process. The process for establishing a leasing level is initiated immediately following the call for expressions of interest. To properly structure the setting of the leasing level approximately five to six months are required. Once the leasing level is established, the tract selection process and formulation of alternatives to the RIM are processed. The proposed action to be taken must be a combination of tracts which falls within the range established by the leasing level.

Process and Responsibilities

The Lead Bureau of Land Management (BLM) State Director, as the regional coal team (RCT) Chairperson, shall have the primary responsibility for establishing broadly stated ranges of leasing level options for the region. The RIM will evaluate lease planning data, regional market information (see Appendix A), coal resource information, and consult with the State Governor's representatives in formulating the initial ranges. The initial ranges are not recommendations by the RIM but a technical interpretation of the information available.

Following approval by the Lead State Director, the initial ranges are transmitted in draft form to the RCT members for their review. At this time, the forthcoming RCT meeting is announced in the Federal Register (FR) and copies of the initial ranges are made available for public review. The public is allowed a 45-day period to review and comment on the initial ranges.

Following the public review the Lead State Director shall assemble a package report containing the initial ranges, associated analysis, and RCT member's and public's comment. The RIM shall: (1) ensure that the recommendations are in the appropriate format; (2) add any additional information that is needed; (3) do open questions and clarify issues raised by the members; and (4) outline any additional alternative ranges. Following approval by the Lead State Director, the package report is transmitted to the RCT members, RIM Directorates and the appointed science advisors. No less than 15 days prior to the announced public meeting.

At the public meeting the RCT may make a consensus recommendation on the range for the leasing level for the proposed action in the forthcoming regional RIM. Any dissenting recommendations should be indicated.

APPENDIX A  
Regional Market Analysis

## I. INTRODUCTION

This appendix provides the step-by-step instructions for performing various mathematical calculations to assess the demand for Federal coal leases and for analyzing other available data. The results of this analysis are to be used as one input in formulating the technical report to the RCT for use in formulating the proposed leasing level.

The projections section of this appendix deals with estimating the projected productive capacity, production forecasts, and identifying a target year. These estimates are used in several of the methodologies discussed in the algorithm sections.

The algorithms section presents six methodologies for making mathematical calculations to determine appropriate levels of coal leasing to meet certain objectives. These objectives include providing leasing opportunities, promoting more economically and environmentally desirable patterns of development, promoting a stable and rational market participation by the Government and promoting competition within the coal industry. These and other objectives are not totally captured in the six methodologies of the regional market analysis. For example, the promotion of optimal patterns of coal development cannot be captured in a mathematical algorithm but depends on the RIM's and RCT's knowledge of the region.

Three objectives that are well defined by the six methodologies are providing leasing opportunities, promoting competition within the industry and promoting a stable and rational market participation by the Government. The six methodologies are: (1) minimum leasing; (2) past sales; (3) contracting rate; (4) strategic supply; (5) production needs; and (6) expressions of interest.

The first two methods primarily provide proxies for the objective of being a stable market participant. The minimum leasing algorithm, as the name implies, sets a lower limit on the leasing options. Where the information is available the analysis provides a range of leasing options that meet the needs for the continued operation of existing mines and allows for leasing to avoid by-pass situations on Federal coal resources. The past sales analysis looks at current market and the price trends which are established. This past sales analysis does not result in a numerical leasing option but allows for further insight into the market. As a stabilizing force in the market, the decision based on this method would tend towards a leasing option that "leaves into the wind". Based on this methodology, a leasing option would dictate offering more coal for lease when a trend of higher prices is observed and offering less when a lower price trend is observed.

Following the public meeting the Lead State Director will be responsible for editing the RCT's recommendation on the range for the proposed leasing level, any dissenting recommendations, and any additional comments to the package report.

The Chairperson shall transmit the final package to the Secretary through the RIM Director. All comments and recommendations shall be transmitted, without change, as a part of the RCT package. The Director may make recommendations, but only through separate documentation.

The Director then forwards to the Secretary the final package on the proposed leasing level. The Secretary, upon receipt of the RCT's transmittal, shall initiate formal consultation, in writing, with the Secretary of Energy, the Attorney General, and affected Indian Tribes. The Secretary shall consult with the Governors of the affected States prior to the leasing level decision being made. Following formal consultation, the Secretary shall establish a leasing level range based on the factors listed in Section 3422(c) and any other relevant information available at that time. The decision is then made public through the appropriate forum.

Promoting competition within the coal industry is a key objective of the Federal coal management program. The contracting rate algorithm provides a leasing option that allows growth in the level of competition for future utility coal contracts. The contracting rate method assesses the downward rate of reserves being committed under long-term coal contracts. The results are utilized to estimate a leasing option necessary to keep the coal market at a competitive level.

The last three methods provide leasing options to meet alternative interpretations of the market's needs and demands for Federal coal leases. The strategic supply and production needs algorithms manipulate the productive capacity and production forecasts to provide information on the coal production needs and the demand for a strategic coal supply. The strategic supply method sets a leasing option that allows companies the opportunity to satisfy the market demand for lignite coal. The production needs algorithm establishes a leasing option to meet the estimated production needs for the target year. The analysis of the expressions of interest relies heavily on the coal industry's perceived needs. This method uses expressions of interest from industry to analyze and address the individual company's desire for lignite coal.

Any two methods will probably result in different numerical results. The difference should be questioned and understood, but any difference in the resulting computations should not be viewed as a dilemma. All relevant algorithms should be utilized to provide as much information as is possible to the RCT members. The procedure laid out in this paper may be modified or additional information gathering tools may be added by the RCT members. Data inputs may be presented as ranges, a single estimate, or high, medium and low estimates, whatever is most useful to the RCT members. As algorithms and input data are improved and accepted by the RIM or RCT members this paper will be revised to reflect those changes.

The information derived from these algorithms is to be evaluated in conjunction with other factors and objectives that must be considered. The intention is not for one methodology or all methods to be the sole factor used in making the proposed leasing level recommendation. Part efforts to determine the appropriate level of coal leasing to be analyzed in the regional RIM relied solely on the results of a single computer model. The danger of that approach are avoided by using multiple sources of information. The intent of these analysis is to derive reasonable proxies for the leasing options that fulfill the various objectives that face the RCT.

Part efforts focused on the coal resources needed to meet the production needs for the region. The social costs of under-leasing and the anti-competitive nature of looking to fulfill only the production needs objective are avoided by instead addressing multiple objectives. The concept of satisfying current market demand, in addition to future production needs, moves the Federal coal leasing program more in line as a participant in the market place, responding to market signals.



# PROPOSED COAL PROGRAM CHANGES

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## II. PROJECTIONS

### A. Target Year

The target year is the best estimate of when significant quantities of coal will be produced from the leases to be offered for sale, assuming a market is available for that coal. The target year is used in several of the algorithms.

For the regions in the Western United States, this relevant timeframe may be as much as 10 to 13 years in the future. This allows up to 3 years for the administrative time needed for activity planning and issuance of the leases and 7 to 10 years to market and develop the coal tract(s). The 10 years also uses the full amount of time allowed the company to meet the diligent development requirements. Where a significant number of the offered tracts are expected to be producing sooner than the 10 to 13 years, an earlier target year should be used.

For the ease of data collection and analysis, it is recommended that the target year be set at a 5 or 10 year increment (i.e., 1990, 1995, 2000, etc...) since most existing data projections are more readily available for these years.

### B. Productive Capacity

The productive capacity reflects the coal that is available for production from Federal Leases, PMA's, and private reserves within the region for the target year without further Federal coal leasing. Due to unknowns in deriving this estimate, the NCM may wish with the productive capacity stated as a range or as high, medium, and low estimates.

Limiting factors that would reduce the productive capacity below the region's total capacity include: (1) coal that is of unacceptable quality; (2) Federal leases and private reserves with location and transportation problems; and (3) PMA's with issuance problems. Unmarketable coal would include coal that is of such poor quality that it is not likely to be produced at a reasonable cost. Also, Federal leases and private coal holdings located in areas that lack adequate transportation facilities may not be produced by the target year. Not all PMA's are expected to be approved or are not expected to be approved in the relevant timeframes; these PMA's would not be included in the productive capacity estimates. The NCM should also be alert to other limiting factors.

The productive capacity, however, would not be reduced due to a lack of expected demand for coal. The effect the demand for coal has on the coal market is captured in the production forecast. (See the following section for the discussion on the production forecast).

Information regarding annual production capacity and development limitations are to be collected through a case-by-case (lease-by-lease or property-by-property) survey. This information is the single most important primary research required of the BLM. This will involve investigating each lease, PMA and mine individually to determine this information. Companies, non-Government organizations, and Federal, State and local agencies involved with coal development within the region should be contacted. Any information on the coal production potential that will assist in determining the productive capacity should be investigated. Several coal publications contain relevant information on restricted future production from individual mines. One such source document is Western Coal Industry Update. When proprietary information is collected and utilized through the reported data sheets an investigator needs disclosing the proprietary information.

### C. Coal Production Forecasts

Several methods for estimating leasing options require the use of forecasts of the production and/or consumption of coal in the future. Users of these forecasts should be aware of the strengths and weaknesses of this type of forecasting, the models involved, and the data inputs that are required.

There are a variety of long range forecasts of coal production and consumption. The National Coal Association and the U.S. Department of Energy (DOE) regularly issue forecasts. Private companies and State agencies occasionally publish studies including coal forecasts. Most of these forecasts do not provide the regional detail required for use in estimating regional leasing levels, but their results can be used in judging the reasonableness of the more disaggregated forecasts.

One model that provides sufficient detail is the National Coal Model (NCM). The NCM, in cooperation with the DOE, has developed a model that provides the NCM with the capability of forecasting coal use with substantial Federal ownership of coal resources. One supply curve with Federal coal reserves and the other for the non-Federal coal supply.

Forecasts using the results of these models are published periodically. The algorithm uses descriptive methods of utilizing these forecasts to derive leasing ranges. For the most recent NCM results, additional documentation, or any other questions concerning the NCM, contact the Washington Office, Policy Analysis and Program Coordination (501), 343-4780. If additional information is desired, the NCM can be run under alternative assumptions of costs, supplies of coal, demand for coal, or leasing scenarios.

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## III. ALGORITHMS

### A. Minimum Leasing

This method of assessing a minimum leasing option draws directly from the objective of the Government being a stable and non-disruptive participant in the market. Where the information is available, the BLM evaluates the tracts that industry expressed interest in and/or have been delineated. The evaluation includes an identification of which tracts are considered maintenance, bypass, expansion, and new production tracts.

A minimum coal leasing option can then be determined by summing the recoverable reserves from the reasonable maintenance and bypass tracts. The BLM and NCM may also want to include in the calculation of the level a minimal amount of coal reserves available for expansion and new production opportunities. This would provide some opportunity for new entries into the region, competition between coal companies, growth of existing operations and allow for the testing of the market.

This approach simply identifies a level of Federal coal leasing that does not negatively impact existing operations by denying coal needed for continued operations and avoids situations where Federal coal will be bypassed without leasing.

Data availability can hamper this approach's reliability. Tract delineation is normally carried out simultaneously with the procedures for setting the proposed leasing option. The delineation reports are generally the best information on what types of tracts will be available. However, these reports are not always completed and available for consultation at the time that the initial leasing ranges are being formulated. The other source of information available is the expressions of interest submitted by industry. As is noted in the discussion of the expression of interest methodology, this source of information can be extremely unreliable. Further evaluation will be required if the expressions are the only information source. Tracts may be identified by companies as maintenance or expansion tracts simply to obtain control of the resource while avoiding competition for those resources.

### B. Past Bids

In a true competitive market situation, no one consumer or producer can greatly alter the market price by its individual buying or selling decision. The coal market is not, however, in a competitive market situation. The Federal Government controls a substantial portion of the coal reserves, especially in the West. The act of Federal coal leasing can greatly influence the supply of coal reserves being offered for sale and thus influence the market price for those reserves. This not only affects the Federal coal market and the revenues raised by Federal leasing, but also impacts the private coal market.

A relatively stable coal market is necessary for the efficient operation of the coal industry. Likewise, leasing decisions that do not take into account the effect on the price of coal reserves may be adversely impacting the surface market. This fact alone might address the issue by monitoring past coal lease sale results. A minimal leasing option is not derived through this analysis. However, it gives the decisionmaker a better understanding of the current market demand for coal. This is done by observing indicators of market trends.

One obvious factor to monitor is trends in the bonus bids received in both Federal and private transactions. The level of competition has tremendous influence on the bids received and therefore should also be monitored. Indicators for assessing competition are number of bidders and bids received. An absolute number of bidders or bids is established as a competitive level; however, there is a positive correlation between the number of bidders and bids, and the bonus bids received.

There are a number of ways of assessing bonus bids. A few of the more common units of measure are dollars per acre, cents per ton, cents per million BTU's, and a percentage of the mine-mouth selling price of the coal. A per acre measure has the obvious disadvantage of being a measure of the surface acreage with little relationship to the coal that lies beneath. Analyzing the price on a per ton basis is a somewhat better measure. One is, however, not a homogeneous commodity. The most significant difference is the energy value (BTU) of the coal. Commonly leased Federal coal ranges from a low of 7,000 BTU's per pound in the Fort Union Coal Region to over 14,000 BTU's per pound in the Uinta-Southwestern Utah Coal Region. An analysis based on cents per million BTU's captures this difference but does not address any of the other significant differences.

The best measure for capturing all these differences is the price in the market place that the coal itself brings. For example, coal that is a relatively high BTU and low sulfur content will generally receive a higher price in the market place for coal than coal that is a relatively low BTU and high sulfur content. The market price captures, at one time, all the characteristics that can not be subtracted from the value of the coal. Trends in the bids received can best be analyzed by observing the average high bonus bid expressed as a percentage of the mine-mouth selling price of coal in the region. For the Green River-Hance Fort and Powder River Bound 1 sales, the average high bonus bid was approximately .007 percent of the FOB mine (spot) market selling price for coal in the West. In the Uinta-Southwestern Utah Bound 1 sale, the percentage was slightly higher at .007 percent of the FOB mine selling price.

If a trend of higher bids and increasing numbers of bidders competing for the tracts is observed, an increased rate of leasing may be called for. The opposite is true if a trend of lower bids

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and fewer bidders is observed. The important thing to remember is to observe trends and not focus on an individual tract. It is also critical that the types of tracts are noted. Maintenance and bypass tracts will tend to have only one bidder due to the often captive nature of the tracts.

Best sale information, including those items mentioned above, are available through the Washington Office, Policy Analysis and Program Coordination (501) (343-4780).

#### C. Contracting Rate

The contract approach presented in this section relies on an observation of the rate at which contracts are being let for development of leased coal in relation to the total amount of leased-but-not-yet-developed coal in the region. The objective is to bring to insure a minimum level of available coal in the region to promote competition within the coal industry.

The basic idea is that the Federal Government would establish in each region an inventory of leased Federal coal, spread across many companies, at a level sufficient to provide full competition for contracts to deliver coal to consumers (in most cases electric utilities). Once a regional coal inventory is established, coal leasing would reflect the actual drawdown of this inventory. As coal leases moved from the inventory to the contracted-for-development mode, a new lease would be issued to keep the coal inventory up to the desired level.

The five basic steps in this approach are:

- Estimate the residual productive capacity of the region.
- Establish a range of the minimum inventory level for the region.
- Estimate the annual rate at which coal is being contracted for development in the region.
- Calculate the full inventory level that would provide full competition among coal companies for new contracts to deliver coal to consumers.
- Finally, the coal inventory level is reduced by the residual capacity leaving the annual shortfall. The leasing option is then calculated from the annual shortfall.

The residual capacity is simply the region's projected productive capacity minus that portion of the capacity already under coal contract for the target year.

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The algorithm for the contract rate method is:

$$\begin{aligned} \text{Projected Productive Capacity} - \text{Contracted Coal} &= \text{Residual Capacity} \\ \text{Annual New Contracting (Years between Sales)} &= \text{New Contracting} \\ \text{Average Large Contract (Competition Factor (Strategic Supply Factor))} &= \text{Minimum Inventory} \\ \text{Minimum Inventory} + \text{New Contracting} &= \text{Full Inventory} \\ \text{Full Inventory} - \text{Residual Capacity} &= \text{Annual Shortfall} \\ \text{Annual Shortfall (Average Mine Life (Percent Federal))} &= \text{Competition Option.} \end{aligned}$$

#### D. Strategic Supply

This algorithm incorporates industry's practice of holding an inventory of nonproducing factors of production into a calculation for a leasing option in the presence of holding a strategic supply of coal in order to add flexibility and a margin of security for a company's dealing with its unknown future resource demands. This algorithm allows the government to calculate a proxy for industry's demand for a strategic supply of coal and provide a leasing option that satisfies that objective.

Holding a strategic supply of coal reserves has both direct and opportunity costs to the company. Each company assesses its own costs and benefits of holding a resource, then acquires the appropriate quantity of resources to be held in inventory. The Federal Government is, however, essentially a monopoly supplier of western coal reserves and, in such a position, directly affects the holding and acquisition costs through the quantity of coal reserves offered for lease. To avoid the problem of undersupplying or oversupplying coal reserves, the leasing option would reflect what the coal industry would hold under normal market conditions.

This methodology has two basic steps.

- The production forecast is multiplied by a strategic supply factor to yield an inventory requirement.
- The inventory requirement is reduced by the productive capacity leaving the annual shortfall. The leasing option is then calculated from the annual shortfall.

Using the procedures spelled out in the projections section, the production forecasts and productive capacity are estimated.

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Next, a range of new contracting in the region (entered in annual production) and an average large new contract in the region (entered in annual production) for the target year is projected. Historical data for the region is one input to these estimates. By simply assuming a continuation of past trends, the average annual new contracting rate and the average size of a large contract can be estimated. The production forecast can also be used to project new contracting in the region based on model outputs for the target year that reflects the expected changes in regional coal production from historical data trends. By using both data sources, a range can be presented for the annual production from new contracting. In most cases, a range will not be needed for the estimate of an average large contract. The annual size of an average large contract is not likely to change significantly within the timeframes of these projections. Other sources, include the electric utilities (the major contractors for western coal) and relevant publications, should be consulted.

The estimated annual range of new contracting is multiplied by the number of years between Federal coal leases sales to calculate estimates of the quantity of coal that is expected to come under contract between sales (new contracting).

The expected annual production from an average large contract is multiplied by a competition factor and a strategic supply factor to calculate the minimum inventory level for the region. The competition factor is simply the average number of coal companies that is desired to compete for a utility's coal contract. This factor is up to the discretion of the RCT. The resulting leasing option from this method embodies the objective of promoting industry competition. This may be desirable to test various values for a competition factor.

A strategic supply factor is the quantity of coal reserves that an average coal company will hold in a non-producing status. As with the competition factor the value of the strategic supply factor is left to the discretion of the RCT. The RCT may wish to use the same factor) used in the strategic supply algorithm (see discussion of next methodology). The RCT may desire to test various values for this factor also.

The minimum inventory plus the new contracting estimate gives a range of figures for the region's full inventory requirement. As with the competition factor the value of the strategic supply factor is left to the discretion of the RCT. The RCT may wish to use the same factor) used in the strategic supply algorithm (see discussion of next methodology). The RCT may desire to test various values for this factor also.

The minimum inventory plus the new contracting estimate gives a range of figures for the region's full inventory requirement. As with the competition factor the value of the strategic supply factor is left to the discretion of the RCT. The RCT may wish to use the same factor) used in the strategic supply algorithm (see discussion of next methodology). The RCT may desire to test various values for this factor also.

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The strategic supply factor is established by the RCT. The objective of the method is to approximate industry's demand for an inventory of insitu coal. The RCT may find it desirable to test various values for a strategic supply factor. One of the strategic supply factors tested should approximate the average inventory held by the coal industry in that region. The RCT in coordination with the RCT should conduct a survey of the active coal companies within the region to estimate an industry average. The survey will not only look at what coal inventories are actually being held but also what individual companies feel is their optimal level of inventory. Past surveys and analysis have generated strategic supply factors ranging from 1.1 to 1.4. However, the requirement of every company is different and the strategic supply factor for each region would also be different.

Once a strategic supply factor (or factors) is chosen, the production forecast is multiplied by the factor, the results being the inventory requirement. The productive capacity is then subtracted from the inventory requirement leaving the annual shortfall. The annual shortfall is multiplied by the average mine life and the percent of coal reserves that are federally owned to derive the leasing option (entered in Federal recoverable reserves).

The algorithm for the strategic supply method is as follows:

$$\begin{aligned} \text{Strategic Supply Factor(s) (Production Forecast)} &= \text{Inventory Requirement.} \\ \text{Inventory Requirement} - \text{Productive Capacity} &= \text{Annual Shortfall} \\ \text{Annual Shortfall (Average Mine Life (Percent Federal))} &= \text{Strategic Supply Option.} \end{aligned}$$

#### E. Production Needs

This method for valuing the quantity of coal needed for leasing identifies the minimum quantity needed to meet estimated future production. This method differs dramatically from the previous methods presented in that it does not take into account industry's need to hold coal in an inventory status, the need to maintain a competition within the coal industry or the need for the Government to be a credible market participant. The objective of this method is to provide leasing opportunities at a level that will balance the production needs with the available supply.

The method simply subtracts the region's productive capacity from the region's production forecast leaving the annual shortfall. The annual shortfall is multiplied by the average mine life and the percent of the coal reserves that are federally owned, thus deriving the amount of leasing needed to meet production needs, stated in Federal recoverable reserves.

# PROPOSED COAL PROGRAM CHANGES

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The algorithm for the production needs method is as follows:

$$\begin{aligned} \text{Production Forecast} &= \text{Productive Capacity} + \text{Annual Shortfall} \\ \text{Annual Shortfall (Average Mine Life (Percent Federal))} &= \\ &= \text{Production Needs Option.} \end{aligned}$$

## F. Expressions of Interest

The use of expressions of interest to determine the appropriate coal leasing option mimics the market place in that it allows each company to assess its own needs for the resource. However, not all expressions of interest can be taken at face value as representing market demand for coal.

In the market place, a company's needs and wants are ignored unless that company can and will pay the market price for the resource. An expression of interest, as used for Federal coal leasing, can have a zero price associated with it. Thus, the simple sum of all expressions of interest may be nothing more than a wish list.

The difference between "need" and "demand" must be understood. That difference is basically that demand entails a willingness to pay at the market rate to fulfill the need. Also, the quantity of coal wanted, as expressed in the former expression of interest, may represent an engineering answer to an optimal size mine, not an expression of market demand for the limited coal.

The objective in this methodology is to calculate a leasing option that satisfies the calculated market demand. Since there is no market price on an expression of interest, the resulting calculation in most cases will exceed the market demand.

An additional shortcoming with using through expressions of interest to estimate demand comes with the assumption that only the companies that participated in the expressions process are the interested parties and that the company that identifies a particular parcel is the only party interested in those reserves. In reality, there is a "free rider" problem where a company can avoid the cost of submitting an expression of interest and instead rely on other companies to bear the cost of researching the reserves and other costs associated with providing an expression of interest.

This valuable source of information, however, should not be ignored due to these shortcomings. As we have the practice in the past, an effort should be made to determine which expressions of interest are "through." A thorough expression of interest can best be summarized as an expression in which the company has done extensive work in defining the resource in which it expresses interest.

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Strategic Supply Factor	- 3, 1.5
Competition Factor	- 3
Annual Production from New Contracting	- 2.0 million tons/year (low)
Contracting	- 2.5 million tons/year (medium)
Annual Production from an Average Large Contract	- 3.0 million tons/year (high)
Formal Industry Expressions of Interest	- 1.5 billion tons
"Through" Expressions of Interest	- 1.0 billion tons
Duplicate Expressions	- .3 billion tons
Maintenance Tracts	- none
Bypass Tracts	- none
Expansion Tracts	- 200 million tons
One Large New Production Tract	- 100 million tons

### A. Minimum Leasing Example

This method does not lend itself easily to an example. The evaluation of the expressions and/or tracts is assumed to have been completed. As given in the assumptions the sum of maintenance and bypass trackage is 100 million tons Federal recoverable reserves. If a minimal amount of expansion and new production opportunities is included, one large new production tract of 100 million tons and 200 million tons for expansion tracts could be added leaving 400 million tons Federal recoverable reserves.

Minimum leasing option - 100 to 400 million tons Federal recoverable reserves.

### B. Past Sale Examples

This methodology also does not lend itself to an example form. The evaluation of the data is assumed to have been done by the BLM Staff Office staff with assistance from the Washington Office, Policy Analysis and Program Coordination (30).

Average Bonus Slide (5 of FOM Mine Selling Price)

1964	- .010
1982	- .004
1982	- .007
1981	- .002

### C. Contracting Rate Example

Production Capacity - Contracted Coal = Residual Capacity

$$70 - 46 = 24$$

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This could include specific location information on the tract and quality and quantity information on the coal resource. Also, if a company has taken upon itself the expense of exploring the resource, it is probably demonstrating more than just a wishful interest. Companies that submit expressions that detail specific needs, such as tonnage, BTU and sulfur ranges, have probably identified potential customers for the coal. Also, the characteristics of the company, including its technical knowledge associated with coal development, are important. A company's track record on past coal production may help in evaluating the expressions. This information and analysis does not, however, establish expressions as being valid or invalid.

Each expression of interest should be evaluated to determine the thoroughness of an expression. Most of the information can be identified in the formal expression of interest submitted by the company. Other information, such as exploration licenses and individual company's past production from Federal leases, are kept on the BLM records. These records include case files kept in the State and District Offices and in the BLM Solid Leaseable Minerals Systems.

Once the expressions have been evaluated for thoroughness, a list of those deemed thorough can be compiled. This will require a certain amount of professional judgment as there are no set standards on what is a thorough expression. Duplicate expressions for the same tract are then accounted for. To ensure consistency with the other methodologies, the tonnage nominated should be stated in Federal recoverable reserves. Although this algorithm is not sophisticated it will give a better estimate of the demand for in-situ coal than the simple sum of all expressions of interest.

## IV. STEP-BY-STEP EXAMPLE

In order to impart a better understanding of the six approaches presented, the following numerical examples are provided. To aid in the example, the following estimates and assumptions are given:

Target Year (TY)	- 1995
Productive Capacity for TY	- 70 million tons/year
Production Forecasts for TY	- 46 million tons/year (low)
	- 52 million tons/year (medium)
	- 64 million tons/year (high)
Coal Under Contract for TY	- 46 million tons/year
Average Mine Life	- 30 years
Percent Federal Ownership	- 75 percent
Years to Sell Federal Coal	- 4 years
Regional Sale	

$$\text{Annual New Contracting (Years between Rates)} = \text{New Contracting}$$

$$\begin{aligned} 2.0 (4) &= 8 \\ 2.5 (6) &= 15 \\ 3.0 (6) &= 18 \end{aligned}$$

$$\text{Average Large Contract (Strategic Supply Factor (Competition Factor))} = \text{Minimum Inventory}$$

$$\begin{aligned} 2.0 (2.5) &= 10 \\ 2.0 (1.5(3)) &= 15 \end{aligned}$$

$$\text{Minimum Inventory} + \text{New Contracting} = \text{Full Inventory}$$

$$\begin{aligned} 20 + 8 &= 28 \\ 20 + 10 &= 30 \\ 20 + 12 &= 32 \end{aligned}$$

$$\begin{aligned} 15 + 8 &= 23 \\ 15 + 10 &= 25 \\ 15 + 12 &= 27 \end{aligned}$$

$$\text{Full Inventory} - \text{Residual Capacity} = \text{Annual Shortfall}$$

$$\begin{aligned} 28 - 24 &= 4 \\ 30 - 24 &= 6 \\ 32 - 24 &= 8 \end{aligned}$$

$$\begin{aligned} 23 - 24 &= -1 \\ 25 - 24 &= 1 \\ 27 - 24 &= 3 \end{aligned}$$

$$\text{Annual Shortfall (Average Mine Life (Percent Federal))} - \text{Competition Option.}$$

4 (30 (.75))	= 90 million tons Federal recoverable reserves
6 (30 (.75))	= 135 million tons Federal recoverable reserves
8 (30 (.75))	= 180 million tons Federal recoverable reserves
0 (30 (.75))	= 0 million tons Federal recoverable reserves
1 (30 (.75))	= 22.5 million tons Federal recoverable reserves
3 (30 (.75))	= 67.5 million tons Federal recoverable reserves

### D. Strategic Supply Example

$$\text{Strategic Supply Factor (Production Forecasts)} - \text{Inventory Requirement}$$

$$\begin{aligned} 2 (46) &= 92 \\ 2 (52) &= 110 \\ 2 (64) &= 128 \end{aligned}$$

## APPENDIX 6

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1.5 (A9) = 73.5  
 1.5 (S5) = 82.5  
 1.5 (S6) = 96.0

Annual Requirement - Productive Capacity = Annual Shortfall

98 - 70 = 28  
 110 - 70 = 40  
 128 - 70 = 58

73.5 - 70 = 3.5  
 82.5 - 70 = 12.5  
 96.0 - 70 = 26.0

Annual Shortfall (Average Mine Life (Percent Federal)) = Demand Option.

28 (30 (.75)) = 840 million tons Federal recoverable reserves  
 40 (30 (.75)) = 900 million tons Federal recoverable reserves  
 58 (30 (.75)) = 1,305 million tons Federal recoverable reserves

3.5 (30 (.75)) = 78.75 million tons Federal recoverable reserves  
 12.5 (30 (.75)) = 375 million tons Federal recoverable reserves  
 26.0 (30 (.75)) = 780 million tons Federal recoverable reserves

### D. Production Needs Example

Production Forecast - Productive Capacity = Annual Shortfall

45 - 70 = -25  
 55 - 70 = -15  
 64 - 70 = -6

Annual Shortfall (Average Mine Life (Percent Federal)) = Production Needs Option.

0 (30 (.75)) = 0 million tons Federal recoverable reserves

### F. Expressions of Interest Example

For the sake of the examples, it is assumed that the BLM has already evaluated the 1.5 billion tons for which expressions of interest have been required and determined that 1.0 billion tons are considered thorough. The BLM has also calculated the 0.3 billion tons are duplicate expressions. The through expressions minus duplications leaves the demand estimate.

Expression Option - 1.0 - 0.3 = 0.7 billion tons Federal recoverable reserves

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### G. Synopsis of Example

Without considering other information not analyzed in these algorithms, the following may be the conclusion reached (ranges resulting from the various algorithms).

1. Minimum Leasing - 100 to 400 million tons Federal recoverable reserves
2. Past Rates - continue past rate of leasing
3. Contracting Rate - 0 to 67.5 million tons Federal recoverable reserves  
 90 to 180 million tons Federal recoverable reserves
4. Strategic Supply - 78.75 to 583 million tons Federal recoverable reserves  
 670 to 1,305 million tons Federal recoverable reserves
5. Production Needs - 0 million tons Federal recoverable reserves
6. Expressions of Interest - 700 million tons Federal recoverable reserves

Since the results were spread over a broad range and the lead State Director is to make initial presentation as broadly stated ranges, initial leasing option ranges of 0 to 200, 200 to 400 and 400 to 1,300 million tons Federal recoverable reserves may be desired. Again, this is based on these algorithms which address three objective, stable market participation, promoting competition, and providing leasing opportunities, and is only one of a number of factors that must be considered.

The technical paper must also consider and report on land use planning data, coal resource information, environmental issues, concerns raised by the Governor, and other pertinent information. The result from the algorithms are only one input into the technical report, the BLM's recommendation, and eventually the Secretary's decision on the leasing level.

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- ICF Incorporated Ltd. Analysis and Critique of the Department of Energy's August 7, 1980, Report Entitled "Preliminary National and Regional Coal Production Goals for 1987, 1990 and 1995". ICF Incorporated, Washington, D.C.
- "Solid Leaseable Minerals System". Bureau of Land Management, State BLMs Coordinator or Division of Solid Minerals Operations (603) (FIS 343-7722).













STAFF DRAFT  
DEPARTMENT OF THE INTERIOR

Bureau of Land Management

Request for Public Comment on Adequacy of Coal Data

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice.

**SUMMARY:** The Commission on Fair Market Value Policy for Federal Coal Leasing (hereafter called the Commission) recommended that more effort be given to the delineation and ranking of tracts. Better tract delineations would result in more efficient mining operations, increase competition, and increase the value of the leases and help the government obtain fair return for the coal resource. Adequate tract-specific data will be needed. The Commission specifically recommended more drilling for better tract delineation. The Office of Technology Assessment report also stressed the importance of a good data base for all resources, not just coal.

To meet its responsibilities the Bureau of Land Management (BLM) needs vast amounts of reliable resource data in order to make good decisions regarding multiple use of the lands under its jurisdiction. This notice proposes national guidelines for adequacy of data specifically related to Federal coal. The guidelines indicate the amount of information on the coal resource needed for the BLM to make decisions at various times during the planning and decision making process. Each regional coal team (RCT) will establish additional guidelines or standards for coal resource data adequacy within its area.

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definition of "adequacy". It was suggested that industry, not Government, should determine data adequacy but that if a Review Council is used to determine data adequacy, the members should be highly qualified and a suggestion was made for qualification.

DATE: Comments should be received by \_\_\_\_\_

ADDRESS: Director (661)  
Bureau of Land Management  
18th and C Street, N.W.  
Washington, D.C. 20240

The comments will be available for public review in Room 3617 at the above address during normal business hours (7:45 a.m. to 4:15 p.m.).

FOR FURTHER INFORMATION CONTACT: Jules A. MacKellar (302) 343-4796.

**SUPPLEMENTARY INFORMATION:** In managing the coal resource there are three stages in the BLM decision-making process:

1) Land use planning in which Resource Management Plans (RMPs) are formulated for large geographic areas. Guidance and often technical assistance are provided by the district and the State offices.

Each area manager is responsible for examining available data and winnowing out the lands within the planning unit that does not have a reasonable potential for coal development. The lands eliminated fall into three categories; no coal resource, some coal resource but with too low a potential for development and those lands with inadequate data. Where data are inadequate to support a decision regarding coal potential, BLM will decide whether or not to obtain more data.

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Even though the coal data are adequate, important decisions affecting the coal leasing process will not be made if there are inadequate data concerning other resources to be considered in multiple-use resource management. This notice also contains a brief description on how coal data interfaces with other resource data in the decision-process regarding coal leasing. Guidelines or standards for data requirements are being formulated for other resources and will be made available for review and comment.

A slightly modified, earlier draft of the proposal to establish Review Councils for coal data adequacy was sent to Western State Governors, major interest groups and organizations at their request in July 1986. Also sent at that time was a short discussion on other types of data needed for FMY determinations. Following this distribution, those groups asked the Department of the Interior to hold informational briefings. Meetings took place in Denver on July 23 and 24, 1986. Written comments received as a result of this distribution are on file at the address specified below.

No comments were received from environmental agencies. One state and an interstate agency commented on data adequacy. They recognized defining and assessing data adequacy is a difficult task and want to be on the Review Council and to be involved in setting standards. This notice emphasizes more strongly than the original version the need for outside members on the Review Council. Responses were received from two industry organizations and two mining companies. They did not want the Department of Energy to become heavily involved in the BLM planning process. They wanted a further

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Only lands that pass the four coal screens of 43 CFR 3420.1-4(a) can be carried forward to the next stage, activity planning, for additional study and consideration for coal leasing. The four screens are potential for coal development, unavailability criteria, multiple-use trade-offs and surface owner consultation. Those lands thus identified as acceptable for further consideration for leasing will be listed in the completed land use plan.

2) Activity planning during which tracts are delineated, ranked, and selected for possible leasing. This stage begins when the RCT receives from the BLM State Director(s), a list of lands acceptable for further consideration for coal leasing. The RCTs are subcommittees of the Federal-State Coal Advisory Board. Copies of the Chapter establishing the Board and describing the composition and functions of the board and the RCTs are available on request from BLM. The steps end after the Secretary of the Interior has made a decision regarding the timing of the coal lease sale and which tracts to offer and the Notice of Sale has been posted in the appropriate BLM State Office(s).

On receipt of the State Director's report designating lands suitable for further study, the RCT will identify any deficiencies in data necessary to make judicious tract delineations. Such deficiencies may apply to a single small parcel or to large areas within the designated lands. To assist the RCTs to determine data adequacy, the Chairman of each RCT in consultation with other RCT members will appoint on a trial basis three science advisers as ex-officio members: one with expertise in renewable resources, one with expertise in non-renewable resources and one with expertise in reclamation and mitigation techniques.

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# PROPOSED COAL PROGRAM CHANGES

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The use of science advisors is in response to the OTA recommendation that more consideration be given to data, or the lack thereof, in land use planning and activity planning. Tracts should not be delineated or selected unless there is adequate knowledge to evaluate potential tract-offs. The OTA report specifically mentions unsuitability criteria, coal resources, soils, wildlife, hydrology, and cultural resources. Thus coal is only one of many resources that must be considered in delineating, ranking and selecting tracts. Furthermore, the coal data requirements for delineating tracts are less than that needed for estimation of fair market value (FMV). The Review Council, described at the end of this Notice, is responsible for the determination of coal data adequacy for FMV. Such a determination requires special skills and experience. The Commission specifically recommended that coal quantity be determined to ensure that the Government receives a fair return.

Tract delineation will begin on those lands with adequate data only if after reviewing a market analysis the RCT recommends that activity planning continue.

If after reviewing a market analysis, the RCT recommends that activity planning proceed, the affected State Directors will appoint tract delineation teams and a Review Council. There will be only one Review Council even if two States are affected. Simultaneously, affected State Directors will issue a call for expressions of interest in leasing. The tract delineation team configures and recommends specific tracts to the RCT. The RCT can formally approve the delineation with or without modifications of the tract boundaries.

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The following proposed data adequacy guidelines, attempt to strike a balance between two extremes: (a) depending totally on the judgement and expertise of highly qualified professionals; and (b) a strictly cookbook numerical approach that requires little or no judgement but would always result in the same determination. Neither extreme is acceptable. The Bureau specifically requests comments on the numerous suggested guidelines. Should they be more or less quantified? If quantified such as a required minimum distance between data points or a minimum number of data points per section, can more desirable alternative numerical standards be suggested? Can any specific number be selected and justified so as to avoid the charge of being "arbitrary and capricious"? Can any practical statistical tests be applied? Should guidelines or standards be set for the accuracy of data, e.g., location and elevation of data points? If so, how?

While it not feasible or cost effective to have complete and perfectly accurate data, BLM must have data of sufficient quantity and quality to make reasonable and defensible decisions. To be of value, data must be interpreted by competent and experienced professionals. It is costly in money and time not only to acquire but to interpret data. The law of diminishing returns applies so that beyond the level of data adequacy, the increasing cost of acquiring more data does not justify the marginally decreasing benefits.

**Coal Data Guidelines - Land Use Planning:** Since time, money and personnel, are limited, it would be impossible to obtain all desirable data for coal in the planning unit. Therefore areas with little or no coal potential should usually be eliminated as soon as possible so that BLM resources can be concentrated on more promising areas.

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The RCT, however, will approve a proposed tract only if adequate data are available. The data adequacy standards are the same initially applied by the RCT to the lands identified as suitable for further consideration but now are applied to specific tracts.

After tracts have been delineated, tract profiles will be prepared by BLM. The RCT then will rank and select the tracts according to 43 CFR 3420.3-4.

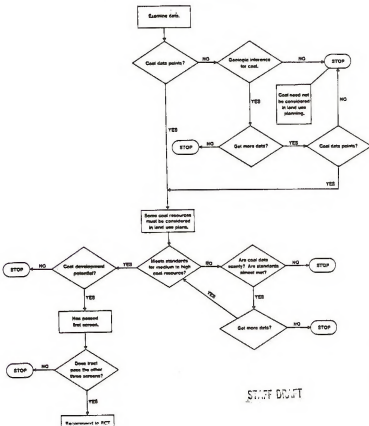
As soon as feasible after tracts have been delineated, the Review Council will report to the RCT which tracts have adequate coal data to make a reliable, estimate of FMV and which do not. For each tract lacking adequate data, the Review Council must state what additional data are needed. If the RCT believes there is little likelihood of acquiring the needed data before the scheduled sale, the tract should not be carried forward. If additional data have been acquired on tracts identified as lacking adequate data, the Review Council will again examine the data for adequacy and report the findings to the RCT. If there are strong indications that adequate data will be available before the issuance of the sale notice, the RCT may recommend a tract to the Secretary with a notation regarding the data.

3) Sales procedures in which tracts are offered for lease and high bids are accepted or rejected. This stage begins with the request for comments on fair market value and recoverable reserves and ends with high bid rejections and (or) the acceptance of high bids and the issuance of leases. The procedures for conducting sales and methods of appraisal for bid adequacy are proposed in other notices and documents.

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FIGURE 1: LAND USE PLANNING FOR COAL



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The decision tree for land use planning of the coal resource (figure 1) shows several decision made where coal date must be considered. If there are any date points, the coal resource must be considered. A coal date point is a coal outcrop or coal intercepted by a drill hole, tunnel, cut or shaft.

Geophysical logs also may establish a coal date point. If there are any date points, the surrounding area has some coal resource and this must be considered in planning. If there are no coal date points, and the geologist cannot make a geologic inference for the occurrence of coal, the management plan need not consider coal. To make an inference regarding the possible occurrence of coal the geologist must consider the types of rocks and geologic history of the area as obtained from technical reports, maps and drill holes. The data examined should be both local and regional. If an area contains a sequence of rocks characteristically associated with coal, the inference should be for coal unless a substantial amount of data indicates otherwise. If geologic inference indicates the occurrence of coal, a decision must be made whether or not to acquire more data.

Significant expenditures normally should not be made at this time unless there is reason to believe that if coal were discovered, it would have a medium to high development potential, i.e., a good chance that the coal resource could now or in the foreseeable future support a profitable mine.

The Department's proposed coal drilling program lists five conditions that might justify some drilling for land use planning.

- a. There are indirect, but strong indications that an area has high coal potential.
- b. The area has an infrastructure that would support coal mining (including large blocks of federally owned minerals and surface).
- c. The area is being considered for "not-suitable for further consideration for coal leasing" status because of conflicting land use recommendations.
- d. The drilling will fill in a major date gap in the coal date base.
- e. The delineation of the boundaries of the coal resource area is not specific enough to determine if a coal resource conflict exists.

If a planning unit or portion thereof contains coal resources, BLM identifies areas known to contain a medium to high coal resources. Only those areas will be given further consideration for coal leasing. Each BLM State Office will set its own guidelines to classify the coal as a low, medium or high (very significant) resource. As a national standard, before an area can be identified as having a medium or high resource, there must be at least three date points from a single bed or coal horizon with at least one of the date points from unweathered coal of marketable quality.

For an area to be classified as having a high or medium resource, date points must show a measurable coal thickness at least 100 (80 for medium) percent of any coal bed currently being mined in the planning area or region.

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Although at least three coal date points are required, additional standards should be set for both a minimum and maximum distance between date points. These requirements are best determined on a regional basis. The area within the triangle or polygon formed by the coal date points and some surrounding area may be considered as having a medium or high resource.

How much area to include beyond the date points should be made on a case by case basis in consideration of such local and regional factors such as geology and topography? In general no land section further from a date point than the maximum distance between any of the date points should be included in the area.

Some areas cannot be shown to have a medium or high coal resource because data are scarce. Other areas may almost meet the quality and coal thickness standards and the geologist believes some tract(s) within or near the area could meet the standards. In such cases it may be advisable to get more data by drilling.

After an area has been identified as having a medium or high coal resource it must be classified as to degree of coal development potential. Each coal region will develop its own guidelines, but the following factors must be considered: coal quality and quantity, mineability, transportation to market, general infrastructure, access to the property and surface control.

Only areas that have development potential will be evaluated to see if they pass the remaining three screens: unavailability criteria, multiple-use trade-offs and surface owner consultations.

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Guidelines for passing these screens will be contained in the Supplemental Program Guidance Manuals. Only areas that pass all four screens, coal development potential being the first, are forwarded by the State Director to the Regional Coal Team (RCT) as acceptable for further consideration for leasing.

Coal Date Guidelines - Activity Planning: The RCT will delineate specific tracts from lands identified by BLM as being acceptable for further consideration for leasing. Before a tract can be formally delineated, the RCT must determine that date are adequate to support the delineation. To make this determination, the RCT must consider the advice of three non-Bureau science advisors; one a specialist on renewable resource, one on non-renewable resources and one on reclamation and mitigation techniques. After tracts have been delineated, the advisors will be available for consultation in preparing tract profiles and in ranking of the tracts.

At this time there are no specific standards for determining date adequacy for tract delineation. Such standards will, however, be developed by each RCT after the science advisors become intimately familiar with the coal leasing program and offer their independent expert opinions.

Data merely showing that an area contains coal of development potential are inadequate for tract delineation. Coal date must be adequate to determine the most likely mining method and to estimate the recoverable reserves within a reasonable range. For example, it may be desirable to offer new production tracts that would support a new mine. Therefore a reserve estimate would help the RCT to delineate a tract with sufficient reserves to support a new mine

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without excessively increasing the storage within the tract. Estimates of coal reserves per acre and coal quality are useful in ranking tracts. For surface mineable coal the stripping ratio and type of overburden are extremely important criteria for ranking tracts so that a wise choice can be made as to which tracts should be leased.

Tracts are ranked into classes of high, medium or low desirability for coal leasing. Three major categories of consideration must be used in tract ranking: coal economics, impacts on the natural environment; and socio-economic impacts (A) CFR 3420.3-4). The relative importance of ranking factors may vary by region. Coal data, including quantity, quality and depth, are not the only type of data that affect coal economics of the tract. Other types of data pertain to the factors, such as transportation, enumerated for consideration of coal development potential in land use planning.

The minimum amount of coal data required for tract delineation will usually, but not always, be enough for the RCT to rank with confidence the delineated tracts. If there is reason to believe that with more coal data, some tract would receive a higher ranking, an effort should be made to obtain the needed data. Otherwise, the tract should be dropped from further consideration.

COAL DATA REQUIREMENTS FOR ESTIMATION OF FAIR MARKET VALUE: Estimating FMV of a lease requires more coal data than any other step in the leasing process. Although the final determination or estimation is not made during activity planning, the RCT will not recommend a tract for leasing unless data are adequate. If, however, the RCT has reason to believe that the needed data for a specific tract(s) will be acquired before the lease sale, the tract(s) can be forwarded to the Secretary with a notation regarding data adequacy.

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More specific guidelines and standards of data adequacy should be established for each region to reflect local and regional conditions. Data standards and guidelines may be established for separate fields or areas within a single coal basin if coal-related factors are substantially different within parts of the basin. Standards should set the minimum amount of data necessary to make a FMV estimate of normal reliability. For example for some regions, areas or particular coal beds the sulfur content is fairly uniform over large areas; one or two analyses of unweathered coal to confirm the sulfur content might be adequate, whereas in regions where the sulfur content changes within short distances even within a single bed, more sulfur analyses would be needed. Likewise the number and distribution of data points regarding coal thickness, mineability and overburden (for stripable coal) will depend in large part on the continuity and uniformity of the beds which were determined by regional geological environment.

In judging data adequacy standards for specific coal regions and for specific tracts consideration must be given to the importance of that particular type of data to the FMV estimate and the increased reliability of the estimates if more data are obtained.

As an example of how specific guidelines for a particular region or coal field might be established, the following suggestions were received from DLM State Officer. One suggestion was that there should be at least one coal data point per square mile. Another was that at least 70 percent of the coal area of a tract be within three-fourths of a mile of coal data point. Both suggestions are reasonable in that data must be available throughout the tract so

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For the Bureau to make a reasonably reliable estimate of FMV it is only prudent to have at least as much data as the minimum requirement of industry. Data needs are not confined to the physical properties and occurrence of coal. For example appraisers need data concerning expectations of future demands for coal, transportation, financial markets and competition from other coal and energy sources.

This notice is concerned primarily with FMV adequacy of coal data; quantity, quality and mineability. The Bureau is requesting guidance in setting national and regional standards and guidelines that reflect actual field and economic conditions. There should be with flexibility for some deviations. Any deviation must be documented with a rationale acceptable to the RCT. The Bureau believes the more precise standards should be developed specifically for each coal region or sub-region. To be adequate, tract specific data must be sufficient in quantity and quality to determine such factors as approximate quantity and quality of reserves, type and probable size of mines, access for an underground mine, stripping ratio for a surface mine, and any unusual geologic conditions that would affect mining costs and (or) recoverable reserves. In order to make the determinations enumerated above, a geologic model of the tract that shows all factors that would affect the tract value is required. The tract model will be based on tract specific data in content with the regional geology. Any anomalies data should be checked for accuracy and reliability. Then they must be explained by the tract model or the model must be revised.

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that tract geologic models with cross-section showing correlation between data points can be constructed. A suggestion regarding coal quality is that there should be a proximate analyses of coal from a drill hole for every 2,560 acres (4 square miles) in areas where coal quality is fairly uniform and consistent. Many data points will be obtained from drill holes. A proposed Departmental coal drilling program addresses how data obtained from drilling will be collected, standardized, stored and released.

One problem not covered in the two suggested guidelines regarding distribution of coal data points is whether the same number of data points are needed on all mineable coal beds within a tract. If not, how can specific guidelines be developed keeping in mind the data are to be used for estimating FMV? The accuracy of the reserves for a thick coal bed of high quality is more critical to FMV than is a bed of marginal value or a deep bed unlikely to be mined within the original life of a lease (20 years). Drilling costs per foot increase rapidly with increasing depth. We do not want guidelines that require large expenditures, public or private, without corresponding benefits; yet guidelines are needed. Public comments are requested.

The determination of data adequacy for FMV analysis requires a broad knowledge of sedimentary geology as well as specific knowledge of the coal deposits within a particular coal basin or region. Technical knowledge of mining engineering and of the problems and methods of each region or coal field, an understanding of appraisal principles and a knowledge of coal market also are needed.

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Even with reasonable guidelines and standards and the availability of the needed expertise, the determination of data adequacy, or lack thereof, requires professional judgment. The Bureau is proposing that each RCT establish a Review Council to judge whether coal data are adequate to support a reasonably reliable PMV estimate. The Review Council will assure the availability of a high level of needed professional skills to evaluate the data and will minimize the impact of any possible bias. The Review Council is a separate entity or group to serve a highly specialized and critical function that to a certain extent overlaps with the much broader function of the three science advisors, ex-officio members of the RCT. A science advisor would not be barred from serving as a member of the Review Council.

**Coal Data Guidelines - Sales Procedures:** Under normal circumstances the RCTs will have determined that data are adequate for estimating PMV before the sales procedures begin. In exceptional cases where data for a tract are inadequate at that time but additional data are obtained shortly thereafter, the Review Council must examine the new data to determine if data are now adequate so that the tract can be offered for lease.

**REVIEW COUNCILS FOR COAL DATA ADEQUACY:** In order for a finding to be made that there are adequate geologic data to offer a tract for lease, the data must be of sufficient quantity and quality so that it is reasonable and prudent to proceed with engineering and economic evaluations. This requires the

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Each Committee member will independently rate the adequacy of data on the following four factors: stratigraphy, structure, areal extent and quality of coal. Each factor will be rated separately according to the following system:

- Score of 4. Data exceed requirements.
- Score of 3. Data are adequate.
- Score of 2. Adequacy of data is doubtful.
- Score of 1. Data are inadequate.

Adequacy will be judged by regional standards and guidelines developed for each region or for specific coal fields. Other factors deemed applicable to a specific tract must be considered. Some types of tracts may require more data than that indicated by guidelines. It is expected that the Council members will consult with one another before making their official ratings. The individual members' ratings must be an integer; the overall factor rating will be the simple mean rounded to the first decimal. If any one of the four factors receives a rating lower than 1.5, the Council's conclusion should be that data are inadequate for that tract, otherwise the data are adequate. Signed rating sheets will be part of the official case file. A member giving a score of 1 or 2 must explain in detail on the rating sheet the basis of the score and state what additional data are needed to assure data adequacy for making a reliable estimate of PMV. A member giving a score of 4 must indicate the extent that the available data exceed the requirement to be adequate.

Each factor has a number of elements that should be considered. Examples follow:

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construction of a geologic model or models of the tract. The engineering, geologic and economic evaluations along with comparable sales, supply and demand studies and other information are then used to estimate fair market value.

Adequacy of coal data will be judged by the collective professional opinions of a Review Council, chaired by the Deputy State Director for mining from the same State as the Chairman of the Regional Coal Team. The Council will consist of from 3 to 5 members, at least one of which must be a geologist with field experience and at least one of which must be a mining engineer. All members must have a high degree of knowledge of economic geology of coal in the region. One or more Council members must be from outside the Bureau of Land Management, such as the U.S. Geological Survey or a State Geological or Mining Agency. The Chairman of each Regional Coal Team in consultation with RCT members is responsible for selecting the Review Council.

Each member of the Council (excluding the Chairman) will examine the data and independently decide if data are adequate to make a reasonable geologic model of the tract in consideration of the objective of estimating PMV. Models normally include such items as geologic, isopachous and structure contour maps and cross-sections. If the model for the tract deviates from the regional geology, the deviations must be explained, possibly by revising the model or obtaining more data. Even though reasonable and defensible models of tracts have been developed, that does not necessarily assure adequacy of data. For example if two models are equally plausible, more data may be required to support one of the models.

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**Factor: Stratigraphy**  
 continuity of beds  
 pinch outs  
 variability in thickness  
 split and partings  
 channels or cut outs

**Factor: Structure**  
 faults  
 foldings  
 regions dips

**Factor: Areal Extent**  
 burn line  
 outcrop, subcrop  
 mining limit

**Factor: Coal Quality**  
 classification of coal  
 proximate analyses: sulphur, ash, moisture  
 sodium analysis  
 BTU content

It is recognized that some of the above elements are interrelated and that some may not apply to every tract. The above list of elements does not preclude the consideration of other elements; the list is to be used only as a guide.

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Comments on a rationale for scoring or rating systems are solicited. The proposed system is a compromise between those wanting a much broader range of scoring vs. those wanting only a go-no-go (pass-fail) rating. Eventually such a decision will have to be made but by having a somewhat expanded scale for rating each component of data adequacy, strength or weaknesses for each factor can be identified and a better decision made.

Some question the use of the proposed rating. "Data Exceeds Requirements."

It is expected that such a rating would be infrequently used. There are circumstances where it might be appropriate. For example, one or more companies might drill holes on every quarter-section under exploration licenses. Such data would be useful but for most areas clearly would exceed what is adequate to estimate PW. Likewise as the result of a research project on trace elements, detailed chemical analyses might be available from every coal bed from every hole and outcrop. The danger of identifying such data as merely adequate, is that such a large amount of tract data might become the standard against which other tracts with truly adequate data would be compared.

Comments are required on establishing strict qualification to serve on the Review Council. Should membership be confined to geologists and engineers or should experienced coal appraisers and minerals economist be eligible? Professional geological and mining organization have requirements that members meet minimum standards pertaining to education and experience. Many States

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also set standards for professions. A typical standard for geologists might be 3 years experience as a professional geologist, with one year's credit for a masters and another year's credit for a Phd. Is such a standard reasonable if additional requirement regarding coal experience be added?

\_\_\_\_\_  
Director

\_\_\_\_\_  
Date

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## APPENDIX 6

INTERNAL USE ONLY  
4-00164-TLP  
3420 (651)

### DEPARTMENT OF THE INTERIOR Bureau of Land Management

#### Implementation of Litwosa Commission Recommendation on Regional Coal Sale Panel Qualifications

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice of Regional Coal Sale Panel Qualifications.

SUMMARY: This notice implements Secretary Clark's March 19, 1984, response to Congress concerning a recommendation made by the Commission on Fair Market Value Policy for Federal Coal Leasing (Litwosa Commission). Specifically, the Commission, among other things, recommended that the Bureau of Land Management's (BLM) sales panels, which make bid or acceptance or rejection recommendations, should be constituted so as to assure the presence on those panels of persons with the background and capabilities of making judgments with respect to appraised values (recommendation VIII-4). Secretary Clark agreed with the Commission's recommendation and directed the BLM to develop qualifications for panel membership, giving consideration to mandatory participation by: (1) an ex officio State representative; (2) members of economic evaluation teams from other coal regions; (3) a Departmental representative from the Washington Office; and (4) a BLM Deputy State Director for Minerals. The final qualifications developed by the BLM and published in

their entirety under SUPPLEMENTARY INFORMATION, are appropriate only to regional coal sales. Qualifications for membership on coal sale panels for lease sales held in response to lease-by-application (LBA) procedures will be developed separately to accommodate the special circumstances presented by LBA.

ADDRESS: Any comments or questions concerning the qualifications for sale panel membership should be addressed to:

Director, (640)  
Bureau of Land Management  
18th and C Streets, NW  
Washington, DC 20240.

FOR FURTHER INFORMATION CONTACT:

John Carlson  
(202) 343-4772

SUPPLEMENTARY INFORMATION: Public Law 98-63 (1983 Supplemental Appropriations Act) contained language directing the Secretary of the Interior to appoint a Commission to review the Department's coal leasing procedures to ensure receipt of fair market value for Federal coal. This Commission was chartered by the Department August 3, 1983.

Over a period of 6 months, the Commission reviewed the various laws, regulations and policies and procedures which guide the Department's coal program. The Commission completed its work in February 1984 with publication

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of its findings and recommendations in "Report of the Commission, Fair Market Value Policy for Federal Coal Leasing". One of the Report's recommendations was that "the BLM Sales Panels which make bid acceptance or rejection recommendations should be constituted in a way that assures the presence on those panels of persons with the background and capabilities of making judgments with respect to appraised values."

Following extensive review and analysis of the Commission's recommendations, Secretary Clark submitted his response, "Review of Federal Coal Leasing", to Congress on March 19, 1984. This document contained the Secretary's comments on the Commission's findings and recommendations, including the Secretary's proposals for implementing those recommendations. With specific regard to the Commission's recommendation on the BLM Sales Panel Qualifications, the Secretary agreed with the Commission and instructed the BLM to develop qualifications for sale panel membership. These qualifications were to include full consideration of mandatory participation by:

- (1) an ex officio State representative with appraisal background;
- (2) a number(s) of an economic evaluation team from a different region;
- (3) a Departmental representative from the Washington Office; and

(4) a Deputy (BLM) State Director for Minerals.

A copy of this proposal was sent to State Governors and major interest groups and organizations at their request in July 1984. Following this distribution, these groups asked the Department of the Interior to hold informational briefings. The meetings took place in Denver, Colorado, on July 23 and 24, 1984. No written or oral comments were received on this proposal as a result of these meetings.

Although this notice suggests that the sale panel qualifications are final the Department is inviting comments specific to: (1) the sale panel qualifications, particularly the requirement that the mineral appraiser/ economist and the geologist come from outside the region in which the sale is being held and (2) the concept of implementing the requirements on a test basis, after which the Department will review and revise the requirements, as necessary. Any comments received will be fully considered before publication of the final sale panel qualifications and will be available for review in the Office of the Assistant Director for Solid Leasable Minerals (640), Bureau of Land Management, 18th and C Streets NW., Washington, DC 20240.

An early draft of the qualifications was also forwarded to several BLM State Directors who would be affected by the sale panel guidelines. Analysis of their comments on the draft qualifications revealed two major areas of



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concern. First, it would be inappropriate to apply the same guidelines and procedures to coal sales held in response to lease-by-application (LBA) procedures. This type of leasing arrangement is used outside Federal coal production regions or for emergency leasing. The LBA sales occur more frequently than regional coal sales, especially in the Eastern States, and usually involve relatively small quantities of coal which are of interest to a single bidder. The LBA sales usually consist of a single tract but may, in unusual circumstances, involve two or more tracts being offered for sale.

The nature of LBA sales suggests that it would be inappropriate to require coal sale panel qualifications and procedures identical to those used for the large, regional coal sales. The logistics, time and expense of convening the panel would often be disproportionate to the value of the coal being offered. Neither would it be appropriate to assemble such a large, highly-technical panel to evaluate a single bid for small coal sales. This is not to say that bid evaluation and review of fair market value (FMV) procedures is not important for small sales. On the contrary, consistency and uniformity in FMV determination is important regardless of the method by which a lease is offered for sale. For LBA sales, however, the Bureau believes the same results can be achieved using parallel but separate procedures. Further, because the Linowes Commission focused its study on the regional coal sale procedures, this notice describes sale panel qualifications which apply only to regional coal sales. Panel qualifications for sales originating from LBA's will be developed and issued later as part of the Bureau's comprehensive procedures and guidelines for holding Federal coal sales.

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## Sale Panel Membership

1. Regional coal sale panels shall be comprised of BLM and State representatives. At least three but not more than five BLM members representing all of the following positions must be on the sale panel. <sup>1/</sup>
  - a. A Deputy State Director for Minerals
  - b. A Washington Office representative
  - c. A Mineral appraiser/economist
  - d. A geologist
  - e. A mining engineer
2. The BLM sale panel representatives will be designated in writing by the lead State Director.
3. The lead State Director will invite each State Governor to provide an ex officio panel representative.

<sup>1/</sup> If an individual meets the qualifications in more than one of the specified areas/expertise, he/she may represent all of those positions.

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The second area of concern identified by the BLM field offices concerned the requirement that the mineral appraiser/economist and geologist must come from outside the region. Although this type of diversity may prove beneficial in some areas, several State Directors commented that it was probably more important to select panel members knowledgeable of mining, geology, coal markets, and related conditions within the region. As the State Directors further pointed out, the Linowes Commission was not overly concerned with where the panel members came from. Rather, the Commission focused its remarks on improving the quality of the sales panel.

The State Directors' arguments for allowing greater flexibility in selecting sale panel members have merit. Nevertheless, the Bureau is proposing to implement, on a test basis, the more rigid requirements described in this notice. We believe the input of mineral appraisers/economists and mining engineers from outside a region can provide a greater diversity of expertise and opinion and may reduce the potential for regional bias in the evaluation process. These requirements will become standard program requirements, provided they are found practical and useful during the test period. Otherwise, the sale panel qualification requirements will be revised to permit State Directors a wider choice in selecting sale panel members.

Federal Regional Coal Sale  
Panel Qualifications

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- a. The State member should be knowledgeable of appraisal techniques and methodology.
- b. The State member(s) will participate as an ex officio members in panel proceedings. The State member's views and recommendations will be documented and considered by the BLM sale panel members. All minority views will be transmitted along with the panel recommendations to the lead State Director.

## BLM Member Qualifications

1. The Deputy State Director, Minerals will serve as the panel chairman.
2. The Washington Office Representative will represent the Department. He/she must have knowledge and practical experience in appraisal methods and techniques, preferably coal related, as applied by the Department.
3. The Mineral Appraiser/Economist must have a minimum of 3 years of mineral appraisal experience, 1 year of which must have involved substantive work carrying out BLM mineral appraisal procedures, preferably coal-related, including the use of discounted cash flow (DCF), economic models, and comparable sales techniques. The Mineral Appraiser/Economist must be selected from a region other than the one in which the coal sale is being held.

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## APPENDIX 6

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4. The Geologist must have a degree in geology and a minimum of 2 years of field experience in applying geologic principles, preferably coal-related. He/she must be selected from a region other than the one in which the coal sale is being held.
5. The Mining Engineer must have a degree in mining or geologic engineering and a minimum of 2 years of practical experience, preferably coal-related.

### State Ex Officio Member Qualifications

1. State Governors may appoint any State personnel to represent them on the sales panel. The Governors should be encouraged, however, to select persons who have knowledge of appraisal techniques and methodologies.

### Review of ELM Panel Member Qualifications

1. Except as noted in Item 3 below, the ELM lead State Director will submit the names of proposed ELM coal sale panel members to the Director (300) 2 months prior to a coal lease sale. This submission will include background and experience information about each proposed panel member demonstrating his/her qualifications for panel membership.
2. The Director (300) will review the lead State Director's proposal, request additional information (as necessary), and provide the lead State Director

with its findings within 10 working days. Once a sale panel has been selected, future review of ELM panel member qualifications will only be necessary in the event of a member vacancy.

The above qualifications will become a part of the ELM's Manual/Handbook guidelines and procedures for conducting Federal coal sales. As such, their use will be mandatory for each Federal regional coal lease sale held by the Bureau.

\_\_\_\_\_  
Director  
Bureau of Land Management

\_\_\_\_\_  
Date

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# PROPOSED COAL PROGRAM CHANGES

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3453 (851)

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## DEPARTMENT OF THE INTERIOR

Bureau of Land Management

Guidance on Coal Lease Transfer  
Financial Data Requirements

AGENCY: Bureau of Land Management.

ACTION: Notice.

**SUMMARY:** By this notice the Bureau of Land Management responds to comments and publishes in final form guidance to field offices on the types of financial and other information that should be required from those seeking approval for acquisition of Federal coal leases by transfer from another party. This information will be used by the Bureau to assist in evaluating coal tracts being considered for lease offering and in determining whether bids received for those coal leases constitute fair market value. The guidance presented here is not a rulemaking but provides policy for Bureau field offices to use in implementing 43 CFR 3453.2-2(f) of the Federal coal Management regulations.

**DATE:** This guidance becomes effective upon publication.

## FOR FURTHER INFORMATION CONTACT:

**GENERAL INFORMATION:** A total of 17 commenters responded to the request for public comment when draft guidance on this topic was published in the Federal Register on June 15, 1984. The commenters represented 15 companies in the energy industry, one industry trade association, and one public utility group. No commenter completely endorsed the proposed guidance; all expressed objections to varying degrees.

General comments fell into the following categories: (1) concerns about the type of guidance; (2) the degree of applicability of lease transfer data to determining the value of coal lease tracts being offered for competitive sale; (3) general concerns about the reporting requirements; (4) concerns about who should submit the financial information and when it should be submitted; and (5) concerns about the protection given proprietary data.

**Type of guidance** - Six commenters believed that the proposed policy was a proposed rulemaking. This guidance is not a rulemaking but is intended to implement the regulation at 43 CFR 3453.2-2(f), which requires submission of financial data about lease assignment transactions. Because the details of assignments vary considerably, not all data listed will be applicable or available for all lease transfer transactions.

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**Applicability of transfer data** - There were four commenters on this topic. The commenters pointed out the differences between lease transfers and competitive sales might make the financial data obtained from lease transfer transactions of limited or even no use in determining competitive coal lease tract value.

The Bureau understands this point and agrees that transfers are not per se equivalent to lease sales. Care must be used in applying lease transfer data to methods for evaluating competitive lease values. Nevertheless, as the Commission on Fair Market Value Policy for Federal Leasing pointed out, there is usually a shortage of comparable sales data; lease transfer data are often the only data available. These data must then be used in tract evaluation. The guidance published below reflects this point.

**Reporting requirements** - Nine commenters stated concerns on this topic. Four believed that the information required exceeded the Department's authority. Two stated that the reporting requirements should not require lengthy evaluation by the negotiating parties and that no information should have to be developed. One requested that the level of detail and the degree of accuracy of the information should be more fully described.

Two commenters believed that the Department was legally entitled to financial information only if an overriding royalty was being created by the assignment. The Department does not agree with this position. The Mineral

Leasing Act of 1920, as amended, stated that no mineral lease could be assigned or sublet without the consent of the Secretary of the Interior. Prior to July 1979 the Secretary approved or withheld approval on coal lease transfers based on qualifications of the prospective transferee to hold the lease, acreage limitations, and the like. The July 1979 coal management regulations inserted the financial data requirements for lease transfers as a way of acquiring data about Federal coal lease transactions. The research done in connection with the July 1979 regulations found nothing illegal about the financial data requirements. Because financial data acquired from lease transfer transactions may be useful in fair market value analyses, the Department will retain the requirement.

We agree that no data should be created or developed in reporting the financial details of transfer transactions. The reporting entity should develop the data asked for in as much detail as possible without having to report or create new data. This position is reflected in the final guidance to the field offices.

With respect to the level of detail and degree of accuracy of the information, the reporting entity should give the information in as much detail as possible, together with a statement about the degree of confidence in the data, where estimates are involved. If one-line answers to questions accurately convey all the information, then these answers are sufficient. Where a great deal of "hard" information is available and where the reporting entity has a high degree of confidence in the data, all of it should be reported.

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Finally, with respect to general reporting requirements, one commenter asked whether the reporting requirements applied to partial assignments and subleases as well as total assignments or merely applied to total assignments only. The reporting requirements apply to all lease transfer actions - total and partial assignments and subleases.

Who should submit and when submitted - Three commenters objected to the prospective transferees having to submit the financial information, and two believed that the information should be submitted after the transfer is completed.

As the commenters pointed out, some of the information is known only to the transferor prior to transfer. Therefore, the final guidance has been modified to require this information of the transferor, or the transferee, whichever has it. The Department retains its position that the information should be provided prior to approval of the lease transfer. The financial data required under 43 CFR 3453.2-2(f) has heretofore been submitted prior to approval, and there is no other way to assure getting the information.

Protection of proprietary data - Sixteen of the 17 commenters expressed concern about the last paragraph of the proposed guidance. This paragraph stated that any information considered proprietary by the submitter should be labeled as such and that information determined proprietary by the authorized officer will be protected from disclosure under the Freedom of Information Act

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submitter would be informed prior to release of the information so that it could pursue judicial remedies, if it wished.

The Bureau has followed these procedures with FOIA requests many times before and will continue to release only information which would not jeopardize a company's competitive position. The last paragraph has been expanded in the final guidance to explain the handling of proprietary information.

SUPPLEMENTARY INFORMATION: The proposed guidance was not clear that the information presented was to be used by the reviewing field personnel in asking for financial lease transfer data from transferors or transferees. It is anticipated that for leases nearing production, coal quality and quantity data (section 3), and mining information (section D), will be available from field office records or mining permit applications filed with the appropriate regulatory authority. Information available without requesting it from the transferor would be filled in by the reviewing officials in the field, and only that information not available from sources outside of the transferor would be requested.

As four commenters pointed out, the coal quantity and quality data in section 3 are not as such financial data. The quantity and quality of the coal, however, affect the price paid for acquiring all or part interest in a coal lease, and so the Bureau believes that it is appropriate to ask for these data if not readily available from other sources. If only estimates of these data are available, that fact should be indicated.

(FOIA). The commenters believed that the submitter, not the authorized officer, should judge the propriety of releasing the information and that the submitter ought to be allowed to seek a court-ordered protective order to prevent release of the information.

Nothing in the last paragraph of the proposed guidance was intended to circumvent the Department's regulations on proprietary data at 43 CFR Part 2, Subpart E, or the submitter's rights under 43 CFR Part 2, Subpart D. Briefly, the FOIA allows the Federal Government to withhold certain classes of information submitted to it from public disclosure, in this case class four: "trade secrets and commercial or financial information not obtained from a person and privileged or confidential." The courts have ruled that commercial or financial information is confidential if disclosure is likely to (1) impair the Government's ability to obtain necessary information in the future and/or (2) cause substantial harm to the competitive position of the person from whom the information is obtained.

The Bureau has in the past given careful consideration to submitters' judgments of what they consider to be proprietary data. The Bureau has in the past and will continue to notify submitters when information that they have labeled as "proprietary" has been requested. The submitter may justify the reason that the information should be withheld.

The Bureau would then only release the information if, in its estimation, release would not jeopardize the competitive position of the submitter. The

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Section C, Description of Transaction, drew by far the most comments of any section. Two commenters interpreted the phrase "other-owned reserves" in C.(1)(b) and C.(2)(b) to mean non-Federal reserves not associated with the lease transfer. Seven commenters objected to attempting to break out cost of various adjustments, subsection C.3., from the total consideration paid, subsection C.1.

As used in the proposed guidance, the phrase "other owned reserves" was intended to refer to transactions involving not just Federal but also State and fee coal leases contiguous to the Federal leases and being transferred in the same transaction. It was not intended to refer to State or private transfer transactions unrelated to the Federal transfer. The final guidance has been modified to clarify this phrase.

With respect to costs of adjustments, several commenters pointed out that frequently a coal lease will sell in the secondary market for a fixed amount with no specific breakout of adjustments. When this is the case, applying specific dollar amounts to such things as drilling, environmental studies, permits, and surface owner arrangements would be arbitrary. Further, in some cases, the leaseholders have not experienced permitting or environmental study costs so that any costs provided for these activities would be estimates, subject to entrepreneurial judgment.

The Bureau understands and agrees with these points. There is no intent to create new information. If information on the total consideration paid is all

# PROPOSED COAL PROGRAM CHANGES

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that is available, then that is all that should be reported. If the transaction involves both Federal and private leases, and these costs can be prorated, they should be. If the transaction involves Federal and non-Federal leases, then this fact should be clearly stated.

These points are made in the final guidance.

One commenter requested clarification of the meaning of the question concerning how diligence was negotiated, if at all. Another commenter overlooked the section on factors affecting negotiation. One other commenter requested that the section on negotiation factors be expanded.

This section has been clarified in the final guidance to describe factors which might affect the transaction price (pre-1976 or post-1976 diligence, relationship of transferor/transferee, etc.) or create a compulsion to bargain (i.e., section 3 of the Federal Coal Leasing Amendments Act of 1976). The question on diligence has been clarified.

The final guidance follows below.

Subject: Coal Lease Transfer Data Requirements

The coal management regulations at 43 CFR 3453.2-2(f) require that all coal lease transfer documents contain a description of the consideration or value paid or promised for the transfer. The regulation does not specify what the

description entails. Because the financial details of coal lease transfer transactions may be useful in both pre-sale and post-sale evaluations of competitive Federal coal lease tracts, this memorandum provides general guidance on the types of financial and related data to be sought.

The information below falls into four categories. Only category C, Description of the Transaction, directly involves financial data. The other categories will affect the acquisition cost to some degree and are thus legitimately included as part of the description of the consideration paid. Of course, not all items will apply in all cases, therefore, discretion should be used in requiring data of assignors or assignees.

Several general points should be made about this information. First, any data which can be obtained from sources other than the transferor or transferee should be obtained from those sources. Access to the lease and total acres held by the prospective lessee should be available from the automated coal leasing data system. Mining information (category D) and resource data (category B) may be available from resource recovery and protection plans or mining permit applications, if production on the lease is occurring or will occur soon.

Second, no data should be created or developed in reporting the transfer details. Nevertheless, the reporting entity should report the data requested in as much detail as possible with as many qualifying statements as necessary to describe the degree of confidence in the data and the estimated accuracy of the data.

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Third, these requirements cover all lease transfer actions described under 43 CFR Subpart 3453, including assignments and subleases. For partial assignments, data concerning only the portion of the Federal leasehold affected should be reported, if that is possible. Otherwise, information on the entire leasehold should be submitted.

Fourth, the information may be obtained from either the transferor or the transferee, whichever organization has it. The assignor may be in a better position than the assignee to provide information on, for instance, coal quantity and quality and on mining costs and methods.

Finally, the lists below may be used as a checklist, with the information requested filled in next to the item or on a separate sheet, if the questions or qualifications are lengthy. Not all items will apply to all transactions, and discretion should be used in determining the applicability of data requested to individual coal lease transfer transactions.

## INFORMATION REQUIRED FOR COAL LEASE TRANSFERS

### A. General Information

1. Lease serial number
2. Legal description - township, range, section, subdivision
3. Acres in lease
4. Estimated number of coal acres

5. Name, address, and phone number of (circle one): assignee/partial assignee/sublessee
6. Total current acreage of assignee Federal coal leases.
7. Coal Quantity and Quality (describe level of confidence)

1. Avg. BTU/lb
2. Percent sulfur by seam
3. Percent ash by seam
4. Percent moisture by seam
5. Percent fixed carbon by seam
6. Percent volatile matter by seam
7. Recoverable reserves (millions of tons)  $\frac{1}{2}$
8. Mineral reserves  $\frac{2}{2}$
9. Weighted average coal thickness (by seam)
10. Average overburden (ft) by seam
11. Weighted average interburden (ft) by seam

### C. Description of Transaction

1. Total consideration paid.

$\frac{1}{2}$  Calculated according to the definition at 43 CFR 3480.0-5(a)(3)(e)

$\frac{2}{2}$  Calculated according to the definition at 43 CFR 3480.0-5(2)(3)

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- (a) Were non-Federal reserves involved in the transfer?
  - (1) If so, consideration paid for Federal reserves only, if known. Otherwise, consideration paid for transfer.
- (b) Were only Federal reserves involved in the transfer?
  - (1) Consideration paid for the Federal reserves.

### 2. Adjustments

- (a) Have environmental studies been conducted on the leasehold?
  - (1) If yes, cost of studies
    - Were these studies conducted in house or contracted out?
  - (2) If no, was the cost of environmental studies factored into the consideration paid?
    - Was it a major consideration?
- (b) Has drilling been completed on leasehold?
  - (1) If so, drilling costs
  - (2) If not, to what extent did drilling costs affect the consideration paid?
- (c) Status of permits applied for and obtained
  - (1) If process complete, total cost of obtaining permits
  - (2) If permits are needed, how were permitting costs figured into the transaction price?
- (d) Overriding royalties, stated as percent of gross sales value (describe payment method)

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### 4. Surface Control.

- (a) Acres of private,
- (b) Acres of State,
- (c) Acres of Federal.

Any information considered to be proprietary by the submitter should be clearly labeled as such. The authorized officer shall treat such data in accordance with 43 CFR Part 2, Subpart B, and 43 CFR Part 2, Subpart D, and shall insure that no data are released which might jeopardize a company's competitive position.

Director

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- (e) Surface owner fees (describe payment method)
  - (f) Production payments (describe payment methods)
- ### 4. Factors affecting negotiations.
- (a) Was this an arms length negotiation or were the parties involved organizationally or familiarly related?
  - (b) Did the diligence term in the lease affect the transaction price? If so, did the diligence requirement increase or reduce the transaction price?
  - (c) Is the lessee subject to section 3 of the PCLAA? If so, did this restriction affect the transaction price?

### D. Mining Information (If available)

- 1. Production data.
  - (a) Estimated production per year or,
  - (b) Estimated future production and date of commencement,
  - (c) Number of seams.
- 2. Box cut data (if applicable)
  - (a) Depth in feet,
  - (b) Estimated mine life of logical mining unit,
  - (c) Average stripping ratio.
- 3. Transportation.
  - (a) On site use,
  - (b) Rail line required,

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# PROPOSED COAL PROGRAM CHANGES

11/13/84

## MARKET ANALYSIS

A thorough market analysis will be conducted to aid in coal activity planning at three points in the process. A long range market analysis (proposed in 1984) would be used as input to the long-range planning schedule (proposed in 1984) recommended by the Federal-State Coal Advisory Board and also used as an input in the RCT decision to initiate coal activity planning. A second market analysis, the regional market analysis, expanded in 1982, is used as an input into the leasing level decision. The leasing level becomes the basis for the proposed action in the regional EIS. The final market demand analysis, proposed in 1984, would be the current market and tract marketability analysis to be provided to the RCT before their formulation of lease sale schedule recommendations. In establishing the lease sale schedule, the Secretary would also have available the information from this current market and tract marketability analysis.

## Long Range Market Analysis

Long range market analysis would be one input into the Federal-State Coal Advisory Board's long range planning schedule and the RCT's decision to initiate activity planning. The long range market analysis will mainly consist of coal production forecasts and coal productive capacity estimates for the region. The purpose of this market analysis is to assess the need to initiate activity planning, not to establish any particular level of leasing.

## Regional Market Analysis

The regional market analysis analyzes various levels of leasing needed to meet certain objectives. From this analysis and other inputs, the RCTs recommend to the Secretary a leasing level that is the basis for the proposed action in the regional EIS. The objectives include fostering a stable market for in-situ coal, promoting competition within the coal industry for utility contracts, and providing the opportunity for industry to acquire Federal coal leases as a means of meeting the Nation's energy needs. Six mathematical algorithms are used to calculate a level of leasing that would satisfy an array of objectives.

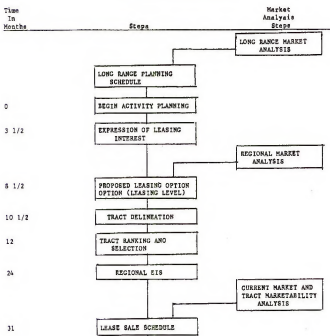
In the 1979 programmatic EIS (BLR 1979a) the key objective in establishing the leasing target was to set a level of leasing that would satisfy the Department of Energy production goals, which were directly linked to the coal production forecasts from the national coal model. In 1982, the term "leasing target" was changed to "leasing level," and the process was expanded to consider not only forecast production needs but other objectives, including market stability, competition, and demand.

## Current Market and Tract Marketability Analysis

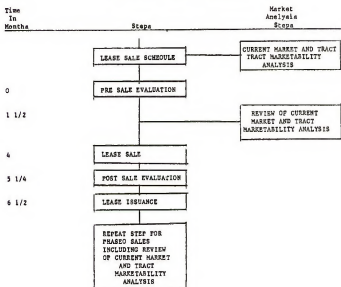
The current market and tract marketability analysis would provide information about the current coal market and the demand for the available Federal coal tracts that may be offered for lease sale. This information would be used by the RCT and the Secretary in evaluating if and when a lease sale (or sales) should be held and which tracts, if any, would have the best opportunity of drawing an acceptable high bid. As with the use of the other market demand analyses, the current market and tract marketability analysis would serve as only one input into the decision on an appropriate lease sale schedule.

For lease sales to be held more than 120 days after the lease sale schedule is established, the current market and tract marketability analysis would be reviewed and results provided to the Secretary, to ensure that the input and the Secretary's decision remains timely. If the results show some revision might be needed in the expected sale, the Secretary would consult with all affected parties.

## FEDERAL COAL ACTIVITY PLANNING



## FEDERAL COAL LEASE SALE PROCEDURES



# APPENDIX 6

MEMORANDUM (501)  
11/16/84

## LONG RANGE MARKET ANALYSIS

### INTRODUCTION

This paper provides the instructions for performing the long range market analysis. The results of this analysis are to be used as one input by the regional coal team (RCT) in formulating its decision on initiating activity planning and by the Federal-State Coal Advisory Board in its review of the long range planning schedule.

The long range market analysis consists of coal production forecasts, coal production capacity estimates and a trend analysis. The purpose of the analysis is to assess the need to initiate activity planning based on market information. The purpose of this long range market analysis is not to evaluate any particular level of leasing, but to provide trend information to the decisionmakers.

The information derived from this analysis is to be evaluated in conjunction with other factors and objectives that must be considered. The RCT's decision on initiating activity planning and the Federal-State Advisory Board's decision on the long range planning schedule must consider other factors including land use planning information, resource information, and Federal, State and public concerns.

### Productive Capacity Estimates

The productive capacity reflects the coal that is available for production from Federal leases, PMA's, and private reserves within the region without further Federal coal leasing. Due to unknowns in deriving this estimate, the RCT may wish to have the productive capacity stated as a range or as high, medium, and low estimates.

Limiting factors that would reduce the productive capacity below the region's total capacity include: (1) coal that is of unmarketable quality; (2) Federal leases and private reserves with location and transportation problems; and (3) PMA's with issuance problems. Unmarketable coal would include coal that is of such poor quality that it is not likely to be produced at a reasonable cost. Also, Federal leases and private coal holdings located in areas that lack adequate transportation facilities may not be producing in the studied time frame. Not all PMA's are expected to be approved or are not expected to be approved in the relevant timeframe; these PMA's would not be included in the productive capacity estimates. The RCT should also be alert to other limiting factors.

The productive capacity, however, would not be reduced due to a lack of expected demand for coal. The effect the demand for coal has on the coal market is captured in the production forecast (see the following section for the discussion on the production forecast).

The production forecasts are much less certain. The further into the future the forecast is made the more unknowns there are to affect the accuracy of the forecast. The forecasts are made under various scenarios that capture key assumption about the future. With changes in these key assumptions high, medium and low scenarios are modeled for the future production needs.

Likewise, the productive estimates involve a significant amount of unknowns. The future capacity figures are dependent on the availability of marketable quality coal and the time required to develop those coal reserves. For the regions in the Western States, developing a coal tract can take 7 to 10 years. Capacity estimates for 10 or more years into the future will reflect many if not all of these yet undeveloped reserves being available for development.

In analyzing the capacity and production information the market and development requirements of the coal reserves must be kept in mind. For example, a direct comparison of the current productive capacity to the productive capacity for 1995 will lead to erroneous results. The 1995 capacity figure is effectively an annual productive estimate for all available reserves; while the current capacity figure is an annual production estimate for only the currently developed reserves.

### Example

The following example (Table 1 and Figure 1) is used to aid in the understanding of the type of information and analysis to be presented. Table 1 provides the capacity and forecast information for the region.

In this example a "shortage" does not appear to be an overwhelming concern. The growth in the regional productive capacity increases rapidly from 1983 through 1995. Market quality reserves are available and given sufficient time to develop those reserves the region's capacity will rapidly increase. By 1995, however, virtually all market quality reserves will have been tapped. From 1995 to 2000 the capacity will be able to increase by less than one percent per year. At the same time the production forecasts show the production growing at 2.7 to 3.1 percent per year from 1995 through 2000.

Except for the high capacity-high production scenario for 1990, capacity is roughly 150 to 155 percent of the forecasted production for 1990 and 1995. By the year 2000 however, capacity will be 137 to 141 percent of production. By mixing scenarios, high capacity-low production and low capacity-high production, more extreme results can be obtained. With a high capacity-low production scenario for 2000 the capacity will remain over 150 percent of production. However, with the reserve scenario, low capacity-high production, regional capacity will drop to 120 percent of production.

No shortfall in available reserves exists; however, the supply of available reserves will start to rapidly diminish after 1995. To counteract this long term trend the RCT and Federal-State Advisory Board may want to consider

Information regarding annual production capacity and development limitations are to be collected through a case-by-case (mine-by-mine or property-by-property) survey. This will involve investigating each lease, PMA and mine individually to determine this information. Companies, non-government organizations, and Federal, State and local agencies involved with coal development within the region should be contacted. Any information on the coal production potential that will assist the RCT in determining the productive capacity should be investigated.

For protections of proprietary information and ease of analysis the capacity estimates should be aggregated by State and region. The studied timeframe covered by the capacity estimates and production forecasts should be at a minimum 15 years into the future, starting with the current capacity and production estimates.

### Coal Production Forecasts

There are a variety of long range forecasts of coal production and consumption. The National Coal Association and the U.S. Department of Energy (DOE) regularly issue forecasts. Private companies occasionally publish studies including coal forecasts. Most of these forecasts do not provide the regional detail required for use in estimating regional leasing needs, but their results can be used in judging the reasonableness of the more disaggregated forecasts.

One model that provides sufficient detail is the National Coal Model (NCM). The Bureau of Land Management (BLM), in cooperation with the DOE, has developed a modified version of the NCM utilizing dual supply curves in areas with substantial Federal ownership to coal resources. One supply curve contains Federal coal, the other curve contains all non-Federal coal supplies.

Forecasts using the results of these models are published periodically. For the most recent NCM results, additional documentation, or any other questions concerning the NCM, contact the Washington Office (403 Policy Analysis and Coordination Staff (501) (31-110)). If additional information is desired, the NCM can be run under alternative assumptions of costs, supplies of coal, demand for coal, or leasing scenarios. Users of these forecasts should be aware to the strengths and weaknesses of this type of forecasting, the models involved, and the data inputs that are required.

### Trend Analysis

In analyzing the current supply and demand for coal the task is relatively straight forward. The current level of coal production is simply the quantity of coal produced. The current productive capacity figures generally will be planned full production level for the developed mines in the region. Generally the unutilized capacity (capacity minus production) will be a relatively small figure. Due to the high costs of development, additional capacity is usually not developed without a significant portion of that capacity committed to a utility contract requiring a certain level of production.

Initiating coal activity planning in the region within the next few years. The decisionmakers may also wish to consider initiating activity planning simply to raise the level of available reserves to increase the 1995 capacity above 150 to 155 percent of production. This level of uncommitted capacity directly affects the level of competition for utility coal contracts within the region.

No great "shortage" or "surplus" is identified in this example region. This was done because in utilizing this long range market analysis model the user find a clear cut case of "shortage" or "surplus". It will seldom always be a case of identifying and interpolating long term trends.

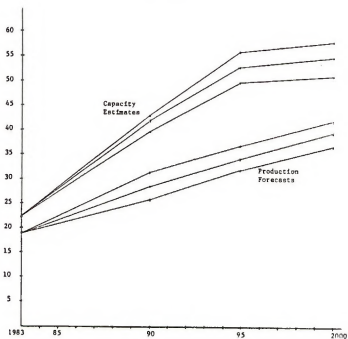


# PROPOSED COAL PROGRAM CHANGES

TABLE 1  
EXAMPLE REGION

	1983	1990			1995			2000		
		Low	Med.	High	Low	Med.	High	Low	Med.	High
Production	19	26	28	32	32	34	37	37	39	42
Capacity	22	40	42	43	50	53	56	51	55	58
Capacity/ Production	1.15	1.53	1.50	1.34	1.56	1.55	1.51	1.37	1.41	1.38
Capacity- Production	3	14	14	11	18	19	19	14	16	16

FIGURE 1  
EXAMPLE REGION



LEASE SALE SCHEDULE

Following the completion of the regional environmental impact statement (EIS) and prior to holding any coal lease sale, the regional coal lease (RCL) will recommend and the Secretary shall establish a lease sale schedule. The regional lease sale schedule shall include identification of each tract to be offered for lease and the date when each tract has been tentatively scheduled for lease offering.

The lead Bureau of Land Management (BLM) State Director shall have the responsibility for providing a current analysis of the coal market. This analysis will be used to support the RCL in formulating its recommendations and the Secretary's decision on the lease sale schedule. The analysis will include information on the current conditions of the coal market and the marketability of the individual Federal coal tracts being considered for offering in the proposed lease sale(s).

The coal market analysis is the responsibility of the lead State Director, supported by BLM field, State Offices, Regional Evaluation Offices and Washington Office staff and State personnel. This analysis will consider relevant market conditions including:

- 1) current price trends of coal in the region.
- 2) new coal-fired power plants proposed for or under construction and their scheduled completion dates.
- 3) current surveys of industry interest in the tracts.
- 4) variations in transportation costs and capacities.
- 5) the availability of coal underlying Indian tract, State and private lands, which the owners have decided to develop.
- 6) any other factors affecting regional demand such as synfuels or slurry pipelines capability

This market analysis (see attachment), along with any other relevant information that will aid the RCL in its decisions, should be drafted by the BLM as a technical report from the lead State Director to the RCL.

Following approval by the lead State Director, the technical report is transmitted to the RCL members and made available for public review and comment. The availability of the technical report is announced in the Federal Register (FR) and the public is given 30 days to review and comment on the

report. In addition to soliciting comments from the general public, industry will be requested to reaffirm any current interest in leasing specific tracts under consideration. In the same FR Notice the forthcoming RCL meeting to formulate the recommendations on the lease sale schedule is announced. The meeting should be held no sooner than 15 days following the close of the comment period. This will allow adequate time for the RCL member to review any concerns and comment presented by the public.

At the RCL meeting the general public will again be given an opportunity to comment on the technical report and other relevant concerns. The RCL shall then consider all inputs and recommend specific tracts to be offered for lease and a schedule for when each tract should be offered. The RCL shall also identify and provide rationale for any tracts not recommended for lease offering. If intertract bidding is recommended by the RCL, the tonnage of coal to be leased in the intertract sale(s) shall be specified.

The technical report provided by the lead State Director shall be considered as one input into the formulation of these recommendations. For further discussion on the RCL's recommendation(s) on lease sale scheduling, including proposed lease sale, see \_\_\_\_\_.

The RCL chairperson shall transmit to the Secretary through the BLM Director the RCL's comments and recommendations, including all supporting technical documentation. The RCL comments and recommendations shall be transmitted without change, as a package to the Secretary. The Director may make recommendations, but only through separate documentation.

The Secretary, prior to establishing the lease sale schedule, shall initiate formal consultation, in writing, with the surface management agency for any proposed lease tract not under the Secretary's jurisdiction, the Attorney General, affected Indian tribes and the Governors of the affected States. The Secretary shall provide 30 days in which these parties may advise the Secretary prior to any decision(s).

Following consultation, the Secretary shall establish the lease sale schedule including identifying the specific tracts to be offered for lease and when each tract should be offered. If intertract bidding is adopted, the tonnage of coal to be leased shall be specified. These decisions shall be based on the RCL's recommendation, environmental concerns, the market analysis, the advice and concerns of the consulted parties, and any other relevant information that the Secretary may be aware of.

The Record of Decision will include the lease sale schedule and the information available to the Secretary in making the supporting documentation. The lease sale schedule and intertract bidding decisions are made public in a notice in the FR. The availability of the Record of Decision is also published in the same FR notice. In this notice any decision(s) that significantly deviates from the recommendation(s) of the RCL must be justified.

CURRENT MARKET AND TRACT MARKETABILITY ANALYSIS

This paper provides suggested methods and information sources to aid in an analysis of the coal market and the marketability of the available Federal coal tracts that may be offered for lease. These two aspects, one looking at the coal market in general and the other addressing the marketability of the individual tract, will require different levels of analysis.

This market analysis is significantly different from the analysis required for the long range market analysis and regional market analysis (see \_\_\_\_\_). These analyses attempt to model the market demand based on the production made 10 to 20 years into the future. These analyses use not a reliable predictor of the demand for an individual lease sale or offered tract at a given point in time. The market demand fluctuates with the current business cycle, just as the individual company's demand fluctuates with the financial health of that company. In conducting the current market and tract marketability analysis the attempt is to model the market demand based on the current market conditions, and the current financial health of the active coal mines in the region.

The following documentation should be provided to the RCL.

- 1) an analysis of the current regional supply of coal,
- 2) an analysis of the current and forecasted regional demand for coal,
- 3) an analysis of recent mine and reserve acquisition activities within the region,
- 4) an assessment of any immediate changes that may occur within the market, i.e., transportation changes, and
- 5) an analysis of the current market and the marketability of the individual Federal coal tracts being considered for lease offering.

For lease sales that are to be held more than 120 days after the lease sale schedule is established, the current market and tract marketability analysis will be reviewed and the results provided to the Secretary. The lead State Director, through the RCL and BLM Director will provide this updated analysis to the Secretary. The market analysis will be submitted to the Secretary 15 days prior to the publication of the lease sale notice. This will aid in ensuring the Secretary's decision remains timely. If this review demonstrates that the original decision on the offering is no longer appropriate, the Department will postpone the offering until the Secretary can consult with the affected parties, including the RCL members. Any changes will be presented and supported in a subsequent Record of Decision and FR notice.

# PROPOSED COAL PROGRAM CHANGES

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Much of this information, including an associated data base will be available from the Washington Office Minerals Policy Analysis and Program Coordination Staff (501). The Washington Office 501 staff will also provide assistance to the regional evaluation teams and State Office staff where requested. The provided information should be the basis for the current market and tract marketability analysis. The regional evaluation team and State Office staff must also draw on its own expertise and knowledge of the region in providing the market analysis.

## Supply Considerations

The market analysis should provide a tabulation of active mines in the region, profile of the mines and associated companies, information on production, productive capacity, production costs and coal characteristics for each mine, and a transportation overview for the region.

## Demand Considerations

The demand considerations should include the current and forecasted demand for coal from utility and industrial sources, contracted demand from utility sources, and current contract and spot market prices.

## Acquisition Activities

A current list of mines and reserves within the region that were offered for sale and for those that could be provided, includes the transaction terms, where the terms can be obtained and are not considered proprietary. If other market information is available on acquisition activities, i.e., length of time offered properties have been on the market, and is considered significant this information should also be included.

## Market Changes

The analysis should assess and report on any immediate changes that may occur within the market that may affect the coal market or the marketability of specific coal tracts for the planned lease sale. The analysis should also assess the impact of a change and the probability of that change. The type of information may include opening of a new railroad spur or potential closure of a major coal or electricity consumer.

## Federal Coal Tracts

This analysis requires the regional evaluation team and State Office staff to assess the current regional market and the marketability of the individual Federal coal tracts being considered for lease offering. This will primarily require a synthesis of the supply and demand considerations, and information on mine and reserve acquisition and immediate market changes. This should be

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Issue - How must the coal tract be offered for lease to avoid a bypass situation?

The analysis (see attached example analysis) should be presented in a way that aids the decisionmakers in first deciding if the planned coal lease sale should be held, held as phased lease sale, or delayed. The decisionmakers must then determine, based on this market analysis and other factors, which tracts to offer, which tracts not to recommend and if phased leasing is called for, when to offer the selected tracts.

The current market and tract marketability analysis is the basis for the technical paper to be presented to the RCT. The lead State Director is responsible for ensuring the technical report is in an appropriate format, delivered to the RCT in a timely manner, and address any special request made by the RCT members. Prior to making the report available for public review or submitting the report to the RCT the technical report shall be reviewed by the Washington Office of Mineral Policy Analysis and Program Coordination (501).

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general review of the current market for the region, then the specific analysis for the tracts that may be offered for lease. The tract analysis is not necessarily an analysis of the tract's production potential, although that is a factor, but an analysis of the tract's potential for drawing an acceptable high bid in the planned lease sale.

One key factor in assessing the marketability of an individual Federal coal tract is the tract's association to a developing or existing mine. For tracts that are not associated with a developing or existing operation (new production tracts) the analysis of the tract's marketability will focus on the competitiveness of the tract and the conditions that exist in current coal market. For tracts that are associated with a developing or existing operation (bypass, maintenance and expansion tracts) the analysis will focus more on the associated operation's need and ability to acquire additional coal reserves.

Critical factors in assessing a new production tracts include:

Tract Size - Is the tract large enough to support a mine?

Coal Quality - Is the coal of average or better quality?

Production Costs - can the coal be developed at a competitive cost?

Market - Is a potential market available for the coal?

Access - Is rail or other competitive access available?

Surface Control - are there potential surface owner problems?

Coal Ownership - are there potential problems with acquiring the rights to the non-Federal coal?

Critical factors in assessing bypass, maintenance or expansion tracts include:

Production Plans - Is an expansion, reduction or maintenance of the current production level planned for the associated operation?

Reserve Requirements - are the current coal reserves sufficient to satisfy those plans?

Production Costs - Is the associated operation currently producing at a competitive cost?

Production Level - Is the associated operation currently producing at the planned full production level?

Market - Is a market available to support the associated operations current and future production plans?

## Example Analysis

To aid to the understanding of the type of information that should be reported on by the M, a hypothetical regional coal market is presented. The region consists of four active mines, four permitted but not operating projects and two permit application (table 1). The Department is considering offering for lease six Federal coal tracts in a planned coal lease sale (table 7). For this example, the earliest a coal lease sale could be held would be in 120 days.

Supply considerations - The four active mines within the region was reported to have produced 16.66 million tons of coal in 1984 (96 percent of their planned full production). According to the mine plans all four mines were scheduled to be at full production prior to 1984.

The four operating mines and four permitted projects are all surface operations, while the two permit applications will utilize underground mining methods (table 2).

Production costs (table 1) have been estimated for the active mines, permitted projects and permit applications using a production cost model. Of the active mines, mine A is estimated to have the highest production cost at \$25 to \$30 per ton. Coal prices (table 3) in the region range from \$9.50 to \$22 per ton (FOB mine price) for coal currently being mined.

Demand considerations - All coal currently produced in the production region is consumed in a four State demand region (table 4). Of the 53 million tons of coal consumed in the demand region in 1984, 33 percent came from the example production region. For the foreseeable future, coal production from the example region will continue to be consumed in this four State demand region.

Consumption of coal (table 4) is expected to increase at about 4.75 percent per annum from 1984 to 1995. From 1990 to 1995 this rate of increase in coal consumption is expected to slow to under 4 percent per year. Utilities consumption of coal will account for virtually all the expected growth in the demand for coal through the year 2000.

Of the 27.6 million tons per year of additional coal consumption expected by 1995, 12.7 million tons per year is known to be currently uncontracted. Much of this uncontracted demand (table 5) is associated with utilities that have start-up dates in the 1990's.

Acquisition activities - In 1983, project 2 (table 1) was purchased by company 1 from company 4. Details of the transaction are not available. This is the only acquisition activity reported on for the past three years in the region.

Market changes - Transportation is a limiting factor in a portion of the region. Construction of a railroad spur into that portion of the region is being considered, but no decision has been made. Completion of the rail spur

## APPENDIX 6

would not effect any of the active mines but would enhance the development potential of three of the permitted non-operating projects (Project 5, 3, and 4), one of the permit applications (Applicant 1) and three of the Federal coal tracts (tract 1, 3, and 8) being considered for lease offering. A decision on developing the railroad spur is not expected for nine months.

Federal coal tracts - Two of the tracts (tract 1 and 2) are considered new production tracts. They are not associated with any existing mines, permitted projects or permit applications.

Tract 1 (table 7) is relatively small and would be mined using underground methods. There is a low confidence in the reserve estimates for this tract. Development of the tract would likely depend on the development of the proposed railroad spur. Production costs for the mining of this tract have been estimated at \$25 to \$30 per ton. The current FOB mine price for coal of this quality is \$22 to \$27 per ton. Without the railroad spur this is a very poor market for this tract. Even with development of the rail spur this tract is not considered competitive.

Tract 2 is a good size new production tract. It is a relatively high BTU surface mineable tract. Production costs for this tract have been estimated at \$8 to \$12 per ton. Goal of this quality is receiving \$21 to \$25 per ton FOB. Three companies initially expressed interest in this tract through the expressions of interest process. This tract is considered to be the region's best new production opportunity.

Tract 3 is an expansion tract for an associated project (Project 3). Project 3 is not expected to start up operations till 1991. This start up date is also dependent on the development of the proposed rail line. Production costs for the associated project have been estimated at \$15 to \$21 per ton. Current FOB mine prices for coal of this quality is about \$9 to \$16 per ton. Due to the dependence of developing project 3 and tract 3 on the proposed rail spur the current marketability of this tract is poor. Following a decision on the railroad spur the marketability will improve.

Tract 4 is an expansion tract associated with applicant 1. Development of tract 4 and the associated application is dependent on the rail line decision. The Bureau also has a low confidence in the current reserve estimates for the tract. Production costs for the associated application are estimated at \$25 to \$30 per ton. The FOB mine price for coal of this quality is estimated at \$22 to \$30 per ton. Due to the number of unknowns, including the rail line decision the current marketability of this tract is considered poor.

Tract 5 is a maintenance tract associated with active mine 2. Mine 2 is operating at near planning capacity and reserves a size worth power plant. Production is currently at 6.4 million tons per year. Marketability of this tract is considered good.

Tract 6 is associated with permitted project 1. It is an extremely high BTU surface mineable tract; however, reserve quality and quantity information on the tract is considered unreliable. Following further exploration work the marketability of the tract will improve significantly. Currently the marketability is considered fair.

Based on the factors and analysis, presented, two tracts, tract 2, and 5, are rated as having potential for drawing acceptable high bids and should be considered for lease offering. With the completion of additional exploratory work on tract 6 this tract may be rated as having good market potential. Tracts 1, 3 and 4 are all dependent on the decision on the railroad spur. The decision on the rail spur is due in 9 months. Even with a positive decision on the railroad spur, tracts 1 and 4 will likely remain as having poor market potential until additional exploratory work is completed to improve the reliability of the reserve information.

Table 1  
SUPPLY CONSIDERATIONS 1

Line #	Company	Primary Market	Start up Date	PRODUCTION (MMTPY)				Production Cost (\$ / ton)
				Current	1990	1995	Full	
1	Company 1	Utility 5-1 and 5-1	1982	4.5	4.5	4.5	4.5	11.05 to 19.00
2	Company 2	Utility 3-3	1982	6.4	6.8	6.8	6.8	9.15 to 14.15
3	Company 2	Utility 5-3/Spot	1973	5.5	3.2	0.2	5.5	8.85 to 13.55
4	Company 3	Spot	1978	0.28	0	0	0.6	25.00 to 30.00
<u>Not Operating</u>								
ect 1	Company 1	N/A	1986	0	0.53	0.53	0.57	13.25 to 20.90
ect 2	Company 1	N/A	1986	0	1.25	1.25	1.25	15.85 to 24.60
ect 3	Company 3	Utility 7-1 and 8-1	1991	0	0	0	5.3	19.10 to 21.15
ect 4	Company 4	N/A	1991	0	0	2.5	2.5	12.75 to 18.50
<u>in Application</u>								
licant 1	Company 2	N/A	N/A	0	N/A	N/A	N/A	25.00 to 30.00
licant 2	Company 4	N/A	N/A	0	N/A	N/A	N/A	25.00 to 30.00

Table 2  
SUPPLY CONSIDERATIONS 2

Active Mine	Reserves (MMT)	Seam Thickness	BTU	Sulfur (Percent)	Minlog Method	Transportation
Mine 1	N/A	6-2'	9,800	N/A	Surface/Dragline	Railroad
Mine 2	N/A	8'	8,700	1.0	Surface/Dragline	Mine Mouth
Mine 3	N/A	N/A	10,000	0.9	Surface/Dragline	Railroad
Mine 4	1-2 Million	11'	13,200	0-0.8	Surface	Truck
<u>Permitted/Not Operating</u>						
Project 1	6.13 Million	9'	9,800 to 10,200	0.53 to 0.58	Surface	Truck/Rail
Project 2	1.08 Million	N/A	10,100	0.62 to 1.04	Surface/Dragline	Planned Railroad
Project 3	136.6 Million	N/A	N/A	N/A	Surface/Dragline	Planned Railroad
Project 4	N/A	N/A	7,850	0.60	Surface/Dragline	Planned Railroad
<u>Permit Application</u>						
Applicant 1	N/A	N/A	11,400 to 14,000	0.6 to 4.0	Underground	Planned Railroad
Applicant 2	40 Million	8'	13,900	0.3	Underground	Truck

# PROPOSED COAL PROGRAM CHANGES

Table 3  
FOR NINE PLANT

Active Mine	BTU (Per Pound)	FOB Mine Price (\$/Ton)
Mine 1	9,800	21.00 to 23.00
Mine 2	8,700	9.50 to 16.00
Mine 3	10,000	22.00 to 23.00
Mine 4	13,300	22.00 to 28.00
<b>Permitted/Not Operating</b>		
Project 1	9,800 to 10,200	22.00 to 26.00
Project 2	10,100	22.00 to 26.00
Project 3	N/A	N/A
Project 4	7,850	5.00 to 9.00
<b>Permit Application</b>		
Application 1	11,400 to 14,000	22.00 to 30.00
Application 2	13,300	22.00 to 30.00

Table 4  
FOUR STATE DEMAND REGION  
(MWH/yr)

State	1984	1985	1986	1987	1988	1989	1990	1995	2000
<b>State 1</b>									
Utility	15.7	17.7	17.7	19.4	19.6	19.4	19.4	21.9	23.7
Industry	2.7	3.2	2.8	3.0	3.0	3.0	3.0	3.0	3.0
Total	18.4	20.6	20.6	22.4	22.4	22.4	22.4	24.9	26.7
<b>State 2</b>									
Utility	6.3	6.4	6.4	6.4	6.4	6.4	10.5	12.5	15.8
Industry	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total	7.3	7.4	7.4	7.4	7.4	7.4	11.5	13.5	17.3
<b>State 3</b>									
Utility	14.7	14.7	14.7	16.3	16.3	18.1	18.1	22.7	24.7
Industry	.5	.5	.5	.5	.5	.5	.5	.8	.8
Total	15.2	15.2	15.2	16.8	16.8	18.6	18.6	23.5	25.3
<b>State 4</b>									
Utility	11.6	15.1	15.1	15.1	15.1	15.1	15.1	18.5	20.0
Industry	.5	.5	.5	.5	.5	.5	.5	.7	.8
Total	12.1	15.6	15.6	15.6	15.6	15.6	15.6	19.2	20.9
Total	53.0	58.8	58.8	62.2	62.2	66.0	68.1	80.9	90.2

Table 5  
FOUR STATE UTILITY DEMAND

State/Utility	MW/yr	Contract Status	BTU (Per Pound)	Delivered Price (\$/Ton)
<b>State 1</b>				
Utility 1.1	.6	Until 1984	9,500	50.05
Utility 2.1	N/A	None	9,000 to 10,000	N/A
Utility 3.1	1.2	Life of Plant	9,800	27.52
Utility 4.1	1.2	N/A (Start up 1995)	N/A	N/A
Utility 5.1	1.2	Until 2005	9,800	37.28
Utility 6.1	1.1	Until 2005	12,000	46.11
Utility 7.1	N/A	None	8,800	25.27
Utility 8.1	2.4	Life of Plant	11,000	18.92
Utility 9.1	1.2	Until 1991	10,000	N/A
Utility 10.1	1.2	1991 to Life	10,000	N/A
Utility 11.1	.15	Until 1991	10,000	N/A
Utility 12.1	.15	1991 to Life	10,000	N/A
Utility 13.1	.3	N/A (Start up 1986)	N/A	N/A
Utility 14.1	.4	N/A (Start up 1985)	N/A	N/A
<b>State 2</b>				
Utility 1.2	.1	Until 1986	10,800	20.50
Utility 2.2	.1	N/A	N/A	21.30
Utility 3.2	N/A	N/A	N/A	26.71
Utility 4.2	.78	Until 1987	10,800	24.93
Utility 5.2	N/A	Until 1993	10,600	31.23
Utility 6.2	.7	Until 1999	10,800	38.11
Utility 7.2	1.3	Life of Project	10,400	32.24
Utility 8.2	N/A	N/A	10,500	38.88
Utility 9.2	1.2	Until 2015	N/A	15.57
Utility 10.2	1.2	N/A	N/A	N/A
Utility 11.2	1.2	Until 2018	N/A	N/A
<b>State 3</b>				
Utility 1.3	1.7	Until 1993	9,300	20.21
Utility 2.3	1.5	Until 1997	8,300	19.18
Utility 3.3	N/A	N/A	9,300	19.18
Utility 4.3	2.5	Life of Plant	8,300	18.29
Utility 5.3	2.5	Life of Plant	N/A	N/A
Utility 6.3	2.5	N/A (Start-up 1990)	N/A	N/A
Utility 7.3	2.5	None (Start up 1995)	N/A	N/A
Utility 8.3	1.0	Until 2005	8,800	11.37
Utility 9.3	2.5	Life of Plant	N/A	N/A
Utility 10.3	1.6	Until 2019	9,600	24.27

Table 5  
FOUR STATE UTILITY DEMAND CONT'D

State/Utility	MW/yr	Contract Status	BTU (Per Pound)	Delivered Price (\$/Ton)
<b>State 4</b>				
Utility 1.4	2.0	Life of Plant	8,500	N/A
Utility 2.4	2.0	1985 to Life	8,500 to 8,500	N/A
Utility 3.4	1.5	Life of Plant	7,900	28.47
Utility 4.4	1.5	Life of Plant	8,800	31.24
Utility 5.4	1.2	Until 1987	8,100	N/A
Utility 6.4	2.0	Until 2005	10,600	52.19
Utility 7.4	2.5	None (Start up 1980)	N/A	N/A
Utility 8.4	2.0	N/A (Start up 1994)	N/A	N/A

## APPENDIX 6

Table 6  
FOUR STATE  
UNCONTRACTED UTILITY DEMAND

State/Utility	MWPT	BTU (Per Pound)	Start Up Date
<b>State 1</b>			
Utility 2.1	N/A	9,000 to 10,000	1979
Utility 4.1	1.2	N/A	1995
Utility 5.1	N/A	8,600	1984
Utility 6.1	-.3	N/A	1986
	-.4	N/A	1985
<b>State 2</b>			
Utility 1.2	-.1	N/A	N/A
Utility 3.2	N/A	10,600	N/A
Utility 4.2	1.2	N/A	N/A
<b>State 3</b>			
Utility 1.3	N/A	8,300	N/A
Utility 2.3	2.5	N/A	1990
	2.5	N/A	1995
<b>State 4</b>			
Utility 4.4	2.5	N/A	1990
	2.0	N/A	1994

Table 7  
FEDERAL COAL TRACTS 1

Tract	Association Project	Reserves (MMT)	Seam Thickness (Feet)	BTU (Per Pound)	Sulfur (Percent)	Mining Method
Tract 1	New Production	14*	6.7	10,989	0.65	Underground
Tract 2	New Production	128.6	10.5	9,467	1.05	Surface
Tract 3	Project 3	57.1	5.3	8,468	0.47	Surface
Tract 4	Applicar 1	6.7*	8.2	11,680	0.60	Underground
Tract 5	Mine 2	32.2	14.3	9,577	0.99	Surface
Tract 6	Project 1	4.3*	3	11,420	0.70	Surface

\* Low confidence in the reserve estimate.

Table 8  
Federal Coal Tracts 2

Tract	Company Interest	Current Marketability
Tract 1	Company 4	Poor
Tract 2	Company 2	Good
	Company 3	
	Company 5	
Tract 3	Company 3	Poor
	Company 4	
Tract 4	Company 2	Poor
Tract 5	Company 2	Good
Tract 6	Company 1	Fair

# PROPOSED COAL PROGRAM CHANGES



United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
U.S. DEPARTMENT OF THE INTERIOR  
WASHINGTON, D.C. 20250

(use reply address)  
3400 (920)

Future Approaches to Coal Leasing  
Issue Paper  
October 1984

Memorandum

To: Director (100)

From: State Directors VT, NM, CO, UT, ES and MT

Subject: Issue Paper-Future Approaches to Coal Leasing

Enclosed for your consideration is an issue paper titled the "Future Approaches to Coal Leasing". The paper which was compiled by a draft ad hoc committee and finalized recently has the agreement of all six State Directors. It focuses on the large amounts of money and manpower being expended in the Coal Leasing Program and provides, by region, recommendations which would noticeably reduce that cost.

After reviewing the paper if there are any questions, please feel free to contact anyone of us.

*William L. Cobden*  
State Director, Wyoming

*Arthur L. Gaudin*  
State Director, New Mexico

*Thomas R. Kesteven*  
State Director, Colorado

*Arvid R. Johnson*  
State Director, Utah

*Robert J. Johnson*  
State Director, Eastern States

*Donna J. Starnes*  
State Director, Montana

## I. Background

At the State Directors' meeting in Reno, Nevada in July 1984, the coal State Directors decided to develop an issue paper on future approaches to Federal Coal Leasing to identify ways to reduce its high cost. Representatives from Colorado, Eastern States, Montana, New Mexico, Utah, and Wyoming were asked to serve on a committee chaired by Richard B. Wilson, New Mexico Deputy State Director, Division of Mineral Resources. The Denver Service Center assisted the committee with logistical and editorial support. The committee's initial charge was to look at the current status of activity in eight Federal Coal Production Regions to develop future leasing approaches.

The State Directors in general believe that large amounts of money and manpower are being expended in the Coal Leasing Program with a minimum of actual coal leasing. Projections in Montana and New Mexico for coal activity planning in Fort Collins and San Juan II indicate a cost of 1700,000 to 8000,000 to accomplish this work. These figures do not include the cost of lead use planning or of tract economic evaluation. Only the cost of tract administration, site-specific analysis, tract ranking, tract selection and Regional IIS preparation are included.

The first Fort Union sale offered eight tracts and received acceptable bids on four. San Juan Round II could conceivably offer as many as 25 tracts but industry is currently maintaining an interest in only two tracts using exploration license activity as an indicator. Given the San Juan example, one tract may cost over 4000,000 to offer. It is possible the Government will be spending more for lease sale preparation than it receives in bonus payments.

In contrast, the BLM Washington Office estimates in Planning and Budgeting for the Federal Coal Management Program FY 1983-1987, that leasing of application tracts approximately 820,000 per application. Recent experience in the Mid-Continent Region indicates a total expense of 131,000. The efficiency of current regional activity planning is in question.

The committee considered developing a new Bureauwide approach to future coal leasing. However, a region by region approach is the better alternative due to the variation in coal resources, development of markets, transportation, the variety of environmental concerns, and current working relationships with state governments.

## II. Options for Management

In considering possible changes in the way the Bureau leases coal, top management has three options it may consider.

A. Retain present regional boundaries but look for efficiencies in the lead use and activity planning. Political pressure may force a continuation of the current process regardless of the savings made possible by a change in the program. Development of better data bases, phased lease sales, and better focus of specific planning efforts, (for example, a better selection of low potential tracts), offer attractive possibilities for more efficient program management.

## Recommendations:

The preferred option is to have the RCT consider the potential for readjustment of regional boundaries and look for efficiencies in lead use and activity planning. The quality, availability, and land portion of the coal is high. That removal demand can be expected with a modest return to the coal market. However, even with an upturn in the market, there is not expected to be significant interest in San Juan, Goshute, Bitterroot, Helderberg, Creek and Weston Counties.

### San Juan River Region

Planning for coal has been completed (via a 1981 NFP update) for the Cheyenne-Juan area. The majority of the activity available coal is covered, but only about 30 percent of the region's land area is included. The plan does not contain any GMP or acreage. Two draft IISs were issued and the final IIS was filed in April 1984.

The region has 26 outstanding PMLAs (all in New Mexico) with 2-1/2 billion tons of mineable reserve. Round II has 39 competitive tracts with 1.94 billion tons of in-place demonstrated reserves. Competitive tracts in the preferred alternative contain 240 million tons.

First round leasing was scheduled for February 1984 but is suspended by coal program revisions and Departmental decisions on the PMA-Fair Market Value study and Indian Policy questions.

There are 12 active mines in the region, 10 in New Mexico, and two in Colorado. Both surface and subsurface operations of substantial coal supply mine south or nearby power plants. Simultaneous coal production serves industrial and domestic purposes. Current production of approximately 25 million tons per year appears adequate to satisfy markets in the region. Lack of rail transportation and coal composition limits export potential but possible markets outside the region do exist, although they are not likely to materialize in the near future. Active mines are complete, but RCT controls could that would form viable competitive blocks. However, such of this coal could be disposed of in PMLAs.

Essentially, the disposition of the PMLAs will determine the need for additional leasing in the San Juan region. The location and volume of PMA additional leasing in the San Juan region. The location and volume of PMA additional leasing in the San Juan region. The location and volume of PMA additional leasing in the San Juan region.

## Recommendations:

(1) The preferred option for the region is to cancel the Region after Round II is completed. After cancellation, operation on leases by application basis would be appropriate (at least until the market or other changes indicate a renewed regional approach fits the circumstances).

(2) Given the uncertainties (market, PMLAs, transportation,...), proceeding with Round II activity in the San Juan region is unjustified.

## B. Readjust regional boundaries by excluding areas of lower interest which would then be subject to leasing by application. When making readjustments RCT must maintain State and public participation. Regional coal tracts (RCTs) would retain their responsibilities for the excluded areas and provide a forum for coal lease discussion; state membership in the Federal-State Coal Advisory Board would not change.

C. Cancel regions or subregions, thus removing the area from the Bureau initiated regional sale process. However, the affected states would retain their membership in the Federal State Advisory Board. Since establishment in 1979, one coal region and one subregion (Utah 1981, 1982, and Oklahoma, 1981) have been cancelled. Others may merit the same consideration. Support of the state governments is critical. State government officials and the general public must be assured that our goal is saving money, and their participation will be maintained in the process.

## III. Recommendation by Region

### Powder River Region

Round I lease sales were held on April 20 and October 15, 1982. The Round I IIS covered 19 tracts containing 2-3 billion tons of Federal coal reserves. Fourteen tracts were offered for sale and 12 tracts (six in Wyoming and six in Montana) containing 1.5 billion tons of coal received acceptable bids. Leases have been issued on all but one of these tracts. The sale is currently in litigation by the National Wildlife Federation and the Northern Cheyenne Indian Tribe.

Activity planning for a Round II sale has progressed to the point of a Draft IIS, which was completed in January 1984. The draft IIS covered 22 tracts (11 in Wyoming and 11 in Montana) containing 4.3 billion tons. Round II leasing has been suspended due to coal program revisions. There are 64 outstanding PMLAs (all in Wyoming) containing 1.5 billion tons of recoverable reserves. Additionally, three Northern Cheyenne Tribe settlement actions in Montana are expected to yield leases totaling 350 million tons.

The Powder River Region has 16 active surface mines, 14 in Wyoming and five in Montana, with 131 million tons annual production. The current coal market has depressed production below capacity and interest in leasing has slowed. However, the thick, shallow, subbituminous coal beds can be economically mined by surface methods and are extractable for surface mount steam generation, synfuels development, or transport from the region. A well developed rail system is in place.

About 80 percent of the region's coal is in Federal ownership. The fragmented, checkerboard ownership pattern in Montana severely limits the ability to develop competitive tracts, but the better blocked pattern in Wyoming provides such opportunities.





# PROPOSED COAL PROGRAM CHANGES

3420.7(651)  
01/23/83

## DRAFT

Instruction Memorandum No. 83-

Expires 9/30/85

To: SAs -- Colorado, Montana, New Mexico, Utah, Wyoming, Eastern States

From: Director

Subject: Preparation of Decision Documents for Coal Activity Planning

The Secretary's response to the Office of Technology Assessment report on the Federal coal management program included a proposal that all decision documents will specify the nature of the decision, the key factors leading to it, supporting information, and an easily understood summary. Our review of past RCT recommendation papers indicates a need to clarify our guidelines, so that future RCT documents reflect the Secretary's proposal. This memorandum refers to two types of decision documents: the RCT recommendations, which are sent to the Secretary through the Director, and the other decisions made during activity planning, such as the decision to initiate activity planning, tract ranking and selection, and development of alternatives for the

land use planning, tract delineation and other activity planning steps take nothing about the factors considered by the RCT and is to be avoided.

In the leasing level recommendation, any constraints on the options should be noted. These may include surface owner problems, lack of coal data, or lack of other resource information. Pursuant to 43 CFR 3461.3-1(b)(2), tracts with data insufficient for the final application of any unsuitability criteria (except criterion 19) will not be included in the final EIS. As a result of the adoption of a proposal responding to the report by the Office of Technology Assessment, tracts lacking other environmental data needed for adequate impact analysis will also be excluded from the final EIS.

Data adequacy must also be a part of the sale schedule recommendation. The document must identify separately any tracts which were not recommended because data were insufficient to adequately assess the tract (except data normally not acquired until mine plan stage). The nature of the data inadequacy must be specified, and the RCT may identify which of these tracts, if any, might have been recommended had the data been adequate.

Third, the supporting information. Any information which the RCT relied on in its recommendation should be included or referenced. For example, the conclusions of the environmental analysis are available in the EIS and can be referenced, except as noted in the previous section, and the EIS attached. The technical paper prepared for the leasing level recommendation should be referenced and attached, for that recommendation document.

Public comments on the leasing level range or the final recommendation are also to be attached, along with the response given by the RCT to those

environmental statement (EIS). Preparation of both types of decision documents will be the responsibility of the RCT chairman.

### Recommendation Decision Documents

These documents present the RCT recommendations for a regional leasing level or a final sale schedule. Now that the Secretary will be accepting the RCT recommendations unless a clear reason exists not to do so, it is essential that this paper articulate the RCT views not only to the public but also to the Director and the Secretary. The following format is to be used.

#### First, the recommendation itself. What recommendation is the RCT making?

This would include either a) the leasing level range, or b) the sale schedule of tonnage to be offered, specific tracts to be offered, when to offer them, and where appropriate, how to offer them (i.e., special leasing opportunities, intertract bidding, phased sales, cooperative leasing).

#### Second, the key factors. What led the RCT to this recommendation? The RCT

will consider a variety of factors in arriving at a recommendation, including those factors which it wants the Secretary to consider in his deliberations. The role each factor played in the RCT recommendation should be explained. Irrelevant factors detract from the logic of the argument and should be avoided. For example, in making a sale schedule recommendation, the RCT will probably consider specific conclusions or results of the EIS analysis (such as socioeconomic impacts or wildlife habits) that should be included in this document. A mere listing of EIS alternatives, however, or a chronology of

comments. In cases where public comments were extremely lengthy, a summary may be prepared, provided that the sense of the comments is not lost.

#### An easily understood summary. A summary of one to two pages should also be

prepared. This summary would serve as the executive summary and should be clear and concise and yet also cover all parts of the paper.

#### Other Decision Documents

For each of the other decisions made in the activity planning process, a decision document should be prepared. This paper need not be elaborate, but it should include all of the sections listed for recommendation documents above. For decisions made during an RCT meeting, the document may be part of the minutes. Anyone who was not at the meeting or is not totally familiar with the program should be able to read this paper and understand what the decision was and why it was made.

The recommendation documents will be attached to the Department memorandum to the Secretary for his leasing level or sale schedule decisions. These decision documents - both the RCT recommendation papers and the other activity planning decisions - should be prepared as soon as possible after the decision and made available to the public.

Please direct any questions or comments to Catherine Bay, in the Branch of Coal Leasing, at FTS 343-8521.

## APPENDIX 6

3420.7 (651)

Instruction Memorandum No. 85-  
Expires 9/30/83

To: RE: Colorado, Montana, New Mexico, Utah, Wyoming; ESD

From: Director

**DRAFT**

Subject: Regional Coal Team (RCT) Recommendations for Phased Coal Lease Sales

The idea of dividing scheduled regional coal lease sales into two or more separate offerings has been recommended by the States and, indirectly, by the Linowes Commission. In the Review of Federal Coal Leasing, the Department's response to the Linowes Commission recommendations, the Secretary agreed to consider, as part of a future lease offering, the design of a tract of smaller phased sales rather than a single large regional sale. Rationale for such an approach is that it would allow the Department to test the market, to provide an opportunity to measure market conditions and better assure sale of resources at market value. It is also a way of providing predictability and stability in the Federal coal leasing program, which the Linowes Commission recommended. Since his response to the Linowes Commission report, the Secretary has also indicated his support of phased sales in his response to the report by the Office of Technology Assessment. It should be expected, therefore, that the Secretary's decisions on future regional coal lease sales will include at least some phased sales.

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The RCT's recommendations will be based on a number of factors, including those which the States proposed for the Secretary's deliberations. Factors appropriate in considering whether to recommend phased sales could include but not be limited to:

1. Apparent industry interest or other public comment, as expressed through the above procedure.
2. Objectives of the affected State(s) - e.g., "dispersed" leasing, a geographic spread within each offering.
3. Status of tract - e.g., surface owner consent (whether needed and, if so, if on file), pending litigation, petitions, e.g., the Alton tracts in Southern Utah, included in a suit that could affect their value.
4. Type of sale - public body, small business (if these tracts do not receive a qualified, acceptable bid in an early sale, they could be reoffered for open competition in a later sale). It is assumed that tracts to be recommended for special leasing opportunities have been identified earlier in the process.

In recognition that no two regions are identical, the RCT may also identify other factors as it deems appropriate, such as the types of tracts available, as specified in the new tract definitions (e.g., new production, production

When the RCT recommends phased sales in its final recommendations, its specific rationale for recommendations on timing of the sales and tracts to be offered in each are to be explicitly part of the recommendations document. This memorandum provides instructions on the procedures to be followed when an RCT will make such a proposal. Instructions on the format and content on the decision document, market analysis, which will be an important factor in the RCT's final recommendations, and intertract bidding guidelines will be presented in separate memorandums.

### Procedure

When the public notice is published announcing the RCT meeting for final recommendations, it should include a request for comments, from industry and other interested parties, on two items: their preference as to tracts to be offered (or not offered) and the suggested timing of any offering. The notice should state that these comments will be only one factor in the lease sale decision, that there is no guarantee that any tract named as desirable (or not desirable) for sale would be offered (or not offered), and that no tract would be withheld for the sole reason that no interest was received. This notice should be published 45 to 60 days before the RCT meeting and specify a cut-off date for submittal of comments, in order to allow enough time for the RCT staff (or RCM project manager) to tabulate these comments and present them to the RCT for consideration.

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maintenance, bypass, captive). Whatever factors the RCT relies on should be developed using public comment to the fullest extent possible and identified along with the final recommendation on the distribution of tracts among the sales. Examples of reasons for recommendations on the distribution of tracts among sales, which would be explained more fully in the recommendation paper, might include (but not be limited to):

1. Offering all emergency leasing tracts in the first sale. (These would have been identified during tract delineation and ranking, under 3420.3-4(b)(2).)
2. Offering a mix of types of tracts in each sale.
3. Offering only one new production tract in the first sale.
4. Deferring (to a later sale) those tracts with special status, i.e., tracts which, while ripe for a decision, would be affected by the timing of the sale. This does not include those with resource conflicts for which additional data must be acquired or tracts without adequate coal data. These tracts are not to be included in the RCT final recommendations but are to be identified separately as not recommended because of data problems.
5. Offering tracts with high relative economic value and competitive interest first.

The RCT final recommendations report, carefully documented with the above information, will help the Department reach its objective of better decisionmaking in the coal management program. It will also be the basis for the Secretary's consultations with the appropriate Governors prior to his final sale schedule decision.

For questions or further information, please call Catherine Roy, in the Branch of Coal Leasing (90-651), at PDS 343-4821.

# PROPOSED COAL PROGRAM CHANGES

## EXECUTIVE SUMMARY

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Recommendation IV-1 of the Linnear Commission stated that the Interior Department should sponsor more drilling for use in tract delineation and evaluation and to encourage cooperative drilling in which any additional firms could participate by paying a provisory charge, even after exploratory drilling has been concluded. The Department concurs with the recommendation.

The Department recommends a Federal coal drilling program in order to increase the national benefits from an improved coal leasing program. The benefits may be both economic and social. The expected benefits should exceed the costs.

### 1. Purpose of the Federal Coal Drilling Program

Federal coal drilling is necessary to provide adequate data in order to delineate coal tracts, determine fair market value (FMV) and enhance competition. Drilling may be required to prevent waste of coal and maintain existing operations by helping establish FMV for bypass, production maintenance, and emergency lease tracts.

Federal coal drilling will also be necessary when there is insufficient data for regional coal resource planning. This planning identifies areas of high and moderate development potential, estimates a general coal inventory, and facilitates consideration of the coal resource in Resource Management Plans (RMP's). In addition, drilling supports regional coal and environmental studies.

### 2. Coordination between USGS and BLM

MDU will coordinate the activities of the BLM and the USGS particularly at the land use planning level. Items to be addressed are:

- a. Cooperative drilling ventures between BLM and USGS.
- b. The availability of USGS Labs in Boston and Denver for coal sample analysis.
- c. Establishment and use of a uniform series of geophysical logs in each area.
- d. Sharing data for geostatistical studies to establish coal deposit models.
- e. Additional studies such as geophysical surveys and field mapping in conjunction with the drilling projects.

## Proposed Department Coal Drilling Program

November 2, 1984

### 3. Data Handling and Storage

The public release of data will be continued in the open file system of USGS (See Appendix D). In addition, open file systems with the State geological surveys should be initiated where appropriate.

Proprietary data is to be protected until officially released. Hard copies of geological and geophysical logs should be stored in appropriate BLM offices. BLM and USGS should coordinate the use and input of electronic data files such as MCRDS.

### 4. Standardization of Data Collection

The Department's coal drilling program needs to consider development of drilling standards, a uniform series of geophysical and geologic logs in each area, consistent and standard sample collection and analysis, and uniform procedures for data collection and storage. This will make the data universally usable (See Section IV).

### 5. Industry Coordination

BLM and USGS should coordinate and develop a cooperative drilling program with industry to support tract delineation and regional coal modeling efforts.

### 6. State Coordination

BLM should explore the possibility of developing cooperative plans with the State agencies for the management of drilling activities on Federal lands.

### 7. Forest Service Coordination

Memorandum of Understanding will be developed at the State Office level concerning preliminary drilling and data collection for the forest planning units.

### 8. Drilling Priority

Standard means should be developed by the BLM for determining which areas will have priority for drilling.

### 9. Data Adequacy Review Council

The Department will not offer tracts for lease until data is adequate for a FMV estimate of normal reliability. Data adequacy standards will be followed. (See appendix B). The Secretary will assign personnel from any Interior agency to serve on the Review Council. The members of the Council must have collective knowledge of the coal geology of the region, coal mining conditions, and the factors influencing the determination of FMV.

### 10. Contract Drilling Specifications

An Instruction Memorandum will discuss control of contract drilling to assure receipt of accurate and adequate information.

### 11. Release of Total Resource Figures

The nationwide adoption of the public release of total resource and recoverable resource figures would be effected through an Instruction Memorandum sent to all BLM State Offices.

## I. Introduction

One of the recommendations of the Commission on Fair Market Value Policy for Federal Coal Leasing (hereinafter known as the Commission) is for the expansion of the Federal Coal Drilling Program by the Department of the Interior. The intended results of such an effort include improved estimates of fair market value for the tracts, and increased accuracy of tract delineation to provide resource data which will stimulate industry interest.

Obtaining drilling information for tract delineation and for a regional understanding of the extent and quality of the coal resource should aid in bringing more new production to the market and foster competition. This wide-spread drilling and additional tract-specific drilling would assist the tract selection, tract delineation, and tract appraisal process.

## II. Previous Drilling Programs

In the past, Departmental coal drilling activities were centered in the USGS primarily for land classification purposes and to examine coal on Indian Lands. Since the late 1970's the Department's efforts have evolved from drilling for classification to drilling to support of the Federal Coal Leasing Program. Table 1 (from Commission Report) summarizes the costs of drilling since 1978. The large jump between 1979 and 1980 denotes the increase in drilling in direct support of coal leasing.

Table 1  
SUMMARY OF DEPARTMENT OF THE INTERIOR COAL DRILLING EXPENSES AND ACTIVITIES

Final Year	Drilling Dollars Spent	Number of Holes Drilled	Total Rotary and Core Footage
1976	1,300,000	347	289,863
1977	2,750,000	1,213	475,914
1978	2,320,000	430	299,963
1979	1,560,000	1,476	413,125
1980	6,890,000	871	302,723
1981	5,900,000	861	539,101
1982	7,000,000	850	N/A
1983	523,000	63	57,739
1984	85,000	78	26,403

drilling information were required for accurate delineation. The Regional Coal Team authorized tract delineation on available data and advanced expenses to obtain exploration licenses in some of the delineated areas. No tracts have yet been offered in this region. Similar coal drilling needs have been identified in other coal regions with currently delineated tracts.

During tract delineation for Round I general coal lease sales, the data adequacy criteria were based on demonstrated reserves as specified in USGS Bulletin 1450-B. For the Round II sales there were no formal requirements for data adequacy but the tracts were delineated on available information based upon professional geologic judgment.

## III. Purpose and Description of New Drilling Program

The purpose of a Department drilling program are the evaluation of: lease tracts, bypass-maintenance tracts, and regional coal resources.

A Department sponsored coal drilling program should be comprised of three types of drilling in addition to supplemental evaluation methods. Each category will generate a different level of information intended for a specific use. Each level of information will, however, pertain to end support directly the long and short term coal leasing policy of the Department.

## A. Types of Exploration Programs

## 1. Regional Coal Resource

## a. Resource Management Planning

Drilling supports RMA, provides a regional understanding of the extent and quality of the coal resource, is used for coal leasing, addresses the State's concerns about decentralization of coal development impacts, and acts as a catalyst to stimulate industry attention (See Appendix A). By definition, this category has no immediate economic (EMV) implication and so need not be reviewed by the Coal Data Adequacy Review Council. Hereafter called the Council (See Section IV).

## b. Supplemental Resource Evaluation Methods

Supplemental studies such as geophysical and field mapping, and remote sensing projects shall be developed during planning of the drilling program as joint undertakings between BLM and USGS.

## 2. Tract Delineation

a. Area Specific: Some drilling will be necessary in areas known to have significant coal development potential and which are likely to be considered for leasing in the near future but are judged by the Council to currently have inadequate data to estimate EMV. These high potential areas are drilled first but they may not necessarily result in delineated tracts.

The drilling program was primarily concentrated in the Powder River, Green River-Hams Fork and Uinta Coal Regions. The Commission partially attributes the success of 1980 and 1981 coal sales in Uinta and Green River-Hams Fork Coal Regions to the adequacy and accuracy of the data provided by this program. This view accurately reflects the opinions of BLM field personnel.

During 1982 the drilling program was nearly terminated due to reduced budgets, and the success of the Department's exploration licensing program, as shown in Table 2 and 3.

Table 2  
SUMMARY OF EXPLORATION LICENSE ACTIVITY 1977 - 1983

Final Year	Number of Licenses Issued	Acres
1977	1	2,222.75
1978	0	0.0
1979	7	26,627.34
1980	26	91,959.34
1981	33	138,319.28
1982	19	90,509.51
1983	35	39,319.28
	95	475,979.13

Table 3  
EXPLORATION LICENSES ISSUED BY REGION 1977 - 1983

Region	Licenses	Acres
Green River-Hams Fork	32	202,472.24
Uinta	12	58,731.28
San Juan	5	21,379.34
Powder River	15	69,667.72
Fort Union	11	53,328.53
Undesignated or Unknown	10	87,810.01
	95	475,979.13

During tract delineation in the San Juan Coal Region, coal data availability became a principal issue because very little drilling data of any kind were available for tract delineation in several areas of industry interest. The coal deposits in the areas were suspected to be such that rather high levels of

1. In Wyoming drilling continued using the Bureau's drilling equipment. 40 holes were completed in FY 1983.

b. Tract Specific: Some drilling will be necessary on tracts currently delineated which the Council judges to have inadequate data to estimate EMV. (See Appendix B.)

## 3. Bypass-Maintenance

When bypass or maintenance tracts are identified the available data is judged by the Council for adequacy. If the data is adequate for fair market value determinations the tracts will be offered for lease. If data are determined by the Council to be inadequate the party must be desirous of the tract sale should provide the data. In the case of a bypass tract, this is likely to be the government; in the case of a maintenance tract, this is likely to be the adjacent lease or owner. However, Federal drilling might allow delineation of a tract or tracts so situated that they would be of interest to more than one company and thus increase competitiveness.

The adequacy determination cannot be made before the identification of a bypass or the proposal of a maintenance tract. Nevertheless, there may be up to two years less time to obtain further data. In addition, under the phased lease approach, the tracts can be held until data is available. The process is outlined in the steps below.

- Recognition of bypass-maintenance area
- Data adequacy judged by Council
- Tracts offered for lease if data adequacy
- If data inadequate, the operator is given the opportunity to do more drilling
- If operator declines to do more drilling, BLM evaluates potential consequences of a bypass
- BLM decides to do government drilling
- Data judged for adequacy by the Council
- Tracts offered for lease

## E. Implementation

- Normally the actual drilling is contracted to private firms. The agency in control of the contract has immediate supervision of the contract activities.
- BLM Offices having in-house drilling capabilities and/or technical expertise should develop proposals, based on guidelines to be prepared by BLM Washington Office, for implementation as soon as funding is approved.

# PROPOSED COAL PROGRAM CHANGES

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3. A study of the merits of cooperative drilling by State agencies under cooperative agreements compared to contract drilling projects run directly by BLM should be made. Field office recommendations summarizing the preferred alternative or alternatives will be forwarded to Washington office (W0).

Following W0 discussion and concurrence, the BLM State Office will write the agreements and contracts. The BLM State Office will implement the agreements and contracts following W0 review for consistency.

4. BLM State Offices not having in-house drilling capabilities or technical expertise or those offices proposing programs which exceed in-house capabilities should investigate the feasibility of cooperative ventures with or general assistance from USGS and the state geological surveys.
5. The BLM State Offices will study supplemental methods for data acquisition and the recommendations will be sent to W0 for review.
- C. Forest Service Coordination
- There should be cooperation between the BLM and the Forest Service to provide adequate minerals inventory data for the Forest planning unit. Supplemental agreements to the Interagency Agreement for Mineral Leasing will be developed at the State level covering the initial exploration stages of this effort, including government sponsored exploration drilling.
- D. Industry Coordination
1. Encouragement of Private Drilling
- Wide spaced government drilling stimulates industry interest. The Government will suggest the potential lease areas where the best areas will be for further exploration.
  - The Government will not lease tracts unless there is sufficient data available.
  - Any requests for exploration licenses will be processed promptly by all concerned offices.
2. Sharing of Data
- It is proposed to change the regulations to require sharing of data (See Part III E below).
3. Cooperative Drilling
- Government Industry cooperative drilling should be developed and actively encouraged by the Department. Any drilling work plans by the BLM or other agencies will be announced in a Federal Register notice inviting companies to enter a drilling contract.

## E. Post Exploration License Data Sharing

A Federal Register notice will be published requesting public comments on the merits and problems of requiring companies to sell drilling data to non-license participants after drilling is complete (Appendix G.).

## F. Cost Estimates

The cost estimates of the Department's drilling efforts in FY 1985 are in Appendix D.

## G. Priority of Drilling

The funds for drilling will be limited. A schedule of tracts listed in order of priority will be developed in the State Office. The priority will be dependent on time constraints. The major tract categories would include:

- |                         |                          |
|-------------------------|--------------------------|
| a. Bypass               | e. Land use planning     |
| b. Regional lease sales | f. Emergency lease sales |
| c. Lease exchanges      | g. Maintenance           |
| d. Tract delineation    | h. Lease by application  |

The tract priority depends on the circumstances in each region. This priority can vary depending on whether activity planning is continuing prior to a lease sale or whether a sale has been completed and land use planning is beginning for the next round of lease sales. Individual tract circumstances and competitive nature may also affect government drilling priority.

## IV. Data Adequacy

The data adequacy standards for each coal region will determine the minimum amount of data that should be collected (See Appendix E.).

The Coal Data Adequacy Review Council is the body that will determine whether lease tracts have adequate data for fair market value determinations.

The three stages where data adequacy is considered are land use planning,

activity planning and lease sale procedures. For land use planning the determination of data adequacy is the responsibility of the Deputy State Director for Minerals and his staff. For activity planning and lease sale procedures the determination of data adequacy for coal is the responsibility of the Review Council. Their findings are reported to the Regional Coal Team (RCT). A separate report on other types of data comes from the Business Advisors.

Activity planning begins with the preparation of the preliminary market analysis and the call for expressions of leasing interest. In the early stages of activity planning the State Director formally designates the Review Council and the Tract Delineation Team (TDT). The TDT prepares a preliminary tract delineation report. After tracts are delineated the Review Council

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Judges data adequacy and reports to the RCT. If more data are needed than that fact is advertised so that additional information can be obtained by interested parties or by a government drilling project. When more data is available the Review Council makes a new determination of data adequacy. These determinations may be made up to the point where the RCT makes the final lease tract sale recommendations, approximately three months before the lease sale takes place.

## V. Data Handling

The Department should standardize the data-gathering and data-usage procedures in support of the Federal coal-leasing program. The principal coordination effort should be between BLM state offices to achieve standardization of data for regional coal leasing.

The reasons for standardizing data are: 1) provide for ease in comparing data collected over a period of time; 2) provide for ease in comparing data between states and coal basins; 3) provide for ease in preparing new contract work statements and diligence or compliance provisions.

The categories that should be considered are:

- Drilling procedures
- Geological and geophysical logging
- Sample collection and analysis
- Data storage, retrieval, dissemination, and manipulation
- Public release

Collection - Procedures for standardizing collection of hydrologic, lithologic and geophysical data will be developed by W0 with other Department agencies and with concurrence from the field. Analyses will be standardized with allowance made for additional non-standard work as needed.

Storage - Proprietary and non-proprietary data shall be handled and stored according to Bureau regulations, and the guidelines presented in Appendix E.

Dissemination - Data shall be made public or shall remain confidential according to Departmental regulations, Federal Law, and the guidelines in Appendix E.

Information on the coal resources collected by companies, based on a government approved exploration plan, has been held confidential by the government until after the affected tract is leased. Recently the Rocky Mountain Regional Solicitor approved release of coal resources and recoverable resource figures for the purposes of tract delineation (Memorandum of February 13, 1984, Appendix F.). Other than voluntary disclosure by the licensee, the Department has not previously made these data available. BLM intends to adopt this solicitor opinion nationwide. All specific data will continue to be held proprietary.

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Data collected by other agencies - Mineral resource data collected by other agencies should be made available to the Department. One or more MOU's may be necessary with other agencies such as the US Forest Service.

## VI. Specifications for Contract Drilling

The W0 will review all drilling contracts. The Division of Minerals in each State Office will recommend in writing to the W0 the type of contract that will be let, i.e., Request for Proposal (R-F-P.) or invitation for bids (I-F-B.).

A geologist should write or agree to the contract. The language should be as precise and as unambiguous as possible. The contract should specify completion of holes to a planned depth and cement on the basis of logged footage. A clause should be included stating that the Government will not be responsible for differing geologic conditions.

To assure a successful drilling project the following points need to be considered:

- Drilling will be conducted under the general direction of the DOI representative.
- The contractor representative must have full authority to act in directing operations while work is underway.
- Specify prompt start up of the project after contract is awarded.
- Specify estimated depth or horizon to be encountered.
- Specify minimum acceptable equipment and supplies on site.
- Specify what information is needed, for example:
  - Logged depth
  - Cuttings log
  - Frequency of sample collection
  - Cored interval to be specified by the geologist at the site
  - Source of water
  - Access to the site
  - Hole plugging and reclamation of drilling sites

The contracts with State geological surveys should be on an annual grant basis. Contracts with the USGS should be for specific periods.

## VII. Management Plan for Agency Coordination

### A. Agency Roles

Departments, bureaus, and agencies which influence the assessment, management and development of Federal coal with respect to a coal drilling program are:

## APPENDIX 6

11

Department of Interior: BLM, USGS, BOM, OSM, BIA

Department of Agriculture: Forest Service,

Department of Defense

States: Geological surveys  
Mining agencies  
Environmental agencies

The Interior agencies that do actual coal drilling for leasing purposes are BLM, USGS and BOM.

The BLM evaluates coal resources and administers leasing aspects of coal exploration and mining. Leasing functions include activity planning, final sales procedures, environmental studies and regulation of mining operations. The BLM coal drilling program deals with tract delineation and fair market value determinations of lease sales for the Federal Coal Management Program. BLM has authority for management of all minerals on Indian lands including drilling.

The USGS undertakes regional coal studies through wide-areed drilling for the Basin Analysis Program and the coal quality research programs. All data generated by these National programs are entered into MCHDS, which is a data bank for coal resource information.

The Bureau of Mines coal drilling program determines coal reserves on Indian lands and in National Parks as part of the Mineral Land Assessment Program.

State agencies in the past have assisted the Conservation Division of USGS in assessing drilling activities. They have used their own drilling crews, geologists and coal chemists as well as private contractors and commercial labs to obtain information for the Federal tracts.

Coordination should be made with other offices and agencies to give them the opportunity to utilize drill holes for other purposes such as hydrologic studies.

### E. Management Action Plan

The management of a departmental drilling program will require specific linkages, documentation, and requirements for diligence and performance to achieve coordination and cooperation.

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### 2. State Cooperation

When feasible, cooperative agreements should be encouraged with the states. Agreements have been used in the past and the Department will seek State cooperation in the future.

### 3. Data Adequacy Review Council

The Secretary's authority to call on personnel in any Interior agency to serve on the Data Adequacy Review Council should be exercised and all agencies should be advised that this function will become part of their responsibilities in the future as needed. The members of the Data Adequacy Review Council will have collective knowledge of the coal geology of the region, coal mining conditions, and the factors influencing determination of PWV.

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### 1. Coordination between USGS and BLM

MUW's will be required to coordinate the activities of the USGS and BLM. Included will be the proposals for sample analyses, data storage and handling, and for proprietary data handling.

BLM needs site specific drilling to delineate tracts for lease sales. USGS identifies geological hazards, ground water problems, and completes large scale (1:100,000) geological maps of coal basins. Coordination between USGS and BLM would occur through the resource management planning process. The regional coal assessment efforts of USGS provides direct inputs into the MUP.

BLM needs proximate analyses and other analytical data for coal quality to delineate tracts. USGS needs detailed chemistry on coal samples. In addition to contracted private labs, the feasibility of using USGS coal analysis labs in Boston and Denver should be considered if the samples can be given highest priority and the cost is competitive. Arrangements may be made to supply USGS with splits from cores so that they can make additional analyses for their purposes.

There should be a uniform suite of geophysical logs agreed upon between USGS and BLM for interpretation of coal resources in a particular area. However, flexibility is necessary because in some areas, other logs may be useful in addition to the standard suite. In addition logs should be compatible with industry.

In cases where BLM has a lot of information, there should be cooperation on geostatistical studies to develop and test coal deposit models. These studies by USGS would be valuable to BLM in designing drilling programs.

The BLM should attempt to utilize Coal branch geologists on a temporary basis whenever manpower shortages exist within BLM. This effort should include but not be limited to site inspection, sampling, field reconnaissance and geologic studies.

The BLM and USGS field offices will coordinate drilling programs with industry exploration licenses or nearby property leases and owners in order to avoid duplication of drilling efforts. The BLM should be responsible for this level of coordination because the BLM field offices have principal contact with surrounding land owners, exploration licenses, and industry in general.

The Department drilling rigs (BOM, USGS and BLM) should be made available for emergency drilling where data are needed quickly such as for PWV determination or for a LUP decision.

APPENDIX 100

VOLUNTARIOUS

ATTACH

# PROPOSED COAL PROGRAM CHANGES

## STAFF DRAFT

3420 (451)

Instruction Memorandum No. 84-  
Expires 9/30/85

To: ID's Colorado, Montana, New Mexico, Utah, Wyoming, Eastern States  
and BCD

From: Director

Subject: Federal Coal Management Program Changes

Secretary Clerk's July 9, 1984, Review of Planning Considerations in Federal Coal Leasing outlined the Department's proposed plans for implementing program improvements in light of the Office of Technology Assessments (OTA) suggestions contained in Environmental Protection in the Federal Coal Leasing Program. This Instruction Memorandum establishes the procedures and guidelines for implementing three of the Department's proposed program changes.

A. Public Participation Calendar: To improve the effectiveness of public participation, the Department indicated that the BLM will develop and release calendars clearly identifying each point at which public participation is encouraged in both resource management planning and activity planning. Public participation calendars will be published at the beginning of the resource management planning process and activity planning. For resource management planning, the public participation calendar will be published upon starting

3. The public hearing on the draft regional coal EIS;
6. The RCT meeting on the draft EIS comments and guidance for the final EIS;
7. The RCT meeting on final tract and sale data/procedures recommendations, special leasing opportunities, and tracts with inadequate data;
8. Public comment on fair market value (FMV) and maximum economic recovery (MER); and
9. The RCT meeting to review FMV/MER, the current market and tract marketability analysis and the recommendation to affirm/modify/reverse previous sale decision.

B. Resource Management Plans: The Department and the BLM are committed to expeditiously completing Resource Management Plans (RMP's) in coal areas prior to initiating new coal activity planning. Activity planning will not begin in areas where RMP's have not been completed. (This action does not affect the activity planning efforts for San Juan River Round I; Green River-Sage Fork Round II; Uinta-Southwestern Utah Round II; Powder River Round II; Fort Union

the resource management plan, as required by 43 CFR 1610.2(c). For activity planning, the initial public participation calendar will be published simultaneous with the notice of the first regional coal team meeting for a particular round of coal leasing. Calendars will be constructed to indicate the point at which public participation is encouraged, along with an estimated date. Public participation schedules will be updated and republished as the need arises.

For land use planning, key public involvement points are prescribed in 43 CFR 1610.2(f). Key public participation points in activity planning are as follows:

1. The regional coal team (RCT) meeting on the summary of land use plans (LUP) the decision to proceed with activity planning, the appointment of Science Advisors, and the review of the long-range plan and the long range market analysis;
2. The call for expressions of leasing interest;
3. The RCT meeting to review expressions of interest, the regional market analysis, and the tract ranking factors and to recommend a leasing level;
4. The RCT meeting on ranking and selecting tracts, and developing regional coal environmental impact statement (EIS) alternatives;

Round II and Southern Appalachian Round II. These activity planning efforts will be allowed to proceed without the preparation of RMP's. Activity planning for a second round of coal leasing in the San Juan River Region and any third round leasing efforts in all regions may not be started until RMP's have been completed.

This commitment may require future coal activity planning in a region to be deferred to accommodate resource management planning schedules at the scope of activity planning will have to be limited to a smaller geographic area (i.e., to those areas where RMP's can be completed timely).

In the future, the RCT's will be required to more systematically use existing land use plans in identifying issues to be addressed and data to be gathered as part of activity planning. This will be accomplished by providing the public and the RCT's with a summary of the land use data and evaluations made during land use planning. This summary will include a brief discussion of coal related concerns raised during the land use planning process and, as appropriate, the means by which these concerns were resolved. The summary should highlight for the public and the RCT any residual questions concerning data adequacy, resource use and values, multiple use tradeoffs and surface owner consultation. This will enable the RCT to readily identify specific areas where additional data is needed to proceed with tract delineation and/or where there may continue to be unresolved concerns. (The RCT's will not evaluate the quality or technical adequacy of the RMP per se; this remains the responsibility of the State Director.)

## APPENDIX 6

### STAFF DRAFT

C. Application of Coal Screens: The 1979 Federal coal management regulations (43 CFR 3420.2-3) required the sequential application of the four screens during land use planning. That is, the coal development potential screen was applied first, followed by the application of the unsuitability criteria, multiple use assessment, and surface owner consultation screens in that order. The provision for sequential application of the screens was eliminated by the July 1982 rule changes to allow BLM staff greater flexibility in applying the screens.

The OTA, however, suggested that the 1982 rule changes may increase the BLM workload because screens are applied simultaneously, thus unnecessarily expending limited fiscal resources because all screens are applied to all lands. Under the 1979 rules, later screens would not have to be applied to lands assessed as unsuitable through application of earlier screens. Consequently, the OTA recommended that generally, but not always, the four screens should be applied sequentially, as outlined in the 1979 rules.

The Department agreed with the OTA's view and the BLM will restore the 1979 procedures (but not the regulations) whereby the four screens are applied sequentially during resource management planning, except in cases where there are indications that the application of a later screen first would prove more efficient because lands would be deleted from further consideration for coal

leasing without expending added resources to apply the earlier screens. In applying this policy, all deviations from the sequential applications of the four screens must be documented in writing, including a brief rationale for the departure. More detailed instructions on applying the four screens are being developed in conjunction with the preparation of Supplemental Program Guidance for Coal. These instructions will be available in the spring of 1985.

bcc: 640-BF 640-HOLD 660 855  
650-BF 650-CF 650-HOLD

LM:651:Carlson:mr:9/4/84:0092J

Retyped for changes:rk:12/1/84



# PROPOSED COAL PROGRAM CHANGES

December 21, 1984

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## DECISION ON THE SCOPE OF THE SUPPLEMENT TO THE 1979 FINAL ENVIRONMENTAL STATEMENT FOR THE FEDERAL COAL MANAGEMENT PROGRAM

On August 30, 1984, Interior Department Secretary William Clark announced the Department's intention to prepare a supplement to the 1979 Final Environmental Statement for the Federal Coal Management Program (FES). Between September 4 and October 11, 1984, the general public and interested organizations had the opportunity to submit written comments on the scope of the FES supplement in response to the Department's formal request for such comments. This request appeared in the Federal Register (FR) on September 4, 1984. During this time period the Department also held several public hearings, held three City of Billings, Boise, Pa, and Washington, D.C. to obtain oral and additional written input to the scoping process. In all, more than 40 individuals and organizations responded during the scoping comment period. See attachment A for a composite summary of all comments. The Department has analyzed these comments and reached a decision on the form and substance of its supplement to the 1979 FES.

The Council on Environmental Quality (CEQ) regulations at 40 CFR 1501.7 direct federal agencies to engage in a public scoping process once a decision has been made to prepare an environmental impact statement (EIS). The purpose of this process is to "determine the scope and the significant issues to be analyzed in each EIS" (40 CFR 1501.7(i)(2)). Subsequent CEQ guidance to agency heads on July 22, 1983, further elaborated on the purpose of scoping as envisioned under the National Environment Policy Act (NEPA).

"The purpose of this process is to determine the scope of the EIS so that preparation of the document can be effectively managed. Scoping is intended to ensure that problems are identified early and properly studied, that issues of little significance do not consume time and effort, that the draft EIS is thorough and balanced, and that delays occasioned by an inadequate draft EIS are avoided."

In deciding to prepare a supplement to the 1979 FES, the Department determined a need existed to review the assumptions and data that were used as the basis for the 1979 FES. In particular, since the projected demand for western coal has changed significantly since 1979, an updated analysis of western coal markets will be a critical factor in determining environmental impacts of Federal coal leasing activities.

The Department also wishes to analyze the environmental impacts of a coal management program that has evolved since its inception nearly 6 years ago. This evolution includes a 1982 rulemaking revising the 43 CFR 3400 coal management regulations and, more recently, a series of procedures, policies,

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When Secretary Clark decided on August 30, 1984, that the Department would prepare a supplement to the 1979 FES, the Department had already reviewed and accepted most of the recommendations contained in the Report of the Commission on Fair Market Value for Federal Coal Leasing. In the Environmental Statement for the Proposed Revision to the Federal Coal Management Rules and Procedures of June 29, 1984, the Department concurred with a finding that the rule and procedural changes needed to adopt the Commission's recommendations related, for the most part, to lease sale procedure and coal lease operations, and no serious issues would be expected to have any significant environmental impacts.

Similarly, on July 9, 1984, the Department had accepted recommendations contained in the report by the OTA on Environmental Protection in the Federal Coal Leasing Program. Currently, the Department is studying the changes to the coal program needed to implement the OTA's proposals, and has provided interested parties with a draft environmental assessment on the impacts of procedural changes that implement Linowes Commission recommendations, the OTA-related proposals also appear not to have any significant environmental impacts.

As part of its plans to study and implement Linowes Commission and OTA items, the Department committed itself at the outset to obtaining full public involvement each step along the way toward its final decision. To that end, the materials under study have been circulated for public comment on the following schedule:

June 1984: Draft proposals to implement Linowes Commission items were distributed to interested parties for comment.

July 23-24: Meetings were held to discuss comments on these proposals with State Government, coal industry and environmental group representatives.

October 31: Federal Register (FR) notices were published requesting formal comment on key proposals circulated in June 1984.

November 3: Proposed rules were published in the FR requesting formal comment on regulatory changes that would allow the Department to implement several Linowes Commission items.

November 19: An additional package of proposals relating to recommendations in both the Linowes Commission and OTA reports was distributed to interested parties.

December 3-7: Meetings were held with State Government and industry representatives to discuss the October 31 FR notice, the November 3 proposed rulemaking, and the November 19 distribution.

and proposed rules stemming from recommendations contained in reports by the Commission on Fair Market Value Policy for Federal Coal Leasing (Linowes Commission) and the Office of Technology Assessment (OTA). The Department believes that these changes improve and strengthen the overall Federal coal management program.

The comments received by the Department on the scope of the FES supplement covered a wide range of issues. It should be noted, however, that many of the environmental concerns expressed about unique, region-specific coal mining operations would normally be analyzed in subsequent EISs for each regional coal leasing proposal as well as the individual mine development plan for each tract eventually leased. Under NEPA tiering guidelines, a programmatic EIS such as this supplement to the 1979 FES is intended to address broad programmatic and national policy questions and proposals; narrower analysis in actions subsequent to a decision by the Secretary on which program design and national policies and implementation will cover specific mining and mine development initiatives. This tiering process reflects the CEQ's philosophy "to focus on the actual issues ripe for decisions at each level of environmental review" (43 FR 15584, November 29, 1983).

Several key themes emerged from the Department's analysis of comments concerning the scope of the FES supplement. The decision on these issues is as follows:

**ISSUE 1:** Interrelationships between the FES supplement and proposed regulatory, procedural, and policy changes to the coal management program.

A number of commenters felt that the FES supplement should serve as the NEPA compliance document for the changes that the Department is considering making to the Federal coal management program. These commenters suggested that NEPA requires the Department to integrate the development of new coal leasing rules and other procedural and policy changes with its environmental analysis in the FES supplement.

**RESPONSE:** The Department decided to prepare a supplement to the 1979 coal programmatic FES because of changes in coal markets and in the coal program which had occurred since 1979. The supplement is being prepared to study impacts of the leasing program as a whole, not the impacts of the specific proposed changes currently under consideration. As the Secretary decides on a program alternative in the 1985 EIS, he will also be reviewing the changes to the coal program in response to the 1984 Linowes Commission and OTA reports, as explained below.

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In September 1984, the Department printed and distributed a coal program implementation plan, which summarized the status and decision path for all the elements involved in the ongoing coal program review. The Department acknowledges that this implementation plan may have led to a perception that there is a causal connection between various program changes and the FES supplement. Concerns have also been expressed over the effectiveness of public comment. For example, some commenters felt their comments on the program as described in the draft EIS will be ineffective if the regulatory and procedural elements that go into that program are put in place before the final programmatic supplemental EIS is published in July 1985.

In response to these concerns over the timing of the EIS completion schedule and its relationship to recently proposed program changes, the Department is adopting this course of action:

First, all final regulations promulgated to implement elements of the Linowes Commission and OTA reports will be deferred for decision until after the final EIS is published. This will permit the Department to obtain the benefit of comprehensive comments on the entire program, as described in the draft EIS, before it makes final changes in those coal program rules.

Secondly, the Department is providing a two-tier public comment opportunity. The first opportunity permit commenters to provide comments on the programmatic proposals. These comments will be considered by the Bureau of Land Management in formulating its decision on whether and how each proposal will ultimately be implemented. The second opportunity comes when comments may be submitted on the draft EIS. These comments may discuss, in addition to the impacts analyzed, the interrelationships of the various components of the coal program, including the effect of all recently proposed changes.

Finally, the Secretary shall review any non-rulemaking decision on Linowes Commission and OTA items made at the Bureau or Assistant Secretarial level when he initiates a coal program alternative following the July 1985 publication of the final EIS. This review by the Secretary will, of course, have the benefit of the programmatic input analysis in the FES supplement.

**ISSUE 2:** Scope of market analysis.

Several commenters urged the Department to undertake an in-depth analysis to determine western coal supply and demand estimates.

**RESPONSE:** The Department agrees with this comment. A central focus of the supplement to the 1979 FES will be an analysis of current markets for western coal and projections of supply and demand through the year 2000. The Department will conduct its analysis on all those factors which can have a significant impact on the supply and demand components of future market dynamics, including mine-specific coal capacity estimates.

## APPENDIX 6

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To underscore the importance of market analysis, the Department will highlight it as a separate chapter in the draft EIS. A separate technical report will also be prepared giving a detailed exposition of the assumptions used in obtaining coal demand forecasts from the Department of Energy's (DOE) National Coal Model (NCM) and the sensitivities of the NCM to changes in input variables.

**ISSUE 3:** Assessment of reclamation success on surface mined western coal lands.

Several commenters urged the Department to gather and publish information on the environmental impacts of very large western surface coal mines and to address in general the question of whether erid western lands are reclaimable. The commenter requested that publication of a report from the Office of Technology Assessment (OTA) study of the reclaimability of western lands disturbed by surface coal mining before completing its draft EIS. This OTA report has a tentative completion date of summer 1985.

**RESPONSE:** The draft EIS will include an abstract of recent reports on reclamation studies for surface mined western coal lands, although the OTA report itself will not be available for inclusion in the Department's draft EIS to be published in February 1985. The Department will respond to those portions of the OTA study relevant to its coal program activities when the OTA has completed its project and published the results. In the interim, the Department will monitor the progress of that study and others to a determining what, if any, impact they have on the coal leasing program.

**ISSUE 4:** Impacts of the Department's policy to pursue fee coal exchanges.

Since 1979, the Department has consummated two fee coal exchanges. Three others are under study. Several commenters felt there was a need for an environmental impact statement on the Department's program to conduct fee coal exchanges, particularly in the checkerboard areas of the west where Federal and land grant railroad ownership are intermingled. While commenters were primarily directed toward the coal exchanges, the Department is also processing several coal lease exchanges.

**RESPONSE:** The Department conducts two types of exchanges that involve transfer of coal mineral rights. Under section 206 of the Federal Land Policy and Management Act of 1976, the Department may exchange fee coal lands, that is, exchange the ownership of the coal deposits, on an equal value basis. In other instances where specifically allowed by law, the Department may award a coal lease of equal value to a Federal or Indian coal lease holder in return for relinquishment by the lessee of an existing lease.

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Environmental Quality (CEQ) of its own rules and regulations published in the FR on March 23, 1984, 46 FR 18038. The CEQ did not address the situation where the agency is implementing an existing EIS and the proposed action is merely a continuation of the program. However, its discussion of the situation where an agency is required by law to act in analogous: the CEQ indicated a new action alternative would be required "to provide a benchmark, enabling decisionmakers to compare the magnitude of environmental effects of the action alternatives," here the continuation in some form of a coal leasing program.

Not all of the alternatives used in the 1979 FES are now feasible or reasonable alternatives to the current Proposed Action. Some of the 1979 alternatives are incorporated in the present alternatives, but under a different title. Circumstances have changed since 1979 and thus changes have rendered certain of the other alternatives inoperable. The following discussion will clarify the disposition of each 1979 alternative:

- o **No New Federal Leasing Until at Least 1985:** This 1979 alternative is incorporated into the No Federal Leasing Alternative.
- o **Process and Lease Only Outstanding Preference Right Lease Applications:** This alternative has been incorporated into the Preference Right and Emergency Leasing Alternative.
- o **Lease Only Open Coal and Coal Needed to Maintain Existing Operations (Emergency Leasing):** This alternative has been incorporated into the Preference Right and Emergency Leasing Alternative.
- o **Lease to Meet the Coal Industry's Indications of Need:** This alternative has been incorporated into the Leasing by Application Alternative. Lease sales would be held in response to applications by industry and the number of tracts and amount of coal offered at lease sales would vary according to the number and location of applications.
- o **Allow State Determinations of Leasing Levels:** Events have made this 1979 alternative a continuation of the implementation of the 1979 coal program in the intervening years but involve the 1979 coal Government participation in the determination of the amount of coal offered for lease sales. Furthermore, changes in the Federal State Coal Advisory Board Charter in 1984 have strengthened the role of the coal industry and the amount of coal offered at lease sales would vary according to the number and location of applications.
- o **Allow State Determinations of Leasing Levels:** Events have made this 1979 alternative a continuation of the implementation of the 1979 coal program in the intervening years but involve the 1979 coal Government participation in the determination of the amount of coal offered for lease sales. Furthermore, changes in the Federal State Coal Advisory Board Charter in 1984 have strengthened the role of the coal industry and the amount of coal offered at lease sales would vary according to the number and location of applications.

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The EIS considers section 206 fee coal exchanges on a case by case basis in response to proposals from private fee coal owners. There are some instances where EIS field officials may also identify coal lands during land use planning or having fee coal exchanging potential. Not all such lands are planned and three proposed fee coal exchanges were, however, undertaken at the behest of the private fee coal owner. The environmental impacts of proposed fee coal exchanges are studied under NEPA before any exchange is completed and the number of future fee coal exchanges is expected to be small. As a result, there is no reason to study them in the FES supplement or to consider separate programmatic EIS on fee coal exchanges.

Under special legislation, Congress has also given the Department discretion, or has directed the Department, to exchange specified coal leases as a means of protecting sensitive areas and reducing the amount of land not amenable with interstate highway I-80 in Wyoming. Enactment of the Federal Coal Leasing Amendments Act of 1979 removed the Department's general authority to lease lease non-completing, a promotion that has not yet been used all lease exchange except for those specifically legislated by Congress. Each lease exchange has a NEPA analysis before a decision is made.

**ISSUE 5:** Programmatic alternatives the Department should analyze in its supplement to the 1979 FES.

A variety of commenters offered advice on this subject. One comment suggested that the Department update the analysis for the six alternatives examined in the 1979 FES, another provided a detailed outline for a different alternative, and a third comment suggested that the 1979, 1981, and 1983 "Coal Programs" should form the framework for the environmental analysis.

**RESPONSE:** The Department has developed four alternatives for study in the supplemental EIS: (1) the proposed action; (2) preference right and emergency leasing; (3) leasing by application; (4) no Federal coal leasing.

The proposed action is to continue the 1979 coal management program as it has evolved since the time through regulatory, procedural, and policy changes. This evolution includes the 1982 and 1983 rulemaking revising the CFR 3000 regulations and, more recently, the series of proposed changes stemming from recommendations of the Linow Commission and OTA.

The next two alternatives chosen represent a tract by tract approach to leasing (leasing by application) and a program that would limit the issuance of new leases to adjudicating and recognizing valid existing rights and maintaining protection at ongoing mines or avoid types of Federal coal leasing (preference right and emergency leasing). Under both alternatives, activity planning on a regional basis would be eliminated.

The Department's use of a no action alternative is required by CEQ regulations (40 CFR 1502.14(d)). The no Federal leasing alternative is viewed as the no action alternative pursuant to the interpretation by the Council on

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o **Leasing to Meet Department of Energy (DOE) Coal Production Goals:** DOE no longer provides production goals, but does prepare demand projections. This 1979 alternative is not included as a separate alternative for environmental impact analysis because the impacts of this type of program are treated either in the no Federal leasing alternative (on the assumption of no demand for coal), or treated in the leasing by application alternative (on the assumption that there is/will be demand for coal). DOE demand projection are also taken into account in the determination of leasing levels under the proposed action.

During scoping for this FES supplement a commenter suggested that a "Leasing for Need" alternative be studied. This would involve an identification of need as follows:

- o Assessment of need for coal production based on consumer demand.
- o Assessment of likely coal production from existing and planned mines.

Both of these items are included as features of market analysis in the Proposed Action. Furthermore, the Proposed Action calls for periodic and topical re-evaluations of the outlook for Federal coal and the appropriate number of tracts to be offered in order to assure compatibility with market conditions. The major difference between the proposed action and the "Leasing for Need" alternative is that the "Leasing for Need" alternative proposes that the Department design a specific fixed, discretion-limited policy on the setting of leasing levels. This is a question of policy relating to the implementation of a specific program component, not a separate program design alternative. The Proposed Action includes most of the significant points identified in the "Leasing for Need" alternative proposal, and the remaining minor differences are not believed sufficient to warrant a separate alternative in the FES supplement.

Some commenters suggested that the FES supplement should have the 1979 program as one alternative, the program as changed in 1981-83 as another alternative, and the program changed in 1984-85 as yet another alternative. The Department does not believe that this is necessary or desirable since these "programs" do not differ enough to have a significant comparative impact on the regulatory standards for what kinds of lands will be studied and delineated, and for decision on how much coal should be leased) to constitute reasonably contrasting alternatives. Furthermore, all of the program changes adopted since 1979 have been addressed and analyzed in environmental assessments and none of them have been found to have a significant environmental impact. The recently proposed implementation items from the Linow and OTA reports similarly appear to be without measurable environmental impacts. None of these adopted or proposed changes disturbs the basic lease sale planning, regional activity planning and lease sale procedures format of the 1979 program. Therefore, the suggestion that these "programs" identified with changes in 1979, 1981-1983, and 1984-1985 be analyzed as separate alternatives has not been accepted.

# PROPOSED COAL PROGRAM CHANGES

OTHER ISSUES

Among the other issues the Department will identify in its FES supplement are concerns of Indian Tribes regarding the effects of Federal leasing policies on Indian lands, and impacts to agriculture of future coal development in the West. An update on surface mine reclamation in the arid western States will be part of the supplement in response to several commenters' requests for such a discussion.

Issues that the Department believes are not germane to this supplement to the 1979 programmatic FES include a variety of environmental questions that more properly relate to the permitting of individual surface coal mines and actions related to the ongoing management of issued coal leases. Impacts of Federal coal leasing policies on transportation costs and resources outside the west, such as lock and dam construction in the Midwest, are highly speculative and therefore not part of the analysis.

Through the NEPA tiering process, the specific impacts on wildlife, air and water quality, and archeological sites shall be analyzed in subsequent environmental analysis of regional lease sale options and specific coal mine development plans. There will, however, be generic treatment of these issues in the draft FES supplement.

The Department believes it has allotted sufficient time to prepare a thorough, credible supplement to the 1979 coal programmatic FES, and expects to complete its analysis within the previously announced time frame. It will not be possible, as one comment requested, to complete the FES supplement several months ahead of schedule. The draft EIS will be available to the general public in the first week of February 1985.

Assistant Secretary,  
Land and Minerals Management

ATTACHMENT A

LIST OF ORGANIZATIONS PROVIDING WRITTEN SCOPING COMMENTS ON  
SUPPLEMENT TO 1979 FEDERAL COAL MANAGEMENT PROGRAM  
FINAL ENVIRONMENTAL STATEMENT

Environmental Organizations

1. Sierra Club, Washington, DC  
Comments delivered by Bruce Yeager at Washington, DC Scoping Meeting
2. Sierra Club, Montana Chapter (Daryle Murphy)
3. Sierra Club, Rio Grande Chapter  
Comments delivered by Jonathan Teague at Santa Fe, NM Scoping Meeting
4. Natural Resources Defense Council
5. National Wildlife Federation  
Comment read by Karl Gowell at Washington, DC Scoping Meeting
6. Environmental Defense Fund, Berkeley, California
7. Western Organization of Resource Councils
8. Northern Plains Resource Council, Billings Chapter
9. Northern Plains Resource Council, Sheridan, Wyoming
10. Western Organization of Resource Councils, Billings, Montana
11. Dawson Resource Council, Glendine, Montana
12. Southwest Research and Information Center, Albuquerque, NM (Allison Monroe)

Energy Companies and Trade Associations

1. Mobil
2. Getty Mining Co.
3. Coastal States
4. NERCO
5. National Coal Association/American Mining Congress (Joint letter)
6. Western Regional Council

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Federal Agencies

1. EPA (Office of External Affairs, Washington, DC)
2. U.S. Fish and Wildlife Service (Albuquerque, NM)

Indian Tribes and Organizations

1. Navajo Nation
2. The 3 Affiliated Tribes (Fort Berthold Res.)

State Governments

1. State of New Mexico, Energy and Minerals Department
2. Hewitt John (speaking for Colorado); Lorin Nielsen (speaking for 6 western coal-producing States)

Individuals

1. Earl Miller
2. Jennie Blackfoot, et al
3. Jeff Redford
4. David Marselli (as WORC attorney)
5. Lillian Tenopir
6. John R. Swanson
7. James Jones

Other

1. Western Network (Santa Fe, NM)

Additional oral comments were provided at the scoping meetings by the following individuals:

- Denver, CO 9/25/84  
 Mrs. John S. Rogers, Montana, NM  
 Carlyn Johnson (NRDC)

Santa Fe, NM 10/9/84

Dorothy James  
 E-mail? Goodwin

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Santa Fe, NM 10/9/84 (cont'd)

- Bert Hanzel  
 Joel Mullin  
 Bruce Stockton  
 Russ Butcher  
 Maria Lopez  
 Jimmy Deagy  
 Leonard Deagy  
 Cathy Albright  
 Larry Frank

Billings, Montana 10/9/84

- G. W. Moresco  
 Helen Waller

ATTENDANCE AT PUBLIC MEETINGS

	INDUSTRY	AGRICULT/ ENVIRON. GROUPS	GENERAL PUBLIC	FEDERAL GOV'T	LOCAL/ STATE GOV'G
Salt Lake City, Utah	5	1	0	1	1
Billings, Montana	2	6	3	2	2
Santa Fe, NM	3	3	23	2	2
Quasar, CO	25	1	6	11	3
Washington, DC	2	3	5	3	0

COMMENTS

Be general and specific enough to analyze with accuracy

Do not analyze regional issues

Present all changes in program since first analyzed, then analyze only those changes

Add and analyze any newly possible alternatives

Present worst and best cases in all alternatives

Consider impact of delays in leasing federal coal

Analyze on a programmatic level by region

Analyze how responsive the coal program is within the EIS

EIS should include new analysis to determine whether or not further leasing of coal is necessary

Scope should include all presently proposed coal leasing

If new production is needed, the most suitable region for such production should be determined on aggregate environmental impacts, availability of various regions environments, availability of infrastructure, and location of projected demand

Needs analysis must consider:

- Current and projected markets for federal coal and coal reserves
- Availability of state, private, and Indian coal
- Development prospects of existing federal leaseholds
- Estimates of the amount of coal which will be transferred for development as Preference Right Leases
- Forecasts of national and regional demand for new coal production from the public lands
- Impacts of various programmatic alternatives which seek to meet any projects need for new coal from federal lands, as opposed to accelerated development of state, private, or Indian coal in the same region

3

Comment (cont'd)

Address level of production for each leasing alternative

EIS should analyze in detail off site impacts of population increase

EIS should address realistic probabilities and lengths of time necessary for reclamation success rather than assuming successful revegetation will occur just because the law requires it. Provide hard data on revegetation efforts

Prepare a worst case analysis of reclamation success since there is uncertainty about the long-range viability of current reclamation attempts

Incorporate the results of the current OEA study on reclamation potential of surface-mined lands into the EIS. Account for recent studies and research on reclamation in the EIS

Evaluate with hard data availability of water of sufficient quality, and legal water rights that are free to be directed to reclamation, coal processing and transport, and related uses. Include impacts of displacing other uses of water

Address disposal of wastes

Discuss proposed coal processing technologies envisioned and their impacts

Analyze coal transportation demands, impacts, and discuss mitigation

Address issues of violation of air quality laws

Address impacts to air quality

Address impacts of preference right lease applications

Address impacts of DOI determination that surface owner consent does not apply to PRLAs

Review status of RMPs and analysis of the completed documents. Propose new data adequacy standards for analysis and review

Address impacts of using existing RMPs, amendments and RMPs as a basis for further activity planning (OTA considered that commitment to high leasing levels resulted in inadequate land use planning)

Evaluate effects of the changes made to the unsuitability criteria in 1983, effects on sales already held, pending sales and other land use plans being completed

Address continued reliance on land use plans which fail to address cumulative environmental and socioeconomic impacts

Address the expanded role of the Regional coal teams, particularly increasing public participation

Comment (cont'd)

EIS should also analyze the proposed changes to the guidance for market analysis, and the new procedure for setting leasing levels

EIS should analyze the consequences of the major decisions on the program rather than have them be made prior to completion of the EIS

EIS is expected to deal with the transition from the EIS and new Federal coal Management Program to activity planning for future coal sales if needed

EIS should consider all alternatives considered in the 1979 EIS

Analyze No Action Alternative

Include alternative of leasing for need only

Analyze alternative of conservation and electrical alternatives to coal leasing

EIS should contain 4 alternatives; No Action, 1979 Program, 1982 Watt Program, and Currently Delisted Coal Program

Give due consideration to using different preferred alternatives in different regions

Give specific data to support calculations for future coal demand

The Need section should include:

- updated national coal market forecasts for all alternatives mentioned above

The Need section should include:

- How much coal is available for development now under state, federal and private lands
- What is current potential production capacity of existing mines and what percentage of potential are they operating at
- How many coal mines outside the Powder River Basin have closed since 1979
- How is the soft coal market being accounted for in new leasing projections
- Consider realistic demand, not demand for in industry reserves

Address alternatives due diligence criteria and the resultant impacts

EIS should develop a tax revenue sharing system to help alleviate impacts

EIS should include an assessment of how effective various techniques for socioeconomic mitigation have been, particularly lease stipulations

4

Comment (cont'd)

Address current emergency coal leasing procedures and impacts

Focus scope on updating where necessary the demand/production assumptions contained in the 1979 EIS

Examine only those recommendations of the Lincoen Commission of OTA which will have a significant environmental consequence

Keep in mind the value of coal production vis-a-vis environmental protection during preparation of the EIS

Address surface owners rights in PRLAs

Include consideration of tribal role in assisting in planning and setting lease targets

Address concerns of impacts to Indians living within coal regions to both their socioeconomic and value structures. Incorporate their concerns from meetings, hearings, etc. (to be addressed in Regional(s))

EIS should establish a method to evaluate reclamation potential in the San Juan River Coal Region

EIS should address the results of failure to adequately screen tracts which have low reclamation potential and the results of failure to adequately reclaim areas initially considered reclaimable

EIS should recognize differences between attempts at federal coal leasing in San Juan Region compared to relatively greater opportunities in other federal coal regions

Address impacts which could result if existing federal laws are not effectively enforced

Consider in EIS programmatic alternatives such as: reinstatement of 1979 coal program emergency and/or bypass leasing only outstanding PRLAs, only leasing to meet DOE production goals, no additional leasing

EIS should analyze individually—proposals for changes in rules and procedures resulting from Lincoen Commission report, GAO report, and OTA report. Examples include tract delineation, methods and sequence of review of environmental data and the setting of leasing levels

Consider global and broad regional environmental impacts of coal mining and use in EIS

Do a cost/benefit analysis of the effects on climate from continuing or expanding the combustion of coastal areas to human settlement due to global warming and related sea levels. Take greenhouse effect predictions seriously

## PROPOSED COAL PROGRAM CHANGES

3

### Comment (cont'd)

Analyze the now widely accepted effects of acid rain precipitation. Use research such as that conducted by the National Science Foundation and National Academy of Sciences, EPA, CBQ, and Dept. of State. Deal with international relations likely to ensue with Canada and Europe if present trends (including continued or expanded coal leasing) in the generation of acid-forming pollutants are not curbed.

### Address pollution of aquifers by mining activities

Due to increasing concern with acid deposition from coal fired industry, western coal may become more attractive. Analyze potential and factors into revised leasing/production levels.

Address the prospect for using or the demand for the low grade bituminous coal and lignite in the San Juan Basin.

Address the socioeconomic impacts to the Navajo Americans and others living on lands which could be leased under the various alternatives.

The EIS should address alternative public participation programs which would promote dialogue among parties.

Analyze major fish and wildlife resources including threatened and endangered species, migratory birds, aquatic and wetlands, rivers and streams, riparian woodlands, intermittent aquatic habitat, big game habitat, and state game agency species of concern.

Provide for protection and reclamation of these habitats.

Address direct and indirect impacts to the above habitats and wildlife species.

Address in the EIS the application of the "suitability criteria" during issuance of PMLAs emergency leases, and leaseback applications.

If lease by application is an alternative for the San Juan Basin Region, address procedures for state input and public participation in the EIS.

On a PMLA alternative, develop specific lease stipulations for the San Juan region.

Address assessment and collection of fair market value on PMLAs in EIS.

Acquire all data available and utilize it to the fullest extent possible in the EIS.

Analyze environmental differences among regions and how differences can be incorporated into leasing practices (e.g., native amer. occupying surface in San Juan, 3 National Parks surrounding 8 State coal lands).

6

### Comment (cont'd)

Identify in EIS additional areas which are unsuitable for coal leasing by taking advantage of new archaeological data, coal reserve data, paleontological research and wildlife surveys, etc.

Examine in EIS the principle which guides the parameters used to determine leasing levels.

The authors who set the levels of production should document and explain any differences with the findings of the 1981 OTA study on production potential of western coal leases & the coal market study of 1984 (if known).

EIS needs a very clear discussion of what the proposed action is including draft regulations. This should include what role of regional coal leases will be. How public participation changes if any are going to be made, how the adequacy of environmental data will be assessed, whether new land lease plans complying with equipment are going to be written for areas like the San Juan Basin and the San Augustine area, how tracts are going to be changed, how checkerboard areas will be dealt with, whether by exchange or cooperative leasing or by what have you, and whether surface consultation will be done again in the San Juan Basin and its results adhered to.

Address impacts to archaeological and paleontological resources.

Consider 100% cultural surveys prior to leasing in known high density areas, consider acquiring ethnographic inquiry into sacred sites.

Address wilderness preservation.

Address legality of PMLAs.

Draft site specific lease stipulations in P889g etc recommended to be leased in the EIS.

Address the threat to the tourist industry associated with Chaco Canyon, etc.

Address indirect effects to the state tourist industry and economy (attracting new businesses) from air pollution.

Use in this EIS the new data from both RMPs and Coal Regional EISs.

Explain the role of the various documents, RMPs, regional EISs, etc. in future management of coal leasing. Include discussion of suitability requirements and criteria for each stage.

EIS should discuss the impacts of exchanging existing nonproducing leases for those which are economically and environmentally more desirable.

Clarify in EIS when and how cumulative impact analyses are conducted in the program and the role which threshold analysis will play.

## APPENDIX 6

4310-84  
4-00164 IL-M

ADDRESS: Comments should be sent to:

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DEPARTMENT OF THE INTERIOR  
Bureau of Land Management  
43 CFR Parts 3400, 3420, 3460  
COAL MANAGEMENT - GENERAL: COMPETITIVE LEASING;  
AND ENVIRONMENT

Director (140)  
Bureau of Land Management  
1825 G Street NW  
Washington, DC 20240

Amendments to Coal Management Program Regulations

Comments will be available for public review in Room 5355 of the above address during regular business hours (7:45 a.m. to 4:15 p.m.), Monday through Friday.

AGENCY: Bureau of Land Management

FOR FURTHER INFORMATION CONTACT:

ACTIONS: Proposed Rulemaking

Carole Reith  
(202) 343-4774  
or  
Robert C. Bruce  
(202) 343-8735

SUMMARY: The proposed rulemaking would implement by regulation certain responses by the Secretary of the Interior to the Office of Technology Assessment's Environmental Protection in the Federal Coal Leasing Program. The OTA identified 10 options in areas of environmental concern to reduce the public perception that coal leasing was taking place in an atmosphere where the environmental effects of mining were not thoroughly enough considered. The Secretary's July 9, 1984, response to the report contained a series of proposals for procedural changes. This proposed rulemaking represents those changes which the Secretary proposed to implement through rulemaking.

SUPPLEMENTARY INFORMATION: As part of the Department of the Interior FY 1984 appropriations act, Public Law 98-53, the Congress directed the Office of Technology Assessment to assess whether the Federal coal management program ensures the development of coal leases in an environmentally compatible manner. The resulting report, Environmental Protection in the Federal Coal Leasing Program, was provided to the Department on May 24, 1984, and contained recommendations in 10 areas of environmental concern.

DATE: Comments should be submitted by \_\_\_\_\_, 1985. Comments postmarked or received after the above date may not be considered in the decisionmaking process on the issuance of a final rulemaking.

The Department responded to the report by proposing a number of procedural changes in the policy goal/option areas identified by OTA. The policy goal/option areas in which regulatory changes would be required are: to improve the effectiveness of public participation (Option 3), to provide meaningful guidelines and standards for assessing the adequacy of the data base (Option 4), and to incorporate cumulative impact assessments in pre-sale planning decisions (Option 7).

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The proposed regulations would be revised in the following subparts: 3400 - Coal Management - General; 3420 - Competitive Leasing; and 3461 - Environment. The proposed revisions are described below by subpart.

Coal Management - General.

As part of his response to Option 3 the Secretary proposed to identify minimum time periods for public comments in the regulations and BLM manuals. To implement this proposal, a new section, 43 CFR 3400.6, would be added to state that the minimum public comment period would be 30 days.

The threshold concept also appears at 43 CFR Group 3400, the Bureau of Land Management planning regulations, and has been used by the Bureau to assess impact thresholds for potential coal lease decisionmaking. Although the concept's appearance in two sections of BLM's regulations may be duplicative, elimination of it from the July 1982 regulations apparently caused confusion and apparently also fueled the perception by certain groups that the Department was not living up to its responsibilities under the Federal Land Policy and Management Act and the National Environmental Policy Act of 1969. Therefore, at OTA's suggestion, thresholds are being reinstated in the Federal coal management rules.

Competitive Leasing.

In response to Option 6 the Secretary proposed to combine the call for coal resource information, made at the beginning of the land use planning process, with a call for other resource information relevant to evaluating lands for potential coal lease offering. The language at 43 CFR 3420.1-2(a) has been expanded to include a call for all resource information.

In response to Option 3, the Secretary proposed to revise the regulations to begin activity planning with an SCT meeting to review land-use data and decisions and the market analysis. A new paragraph (b) would be added to 43 CFR 3420.1-8 to accomplish this proposal.

In response to Option 7 the Secretary proposed to restate the threshold concept in the coal management regulations. A new paragraph (f) has been added to 43 CFR 3420.1-4 to restate this concept in accordance with the Secretary's intent.

Environment.

In response to Option 3, the Secretary proposed to restate the public comment period on the application of the unavailability criteria in land-use planning. New language would be added at the end of 43 CFR 3461.3-1(a) to accomplish this proposal.

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The regulations at 43 CFR Group 3400 are changed as follows:

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# PROPOSED COAL PROGRAM CHANGES

## § 3091-1 Coal production permits

Once a coal production permit may be changed or its term extended by the expiration of a notice of change in the Federal Register. The production permit shall be used for establishing regional leasing areas under § 3092.2 of this title. Coal production permits shall be issued to establish areas under § 3092.2 which leasing shall be conducted under § 3092.3 of this title and for permit program.

141 PR 31171, July 26, 1982

## PART 3410--EXPLORATION LICENSES

### Subpart 3410--Exploration Licenses

- 3410.1 Purpose.
- 3410.2 Authority.
- 3410.3 Definitions.
- 3410.4 When an exploration license is required.
- 3410.5 Preliminary procedures.
- 3410.6 Application for an exploration license.
- 3410.7 Determination of whether an exploration license is required.
- 3410.8 Duration and termination of an exploration license.
- 3410.9 Suspension or expiration of an exploration license.
- 3410.10 Operating conditions.
- 3410.11 Bonds.
- 3410.12 Closures and submission of data.
- 3410.13 Use of reserves.

Authority: 30 U.S.C. 191 et seq.

Revised on 47 FR 4971, July 19, 1982, unless otherwise noted.

### Subpart 3410--Exploration Licenses

§ 3410.1 Purpose. This subpart provides for the issuance of licenses to explore for coal deposits subject to disposal under Chapter 3092.

### § 3410.2 Authority.

The authority of this subpart is to allow certain persons (including corporations) to explore for coal deposits geologically, environmentally, and other pertinent data concerning the coal deposits.

## § 3091-4 Call for coal resource information

(a) Prior to or as part of the initiation or update of a land use plan or land use analysis, a Call for Coal Resource Information shall be issued to formally solicit indications of interest and information on coal resource development potential for lands in the planning area. Industry, State and public may submit information on lands that should be considered for coal leasing, including suggestions or writing which the lands should be considered for leasing.

(b) Proprietary data received on coal resource information may be submitted to the Call for Coal Resource Information to the Bureau of Land Management only. This data shall be submitted to the Bureau of Land Management in accordance with the terms of each information.

(c) The Call for Coal Resource Information may be combined with other notices of interest to conduct land use planning published in accordance with § 3092.2(a) of this title or with other notices published in accordance with § 3092.2(b) of this title if it is necessary to conduct such a combined notice.

(d) Other than the Bureau of Land Management, land agency may combine the Call for Coal Resource Information with the land use planning process at the appropriate step.

141 PR 31171, July 26, 1982

## § 3091-4a Special leasing opportunities

(a) The Secretary shall, under the provisions of this title, review and identify a reasonable number of lease tracts through competitive lease and open entry to a reasonable class of mineral interests. Except for the limits set on leasing established in part 3410 of this section, all mineral interests in the subject lands eligible for special leasing opportunities shall be made available for lease.

(b) Special leasing opportunities shall be provided for two classes of mineral interests:

(1) Public bodies. (i) Only public bodies with a definite plan for producing energy for their own use or if their members or customers shall be for leases designated as special leasing opportunities for public bodies. (ii) A notice of a definite plan, a plan of energy sale the intended use of coal and lease have been approved by the public body and public body submitting the plan. In the event a public reviewing action which produce energy for the public body

other agency to obtain the recommendation of the Secretary for leasing of the lands the other agency administration.

141 PR 31171, July 19, 1982; Redesignated at 47 FR 31171, June 26, 1982

## § 3091-4a-1 Consultation with state and Indian tribes

Before adopting a comprehensive land use plan or land use analysis that makes an assessment of lands managed by the Bureau of Land Management, the Bureau of Indian Affairs shall consult with the state Governor and the Indian tribes for their responsibility for maintaining the State availability program of 30 CFR 3410-4.1. Where a tribal government desires some withdrawal of the boundaries of a comprehensive land use plan or land use analysis prepared by the Bureau of Land Management, the Bureau shall consult with the tribal government.

141 PR 31171, July 19, 1982; Redesignated and amended at 47 FR 31171, June 26, 1982

## § 3091-4a-2 Identification of lands as available for further consideration

(a) Identification of lands as available for further consideration for leasing will be made in the adoption of a comprehensive land use plan or land use analysis. Any lands identified as so available may be further considered for leasing under § 3092.2 of this title.

141 PR 31171, July 19, 1982; Redesignated and amended at 47 FR 31171, June 26, 1982

## § 3091-4a-3 Regional leasing levels

The process to be followed in establishing regional leasing levels, including leasing levels shall be established by the Secretary. The Secretary shall actively rely upon the advice and assistance of Federal State Governors in identifying lands which have a high potential for coal resource development and development.

(b) The regional coal lease shall be the form through which the leasing level recommendations are transmitted to the Secretary. Initial leasing

3400.6 Minimum comment periods. Unless otherwise noted, a minimum time period of 30 days will be allowed for public review and comment where such review is specified for Federal coal management program activities under 43 CFR Group 3400.

Resource

And other

And Other

And Other

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## § 3410-4 General requirements for land leasing

When information relating techniques that may be available for further consideration for leasing of the lands, the Secretary shall be considered acceptable for further consideration for leasing of the lands. If other than understood land lease is available to meet the general leasing.

(1) The number of public owners that have expressed their preference for leasing of the lands, the number of public owners that have given written consent for such leasing or have been interviewed to understand their preference.

(2) The number of public owners that have given their preference for leasing of the lands.

(3) The number of public owners that have given their preference for leasing of the lands.

(1) In their review of cumulative impacts of coal development, the RCTs will consider any threshold analysis performed during land-use planning and will expand this analysis, where appropriate, to the broader area.

(a)

(b) Activity planning will begin with an RCT meeting to review market analyses and land use planning summaries. The market analyses and land use planning summaries will be available at least 45 days prior to the meeting.

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## APPENDIX 6

### \* 1981-82 Assessment and land use plan

(a)11 Each of the unsuitability criteria shall be applied to all new lands with development potential identified in the comprehensive land use plan or land use analysis. For areas where 1 or more unsuitability conditions are found and for which the authorized officer of the surface management agency could otherwise reach conclusions as to likely use, the provisions and exemptions for each criterion may be applied.

(a)12 The authorized officer or the surface management agency shall describe in the comprehensive land use plan or land use analysis the results of the application of each unsuitability criterion, exemption and remedy. The authorized officer of the surface management agency shall state in the plan or analysis those areas which could be leased only subject to conditions or stipulations to conform to the application of the criteria or remedies. Such areas may ultimately be leased provided that lease conditions or stipulations are contained in the lease.

(a)13 The authorized officer shall make this assessment on the best available data that can be obtained given the time and resources available to prepare the plan. The comprehensive land use plan or land use analysis shall include an indication of the adequacy and reliability of the data involved. Where either a criterion or a remedy (when under paragraph (a) of this section) the authorized officer decides that application of an exemption is appropriate cannot be applied during the land use planning process because of inadequate or unreliable data, the plan or analysis shall discuss the reasons therefor and describe when activity planning, or in the case of a criterion, in order to approval of a permit, the data needed to make an assessment with reasonable certainty would be generated. The authorized officer shall make every effort within the time and resources available to collect adequate and reliable data which would permit the application of a criterion if it is the land use or activity planning process. When those data are obtained, the authorized officer shall make a new assessment on the application of the criterion. If appropriate, the exemption and the remedy therefor shall allow opportunity for public comment.

(a)14 The lease tract shall be analyzed as a final report lease sale environmental impact statement approved

(2) Public comments on the application of the unsuitability criteria will be solicited by Federal Register notice. This call for comments may be part of the public comment period on the draft land-use plan or land-use analysis. This notice will announce the availability of maps and other information describing the results of the application and the application process used.

(3)



# PROPOSED COAL PROGRAM CHANGES

BLM (10-7)

DEPARTMENT OF THE INTERIOR  
Bureau of Land Management  
Implementation of Office of  
Technology Assessment Policy  
Option #6 on Evaluation of  
Data Adequacy for Coal Tract Delimitation

AGENCY: Bureau of Land Management, Interior.

ACTION: Request for Public Comment on Guidelines for Evaluating Data and Data Adequacy for use in Delimitating Federal Coal Tracts.

SUMMARY: This notice provides information for implementing several proposed changes to the Federal coal program directed by the Secretary of the Interior. The Secretary's changes are in response to recommendations made by the Office of Technology Assessment (OTA) in its report of May 1984 entitled Environmental Protection in the Federal Coal Leasing Program.

The OTA's May 1984 report contained ten Policy Options to help ensure environmental protection and compliance with existing statutory mandates, reduce the environmental risk of leasing decisions, maintain a predictable and stable leasing process, and restore public confidence in the environmental tract was unavailing.

soundness of the leasing program. Policy Option 6, in particular, emphasized a need to provide meaningful guidelines and standards for assessing the adequacy of the data resource base.

The Department concurs with OTA's view embodied in Policy Option #6 that meaningful guidelines and standards are needed to assess the adequacy of the data base. Thus, the Bureau of Land Management (BLM) has been directed to implement several proposed changes to the Federal coal management program. Among these changes are:

1. The Chairperson of each Regional Coal Team (RCT), in consultation with other team members, is to appoint (on a tract basis) three science advisors as ex officio members to assist the RCT in evaluating the adequacy of the data available to it and the analysis of that data.
2. The BLM will expand tract profiles to include assessments of the coal and other resource data available on each tract and of the additional data, if any, needed for an adequate evaluation of the tract. This information will be used by the RCTs in ranking of potential tracts for inclusion in the (regional coal) environmental impact statement.

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3. When the RCTs forward final tract selection recommendations to the Department, they will separately identify any tracts that were not recommended because the information necessary for adequately assessing the tract was unavailing.

The draft procedures and guidelines for implementing the above program changes required by the Department are outlined in the SUPPLEMENTARY INFORMATION section of this notice.

DATE: Written comments on the proposed guidelines and procedures contained in this notice will be accepted until (30 days from date of publication). Comments received after that date may not be considered.

ADDRES: Comments or questions concerning the proposed procedures and guidelines should be addressed to:

Director (640)  
Bureau of Land Management  
1825 and C Streets, N.W.  
Washington, D.C. 20240.

FOR FURTHER INFORMATION CONTACT:

John Callam  
(202) 343-4772

SUPPLEMENTARY INFORMATION: Since publication of the Federal Coal Management Program in 1979, the Department has made several program changes which have resulted in considerable controversy. In particular, some groups have

charged that program changes have resulted in the Federal Government receiving less than fair market value for some Federal coal leases. Additionally, these groups also believe that some environmental protection provisions of the leasing program have been softened and are not being implemented fully or would not be followed when the coal is developed.

In mid to late 1983, Congress took two separate but related actions in response to these public concerns. First, Congress included language in the 1983 Supplemental Appropriations Act (P.L. 98-63) which directed the Secretary of the Interior to appoint a Commission (Advisory Commission on Fair Market Value for Federal Coal Leasing) to review the Department's policies, procedures, and guidelines for determining fair market value for Federal coal leases. This Commission, which consisted of five members, completed an exhaustive review of the Department's coal leasing program and published its findings and recommendations in the Report of the Commission on Fair Market Value Policy for Federal Coal Leasing. The report was submitted to Congress in February 1984.

A second Congressional action came in the fall of 1983 following continued controversy that Federal leasing was being conducted without adequate environmental safeguards. As part of the FY 1984 Interior and Related Federal Agencies Appropriations Bill, Congress adopted the Conference Committee Report on that bill which specified that:

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... the managers will direct the Office of Technology Assessment (OTA) to provide the Congress with an assessment of the Federal coal leasing program's ability to ensure the development of coal leases in an environmentally compatible manner.

The OTA, after extensive interviews, preparation of background papers, and workshop discussions on the environmental aspects of the Federal coal leasing program, submitted a final report to Congress and the Department of the Interior in May 1984. This report, though distinctly separate from the Commission's report on Fair Market Value Policy for Federal Coal Leasing, is a companion document which often presents overlapping views and recommendations. Thus, both documents must be reviewed to fully understand the extent and nature of the coal program and the recommendations for resolving program issues.

Reference to the report on Fair Market Value Policy for Federal Coal Leasing is for information only. Mention of this document is intended to make the public aware of its existence and its general relationship to the OTA's document, Environmental Protection in the Federal Coal Leasing Program. The remainder of this notice will focus on the OTA report.

The OTA report outlines 10 Policy Options which the OTA believes, if adopted, will help to ensure environmental protection and compliance with the existing

statutory mandates, reduce the environmental risk of leasing decisions, maintain a predictable and stable leasing process, and restore public confidence in the environmental soundness of the leasing program.

In particular, Policy Option #6 of the OTA report emphasizes the need for the Department to provide meaningful guidelines and standards for assessing the adequacy of the resource data base. The OTA believes that such standards and guidelines would provide better guidance to Departmental employees and would enhance the ability of the public to comment on coal leasing issues.

The Department agrees with the OTA that implementation of Policy Option #6 would strengthen the coal program. Consequently, the BLM has been directed to review several areas of the coal program. Among those proposed changes for implementing Policy Option #6 which will be addressed in this notice are:

1. The chairperson of each NCT, in consultation with other team members will appoint three science advisors as an officio member of the NCT.
2. The BLM will expand tract profiles to include assessments of the coal and other data available on each tract and of additional data, if any, needed to determine environmental impacts and the fair market value of the tract. This information will then be used by the NCTs in ranking of potential tracts for inclusion in the EIS.

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3. When the NCT's forward final tract selection recommendations to the Department, they will separately identify any tracts that were not recommended because the information necessary for adequately determining environmental impacts and fair market value was unavailable.

Following are the proposed guidelines and procedures to implement the above changes:

#### Change 1

#### Science Advisors

##### A. Appointment of Science Advisors

1. A Science Advisory Group, consisting of three individuals, will be selected by the NCT chairperson on an experimental basis to assist the NCT in reviewing the adequacy of data and the analysis of that data for use in delineating coal tracts and preparation of the regional coal EIS. Use of the Science Advisory Group may continue indefinitely if they prove useful to the NCT.

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2. The NCT chairperson will screen possible Science Advisors prior to the first NCT meeting for a particular round of coal leasing. Screening must allow sufficient time to consult with and receive the views of other NCT members.
3. Official appointment of the Science Advisors shall be made by the NCT chairperson at the first NCT meeting. Appointments shall be noted in the official minutes of the meeting, along with objections to the appointment, if any, and reasons therefor.

##### B. Qualifications of Science Advisors

1. Science Advisors will be selected to represent three general areas:
  - a. One Advisor must have broad, extensive knowledge and expertise in the management and use of renewable resources;
  - b. A second Advisor must have thorough knowledge and expertise in the management and development of non-renewable resources, and
  - c. The third Advisor must be a recognized expert in the reclamation of mined lands and mitigation of mining impacts.
2. Science Advisors may be selected from within or from outside the Federal Government, except that BLM personnel may not serve as

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# PROPOSED COAL PROGRAM CHANGES

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science advisors. Further, the reclamation and mitigation techniques Advisor, must be from the Office of Surface Mining or from a State agency which has primary responsibility for reviewing and approving coal mining permits.

## C. Functions of Science Advisors

1. The Science Advisors will assist the NCT in its review of resource data to determine if the available data is adequate to:
  - a. delineate possible lease tracts;
  - b. determine tract values; and
  - c. identify and evaluate individual and cumulative effects of leasing and mining on the environment.
2. The Science Advisors will review the quantity and quality of available resource data, using their professional judgment, other criteria they may establish, or both, and rate the adequacy of the data. Data adequacy reviews by the Science Advisors may occur, as necessary, at various stages in the activity planning process, beginning with a review of the land use planning summary and ending with the NCT's final recommendations; review of data by the Science

Advisors will be at the discretion and under the guidance of the NCT. This procedure will remain in effect until formal procedures and guidelines for reviewing data and determining data adequacy are developed and implemented by ELM.

3. The Science Advisors will provide the NCT with its findings in writing 45 days prior to the NCT meeting for which the Science Advisor's findings have been requested. These findings will be made available for public review at least 30 days prior to the NCT meeting on tract ranking and selection. These findings must clearly indicate the adequacy of the data examined along with the Science Advisors' recommendations, as appropriate, for:
  - a. proceeding with activity planning, along with any limitations thereon;
  - b. proceeding with additional tract delineation, identifying tracts that have adequate data;
  - c. resolving data needs; and
  - d. proceeding with evaluation of a tract which has been delineated but for which there is inadequate data.

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## Change 2

### Tract Profiles/Tract Ranking

- A. Tract Profiles will be prepared only where the Science Advisors and the Review Council 1/ have found that available data is adequate to permit the tract delineation team to identify and configure a tract which can be economically developed. This means that tracts may be delineated in the face of data deficiencies which would permit determination of fair market value and for assessing specific environmental impacts. If, however, coal and geologic data cannot be obtained prior to fair market value determination, a tract cannot be delineated. Likewise, if data on other resources cannot be obtained prior to preparing the final regional coal EIS, a tract cannot be delineated.

1/ A Review Council was proposed in response to the Litwack Commission recommendation. The Review Council determines data adequacy for coal and geologic data using standards and guidelines separate from this notice.

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1. Each Tract Profile will include a summary rating provided by the Science Advisors which reflects the overall quantity and quality of available tract data (coal and others).
2. Summary ratings will be as follows:
  - a. Excellent - The overall quantity and quality of available coal and other resource data permits reasonable projection of impacts, development of specific protective measures, and estimate of tract value.
  - b. Good - Overall quantity and quality of available coal and other resource data exceeds minimum standards of data adequacy. Estimates of environmental impacts and tract values are definable but do not permit the preciseness of definition where the adequacy of information is considered excellent.
  - c. Fair - Overall quantity and quality of available coal and other resource data meets minimum data adequacy standards.

### B. Tract Ranking

Data adequacy summary ratings will be considered by the NCT in ranking and selecting tracts for the environmental impact statement alternatives. An "Excellent" or "Good" rating, for example, could have the effect of raising a tract's overall rank. Conversely a "Good" or "Fair" rating could diminish the ranking value of an otherwise highly ranked tract.

DRAFT

## APPENDIX 6

13

### Change 3

#### Tract Selection Recommendations

The Department has adopted a policy (Linowas IV-2) which does not permit the Bureau to delinest tracts unless the Government has or is able to acquire adequate knowledge to evaluate potential trade-offs prior to preparing the final regional coal EIS. Circumstances may evolve, however, which will prevent the Bureau from acquiring the data or a new issue may surface after a tract has been delinested. In the latter case, resolution of the issue may require a redetermination of data adequacy. In the event additional data is needed to resolve the question the NCT may elect not to acquire the data. In any case, the NCT will identify all delinested tract(s) for which data deficiencies remain to the Department along with its final recommendations. No tract will be included as part of the final recommendation if additional data is required for that tract.

\_\_\_\_\_  
Director, Bureau of Land Management

Date: \_\_\_\_\_

DRAFT

PROPOSED COAL PROGRAM CHANGES

(4310-85)  
4-00164-ILM  
3461 (641)

DRAFT

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

Notice of Availability of Report  
Concerning The Application of Coal  
Unsuitability Criteria

- AGENCY: Bureau of Land Management, Interior
- ACTION: Notice of Availability of Report Concerning the Application of Coal Unsuitability Criteria
- SUMMARY: This report implements Secretary Clark's July 9, 1984 response to Congress concerning recommendations made by the Office of Technology Assessment (OTA) in its study entitled Environmental Protection in the Federal Coal Leasing Program, May 1984. Specifically, among other things, the OTA noted concern regarding changes in the details of the application of the unsuitability criteria screen. The Bureau of Land Management (BLM) has evaluated its experience with these changes and is reporting on the need for revisions. Furthermore, this report proposes guidelines and procedures for applying the unsuitability criteria and assessing the adequacy of the data for these criteria. The evaluation included opportunities for interested parties to express their concerns with the 1982-83 changes in the unsuitability criteria and to submit information on the effects of those changes by means of a series of meetings. An interdisciplinary team consisting of professional staff and managers from the BLM, the Office of Surface Mining Reclamation and Enforcement (OSM), the Fish and Wildlife Service (FWS) and the Forest Service (FS) prepared this report. The draft of this report will be distributed for public review in March 1985. Copies will automatically be sent to everyone who receives a copy of the supplemental draft environmental impact statement (EIS) for the federal coal program; in addition, the report will be available by request. Following a 30-day comment period and the analysis of the comments, a final report will be prepared and published as an appendix to the final EIS.

APPENDIX 6

ADDRESS: Copies of this report may be obtained by writing to:

Director (640)  
Bureau of Land Management  
18th and C Streets, N.W.  
Washington, D.C. 20240

FOR FURTHER INFORMATION CONTACT:

Michael Giblin  
(202) 343-4790

Douglas Blankinship  
(202) 343-2091

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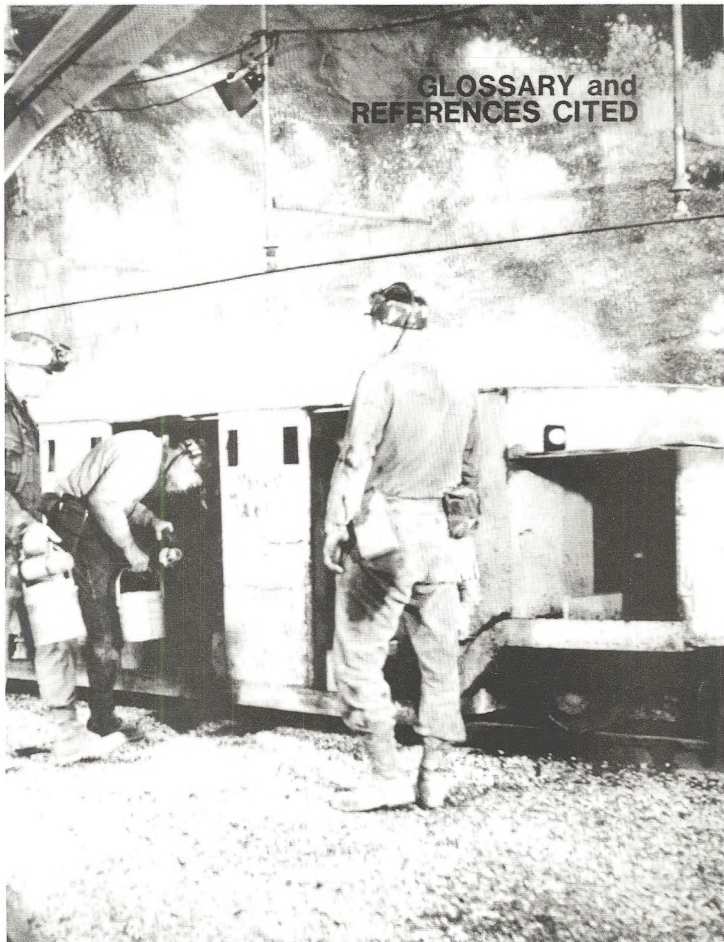
Director  
Bureau of Land Management

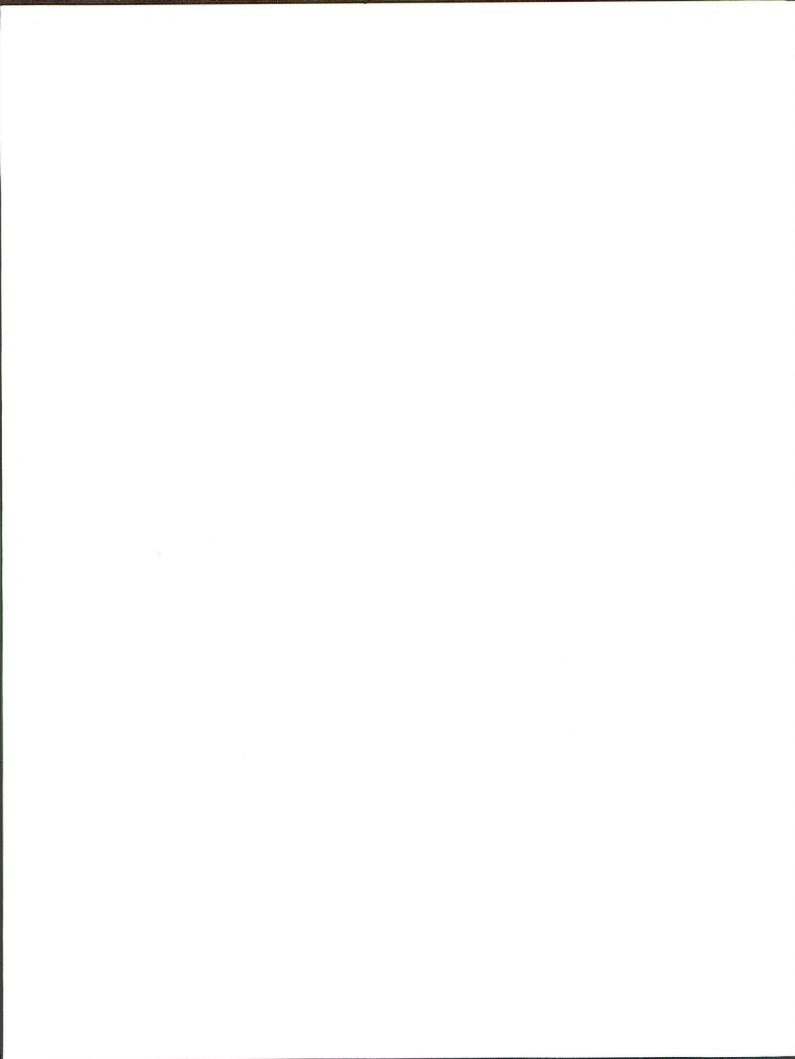
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Date

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                  650-RF      650-CF  
LLM: 641: M. Giblin:mr:343-4790

**GLOSSARY and  
REFERENCES CITED**







**ACCELERATED EROSION:** Soil loss more rapid than normal, natural, or geologic erosion, mainly as a result of the influence of human activities or in some cases of animals or natural catastrophies that expose bare surfaces.

**ACID MINE DRAINAGE:** Drainage, discharged from an active, inactive, or abandoned mine and containing free sulfuric acid, mainly due to the weathering of iron pyrites.

**ACID RAIN (ACID PRECIPITATION):** airborne contaminants, particularly nitrogen oxides, hydrogen sulfides, and sulfur dioxide, when converted to acid sulfates and nitrates and removed from the atmosphere by precipitation.

**ACRE-FOOT:** The volume of water that would cover 1 acre to a depth of 1 foot, equal to 325,853 gallons.

**ACTIVITY PLAN:** A more detailed and specific plan for managing a single resource program or plan element undertaken to implement more general land use plan decisions. An activity plan is prepared for specific areas to reach specific resource management objectives within stated timeframes. An activity plan describes schedules and details management actions, including projects, treatments, and other on-the-ground activities.

**ACTIVITY PLANNING:** The process in federal coal leasing between land use planning and the Secretary of the Interior's final regional lease sale decision. Activity planning includes tract delineation, ranking, and selecting of tracts for further consideration; EIS preparation, final recommendation of the regional coal team; and secretarial consultations with the Department of Justice, Department of Energy, Indian tribes, governors, and other agencies.

**AIR QUALITY CLASS I, II, AND III AREAS:** Regions in attainment areas where maintenance of existing good air quality is of high priority. In Class I areas, maintaining air quality has the highest priority with respect to other values; in Class III areas, air quality has lower priority than it does in the other areas. At first, all attainment areas except mandatory Class I areas were designated Class II.

**AIR QUALITY STANDARDS:** The concentrations of pollution and lengths of exposure at which specified adverse effects to health and welfare occur.

**AIR QUALITY MODEL:** A mathematical representation of the behavior of air pollutants or their effects on air quality related values.

**AIR QUALITY RELATED VALUE:** Resources identified by federal land managers as being susceptible to degradation of air quality, such as visibility, odor, plants, animals, cultural resources, geologic features, and climate. Soil and water quality are values that could be affected by acid rain.

**AIRSHED:** The air encompassing a specific geographic region.

## GLOSSARY

**ALGORITHMS:** Step-by-step procedures for solving problems.

**ALKALINITY:** A measure of water's potential as a base to neutralize acids.

**ALLUVIAL FAN:** A sloping, fan-shaped mass of sediment deposited by a stream or drainageway where it emerges onto a plain.

**ALLUVIAL VALLEY FLOOR EXCHANGE:** A provision of the Surface Mining Control and Reclamation Act that allows coal companies with existing federal leases in areas determined to be alluvial valley floors to exchange these leases for federal leases in areas outside alluvial valley floors.

**ALLUVIAL VALLEY FLOOR FEE COAL EXCHANGE:** An exchange of title to private coal for title to federal coal where private coal has been determined to lie beneath an alluvial valley floor on which mining is prohibited under Section 510(b)(5) of the Surface Mining Control and Reclamation Act.

**ALLUVIUM:** Clay, silt, sand, gravel, or other loose stream-deposited material.

**AMBIENT AIR:** The air around us.

**AMBIENT AIR QUALITY:** Concentration levels in the surrounding air for a specified pollutant and a specified averaging time within a geographic region.

**AMBIENT AIR QUALITY STANDARD:** Established by federal or state agencies, the level of ambient air quality to be achieved and maintained. Primary standards are those judged to be needed, with an adequate margin of safety, to protect the public health. Secondary standards are those judged to be needed to protect the public welfare from any known or expected adverse effects of a pollutant. Ambient standards are given in micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

**ANASAZI CULTURE:** The most extensive prehistoric culture of the southwest United States, best known to the public by the spectacular cliff dwellings or large pueblos at such locations as Mesa Verde, Chaco Canyon, and Canyon de Chelly. Artifacts of this culture are distributed throughout southwest Colorado, southeast Utah, northeast Arizona, and northwest New Mexico. Although the best known pueblos represent the classic bloom of Anasazi society, the culture originated from the Desert (Archaic) culture beginning an evolution as Basketmakers about AD 1-500 and ultimately resulting in the pueblo societies of today.

**ANIMAL UNIT MONTH (AUM):** The amount of forage a cow and a calf (6 months of age or under) consume in 1 month. This unit is used to calculate livestock carrying capacities and serves as a basis for grazing fees.

**ANTHRACITE:** A hard black lustrous coal containing fixed carbon of 85 percent or more.

**AQUIFER:** A water-bearing bed or layer of permeable rock, sand, or gravel, capable of yielding water.

## GLOSSARY

**ARCHAIC PERIOD/TRADITION:** A culture period of hunting and gathering subsistence patterns; the development of barbed and stemmed projectile points for use as spears, grinding and milling stones for food preparation, and ground and polished stone tools for everyday use; and the adoption of a seasonally migratory life-style. Sites of this period usually date from 7500-1500 before the present.

**AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC):** A public land area where special management attention is required to protect life from natural hazards or to protect and prevent irreparable damage to important historic, cultural, or scenic values or to fish, wildlife, or natural systems or processes.

**ASPECT:** The direction that a slope faces.

**ATMOSPHERIC DISPERSION MODEL:** A mathematical simulation of the atmospheric transport and dispersion of pollutants used to predict pollutant concentrations.

**ATTAINMENT AREA:** An area where the National Ambient Air Quality Standards are not violated.

**AUTHORIZED OFFICER:** Any employee of the Bureau of Land Management delegated the authority to perform specified duties.

**BART - BEST AVAILABLE RETROFIT TECHNOLOGY:** A requirement under Section 169A of the Clean Air Act to remedy existing visibility impairment in Federal Class I areas. This requirement applies to major stationary sources less than 15 years old.

**BACT - BEST AVAILABLE CONTROL TECHNOLOGY:** A standard of emission control required of all new sources of pollution in attainment areas. In setting this standard, the Environmental Protection Agency may consider social, economic, and other costs.

**BASELINE:** In this supplemental EIS, projected conditions expected to exist in the areas of influence under the No New Federal Leasing (no action) Alternative.

**BEARING STRENGTH:** The amount of force overburden can receive without being crushed, including the weight of buildings, roads, or shallow spoils on top of deeper spoils.

**BENEFICIATION:** The dressing or processing of coal or ores for the purpose of (1) regulating the size of a desired product, (2) removing unwanted constituents, and (3) improving the quality, purity, or grade of a product.

**BIOME:** A major assemblage of all the plants and animals living in a prescribed area or physical habitat, including the area's successional stages. A biome is usually named for its characteristic vegetation.

**BITUMINOUS:** A rank of coal that is above subbituminous and below anthracite in degree of coalification and has a heat value exceeding 10,500 British thermal units per pound.

## GLOSSARY

**BONUS BID:** The dollar amount offered by a potential lessee as consideration for receiving a lease. Under existing regulations, the bonus bid must exceed full market value to be accepted by the Department of the Interior.

**BRITISH THERMAL UNIT (Btu):** The amount of heat needed to raise the temperature of 1 pound of water 1 degree Fahrenheit.

**BYPASS TRACT:** A tract that contains federal recoverable coal, which if not leased, would be bypassed in the reasonably foreseeable future.

**CAPACITY:** See COAL PRODUCTION CAPACITY.

**CARBON MONOXIDE (CO):** A colorless, odorless, toxic gas produced by the incomplete combustion of carbon-containing substances. One of the major air pollutants, CO is emitted in large amounts in the exhaust of gasoline-powered vehicles.

**CARRYING CAPACITY:** See LIVESTOCK CARRYING CAPACITY and WILDLIFE CARRYING CAPACITY.

**CHACOAN:** Pertaining to the prehistoric Anasazi Indian culture that dominated the Chaco Canyon area in northwestern New Mexico during the 11 and early 12 centuries A.D. In this narrow canyon, twelve great pueblo cities were built and tied together by a network of wide trails. Together with smaller groups of dwelling rising on the mesas above the canyon and along the foot of the canyon walls, a population of about 7,000 resided during the boom years in the late 11th century. The population concentration in Chaco Canyon was the direct result of the Chacoans' high efficiency in agriculture and ability to store massive food surpluses.

**CHECKERBOARD AREAS:** Geographic areas where the Federal Government owns alternate sections of land, giving the land ownership pattern a checkerboard appearance.

**CHINOOK:** A warm dry wind that descends the eastern slopes of the Rocky Mountains.

**CLAYEY SOIL:** A fine-grained soil that has high plasticity and contains more than 35 percent clay by weight. Clayey soil includes mainly clay loams, clays, sandy clay loams, and sandy clays.

**CLIMATE:** The average cause or condition of the weather at a place over a period of years.

**CLIMATOLOGY:** The study of the statistical collection of weather conditions during a specified interval time (usually several decades) in a specified area. The study of the long-term manifestations of weather.

**COAL PRODUCTION CAPACITY:** The amount of coal that could be mined if the demand for it existed.

**COAL-RELATED:** In this supplemental EIS, coal-related pertains to the effects of coal mining, beneficiation, and transportation but not to the effects of coal conversion and use.

## GLOSSARY

**COAL SLURRY:** A fine coal emmersed in a fluid (such as water or liquid carbon dioxide) and carried through a pipeline.

**COAL TRACT:** A defined area that forms a logical mining unit, has had the land use planning screens applied, and is proposed for leasing as a single lease offering. Coal tracts may include areas of state and private coal ownership, but only the federally owned coal is offered for lease under the federal coal management program.

**COLLUVIAL:** Pertaining to rock debris and soil that has accumulated at the foot of a slope.

**CONTINENTAL CLIMATE:** The climate of the interior of a continent, which is marked by large annual, daily, and day-to-day temperature ranges, low relative humidity, and generally moderate or small and irregular rainfall. The annual extremes of temperature occur soon after the solstices. In its extreme form, a continental climate gives rise to deserts.

**CONTINENTAL DEPOSIT:** A sedimentary deposit laid down within a general land area in lakes or streams or the wind, in contrast to marine deposits, laid down in the sea.

**COOPERATIVE DRILLING:** An arrangement that allows other parties to participate and share in the benefits of exploring federal coal lands under an exploration license on a pro rata, cost-sharing basis.

**COOPERATIVE LEASING:** An agreement between BLM and another party that allows for the offering of both federal and private (or state) coal under a leasing arrangement in which both parties receive their share of revenues as described in the agreement.

**COW-CALF LIVESTOCK OPERATION:** A livestock operation in which a base breeding herd of mother cows and bulls is maintained. The cows produce a calf crop each year, and the operation keeps some heifer calves from each calf crop for breeding herd replacements. The operation sells the rest of the calf crop between the ages of 6 and 12 months along with old or nonproductive cows and bulls.

**COW-CALF-YEARLING LIVESTOCK OPERATION:** A cow-calf operation that, instead of selling its calves between the ages of 6 to 12 months, sells them after they are 12 months old.

**CRETACEOUS:** Of, relating to, or being the last period of the Mesozoic era (from 136 to 63 million years ago) or the corresponding system of rocks.

**CRUCIAL AREA:** An area of habitat that is essential to the survival of any wildlife species sometime during its life cycle.

**CULTURAL RESOURCE INVENTORY CLASSES:**

## GLOSSARY

**Class I - Existing data inventory:** an inventory study of a defined area designed (1) to provide a narrative overview (cultural resource overview) derived from existing cultural resource information and (2) to provide a compilation of existing cultural resource site record data on which to base the development of the BLM's site record system.

**Class II -** a sample-oriented field inventory designed to locate and record from surface and exposed profile indications all cultural resource sites within a portion of a defined area to allow an objective estimate of the nature and distribution of cultural resources in the entire defined area.

The Class II inventory is a tool for use in management and planning as an accurate predictor of cultural resources in the area of consideration. The primary area of consideration for implementing a Class II inventory is a planning unit. The secondary area is a specific project in which an intensive field inventory (Class III) is neither practical nor necessary.

**Class III -** an intensive field inventory designed to locate and record from surface and exposed profile indications all cultural resource sites within a specified area. After Class III inventories are completed in an area, no further cultural resource inventory work is normally needed. A Class III inventory is appropriate on small project areas, all areas to be disturbed, and primary cultural resource areas.

**CULTURAL RESOURCES:** Remains of human activity, occupation, or endeavor, reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in past human events. These resources consist of (1) physical remains, (2) areas where significant human events occurred, even though evidence of the event no longer remains, and (3) the environment immediately surrounding the actual resource.

**DENDRITIC DRAINAGE (PATTERN):** A drainage pattern with tributaries branching like a tree's boughs.

**DILIGENCE:** Compliance with the term of a federal coal lease requiring production in commercial amounts of recoverable coal reserves to achieve diligent development (after August 4, 1976, a 10-year period beginning on the date of lease issuance, readjustment, or modification if acreage or reserves are added) and to maintain continued operation (production of not less than commercial amounts in the first 2 years after achieving diligent development and an average of not less than commercial amounts on a 3-year basis thereafter).

**DIP:** Angle at which a stratum or any planar feature is inclined from the horizontal.

**DRAWDOWN:** The lowering of the water table by pumping or creating conditions that allow water to flow downward.

**DRAGLINE:** A type of excavating equipment that casts a rope-hung bucket a great distance; collects the dug material by pulling the bucket toward itself on the ground with a second rope; elevates the bucket; and dumps the material on a spoil bank, in a hopper, or on a pile.

## GLOSSARY

**EMERGENCY LEASING:** The leasing of federal coal needed by an existing mine for one of the following two reasons: (1) coal is needed within 3 years of the date of the lease application (a) to maintain a mine at its current average annual level of production or (b) to supply coal for contracts signed before July 19, 1979; or (2) without the emergency lease, federal coal would be bypassed by mining. An emergency lease can be issued for no more than 8 years of recoverable coal reserves, and to be issued an emergency lease, a mine's need for the coal deposit must result from reasonably unforeseen circumstances.

**EMINENT DOMAIN:** The right of government to take private property for public use.

**EMISSION:** Effluent discharge into the atmosphere, usually specified by mass per unit time.

**EMISSION INVENTORY:** A set of emission source information, usually applied in an air quality simulation model; a list of air pollutants emitted into a community's atmosphere in amounts (commonly tons) per day by type of source.

**EMISSIONS RATE:** The amount of an air pollutant emitted into the atmosphere from a pollution source over a defined period of time.

**ENDANGERED SPECIES:** Any animal or plant species in danger of extinction throughout all or a significant portion of its range as designated by the U.S. Fish and Wildlife Service under provisions of the Endangered Species Act. See **THREATENED SPECIES**.

**ENVIRONMENTAL ASSESSMENT:** A concise public document for which a federal agency is responsible that serves to (1) briefly provide enough evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact; (2) aid an agency's compliance with the the National Environmental Policy Act when no EIS is needed; and (3) facilitate preparation of an EIS when one is needed.

**EPHEMERAL STREAM:** A stream that flows only as a result of precipitation.

**EVAPOTRANSPIRATION:** The loss of water by transpiration from plants and evaporation from the soil.

**EXCHANGE:** A trading of public lands (surface, subsurface, or both) for lands in other ownerships, see **FEE COAL EXCHANGE**, **FEE MINERAL EXCHANGE**, and **FEE TITLE EXCHANGE**.

**EXPRESSIONS OF INTEREST:** A written submission describing an area of federal coal that a party is interested in leasing.

**FAIR MARKET VALUE:** The amount in 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.

**FAULT:** A fracture in rock or strata along which two sides have been displaced relative to one another parallel to the fracture.

## GLOSSARY

**FEDERAL COAL LEASING AMENDMENTS ACT OF 1976 (FCLAA):** The federal law that amends the coal leasing provisions of the Mineral Leasing Act of 1920. Among other things, FCLAA requires receipt of fair market value for federal coal leases, competitive lease sales, consideration of special leasing opportunities for public bodies, comprehensive land use planning for lands offered in a coal lease sale, and production within 10 years of lease issuance (diligent development).

**FEDERAL LAND POLICY AND MANAGEMENT ACT OF 1976 (FLPMA):** The Bureau of Land Management's organic act, which sets out standards for managing the public lands, including land use planning, sales, withdrawals, acquisitions and exchanges; authorizes the establishing of local advisory councils representing major citizens group interests in land use planning and management; establishes the size and deadlines for review of proposed wilderness areas; and provides guidelines for other aspects of public land management, such as grazing.

**FEDERAL LAND SYSTEM:** The network of land, surface, and minerals, owned by the United States, without regard to how the United States acquired ownership, and administered by various federal agencies.

**FEE COAL EXCHANGE:** A fee mineral exchange involving coal.

**FEE MINERAL EXCHANGE:** An exchange that involves subsurface (mineral) rights only.

**FEE TITLE EXCHANGE:** An exchange that involves surface and subsurface lands.

**FINES:** Very small material produced in breaking up large lumps of coal or ore.

**FLYWAY:** A specific corridor of both land and air space within which migratory birds travel and feed during seasonal migrations.

**FOLD:** The structure of rocks or strata that has been bent into a dome, basin, terrace, or a roll.

**FOOD CHAIN:** A series of plant or animal species in a community, each of which is related to the next as a source of food.

**FORAGE:** All browse and herbaceous foods available to grazing animals, which may be grazed or harvested for feeding.

**FORB:** A low-growing, herbaceous plant that is not a grass, sedge, or rush.

**FOSSIL:** Any remains, trace, or imprint of a plant or animal that has been preserved by natural processes in the Earth's crust since some past geologic time.

**FRACTURE:** A break in the continuity of a body of rock not accompanied by a movement on one side or the other and not oriented in a regular system.



## GLOSSARY

**FREMONT CULTURE:** A stage of civilization that evolved after AD 900, whose people are known for their sheephide moccasins, elaborate clay figurines, rock paintings of Kachinas (supernatural beings), and raised or appliqued ornaments with punched designs. Evidence of this culture has been found mainly along the Fremont River in central Utah and in southeast Nevada.

**FUGITIVE DUST:** Airborne particles emitted from any source other than through a stack.

**GENERIC IMPACT:** A type of impact that would normally be expected to occur. Impacts are described in generic fashion in the text when specific measurements of their magnitude do not exist.

**GIGAWATT:** One billion watts.

**GROSS NATIONAL PRODUCT (GNP):** the monetary value of the total output of goods and services within a country during a given time, usually a year. GNP does not include allowances for depreciation or the consumption of capital goods.

**GROUND WATER DISCHARGE:** The process of depleting ground water from an aquifer.

**GROUND WATER, PERCHED:** Ground water separated from the underlying water table by a zone of impervious or relatively impervious material.

**GROUND WATER RECHARGE:** The process of replenishing ground water into an aquifer.

**HABITAT:** A specific set of physical conditions that surround the single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

**HYDROCARBONS:** Any of a vast family of compounds containing carbon and hydrogen in various combinations, found especially in fossil fuels. Hydrocarbons in the atmosphere resulting from incomplete combustions are a major source of air pollution.

**INCREMENTS (Air Quality):** Maximum allowable increases over baseline concentrations of pollutants covered by the PSD provisions in Class I, II, and III areas.

**INFRASTRUCTURE:** The set of systems and facilities that support a region or community's social and economic structures. Examples of such systems include transportation, education, medical service, communication, and fire and police protection.

**IN SITU COAL:** Coal in its natural or original position.

**INTERMITTENT STREAM:** A stream that flows part of the time, as after a rainstorm, during a wet weather period, or during part of the year.

## GLOSSARY

**INTERTRACT BIDDING:** A bidding system in which more coal lease tracts are offered for sale than are to be leased; only those tracts receiving the highest fair market value bids-per-unit or otherwise meeting predetermined ranking criteria are actually leased.

**INVERSION:** A departure from the usual decrease in temperature with altitude occurring when a warm layer of air overlies a cooler layer.

**INVERTEBRATE:** Any animal that lacks a backbone. See VERTEBRATE.

**LAND USE PLAN:** A plan that identifies and establishes land uses and restrictions for a given area.

**LATE PREHISTORIC CULTURE:** The final stage of the recognized development of northwestern plains archaeology preceded by the Early and Middle Prehistoric Periods. From around AD 600 to 1800, the northwest plains (Alberta, Saskatchewan, Montana, and northern Wyoming) were inhabited by nomadic bands of bison-hunting Indians. These Indians lived in conical skin tipis, used bows and arrows, and, before the introduction of horses, employed dog sledges for carrying their goods. The main archaeological characteristics of the period were distinctive projectile points, buffalo jumps, tipi rings, rock piles, rock configurations, rock art, and three pottery traditions.

**LEACHING:** The separating or dissolving of soluble constituents from a rock or ore by chemical solutions or water.

**LEASE MAINTENANCE:** The activities of Federal Government agencies associated with a coal lease after the issuance of the lease. This maintenance includes monitoring of mining, reclamation, royalty accounting, and readjustment of lease conditions after the initial lease term.

**LIGNITE:** A soft brownish black coal that lies between peat and subbituminous coal in degree of coalification and has a heat value less than 8,300 British thermal units per pound.

**LIVESTOCK CARRYING CAPACITY:** The most livestock that can graze an area without damaging vegetation or related resources. The carrying capacity can vary from year to year, depending on the range's forage production.

**LOGICAL MINING UNIT (LMU):** An area of land in which recoverable coal reserves can be developed in an efficient, economical, and orderly manner as a unit with due regard for to conservation of recoverable coal reserves and other resources.

**MAINTENANCE TRACT:** A tract that lacks the recoverable reserves to support an entirely new mining operation, on which recoverable reserves are large enough only to extend the life of an adjacent, existing mine or to permit expanding that mine's annual production.

**MANAGEMENT FRAMEWORK PLAN (MFP):** BLM land use plan developed before the Federal Land Policy and Management Act of 1976. Most MFPs require an amendment to include the four screens required for coal leasing.

## GLOSSARY

**MANDATORY CLASS I AREA (AIR QUALITY):** Areas given a Class I air quality designation by the Clean Air Act of 1977, which include existing (1977) international parks; national wilderness areas or national memorial parks larger than 5,000 acres; and national parks larger than 6,000 acres. States may not reclassify mandatory Class I areas.

**MARINE DEPOSIT:** A sedimentary deposit laid down by the sea as contrasted with continental deposits, laid down under inland conditions.

**MICROCLIMATE:** Climatic conditions of a small area. Microclimates are influenced by local geography and vegetation and may greatly differ from regional climate in temperature, wind, length of growing season, or precipitation patterns.

**MILIGRAMS PER LITER:** A unit of measure expressing weight of a constituent per unit volume of water.

**MINE-MOUTH FACILITIES:** Facilities such as processing and generating plants that are placed at a mine site under the premise that shipping upgraded products or electricity is cheaper than shipping raw coal.

**MINERAL LEASING ACT OF 1920 (MLA):** The federal law that establishes the procedures for the disposal of certain federally owned mineral deposits (including coal) on public domain lands of the United States.

**MINERAL LEASING ACT FOR ACQUIRED LANDS:** The federal law that provides for the disposal of certain federally owned mineral deposits (including coal) on acquired lands of the United States under the procedures of the Mineral Leasing Act of 1920.

**MINIMUM BONUS BID:** The least amount that must be bid at a federal coal lease sale, as stated in the notice of sale, to qualify a bid for consideration; the minimum bonus bid is not necessarily fair market value.

**MISSISSIPPIAN CULTURE:** A cultural development existing between AD 500 and 1650 in the southeastern and midwestern United States, which was the dominant American culture north of Mexico. This culture is characterized by crushed shell-tempered pottery, tiny, triangular arrowheads, and the truncated pyramidal mound. The culture was elaborate and complex and had spectacular artistic and architectural accomplishments.

**MITIGATION:** The abatement or reduction of an impact to the environment by (1) avoiding a certain action or parts of an action, (2) employing certain construction measures to limit the degree of impact, (3) restoring an area to preconstruction conditions, (4) preserving or maintaining an area throughout the life of a project, or (5) replacing or providing substitute resources to the environment.

**MIXING HEIGHT:** The height of the layer of air where well-mixed conditions exist, usually the height of the first significant inversion above the surface.

## GLOSSARY

**MULTIPLIER:** A number that is multiplied by one or more other numbers to produce estimates of impacts. Each multiplier used for impact analysis in this supplemental EIS is based on a numerical relationship between coal production and a type of impact.

**NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS):** The allowable concentrations of air pollutants in the air specified by the Federal Government in Title 40, Code of Federal Regulations, Part 50. The air quality standards are divided into (1) primary standards (based on the air quality criteria and allowing an adequate margin of safety requisite to protect public health) and (2) secondary standards (based on the air quality criteria and allowing an adequate margin of safety requisite to protect the public welfare from any unknown or expected adverse effects of air pollutants). Welfare includes effects on soils, water, crops, vegetation, manufactured materials, animals, wildlife, weather, visibility and climate, damage to and deterioration of property, and hazards to transportation, as well as effects on economic values and on personal comfort and well being.

**NATIONAL ENVIRONMENTAL POLICY ACT (NEPA):** The federal law, going into effect on January 1, 1970, that (1) established a national policy for the environment, (2) requires federal agencies to become aware of the environmental ramifications of their proposed actions, (3) requires full disclosure to the public of proposed federal actions and a mechanism for public input into the federal decisionmaking process, and (4) requires federal agencies to prepare an environmental impact statement for every major action that would significantly affect the quality of the human environment.

**NATIONAL REGISTER OF HISTORIC PLACES:** The official list, established by the Historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation.

**NEW PRODUCTION TRACT:** A coal tract that contains enough federal recoverable coal and of high enough quality, either by itself or in combination with surrounding nonfederal recoverable coal, to justify spending money and the effort to develop and implement new mining operations.

**NITROGEN OXIDES (NO<sub>x</sub>):** Compounds produced by combustion, particularly when there is an excess of air or when combustion temperatures are very high. Nitrogen oxides are primary air pollutants.

**NON-ATTAINMENT AREA:** A geographic area where the quality of the air is worse than federal ambient air quality standards.

**OFF-ROAD VEHICLE (ORV):** A vehicle (including four-wheel drive, trail bikes, and snowmobiles but excluding helicopters, fixed-wing aircraft, and boats) capable of traveling offroad over land, water, ice, snow, sand, marshes, and other terrain.

**OVERBURDEN:** All the earth and other materials that overlie a natural mineral deposit.

**OVERSTORY:** The upper canopy or canopies of plants, usually trees, tall shrubs, and vines.

## GLOSSARY

**OVERTHRUST BELT:** An extensive zone in western North America (believed to extend from Canada to Mexico) where an overthrust fault has forced older rocks on top of younger rocks. The discovery of oil and gas in the younger rock layers has aroused much interest in exploration throughout this belt.

**OZONE:** A pungent, colorless, toxic gas. As a product of the photochemical process, it is a major air pollutant.

**PALEO-INDIAN:** Earliest documented hunting and gathering groups in North America, dating from 12,000 to 6,000 years ago.

**PALEONTOLOGY:** A science dealing with the life of past geological periods as known from fossils.

**PARTICULATE:** A particle of solid or liquid matter: soot, dust, aerosols, fumes, and mist.

**PEAT:** A yellowish brown to brownish black fibrous material, formed by decomposition of plants in water, relatively low in carbon, and containing moisture exceeding 75 percent.

**PEDIMENT:** A broad, gently sloping bedrock surface at the base of a steeper slope, which is usually thinly covered with alluvial gravel and sand.

**PENNSYLVANIAN:** A time period in geologic history between 270 million and 300 million years ago.

**PERCHED GROUND WATER:** See GROUND WATER, PERCHED.

**PERENNIAL STREAM:** A stream that flows throughout the entire year and receives water from surface and underground sources .

**pH:** A numeric value that gives the relative acidity or alkalinity of a substance on a 0 to 14 scale with the neutral point at 7.0. Values lower than 7.0 show the presence of acids, and values greater than 7.0 show the presence of alkalis.

**PHASED SALES:** Lease sales that are spaced over a period of time after the amount of coal to be leased is determined. Such sales provide for the review of the initial decision after any particular sale.

**PHOTOCHEMICAL OXIDANTS:** Pollutants in the air (nitrogen dioxide, ozone) that are formed in areas of intense sunlight and result in extremely reactive chemical substances that damage plants and materials and cause health problems.

**PHOTOCHEMICAL PROCESS:** The chemical changes brought about by the radiant energy of the sun acting upon polluting substances. The products are known as photochemical smog.

**PHYSIOGRAPHIC PROVINCE:** An extensive portion of the landscape normally encompassing hundreds of square miles, portrayed by similar qualities of soil, rock, slope, vegetation, and climate of the same geomorphic origin.

## GLOSSARY

**PLUME:** The volume of air space containing substances emitted from a source characteristically shaped stream of materials of heated gasses entering the atmosphere from a localized source such as a stack. A plume may be visible (smoke, water droplets) or invisible (heated air).

**POLLUTANT (AIR QUALITY):** Any substance discharged into the ambient air that tends to create a harmful effect upon humans, property, convenience, or happiness or that causes contamination in ambient air to exceed legal limits.

**PREFERENCE RIGHT LEASE APPLICATION (PRLA):** An application for a non-competitive federal coal lease for lands in which the applicant has shown the probable existence of commercial amounts of coal according to the terms of a prospecting permit issued under the Mineral Leasing Act of 1920. Authority for issuing prospecting permits was repealed by the Federal Coal Leasing Amendments Act of 1976.

**PREVAILING WIND:** The most frequent compass direction from which the wind blows.

**PREVENTION OF SIGNIFICANT DETERIORATION (PSD):** A regulatory program based not on the absolute levels of pollution allowable in the atmosphere but on the amount by which present air quality will be allowed to deteriorate in a given area. Under this program, geographic areas are divided into three classes, each allowing different increases in increments of total suspended particulates and sulfur dioxide concentrations.

CLASS I - minimal additional deterioration in air quality (certain national wilderness areas).

Class II - moderate additional deterioration in air quality (most lands).

Class III - greater deterioration for planned maximum growth (industrial areas).

**PRIMARY (DIRECT) EMPLOYMENT:** Employment in economic activities that earns money from outside the area being studied. In this document, primary employment is employment in coal mine construction or operation. See **SECONDARY EMPLOYMENT.**

**PRIME AGRICULTURAL LAND (PRIME FARMLAND):** Land that is best suited for producing food, feed, forage, fiber, and oilseed crops. The inventory of prime agricultural land is maintained by the U.S. Department of Agriculture, Soil Conservation Service.

**PUBLIC BODY LEASING:** A procedure that limits bidding for a specific federal coal lease exclusively to federal and state agencies; political subdivisions of a state, including counties and municipalities; rural electric cooperatives and similar organizations; and nonprofit corporations controlled by any such entities.

**PUBLIC LAND:** Federal land administered by the Bureau of Land Management.

## GLOSSARY

**QUEUING:** The forming of a line of vehicles delayed at a railroad crossing by the passing of a coal train.

**RAILROAD SYSTEM CAPACITY:** The volume of traffic that can be moved by rail without undue delay because of traffic congestion.

**RAPTOR:** A bird of prey, such as an eagle, hawk, or owl.

**RECLAMATION:** The process of converting disturbed land to its former use or other productive uses.

**REGIONAL COAL TEAM (RCT):** A body, consisting of BLM state directors and state governors or their representatives, that guides coal activity planning within a federal coal production region and that makes leasing level and lease sale recommendations to the Secretary of the Interior.

**RECOVERABLE COAL RESERVES:** The minable coal reserve base excluding all coal that will be left unmined, such as pillars, fenders, and property barriers.

**RIPARIAN LAND:** Land along the edge of a stream or other body of water.

**ROAD SEGMENTS:** Designated segments of roads for which specific traffic data is collected.

**ROYALTY:** The amount established in a lease that the lessee must pay the lessor as part of the consideration for the right to remove coal for sale or use. Under the Federal Coal Leasing Amendments Act of 1976, royalty is expressed as a percent of the value of the coal. In older leases, royalty was expressed as a fixed amount per ton.

**RUNOFF:** The portion of the precipitation on a drainage area that is discharged from the area in stream channels.

**SALE PANEL:** A group appointed by the BLM state director to review lease sale results and the fair market value analysis and prepare a report recommending acceptance or rejection of bids. For regional coal sales, the sale panel consists of a BLM geologist, mining engineer, mineral economist/appraiser, and the deputy state director, minerals.

**SCOPING:** An early and open process for determining the scope of issues to be addressed in an EIS and for identifying the significant issues related to proposed action. Scoping may involve public meetings, field interviews with representatives of agencies and interest groups, discussions with resource specialists and managers, and written comments in response to news releases, direct mailings, and articles about the proposed action and scoping meetings.

**SCRUBBERS:** Equipment used to remove pollutants, such as sulfur dioxide or particulates, from stack gas emissions.

**SECONDARY (INDIRECT) EMPLOYMENT:** Employment in economic activities that earns money from within the area being studied. Examples are employment in stores, laundries, and other local services and local government. See PRIMARY EMPLOYMENT.

## GLOSSARY

**SEDIMENTARY ROCK:** Rock formed from accumulations of sediment, which may consist of rock fragments of various sizes, the remains of animals or plants, the product or chemical action or of evaporation, or mixtures of the above.

**SEVERANCE TAX:** A tax paid generally to states upon mining of coal. The severance tax may be a fixed amount per unit of coal, or it may be a percentage of the value of the coal.

**SOIL PRODUCTIVITY:** The capacity of a soil to produce a plant or sequence of plants under a system of management.

**SOIL PROFILE:** A vertical section of soil that shows all horizons and parent material.

**SOIL RECONSTRUCTION:** On drastically disturbed areas, such as where surface mining has occurred, the process of replacing layers of soil material, unconsolidated geologic material, or both in a vertical sequence of such quality and thickness that they provide a favorable medium for plant growth.

**SPLIT ESTATE:** Land whose surface rights and mineral rights are owned by different entities. Such a condition commonly occurs when the surface is privately owned but the mineral rights are owned by the Federal Government.

**SPOIL:** Earth and rocks excavated or dredged.

**STRATIGRAPHY:** Relating to the formation, composition, sequence, and correlation of the rock deposits of the earth's crust.

**STRIP MINING:** The surface mining of coal as distinguished from the surface mining of metalliferous ores, which is commonly called open pit mining.

**SUBBITUMINOUS COAL:** A rank of coal that is above lignite and below bituminous in degree of coalification and has a heat value ranging from 8,300-13,000 British thermal units.

**SULFUR OXIDES:** Pungent, colorless gases formed mainly by the combustion of fossil fuels. Considered major air pollutants, sulfur oxides may harm the human respiratory tract as well as damage vegetation.

**SURFACE MINING CONTROL AND RECLAMATION ACT OF 1977 (SMCRA):** A federal act that sets rules for surface mining and reclamation of mined lands, providing for transfer of much authority to states with approved programs.

**TERTIARY:** A time period in geologic history between 2 million and 63 million years ago.

**THREATENED SPECIES:** Any plant or animal species likely to become endangered within the foreseeable future throughout all or a part of its range as designated by the U.S. Fish and Wildlife Service under the Endangered Species Act. See **ENDANGERED SPECIES**.



## GLOSSARY

**TIERING:** Discussing general matters in broader EISs (such as national program or policy EISs) while discussing more specific matters (such as regional, basinwide, or site-specific issues) in narrower EISs or environmental assessments that incorporate by reference the general discussions and concentrate solely on specific issues.

**TOTAL DISSOLVED SOLIDS (TDS):** An aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts. High TDS solutions can change the chemical nature of water, exert varying degrees of osmotic pressures, and often become lethal to life in an aquatic environment.

**TOTAL SUSPENDED PARTICULATE (TSP) MASS:** A pollutant measured as the mass of all particles in the atmosphere without regard to size or chemical composition.

**TRACT:** See COAL TRACT.

**TRACT DELINEATION TEAM:** A group of BLM geologists, mining engineers, mineral appraisers/economists and others who evaluate coal, geologic, and other resource data and configure an area of federal coal for potential lease.

**TRACT PROFILE:** A document containing a summary of the information used to delineate a federal coal tract and a site-specific environmental inventory and preliminary analysis of the possible effects of mining the tract.

**TRACT PROFILE REPORT:** Prepared after land use planning and before the regional EIS, an environmental assessment that considers the impact of leasing an individual coal tract independently of other coal tracts within the region.

**TRAFFIC:** The flow of vehicles along a roadway.

**TRAILHEAD:** The terminus of a hiking or horse trail, accessible by motor vehicle and sometimes having parking, signs, a visitor register, and camping and sanitary facilities.

**UNCLASSIFIED AREAS (Air Quality):** Areas that are classed as neither attainment nor non-attainment because of insufficient information.

**UNDERSTORY VEGETATION:** Plants growing beneath the canopy of other plants, usually grasses, forbs, and low shrubs.

**UNIT TRAIN:** A train whose entire cargo (coal) is loaded from one source and delivered to only one location or customer.

**VALLEY WINDS:** Winds that ascend a mountain valley during the day.

**VEGETATION TYPE:** A plant community with distinguishable characteristics described by the dominant vegetation present.

**VERTEBRATE:** Animals that have backbones. See INVERTEBRATE.

**VISIBILITY:** A measurement of the maximum distance from which large objects may be viewed. Fixed reference objects such as mountains, hills, towers, or buildings are normally used to estimate visibility.

## GLOSSARY

**VISUAL INTRUSION:** A feature (land, vegetation, structure) that is generally considered out of context with the characteristic landscape.

**VISUAL RESOURCE MANAGEMENT (VRM):** The planning, design, and implementation of management objectives to provide acceptable levels of visual impacts for all resource management activities.

**WATER TABLE:** The upper limit of the portion of the ground that is wholly saturated with water.

**WATER YIELD:** The total volume of water that passes through a stream.

**WILDERNESS:** An uncultivated, uninhabited, and usually roadless area set aside by Congress for preserving natural conditions.

**WILDERNESS STUDY AREA (WSA):** A roadless area that has been inventoried and found to have wilderness characteristics as described in Section 603 of the Federal Land Policy and Management Act of 1976 and Section 2(c) of the Wilderness Act of 1964.

**WILDLIFE CARRYING CAPACITY:** The greatest number of animals an area can support during a given period.

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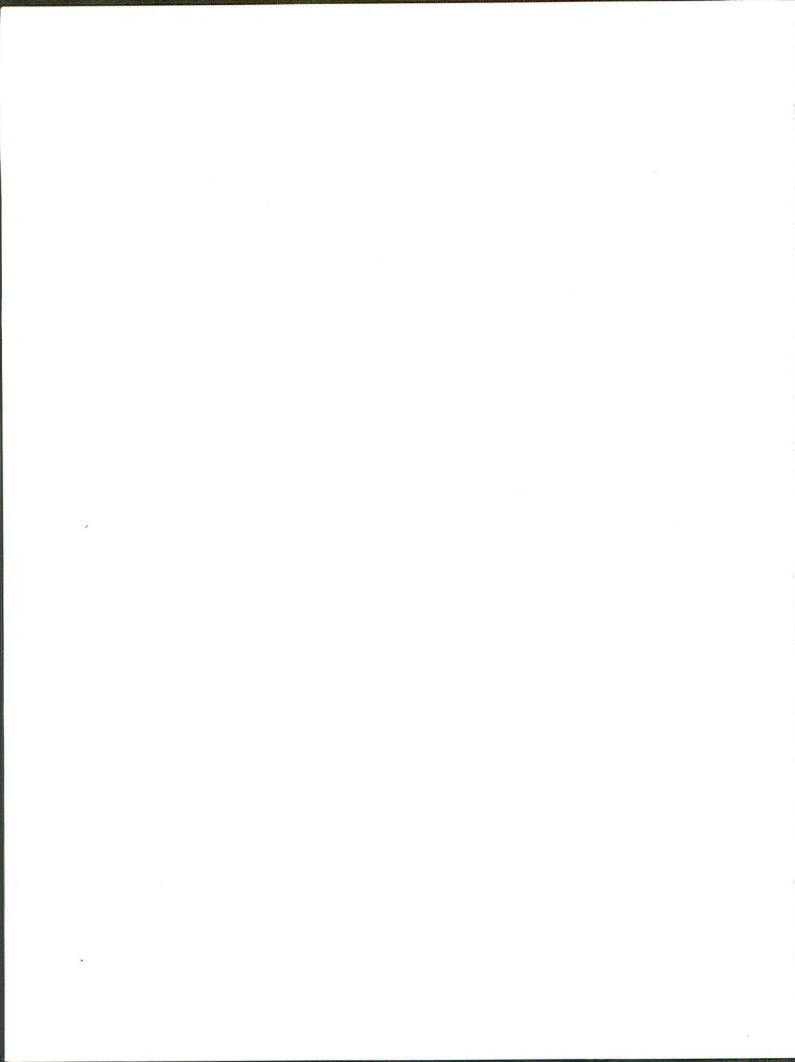
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## ABBREVIATIONS

The following abbreviations are frequently used in this supplemental EIS. For the definition of terms, see the Glossary at the end of this volume.

ACHP: Advisory Council on Historic Preservation

ACQR: air quality control region

AUM: animal unit month

AVF: alluvial valley floor

BLM: Bureau of Land Management

CEQ: Council on Environmental Quality

CFR: Code of Federal Regulations

DOE: U.S. Department of Energy

DOE/EIA: U.S. Department of Energy, Energy Information Administration

D&RGW: Denver and Rio Grande Western

EIS: environmental impact statement

EPA: U.S. Environmental Protection Agency

FCLAA: Federal Coal Leasing Amendments Act of 1976

FLPMA: Federal Land Policy and Management Act of 1976

FS: U.S. Department of Agriculture, Forest Service

FSCAB: Federal-State Coal Advisory Board

GAO: U.S. Government Accounting Office

LRR: land resource region

MLA: Mineral Leasing Act of 1920

MLRA: major land resource area

MMS: U.S. Department of the Interior, Minerals Management Service

NAAQS: National Ambient Air Quality Standards

NCM: National Coal Model

NEPA: National Environmental Policy Act

NF: National Forest

1979 FES: Final Environmental Statement--Federal Coal Management Program

OSM: U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement

OTA: U.S. Congress, Office of Technology Assessment

PRLA: preference right lease application

PSD: Prevention of Significant Deterioration

RCT: regional coal team

SHPO: State Historic Preservation Officer

SMCRA: Surface Mining Control and Reclamation Act

TSP: total suspended particulates

USDI: U.S. Department of the Interior

USGS: U.S. Department of the Interior, Geological Survey

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