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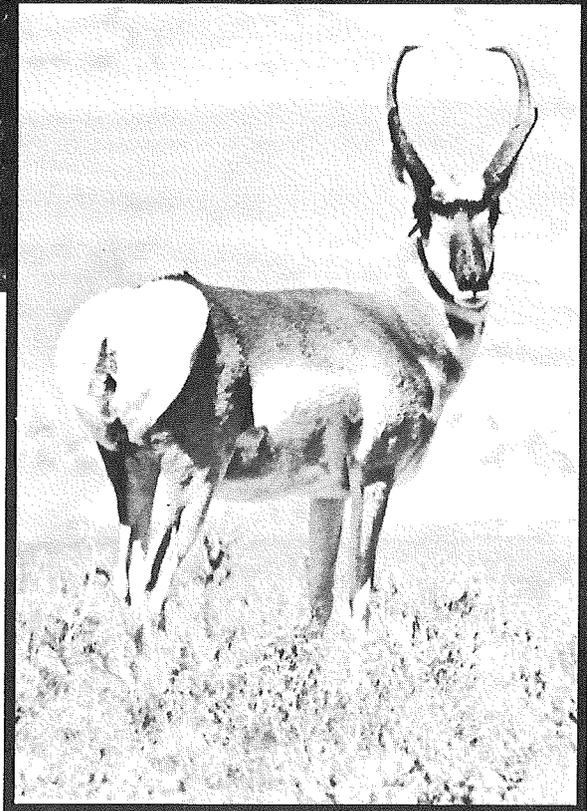
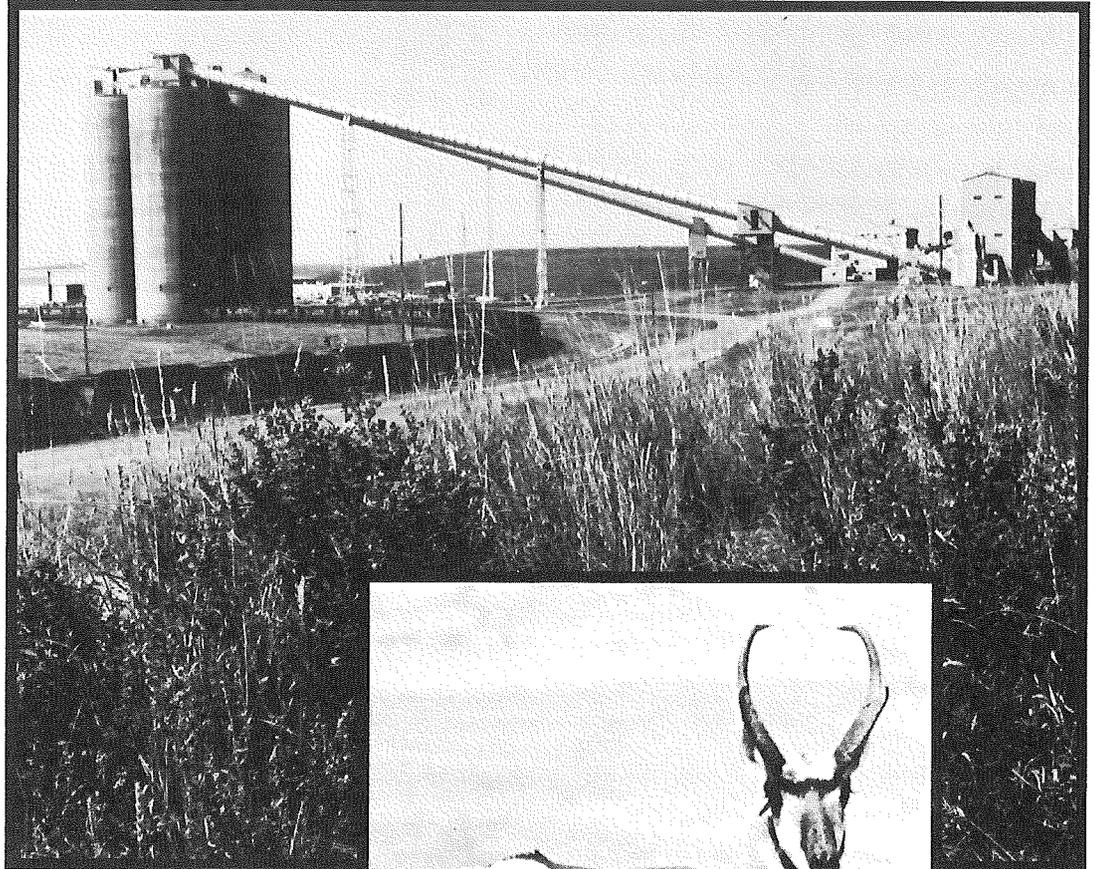
Casper District Office

June 1992

Final

West Rocky Butte Coal Lease Application

Environmental Impact Statement



The Bureau of Land Management is responsible for the balanced management of the public lands and resources and their various values so that they are considered in a combination that will best serve the needs of the American people. Management is based upon the principles of multiple use and sustained yield; a combination of uses that take into account the long term needs of future generations for renewable and nonrenewable resources. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness and natural, scenic, scientific and cultural values.



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003

TAKE
PRIDE IN
AMERICA
3420(LBA)
WYW122586

JUN 09 1992

Dear Reader:

This Final Environmental Impact Statement (FEIS) is prepared pursuant to 40 CFR 1500-1508 for the West Rocky Butte Coal Lease Application (WYW122586), located in the Wyoming portion of the Powder River Basin. This FEIS is provided for your review and comments.

The Draft Environmental Impact Statement (DEIS) was issued on January 17, 1992. The comment period on the DEIS was from January 17, 1992, through March 16, 1992. Thirty-six comments were received on the DEIS. This FEIS has been revised in response to these comments, which are included along with responses as Appendix E of the FEIS.

A public hearing on the proposed West Rocky Butte Coal Lease Application was held on February 26, 1992, at the Holiday Inn in Gillette, Wyoming. Approximately 90 people attended the public hearing, and eight speakers made formal statements. A transcript of the hearing is available for review at the BLM office in Casper.

Comments will be accepted on the Final EIS, as well as on the issues of Fair Market Value of the tract, and Maximum Economic Recovery of coal on the tract through August 3, 1992. Comments received on the final EIS will be considered in preparation of the Record of Decision. Please address your comments to:

Casper District Office
Bureau of Land Management
c/o Mike Karbs, Acting District Manager
1701 East E Street
Casper, Wyoming 82601

Sincerely,

F. William Eikenberry
State Director
ASSOCIATE



**Final
Environmental Impact Statement
for the
West Rocky Butte Coal Lease Application
(Federal Coal Lease Application WYW 122586)
FES 92-11**

Prepared by

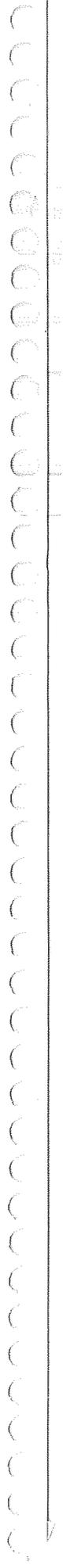
**Western Water Consultants, Inc.
Mariah Associates, Inc.
Browne, Bortz & Coddington, Inc.**

For the

**Casper District Office
Bureau of Land Management**

**Cooperating Agency:
Office of Surface Mining Reclamation and Enforcement**

June 1992



**ENVIRONMENTAL IMPACT STATEMENT FOR THE WEST ROCKY BUTTE COAL
LEASE APPLICATION**

() Draft

(X) Final

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Cooperating Agency: U.S. Department of the Interior, Office of Surface Mining Reclamation and Enforcement

Abstract

Northwestern Resources Company filed an application for a coal lease (the West Rocky Butte Tract) on Federal coal located in Campbell County, Wyoming on December 12, 1990. The application was made to the Bureau of Land Management (BLM) pursuant to provisions of 43 CFR 3425.1 as a Lease By Application (LBA). The West Rocky Butte Tract is west of and adjacent to the existing Rocky Butte lease (WYW 78633), which is currently held by Northwestern Resources Company. These two tracts are located approximately 10 miles south of Gillette, Wyoming in the Powder River Basin. There are currently no mining operations on the existing lease. If the West Rocky Butte tract is leased to Northwestern Resources Company, it would be combined with the existing Rocky Butte Lease into a Logical Mining Unit (LMU), and both leases would be permitted as a new mine. This EIS has been prepared to analyze direct, indirect, and cumulative impacts to various resources which would occur as a result of the proposed action and alternatives. The proposed action, and the preferred alternative of the BLM, is to lease the West Rocky Butte tract, as modified by the BLM, to the applicant.

Comments on the EIS should be directed to:

Casper District Office
Bureau of Land Management
c/o Nancy Doelger
1701 East E Street
Casper, WY 82601

Date Draft EIS issued:
January 17, 1992

Date Final EIS issued:
July 3, 1992

Date comments on the Final EIS must be received to be considered in the BLM's Record of Decision:
August 3, 1992



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ABBREVIATIONS AND ACRONYMS

AIRFA	American Indian Religion Freedom Act	PSD	prevention of significant deterioration
AOC	approximate original contour	RCT	Regional Coal Team
AQD	Air Quality Division, Wyoming DEQ	RMP	Resource Management Plan
ARPA	Archeological Resources Protection Act	ROD	record of decision
AUM	animal unit month	ROW	right of way
AVF	alluvial valley floor	SAR	sodium adsorption ratio
BBC	Browne, Bortz & Coddington, Inc.	SCS	Soil Conservation Service, U.S. Department of Agriculture
bcy	bank cubic yard	SHPO	State Historic Preservation Office
BLM	Bureau of Land Management, U.S. Department of the Interior	SIP	State Implementation Plan
BNR	Burlington Northern Railroad	SMCRA	Surface Mining Control and Reclamation Act of 1977
Btu	British thermal unit	T or E	threatened or endangered
CEQ	Council on Environmental Quality	TDS	total dissolved solids
CFR	Code of Federal Regulations. Numbers refer to title and part; that is, 43 CFR 4100 refers to title 43, part 4100.	tpy	tons per year
cfs	cubic feet per second per square mile	TSP	total suspended particulates
CHIA	cumulative hydrologic impact assessment	TSS	total suspended solids
CNR	Chicago and Northwestern Railroad	$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
db	Decibel(s)	USDA	United States Department of Agriculture
dBA	"A" weighted decibel(s)	VRM	visual resource management
DEQ	Wyoming Department of Environmental Quality	WNDDDB	Wyoming Natural Diversity Database
DI	U.S. Department of the Interior	WRB	West Rocky Butte
DO	District Office, Bureau of Land Management		
DPASS	Division of Public Assistance and Social Services		
EA	environmental assessment		
EIS	environmental impact statement		
EPA	U.S. Environmental Protection Agency		
EPRB	Eastern Powder River Basin		
FCLAA	Federal Coal Leasing Amendments Act of 1976		
FLPMA	Federal Land Policy and Management Act of 1976		
FMV	fair market value		
FR	Federal Register		
FS	Forest Service, U.S. Department of Agriculture		
FWS	U.S. Fish and Wildlife Service, Department of the Interior		
GAGMO	Gillette Area Groundwater Monitoring Organization		
gpm	gallons per minute		
GS	Geological Survey, U.S. Department of the Interior		
KGS	known geologic structures		
LBA	Lease-by-Application		
LOS	level of service		
LMU	logical mining unit		
Mariah	Mariah Associates, Inc.		
MBHFI	migratory birds of high federal interest		
mgd	million gallons per day		
mg/L	milligrams per liter		
MLA	Mineral Leasing Act		
MPH	miles per hour		
NAAQS	National ambient air quality standards		
NAGRA	Native American Graves and Repatriation Act		
NEPA	National Environmental Policy Act of 1969		
NHPA	National Historic Preservation Act		
NRHP	National Register of Historic Places		
NWR	Northwestern Resources Co.		
OSM	Office of Surface Mining Reclamation and Enforcement, U.S. Department of the Interior		
PAP	permit application package submitted to obtain a permit to mine		
PET	potential evapotranspiration		
PMT	postmining topography		
ppm	parts per million		



EXECUTIVE SUMMARY

Northwestern Resources Company has applied for a coal lease under the lease-by-application regulations. The lease being applied for, called the West Rocky Butte tract, contains about 50 million tons of federal coal under 390 acres of private surface. The lease application tract is contiguous to the Rocky Butte lease, which Northwestern Resources Company has recently acquired.

The Rocky Butte lease will expire in February 1993. If the Bureau of Land Management holds a lease sale for the West Rocky Butte tract and if Northwestern Resources is the successful bidder, the two leases could be combined into a logical mining unit and a new diligence period would be established.

The Bureau of Land Management is required to take action on the lease application. The action considered is whether or not to hold a lease sale.

The holding of a lease sale would allow Northwestern Resources Company to acquire the lease, submit an application to form a logical mining unit and open a new mine. As such, this would be a major federal action, and the Bureau of Land Management has determined that the action requires the preparation of an environmental impact statement.

Two alternatives are analyzed in this environmental impact statement. The first alternative is the Proposed Action, which would result in the holding of a lease sale, an application for a Logical Mining Unit (assuming Northwestern Resources Company is the successful bidder), and the opening of a new mine. The Proposed Action, including lands added to the West Rocky Butte tract by the BLM (Option A), is the Preferred Alternative of the BLM. The second alternative, the No Action Alternative, is defined as the rejection of the lease application. Under this alternative, the lease would not be issued, the existing Rocky Butte lease would expire on February 1, 1993, and a new mine would not be opened. For purposes of analysis, the No Action Alternative assumes that the coal would never be mined.

Alternatives considered but not analyzed in detail are: revising the mine plan to bring the coal production rate into line with BLM coal demand forecasts, delineating the tract differently to make the LBA as attractive as possible to potential bidders and avoid bypassing federal coal, leasing the West Rocky Butte tract for a stand-alone mine, delaying the lease sale, and analyzing the impacts of using different mining technologies. These alternatives are not analyzed in detail in this EIS because the environmental impacts of these alternatives would be within the range of the impacts described for the two principal alternatives, or the alternatives are considered unreasonable, impractical, or outside the scope of this EIS.

While selection of the Proposed Action would be a necessary action for the Rocky Butte Mine to open as planned, it is not the only action that would be required. Numerous permits must be acquired to open a mine, and while it was assumed for the purposes of environmental analysis that the permits could be acquired, no prejudgment that this is so is to be construed from this assumption.

The Rocky Butte Mine would join 18 operating mines in the Wyoming portion of the Powder River Basin and would be part of a contiguous block of five mines south of Gillette. The other mines in this block are the Caballo, Belle Ayr, Caballo Rojo, and Cordero mines. The mine would add incrementally to the environmental effects of the other mines in the region. No significant long-term adverse impacts were identified which cannot be mitigated through normal operating procedures or special lease or permit conditions. There would be impacts to all resources during mining. There would be impacts to the topography, vegetation, water resources, and fish and wildlife resources which would extend beyond the mine's existence. There would be impacts to cultural and paleontological resources which would be removed and mitigated through data recovery. Impacts of the two alternatives are summarized in Table 4-1 of Chapter 4.



1.0 INTRODUCTION

1.1 General Location

On December 3, 1990, Northwestern Resources Co. (NWR) filed an application for a coal lease (the West Rocky Butte tract) on federal coal located west of and adjacent to Federal Coal Lease WYW-78633, otherwise known as the Rocky Butte tract. This application was made to the Bureau of Land Management (BLM) pursuant to provisions of 43 CFR 3425.1 as a Lease-by-Application (LBA).

The subject area is located approximately 10 miles southeast of Gillette, Wyoming (Figure 1-1). The existing Rocky Butte lease tract comprises approximately 4,910 acres and contains approximately 575 million tons of coal. This lease was issued to Texas Energy Services, Inc. and Northwestern Mutual Life Insurance Co. (collectively, TESI) in February 1983. The Rocky Butte lease was acquired from TESI by NWR through a lease assignment dated October 3, 1991. NWR is a subsidiary of Western Energy Company, which in turn is a wholly-owned subsidiary of Montana Power Company. The LBA area encompasses approximately 390 acres and contains about 50 million tons of federal coal.

If the West Rocky Butte (WRB) tract is acquired by NWR, NWR will apply for permission to combine it with the Rocky Butte lease tract into a Logical Mining Unit (LMU). Combining the two tracts into an LMU will enable NWR to produce higher-quality coal, achieve maximum economic recovery of the public coal resource, and preserve the existing federal coal lease. Figure 1-2 shows the location of the WRB tract with respect to the existing Rocky Butte lease tract and the mine permit boundary that would encompass the coal removal areas as well as associated disturbances for overburden benching, stockpiling, and construction of facilities such as an office, shop, railroad spur and loop, coal loading facilities and access roads. Figure 1-2 also shows two small areas which would be added by the BLM to the WRB tract under the Proposed Action to avoid bypassing coal (Option A area). This area consists of approximately 70 acres and contains about 9 million tons of federal coal.

1.2 Purpose and Need for Proposed Action

The acquisition of the WRB tract by NWR and the formation of an LMU with this tract and the Rocky Butte tract would enable the opening of a new mine. Under this scenario, the issuance of the lease constitutes a major federal action that could significantly affect "the quality of the human environment." Consequently, pursuant to Section 102 (2)(C) of NEPA, the processing of the WRB lease application requires the preparation of an Environmental Impact Statement (EIS). The BLM has prepared this EIS to identify and analyze impacts on the quality of the human environment that would result from proposed federal action and its reasonable alternatives.

1.3 Authorizing Actions

The coal lease application for the WRB tract was submitted and will be processed and evaluated under the following authorities:

- Mineral Leasing Act of 1920, as amended,
- Multiple-Use Sustained Yield Act of 1960,
- National Environmental Policy Act of 1969, as amended (NEPA),
- Federal Coal Leasing Amendments Act of 1976 (FCLAA),
- Federal Land Policy and Management Act of 1976 (FLPMA), and
- Surface Mining Control and Reclamation Act of 1977 (SMCRA).

Additionally, the lease will be processed according to the Powder River Regional Coal Team (RCT) Operational Guidelines for Coal Lease-by-Applications (Powder River RCT, 1991). On October 31, 1989, the RCT made the recommendation to the Director of BLM that the Powder River Coal Production Region be decertified and, to assure federal and state cooperation in coal development, that the RCT should remain in place to periodically review coal leasing in the region. These recommendations were accepted by the BLM Director and announced in the January 9, 1990

1.0 INTRODUCTION

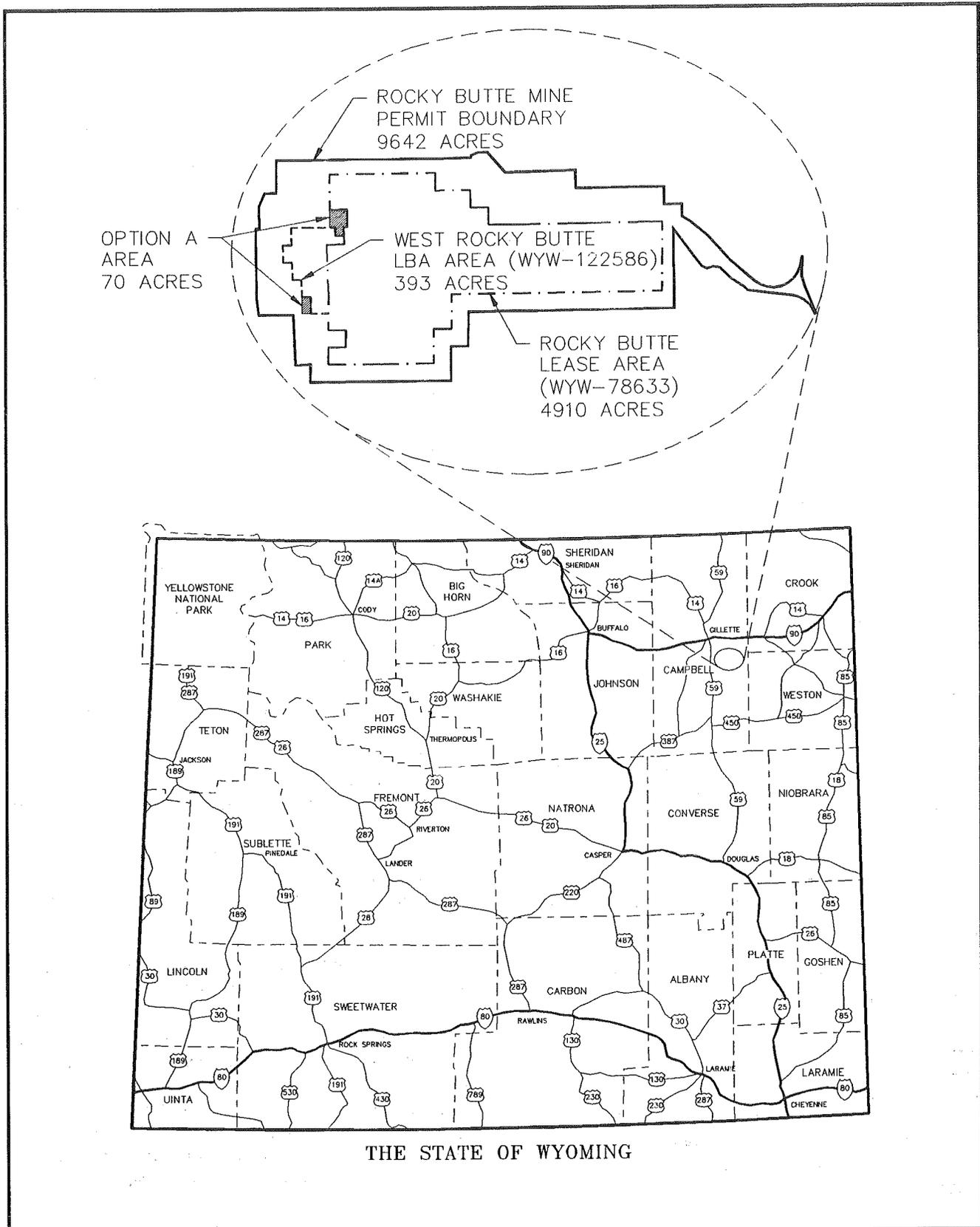


Figure 1-1. General Location Map for the West Rocky Butte LBA Area

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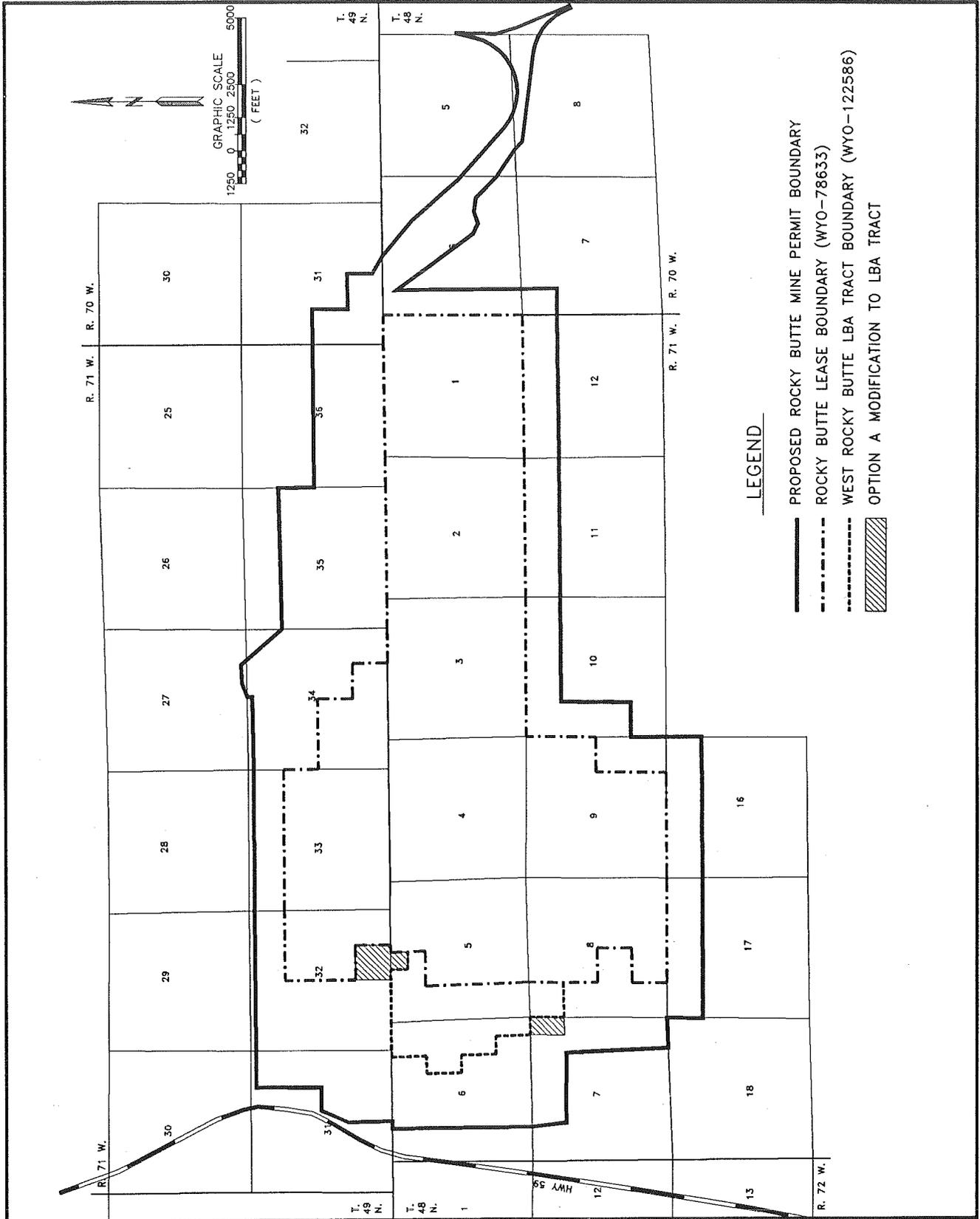


Figure 1-2. Location Map of Rocky Butte Tract, West Rocky Butte LBA Tract and Proposed LMU Permit Area

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Federal Register (55 FR 784). As of the date of that FR notice, all federal coal in the Powder River Coal Region will be leased competitively using the lease-by-application procedures as defined at Title 43 CFR 3425.

The recommendation of the RCT included a provision to retain the RCT as an oversight body to monitor leasing in the Powder River Region. This is to assure federal and state cooperation in coal leasing and to provide a review mechanism to determine when and if the region should be recertified. The guidelines for processing an application for a coal lease include the following requirements:

- The application must be filed with the BLM State Director.
- The BLM announces to the public via a press release and FR notice that the application has been filed and begins an evaluation of the application.
- The BLM notifies the Governor of the respective state that the lease application has been filed and invites the State to participate in the NEPA process. Consultation with any affected Indian tribes may be accomplished through a copy of this notice.
- The BLM District Office (DO) assures that leasing is in conformance with any land use plans or Resource Management Plans; prepares an EA or EIS, as appropriate; develops mitigation measures which warrant special lease stipulations; prepares a geologic report on the LBA area; and recommends to the State Director any modification to the application that would promote better competition or maximum economic recovery of the federal coal resource.
- The BLM prepares a Fair Market Value (FMV) assessment of the lease application tract.
- The BLM through the applicant obtains any surface owner consent required (43 CFR 3427).
- BLM conducts a final consultation with the surface management agency, if any, the Governor, the Attorney General, and affected Indian Tribes.

- BLM prepares a Record of Decision (40 CFR 1500), which may direct that the lease sale be held or that the application be rejected.
- If the decision is made to hold a lease sale, it is conducted competitively (43 CFR 3422) and in accordance with BLM Manual/Handbook H-3420-1, Chapter 4. Lease awards are then conducted (43 CFR 3422.4).

Since the Powder River Coal Region was decertified and the lease-by-application rules promulgated, six lease applications have been filed in Wyoming's Powder River Basin. Only the WRB tract is associated with a new mine start. The other five are applications for production maintenance tracts at operating mines. Because the WRB tract is associated with a new mine start, this EIS addresses the environmental and socioeconomic impacts of the new mine and not just the incremental impacts of the WRB tract.

1.4 Relationship to Powder River Basin Coal Demand Forecasts

The proposal to open a new mine in the Powder River Basin (PRB) with a proposed production by 1995 of 8 million tons annually and a production of 16 million tons annually by 1997 (refer to Section 2.1 of this report) is not consistent with the published demand forecasts for the PRB. However, there is the potential for a lower production rate based on the transfer of an existing contract from the Rosebud Mine in Montana to a new mine at Rocky Butte. This contract could enable the Rocky Butte Mine to achieve a production rate of one to two million tons annually by the 1995 target, and it would have the general effect of changing the proposed production schedule by lowering production in the early years and either extending the mine life or permitting higher production rates in later years. This, in turn, would lower the initial rates of surface disturbance and employment, but would lengthen or intensify these impacts in future years. Other than timing, impacts on the environment would not be greatly different from those expected to result from the Proposed Action described in Section 2.1 of this report.

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During review of the DEIS, concerns were raised whether current market conditions justify the opening of a new mine at Rocky Butte. Currently depressed coal prices and excess production capacity in the Powder River have resulted in a relative lack of interest in coal leasing in the PRB other than leasing of production maintenance tracts at operating mines under the LBA process.

The average price of bituminous coal and lignite sold in the United States was increasing on a nominal basis up through 1982, but has steadily decreased since that time. On a real 1990 dollar basis (corrected for inflation), the average price of bituminous coal and lignite began declining as early as 1978. In Campbell County real coal prices began to decline in 1982. The average price for Wyoming coal is forecast to continue decreasing at least through 1995 (Geological Survey of Wyoming, 1992). Price decreases from 1982 through 1987 were related to the increasing amount of less expensive coal produced from PRB mines. Price decreases from 1987 through 1990 as well as projected decreases in 1991 through 1995 are related to the increasing amount of coal priced below \$5.00 per ton that is sold on the spot market, through short-term contracts, or through renegotiated long-term contracts. The amount of low-priced coal sold each year from Wyoming coal mines may account for almost half the State's coal production by 1995 (Ibid). This could lower the average price of Wyoming coal to slightly more than \$7.00 per ton by 1995, compared with \$8.21 in 1990 (Wyoming Coal Information Committee, 1991).

The declining price is due in part to the large combined production capacity of PRB mines. The total 1990 coal production of about 200 million tons was about 85 percent of the current capacity of the PRB mines and about 63 percent of their full design capacity.

If a lease sale is held for the WRB tract, it will be based on a competitive, sealed bid. The successful bidder must not only submit the highest bid for the tract but that bid must equal or exceed an undisclosed amount determined by the BLM as the "fair market value."

Current market conditions pose some unique questions for BLM in the agency's determination of the fair market value for the WRB tract. In this

determination the BLM prepares an independent analysis of production costs, performs a market analysis for the coal, assumes a reasonable rate of return and derives a value for the in-place coal reserve. The hypothetical mine plan that BLM uses in this analysis is designed to maximize the value of the coal and is not necessarily the same as the mine plan described in Section 2.2 of this EIS, which reflects an optimistic coal production rate in order to conservatively evaluate potential environment consequences of the mining operation. Important factors that will be considered by BLM in evaluating the WRB coal reserve include coal quality, depth and thickness and the fact that without this lease and the subsequent formation of an LMU (refer to Section 2.2), the existing Rocky Butte lease will expire under the diligent development regulations.

1.5 Relationship to BLM Policies, Plans and Programs

The BLM's principal authority to manage public lands is established by the Federal Land Policy and Management Act of 1976 (FLPMA). Through this authority, the BLM is responsible for managing resources on public lands in a manner that maintains or improves them. The BLM planning regulations are set forth in 43 CFR 1600. The Buffalo Resource Area Resource Management Plan (RMP) and its associated EIS is the plan which governs the management of lands and minerals in the Buffalo Resource Area, consisting of Campbell, Johnson and Sheridan counties (BLM, 1985).

The plan for coal leasing and development presented in the RMP was developed following the coal screening process described in 43 CFR 3420. This screening process included the following steps: (1) call for coal resource information, (2) assessment of coal development potential, (3) application of the coal unsuitability criteria (43 CFR 3461), (4) analysis of multiple-use conflicts, and (5) surface owner consultation.

Regarding step 1 of the screening process, no new coal resource information was received. Under step 2, four review areas were identified and carried forward into the Buffalo RMP comprising 963,000 acres with coal development potential containing 80.7 billion tons of federal coal. The proposed Rocky Butte permit area is within the Gillette Review

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Area which comprises about 154,000 acres containing 11 billion tons of federal coal.

The coal unsuitability criteria (step 3 above) were applied to all the known federal coal land that has development potential in the Buffalo Resource Area. A total of 144,000 acres containing about 9 billion tons of federal coal were declared unsuitable for leasing. About 2,400 acres containing 200 million tons of coal were within the Gillette Review Area. Appendix A provides a summary of the unsuitability findings. On the basis of the 1985 RMP and the field studies conducted in 1991 (See Section 3.0 of this EIS) no lands were found on the WRB tract which would make the tract unsuitable for leasing, and the entire tract is therefore available for further consideration.

The fourth step in the coal screening process was a multiple use analysis of the federal coal lands that remained available for leasing after the unsuitability criteria had been applied. This included the entire WRB tract. The review involved consideration of other multiple use values (not related to the unsuitability criteria) that would make an area unsuitable for coal mining. This step is intended to identify conflicts and make planning decisions that may preclude coal leasing, such as designation of community buffers, completion of oil and gas development before coal development can begin, or setting aside lands for recreation and public purpose uses. As a result of this multiple use analysis, a total of 221,000 acres containing 23 billion tons of federal coal were found to contain conflicts which may affect coal leasing. Only one of these conflicts, oil and gas development, applies to the WRB tract. Oil and gas production occurs within known geologic structures (KGSs) on the north and south sides of the WRB tract. Land use studies conducted in 1991 (see Section 3.14 of this EIS) show that there are active oil and gas wells on and adjacent to the WRB tract. The presence of these activities does not preclude leasing, but a determination is required that coal development will not interfere with the economic recovery of the oil and gas or that such conflicts can be mitigated. In the case of the West Rocky Butte tract, there are potential conflicts between the proposed development of federal coal and oil and gas production from currently existing non-federal oil and gas wells (see Section 3.14.2 for discussion). The BLM's policy on these conflicts is to encourage

resolution of the conflict by the parties involved. Resolution could include purchase and abandoning of the oil and gas wells by the coal operator or temporary plugging of the oil and gas wells during mining with the intention of reestablishing production after the area is reclaimed. In the event that economically minable coal is bypassed as a result of failure to reach a mutually acceptable agreement by the coal and oil and gas lessees, the coal lessee can be required to pay royalty to the federal government on the unmined coal. This requirement is included in the stipulations which are currently being attached to coal leases when they are issued (see Appendix D).

The final step in the coal screening process was surface owner consultation. No surface owner on the WRB tract expressed a preference against leasing. NWR has reached agreements to mine with the current resident surface owners, and therefore ownership and surface consent would not be constraints to leasing.

At the September 6, 1991 meeting of the Regional Coal Team (RCT), the decision was made for the BLM to continue with the processing of the WRB lease application. At that time the applicant was instructed by the RCT to meet with the BLM to discuss the steps necessary to process the lease application and assure compliance with NEPA. In response to these instructions, a meeting was held at the BLM State Office in Cheyenne, Wyoming on September 17, 1991 between representatives of NWR, BLM, the Office of Surface Mining Reclamation and Enforcement (OSM), and the Wyoming Governor's Office. Major decisions resulting from these two meetings were:

- BLM will process the WRB lease application as a Lease-by-Application under 43 CFR 3425.
- Because the issuance of the lease will result in new mine start, compliance with NEPA will require the preparation of an EIS prepared under the BLM format (BLM, October 1988).
- The schedules for the lease processing and EIS publication were established to accommodate a lease application sale date of October 16, 1992.
- OSM will be a cooperating agency for the preparation of this EIS and may prepare a

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separate environmental analysis prior to recommending final action on the mining plan.

Issues identified during the scoping process center around air quality, hydrology, noise, reclamation and socioeconomics as they relate to a new mine start. Short- and long-term impacts of the new mine, as well as cumulative impacts of this mine in conjunction with other mines in the region, were identified as issues during the scoping process. BLM considered each issue and concern raised during the scoping process in terms of its relevance to the proposed action. This EIS addresses the issues identified during the scoping process and provides an additional basis for public review of the proposed mine plan and the BLM's decision-making process.

1.6 Additional Permit Requirements

While the decision to lease the WRB tract is a necessary requisite for the opening of the Rocky Butte Mine, it is not in itself the enabling action that will lead to the opening of a new mine. Numerous permits must be acquired from a variety of regulatory agencies. Foremost among these are a permit to mine from the Wyoming Department of Environmental Quality, Land Quality Division (DEQ/LQD) and approval of the mining plan by the Assistant Secretary, Land and Minerals Management. All the issues raised during scoping will be fully resolved prior to completion of all necessary permitting activities.

The Mineral Leasing Act (MLA) requires that, before conducting any Federal coal development or mining operations on Federal leases or licenses, the operator/lessee shall submit and obtain approval of a resource recovery and protection plan. On any Federal lease issued BEFORE August 4, 1976, MLA requires that a resource recovery and protection plan shall be submitted no later than 3 years after the effective date of the first lease readjustment after August 4, 1976, or the effective date of the operator/lessee's election provided for at para. 3483.1(b)(1) of this title, unless a current resource recovery and protection plan has been approved. On any Federal lease issued AFTER August 4, 1976, MLA requires that a resource recovery and protection plan shall be submitted no later than 3 years after

the effective date of the Federal lease. These requirements are found in 43 CFR 3482.1(b). The lessee is obligated to mine according to an approved resource recovery and protection plan, under threat of a suspension of operations, and possible loss of the lease.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) gives OSM primary responsibility to administer programs that regulate surface coal mining operations on federal lands and the surface effects of underground coal mining operations on these same lands. Pursuant to Section 503 of SMCRA, the Wyoming DEQ developed, and the Secretary of the Interior approved, a permanent program authorizing Wyoming DEQ to regulate surface coal mining operations and the surface effects of underground coal mining on non-federal lands within the State of Wyoming. In January 1987, pursuant to Section 523(c) of SMCRA, Wyoming DEQ entered into a cooperative agreement with the Secretary of the Interior authorizing Wyoming DEQ to regulate surface coal mining operations and the surface effects of underground mining on federal lands within the State.

Pursuant to the cooperative agreement, federal coal lease holders in Wyoming must submit permit application packages (PAPs) to OSM and Wyoming DEQ for proposed mining and reclamation operations on federal lands in the State. Wyoming DEQ reviews each PAP and determines whether the coal mining operation will meet the performance standards of the approved permanent program; if it does comply, Wyoming DEQ issues the permit applicant a permit to conduct coal mining operations. OSM and other federal agencies review the PAP to ensure that it complies with the terms of the coal lease, the requirements of the Mineral Leasing Act of 1920, NEPA, and other applicable federal laws and their attendant regulations. OSM recommends approval, approval with conditions, or disapproval of the mining plan contained in the PAP to the Assistant Secretary for Land and Minerals Management. The BLM and the surface-managing agency (if that agency is not BLM) must concur with this recommendation.

Wyoming DEQ enforces the performance standards and permit requirements during operation of the mine and has primary authority in emergency

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environmental situations. OSM retains oversight responsibility for this enforcement. BLM has authority in those emergency situations where Wyoming DEQ or OSM inspectors are unable to take action before significant harm or damage to the environment occurs.

In anticipation of acquiring the WRB tract, NWR is conducting baseline studies and designing a mining and reclamation plan for the LMU. This information will be incorporated into the PAP and submitted to Wyoming DEQ/LQD in the spring of 1992. Typically, several rounds of review by Wyoming DEQ/LQD and responses by the applicant are required before a mine permit application can be approved. Prior to issuance of the permit, opportunity is provided for public review of the mining and reclamation plan. If objections are filed, an administrative hearing is held before a final decision is made regarding the permit. The BLM reviews the mine plan for compliance with the Resource Recovery and Protection Plan requirements (43 CFR 3484).

Another major permit that must be acquired is an air quality permit from Wyoming DEQ, Air Quality Division (AQD). Prior to issuance of an air quality permit, there is another opportunity for public review and, if objections are filed, a public hearing.

NWR will be required to obtain numerous additional regulatory permits including, but not necessarily limited to:

- permits to appropriate surface and ground water from the Wyoming State Engineer's Office
- permits to construct sediment-control and other water treatment facilities from Wyoming DEQ, Water Quality Division (WQD)
- a permit to discharge treated wastewater, also from WDEQ/WQD.
- an industrial siting permit from the Wyoming Industrial Siting Administration.

These permits provide opportunities for the public to review and comment if they believe they may be adversely affected by the proposed activity being permitted.

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2.1 Introduction

Under the lease-by-application regulations discussed in the previous chapter, the BLM must take action on the WRB lease application. If the action is the holding of a lease sale, and if the lease is acquired by the applicant and an LMU application is received and approved, enabling a new mine start, then the BLM action is a major federal action requiring the preparation of an EIS. As an alternative, the BLM action could be to reject the WRB lease application.

For the purpose of this EIS, the first alternative (i.e., the holding of a lease sale and the assumption that this would enable the formation of an LMU and the opening of a new mine) is termed the Proposed Action. The second alternative (i.e., the rejection of the lease application), is assumed to result in the expiration of the Rocky Butte lease and therefore no new mine start at this time. This alternative is defined for the purposes of this document as the No Action Alternative.

Section 2.3 of this chapter lists other alternatives which were considered during scoping for this EIS but were not analyzed in detail.

The lands included in the lease application are located as follows:

Township 48 North, Range 71 West, Campbell County, Wyoming

- Section 5: Lots 8, 9, 16 and 17 and S $\frac{1}{2}$ and NW $\frac{1}{4}$ Lot 7
Section 6: Lot 8, E $\frac{1}{2}$ Lot 14, Lots 15, 16, E $\frac{1}{2}$ Lot 23
Section 8: Lot 4

Total Area: 393.04 acres, more or less

This legal description and acreage are based on approved U.S. Department of the Interior BLM mineral plats on file at the Buffalo Area Office.

In order to avoid bypassing certain coal, the BLM has, as Option A to the Proposed Action, added the following lands to the WRB tract:

Township 48 North, Range 71 West, Campbell County, Wyoming

- Section 5: NE $\frac{1}{4}$ Lot 7
Section 7: E $\frac{1}{2}$ Lot 5

Township 49 North, Range 71 West, Campbell County, Wyoming

- Section 32: Lot 9

Total Area: 70.36 acres, more or less

The existing Rocky Butte lease contains 4909.98 acres. If NWR acquires the WRB lease and forms an LMU as proposed, there would be a total of 5303.02 acres of federal coal in the LMU (5373.38 acres with Option A).

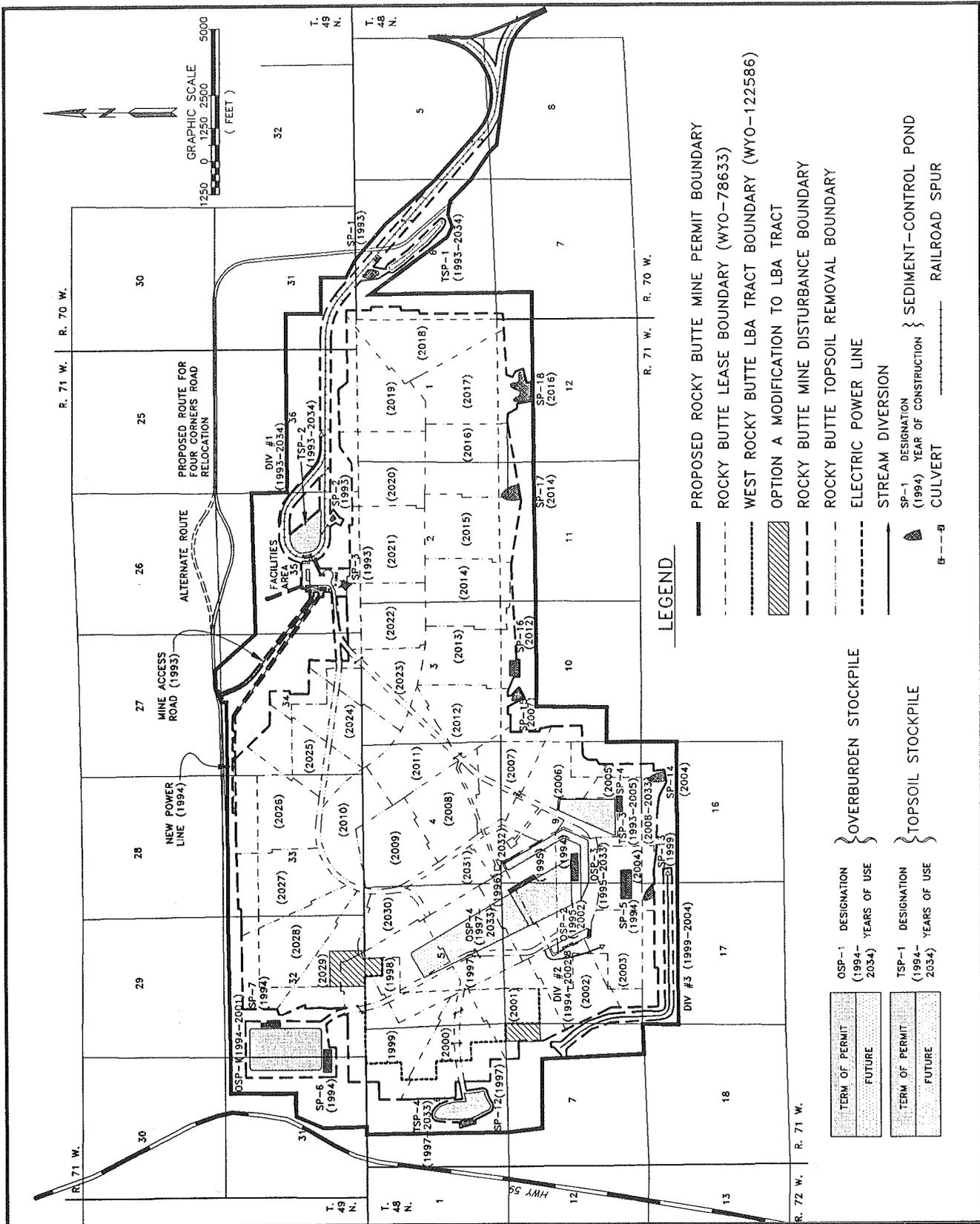
The 393.04 acres in the lease application area contain approximately 50 million tons of recoverable coal. The area included in Option A contains about 9 million tons of recoverable coal. About 575 million tons of coal are contained in the Rocky Butte lease tract. Therefore, combining the WRB LBA area with the Rocky Butte lease brings the total recoverable coal in the LMU to about 625 million tons (634 million tons with Option A).

2.2 Description of Proposed Action

Under the Proposed Action, it is assumed that the WRB tract would be combined with the Rocky Butte lease into an LMU. The Proposed Action, including Option A, is the Preferred Alternative of the BLM.

A new mine would start production in 1995 according to NWR's plans. The mine layout and pit progression are illustrated on Figure 2-1. Table 2-1 summarizes the material handling sequence for the life of the mine. The mine plan calls for construction

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coal from the WRB tract would be mined shortly after startup (approximately 30 million tons into the mine or within the first three years of coal production). In actuality, coal production rates would be dictated by market conditions. The production scenario reflected in Table 2-1 is believed to be a conservative case on which to base the impact analysis of Chapter 4.0.

NWR believes that adding the coal in the WRB tract provides enough low strip ratio, high quality, compliance coal to justify the development expense of mining coal west of a high-strip-ratio ridge which extends through Sections 32, 5 and 9 (Figure 2-1).

The mine plan would recover all federal coal in both the Rocky Butte tract and the WRB tract as described in the LBA. The final highwall is in close proximity to the initial box cut, facilitating final reclamation efforts by allowing the material from the box-cut stockpile to be transported to the final pit.

The overburden would be mined with a dragline, all-purpose shovels and trucks. Employment over the life of the mine would average about 400, including 200 operators, 120 laborers, and 80 administrative and professional staff. About 125 to 130 construction employees would be required during the first two years of operation. Employment needs would fluctuate over the mine life as a function of coal sales, overburden thickness and other variables. Typically, fluctuations in employment needs are handled by the use of temporary or contract workers and this is expected to be the case for the Rocky Butte Mine as well. It is not unusual for mines to contract all their topsoil stripping.

Support facilities for the Rocky Butte Coal Mine include an office; shop; warehouse; employee change facility; coal crushing, handling, and loadout facilities; and smaller facilities such as a power transmission network and solid waste disposal site (Figure 2-1).

The main office for the Rocky Butte Coal Mine will house mine operations, engineering, environmental, accounting, payroll, computer, safety and quality control departments. Additional structures in the complex include a diesel and gasoline fueling station for both large mobile mine equipment and mine pickup truck fleet. Mobile equipment and employee parking areas will be provided at the complex.

The coal crushing, handling, and loadout facilities will include the following: raw coal storage area, truck dump, primary crushers, sampling location, covered conveyors, coal storage facilities, and a train loadout facility (Figure 2-1). All facilities including the transportation facilities, are subject to final design pending the outcome of the lease sale and the mining permit application.

Utility requirements for the mine will include electric power, telephone and water. Power will be required to operate the dragline, shovels, and plant and office facilities. This power will be supplied by Tri-County Electric Association, which purchases wholesale power from the Basin Electric Power Cooperative, headquartered in Bismark, North Dakota. Energy requirements are expected to average up to four or five million kwh per month. Telephone service is provided by Mountain States Telephone and Telegraph.

The major water requirement is for dust control on haul roads. Water is also required for equipment washdown, drinking, showers in the change house, and sanitary purposes. Dust control water will be supplied from water collected in the pit, from sediment and wastewater treatment ponds, and, as necessary, from wells. Total water requirements for all uses at the mine are expected to average around 150 to 200 gallons per minute based on other mines in the region with similar production rates and disturbance schedules. Portions of the area to be mined contain extensive saturated sandstone bodies in the overburden. Dewatering of these sands during mining is expected to provide the required dust control and equipment washdown water. These sandstone bodies are most prevalent in the western half of the mine area. In the unlikely event that the overburden sands cannot provide all the water needed, a deep well will be drilled and completed in sandstone intervals several hundred feet below the base of the coal. Drinking water will be purchased from a bottled-water service.

There are 16 operating coal mines in Campbell County (Figure 2-2). These are, from north to south, the Buckskin, Rawhide, Eagle Butte, Dry Fork, Fort Union, Wyodak, Caballo, Belle Ayr, Caballo Rojo, Cordero, Coal Creek, Jacobs Ranch, Black Thunder, North Rochelle, Rochelle, and North Antelope Mines. The Clovis Point and adjoining East Gillette Mines are permitted but are currently inactive. Because of

2.0 PROPOSED ACTION AND ALTERNATIVES

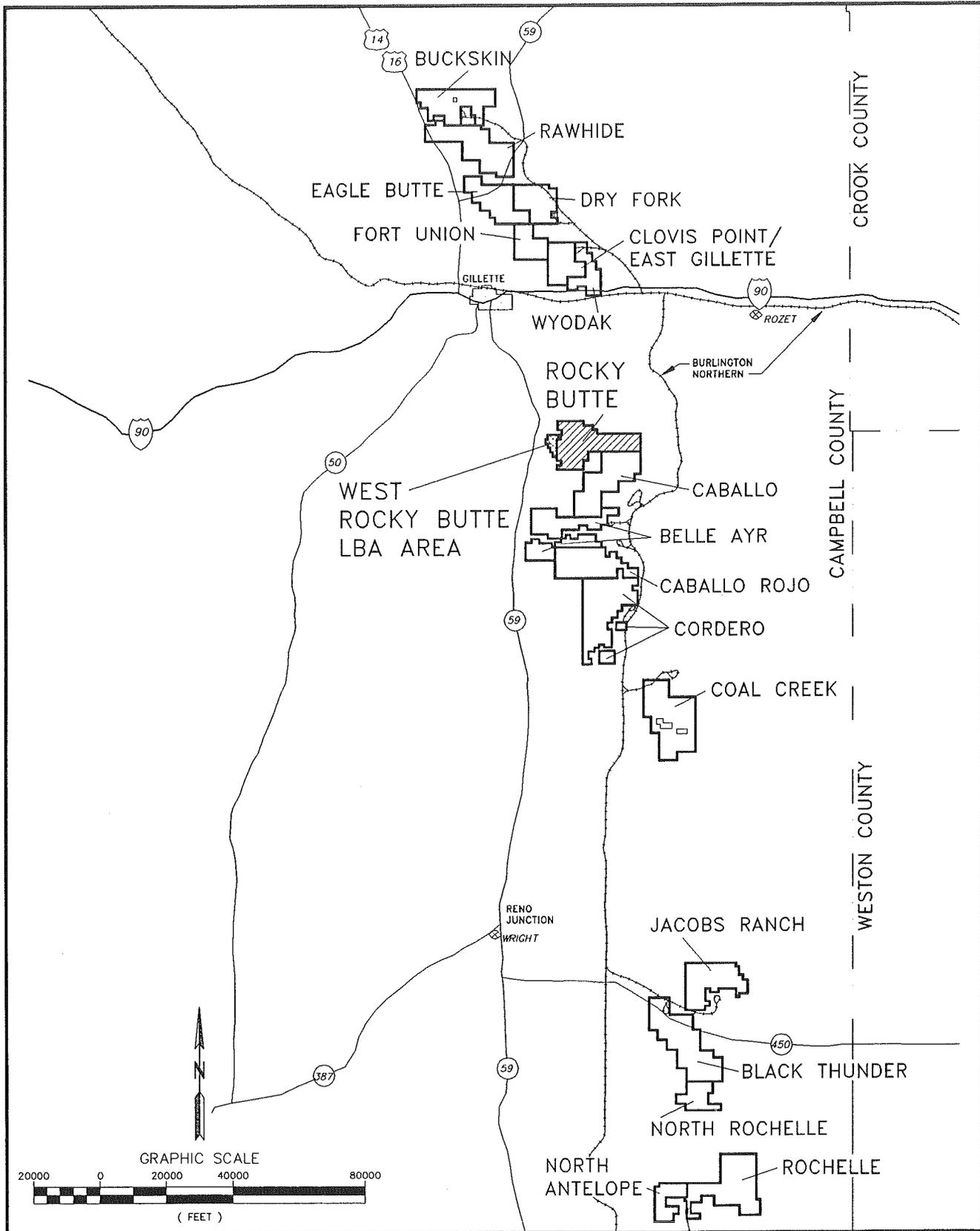


Figure 2-2. Locations of Coal Mines and Transportation Facilities in Campbell County, Wyoming

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the proximity of these other mines, this EIS includes an evaluation of cumulative impacts as well as those which result from the Rocky Butte Mine alone. The Rocky Butte Mine would be contiguous with a group of four existing mines in a strip of land located along the coal outcrop south of Gillette. These four mines are (1) Caballo Mine, operated by The Carter Mining Company, a division of Exxon Coal USA; (2) Belle Ayr Mine, operated by Amax Coal Company; (3) Caballo Rojo, operated by Caballo Rojo, Inc. (owned by Marigold Land Co.; and (4) Cordero, operated by Cordero Mining Company, a division of the Sun Company. A fifth mine, Coal Creek, operated by Thunder Basin Coal Company, a subsidiary of Arco Coal, is located a short distance southeast of the Cordero Mine. This EIS addresses regional impacts of all the mines in the county in a general way, and more detailed cumulative environmental impacts are addressed for this cluster of mines between the Rocky Butte and Coal Creek mines. The cumulative ground-water impact analysis in this EIS extends northward to include the Wyodak Mine.

2.3 No Action Alternative

The primary alternative to the Proposed Action is the No Action Alternative. Under this alternative, the West Rocky Butte lease would not be issued, and the Rocky Butte lease would be terminated on February 1, 1993. For the purposes of this analysis, the No Action Alternative assumes that the coal would never be mined. This enables a comparison of the economic and socioeconomic impacts of mining the coal on the Rocky Butte and West Rocky Butte tracts versus no disturbance of the area. This is an assumption for the purposes of analysis, and does not preclude the reality that a tract could be delineated, leased and mined in this area in the future, which is discussed in Section 2.4, Alternatives Considered But Not Analyzed In Detail.

2.4 Alternatives Considered But Not Analyzed in Detail

In addition to the two principal alternatives described in Sections 2.2 and 2.3, a number of other alternatives were considered. None of the other alternatives are evaluated in detail in this EIS because (1) the environmental impacts of the other alternatives would be within the range of the impacts described for the two principal alternatives, or (2) the

alternatives are considered unreasonable, impractical or outside the scope of this EIS. The other alternatives considered but not analyzed in detail are listed below, together with reasons why they were not analyzed in detail.

One alternative would be to revise the mine plan to bring the coal production rate more into line with coal demand forecasts (see Section 1.4). During at least the early years of mining the coal production rates would be less than the 8 to 16 million tons per year reflected in Table 2-1. This is an important alternative from the standpoint of the economic evaluation of the coal reserve which, together with a geologic evaluation and this NEPA evaluation, are tasks which BLM must perform if a lease sale is to be held. However, a slower coal production rate would not change the total impacts of mining (e.g., disturbed area, aquifers affected, overburden removed and replaced, etc.) and would reduce certain cumulative impacts that result from simultaneously-occurring operations. For example, cumulative employment impacts would be lessened if the Rocky Butte Mine reaches its peak employment after the Dry Fork Mine expansion and Black Hills Power and Light power plant construction project are complete (see Section 6.17.2). Cumulative air quality impacts would be reduced if the Rocky Butte Mine reaches its peak production rate after the nearby mines (Caballo, Belle Ayr, and Caballo Rojo) have passed their peak production rates. From strictly an environmental impact standpoint the production rates assumed for the Proposed Action are therefore believed to be conservative. The mine plan in this EIS would also be consistent with NWR's permit applications being prepared for submittal to Wyoming DEQ and OSM. Therefore, the mine plan described in Section 2.2 is appropriate for this EIS. Because BLM is required to maximize the economic return to the federal government from a lease sale, and because a different mine plan might result in a higher valuation for the WRB coal reserve, the hypothetical mine plan used by BLM to evaluate the coal reserve prior to a lease sale may be different from the one used in this EIS to evaluate environmental impacts. Because the environmental and employment impacts of a mine plan designed to maximize the economic value of the coal reserve would be less than or equal to those that would result from the optimistic mine plan described in this EIS, the alternative of changing the mine plan to

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reflect a slower coal production rate was not evaluated in detail in this EIS.

Another alternative considered was a mine plan that would result from a different boundary delineation for the WRB tract. Several possible tract configurations were considered by BLM with the goal being to make the LBA area as attractive as possible to potential bidders while minimizing the risk of bypassing federal coal that would then become economically unrecoverable. Constraints on tract boundaries include the presence of housing developments and Highway 59 as well as thickening overburden toward the west, thickening overburden and a coal split toward the north, fee coal and thickening overburden toward the south, and the existing Rocky Butte lease toward the east. After considering the coal reserve data, overburden thickness and other site constraints, BLM modified the WRB tract to include the Option A area described in Section 2.1. No other tract configuration was analyzed in this EIS because BLM believes the revised tract with Option A is the most desirable configuration. Also, the LBA tract under any reasonable configuration would comprise a relatively small portion of the resulting LMU, meaning that minor revisions to the WRB tract would not appreciably alter the overall mining impacts for this project. Therefore this alternative (different tract configuration) was not analyzed in detail in this EIS.

One alternative that was considered, as it has been for all pending LBA's in the region, was the leasing of the WRB tract for a stand-alone mine. This alternative was not analyzed in detail because the WRB coal reserve (50 million tons, or 59 million tons with Option A) is an insufficient coal reserve on which to base the capital investment required to construct a new mine. While the tract boundaries might be adjusted to include enough coal to justify a stand-alone mine, the constraints listed above for the previous alternative (thickening overburden toward the west and the presence of surface developments) would probably make the coal unattractive to potential bidders in today's market.

Another alternative considered was delaying the lease sale. This would result in the expiration of the Rocky Butte lease. This alternative was not analyzed in detail because its effects could be similar to either of the two principal alternatives. If this alternative resulted in the Rocky Butte and West Rocky Butte

tracts' never being mined, the effects of this alternative would be similar to the No Action Alternative. Baseline environmental conditions would continue to exist, and the socioeconomic benefits of the Rocky Butte Mine, would not be realized. This alternative could also result in a delay in the opening of the Rocky Butte Mine under the assumption that the current lease would expire and the tract would be leased again at some future date. Under this scenario the environmental consequences of this alternative would be similar to those for the Proposed Action, except that the cumulative effects could be less if there were no overlapping activities such as the planned expansions at the Dry Fork Mine and Wyodak power plant, and if the adjacent mines were past their years of peak production. The socioeconomic impacts would be delayed. Royalty income could change favorably or unfavorably depending on the price of coal at the time the mine started production. One socioeconomic benefit of this alternative would be the potential for a bonus bid if the tract is released. Based on current market projections, the BLM estimates that there would not be interest in leasing the Rocky Butte lease for a new mine start until sometime between the years 2010 and 2020. The environmental consequences of this alternative would be expected to be within the range of those for the two principal alternatives, and an analysis of environmental and socioeconomic impacts of actions projected to occur that far in the future would have to be very speculative regarding coal prices, mine plan, and even mining technology. Therefore, this alternative was not analyzed in detail.

Another alternative might be the use of different mining technologies. This alternative was briefly considered but was not found to be reasonable. NWR proposes to use a technology which has been successfully and profitably employed by coal operators in the Powder River Basin since the early 1980's and by NWR's parent, Western Energy Company, at a surface coal mine in the northern Powder River Basin since the late 1960's. This basic technology is widely accepted, has resulted in the production of coal which meets contract or other market-place requirements, and would be employed at the mine over the next 40 years. This alternative was not evaluated in detail in this EIS because there are no known alternative mining technologies applicable to the site.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.5 Comparison of Alternatives

Table 4-1 in Chapter 4 of this EIS presents a summary of impacts for the two primary alternatives evaluated.



3.0 AFFECTED ENVIRONMENT

3.1 Geology and Mineral Resources

The proposed Rocky Butte permit area is located in the central portion of the Powder River Basin. The overburden in the area is part of the Eocene Wasatch Formation. Although the Wasatch Formation is dominated by claystones and siltstones, its composition is extremely variable, consisting of a complex interfingering of claystones, shales, siltstones, sandstones, and minor thin limestone beds within the proposed Rocky Butte permit area. Figure 3-1 shows a cross section developed from drill hole data. This cross section is fairly typical of the site, with the primary variable from place to place being the amount of sandstone in the overburden.

NWR proposes to mine the Wyodak-Anderson coal seam at the Rocky Butte Mine. This seam is the uppermost unit of the Tongue River Member of the Fort Union Formation. Two thin rider seams are located above the main seam in the overburden. The total thickness of the Wyodak-Anderson seam within the proposed permit area averages 67 feet and ranges from 55 to 72 feet. The coal does not crop out on the property. Approximately 625 million tons of in-place coal reserves exist within the proposed Rocky Butte permit area, of which roughly 608 million tons, or approximately 97 percent, would be mined. This tonnage represents about 0.03 percent of the estimated 21.2 billion tons of strippable coal within the Powder River Basin.

The overburden within the proposed Rocky Butte permit area ranges from 76 to 370 feet thick and averages approximately 195 feet thick. NWR obtained core samples from drill holes for the purpose of determining overburden geochemistry and reclamation suitability. Samples from several of these drill holes showed zones in the overburden that exceed Wyoming DEQ/LQD guideline limits for suitable texture, saturation percentage, pH, acid-base potential, electrical conductivity, boron, and nitrate-nitrogen. Samples from three of the holes showed zones that exceed recommendations for molybdenum. Samples from all of the holes showed zones that exceed recommendations for selenium

although very little high-selenium material is located with 20 feet of the surface. Roughly 60 percent of the sample intervals tested exceed the new selenium suitability guideline of 0.1 ppm. The selenium concentration is generally only marginally above this Wyoming DEQ/LQD guideline limit. Samples from all of the holes also showed zones that exceed recommendations for total organic carbon content.

The companies at the other existing mines in the basin have also conducted overburden drilling and sampling programs to identify unsuitable overburden in their respective permit areas. The preliminary findings at the Rocky Butte Mine are within the range of overburden suitability values at these other mines.

The sampling programs have identified some overburden unsuitable for use in reclamation within all regional permit areas. The reasons overburden was found to be unsuitable have varied from mine to mine; the majority of the unsuitable overburden either contained high sodium adsorption ratios (SARs) or potentially acid-forming materials or had unsuitable texture. Excessive total carbon content is generally associated with non-minable carbonaceous zones at all of the mines. Concern for selenium concentrations in near-surface material within several of the Powder River Basin mines has prompted a recent reduction in suitability limits in surficial materials. The Wyoming DEQ/LQD and the mining companies are cooperating in defining the magnitude of the selenium issue and developing mitigation measures.

3.2 Topography

The proposed Rocky Butte Mine is in an area of low rolling terrain separated by broad subdued ephemeral drainages. The elevation within the proposed Rocky Butte permit area ranges from 4519 to 4758 feet above mean sea level. The average elevation is 4618 feet above mean sea level.

Approximately 87 percent of the proposed permit area has slopes of 5 percent or less. Only 13 percent has slopes greater than 5 percent. These

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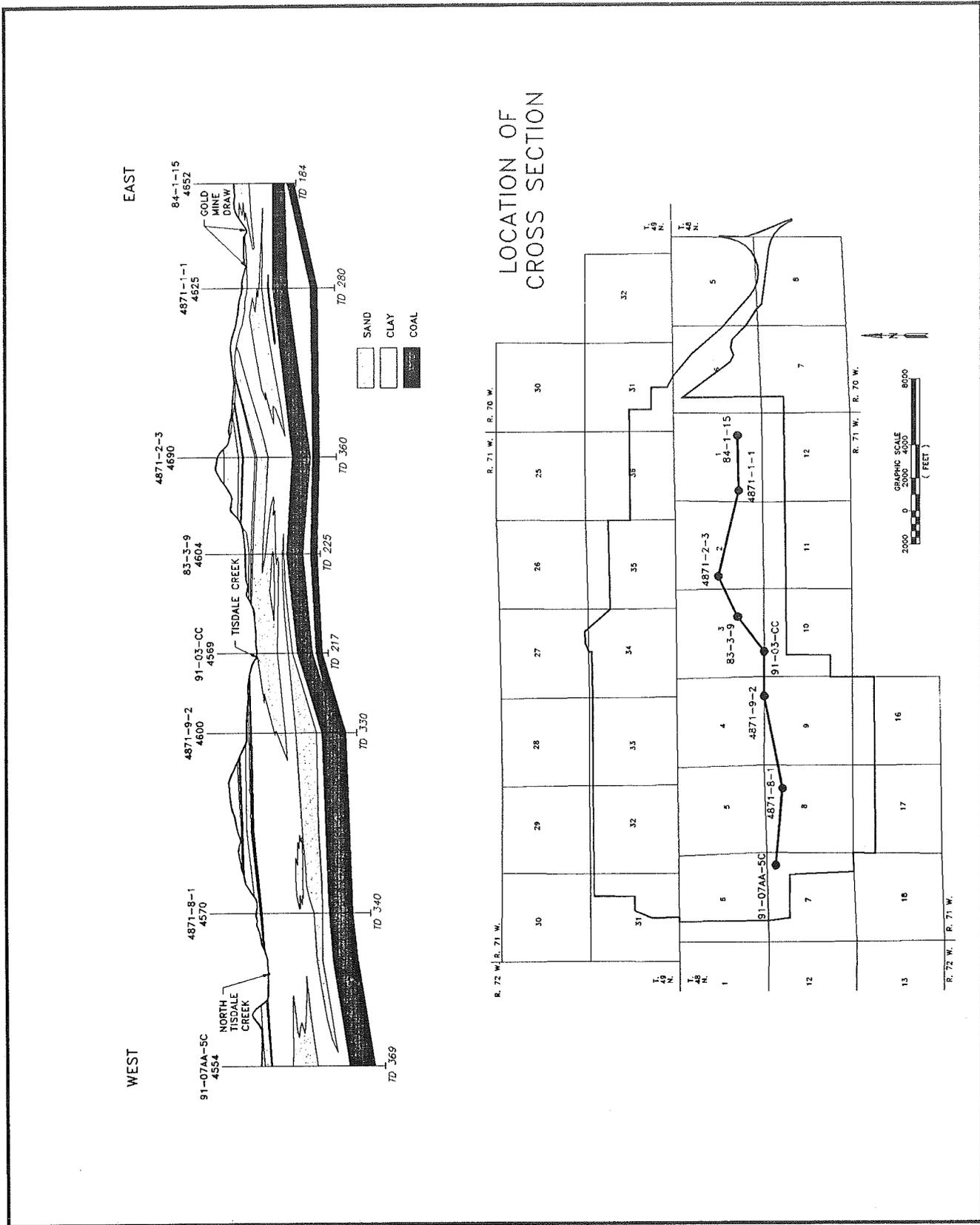


Figure 3-1. Generalized Geologic Cross Section in Proposed Rocky Butte Mine Area

3.0 AFFECTED ENVIRONMENT

percentages reflect the dominance of very flat surfaces in the permit area, both in the uplands and in major valleys. Playas, which are shallow closed drainages that pond water during wet seasons, are common. In areas where the more erosion-resistant rocks occur, buttes or plateaus often form. Buttes and plateaus are not common within the proposed mine area but can be found nearby.

Broad, nearly flat basins are the most striking topographic feature of the proposed mine area. A prominent northwest-southeast trending ridge in the western third of the proposed mine area reflects the presence of slightly more resistant sand units.

3.3 Soils

Soils in the permit area were mapped in 1991. The soils in the proposed permit area are classified into four broad taxonomic orders: 1) Aridisols; 2) Entisols; 3) Vertisols; and 4) Mollisols. These soil orders are common in Campbell County and northeastern Wyoming. The Aridisols comprise the majority of the soils on the broad, rolling uplands. The Aridisols are intergrading toward Mollisols and are usually dry for significant periods of the growing season. They have moderate accumulations of organic matter in the surface layers, and over a long period of time leaching has resulted in modest to strong accumulations of clay in subsoil horizons. Textures of soils within the Aridisol order in this area range widely from sand to clay and can vary within a short distance on the landscape.

Entisols are a much less extensive group of soils within the proposed permit area. They occur in small scattered areas on upper hillslopes and ridge crests where geologic erosion does not provide a stable surface for soil horizon development or on

areas of recent alluvial deposition. Textures of Entisols vary widely from sand to clay and are strongly influenced by the interbedded underlying bedrock that ranges from sandstone to shale.

The Vertisol soil order occurs in some playas within the proposed permit area. Vertisols are clayey, have deep, wide cracks when dry, and are dense and massive between the cracks. These soils receive extra moisture that enhances their productivity.

A small area of Mollisols occurs in a concave basin within the central portion of the proposed permit area.

Soil suitability for use as topsoil during reclamation was evaluated according to Wyoming DEQ/LQD guidelines. All soils rated suitable or marginally suitable above 60 inches in depth were included in the "suitable" class. An exception to this is the very clayey soils in some playas where two feet of surface soil is rated as suitable for replacement on similar postmining playas and potholes.

Table 3-1 provides the extent of five depth classes of suitable topsoil in the proposed permit area and disturbed area. If all suitable topsoil to a depth of five feet is salvaged within the disturbed area, 31,900 acre-feet of topsoil will be available for use in reclamation. This would allow approximately 4.3 feet of topsoil to be replaced over the entire disturbed area.

Table 3-1. Acres of Topsoil for Reclamation Within the Proposed Permit Area and Disturbed Area

	Thickness of Suitable Topsoil (inches)				
	0	1-10	10-20	20-40	40-60
Acres in Permit Area ¹	128 (1)	738 (8)	157 (2)	1833 (19)	6801 (70)
Acres in Disturbed Area ¹	103 (1)	544 (7)	123 (2)	1328 (18)	5235 (71)

¹ Numbers in parenthesis indicate percent of total.

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3.4 Vegetation

There are eight vegetation types in the WRB proposed mine permit area: cropland, big sagebrush, silver sagebrush, saline big sagebrush, upland grass, lowland grass, riparian and pasture

(Figure 3-2). Cropland, including hay fields, is the most abundant vegetation type (Table 3-2). Winter wheat (*Triticum* spp.), hay (*Agropyron cristatum* plus *Medicago sativa*), barley (*Hordeum* spp.), and oats (*Avena* spp.) are the most commonly grown crops.

Table 3-2 Acreage of Vegetation Types Within the Proposed Disturbed Area and the Rocky Butte Permit Area, Campbell County, Wyoming.

Vegetation Type	DISTURBED		PERMIT TOTAL	
	Acres	Percent of Permit	Acres	Percent of Permit
Big Sagebrush	1,066	11	1,965	20
Silver Sagebrush	789	8	1,069	11
Saline Big Sagebrush	299	3	355	4
Upland Grass	835	9	987	10
Lowland Grass	124	1	134	1
Cropland	3,752	39	4,382	45
Pasture	327	3	579	6
Riparian	52	1	66	1
Disturbed	89	1	110	1
TOTAL	7,333	76	9,647	≈100

Shrublands, including big sagebrush, silver sagebrush, and saline big sagebrush types are typically dominated by either Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) or silver sagebrush (*Artemisia cana*) or a mixture of the two. Common grasses and forbs in shrublands are Japanese brome (*Bromus japonicus*), cheatgrass (*Bromus tectorum*), needle-and-thread grass (*Stipa comata*), bluegrass (*Poa* spp.), blue grama (*Bouteloua gracilis*), western wheatgrass (*Agropyron smithii*), common yarrow (*Achillea millefolium*), and milkvetch (*Astragalus* spp.). Additional shrubs and subshrubs occurring in shrublands include winterfat (*Krascheninnikovia lanata*), rabbitbrush (*Chrysothamnus* spp.), and fringed sage (*Artemisia frigida*). In saline areas inland saltgrass (*Distichlis spicata stricta*), prairie cordgrass (*Spartina pectinata*),

and alkali sacaton (*Sporobolus airoides*) are also common. Many of these species are also common in the upland and lowland grass types.

There are 33 riparian zones that support wetland plant species within the permit area (Reed, 1988). Of these 33 riparian zones, 28 are within the proposed disturbed area and most are associated with stockponds or reservoirs where levees have been constructed to hold water. One 29-acre jurisdictional wetland (U.S. Army Corps of Engineers et al., 1989) occurs on the area where there is a locally high water table. Riparian vegetation also occurs adjacent to springs or hollows and in ephemeral channels. The common species are spikerush (*Eleocharis* spp.), arrowhead (*Sagittaria cuneata*), broadleafed cattail (*Typha latifolia*), scouringrush

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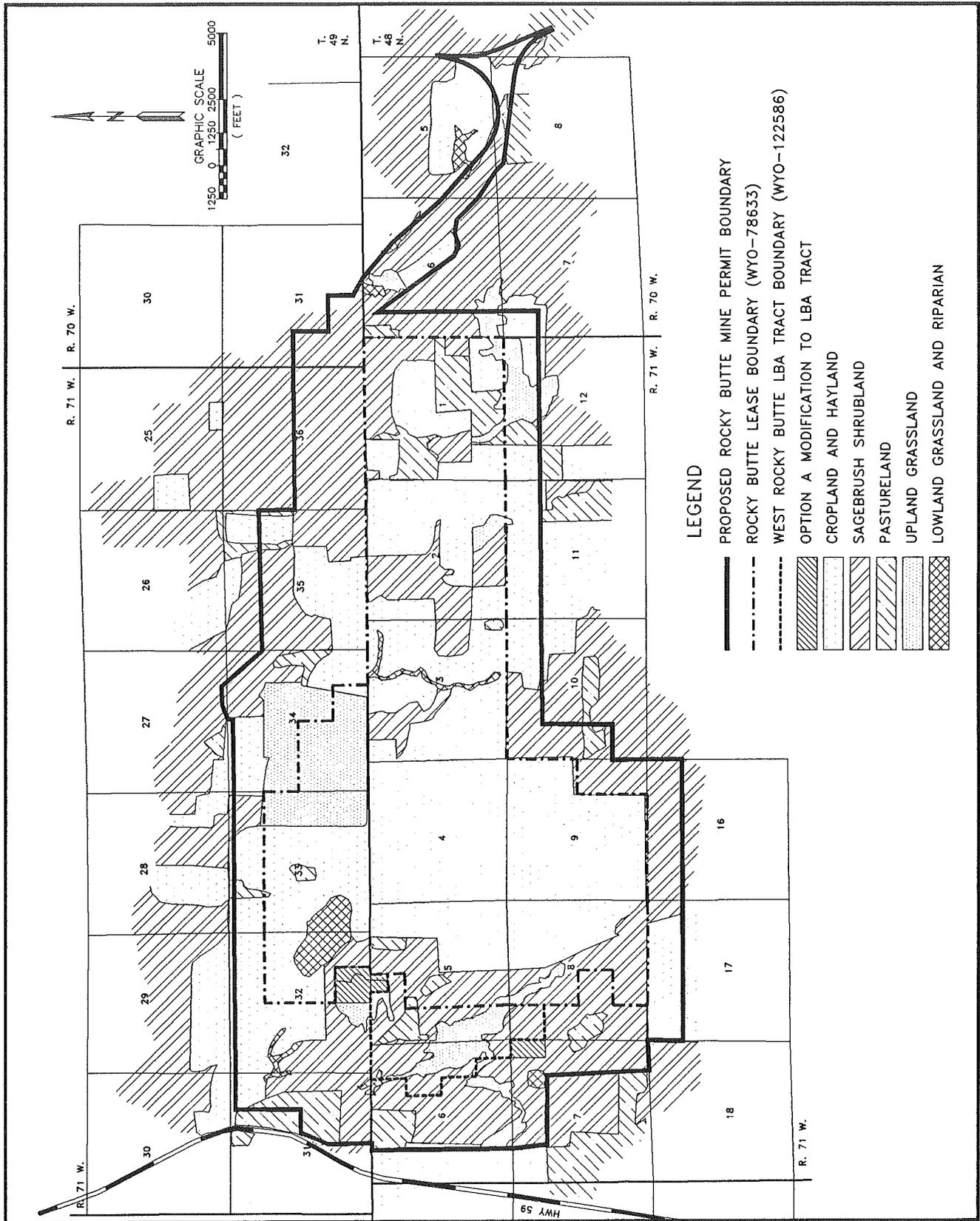


Figure 3-2. Vegetation Types On and Near the Rocky Butte Mine Area

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(*Equisetum variegatum*), and bulrush (*Scirpus* spp.).

Pastures within the permit area include improved native range dominated by crested wheatgrass. Pastures are undergoing succession to a more native state, with varying degrees of encroachment of big sagebrush, silver sagebrush, bluegrass, western wheatgrass, and cheatgrass.

There are 688 trees which are distributed in isolated clusters, windbreaks, or shelterbelts throughout the permit area. Plains cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*), and green ash (*Fraxinus pennsylvanicus*) are the most common native trees.

There are no known threatened and endangered (T & E) plant species present in the permit area (personal communication, July 18, 1991, with Robin Jones, Nature Conservancy, Laramie). One state-listed species of concern, *Astragalus barrii*, is known to occur in the region, but none has been observed in the permit area.

3.5 Water Resources

3.5.1 Surface Water

The general hydrologic setting of the Rocky Butte mine area is illustrated on Figure 3-3. Most of the mine area is in the drainage of Caballo Creek. A small portion of the area drains northward into Dry Donkey Creek, a tributary to Donkey Creek. Both Caballo Creek and Donkey Creek are eastward-flowing tributaries to the Belle Fourche River, which joins the Cheyenne River in western South Dakota.

Tisdale Creek, a tributary to Caballo Creek, flows southward across the southwestern portion of the mine area. North Tisdale flows southward across the central portion of the mine area, joining Tisdale Creek about 3½ miles south of the Rocky Butte lease boundary. Gold Mine Draw, also a tributary to Tisdale Creek, drains the east-central part of the proposed mine area and joins Tisdale Creek about 3½ miles downstream from the mine boundary. Dry Donkey Creek drains the extreme eastern portion of the proposed mine area, joining Donkey Creek about 8 miles north of the mine area and about 10 miles east of Gillette, downstream from the Wyodak Mine. A large closed basin which does not contribute

runoff to area streams is located in the existing lease area in parts of Sections 3, 4, 32 and 33 (Figure 3-3).

Into the Caballo Mine permit area downstream from the proposed Rocky Butte Mine, portions of Tisdale and North Tisdale Creeks have been removed by mining, and reservoirs have been constructed on both streams to keep flood waters out of Caballo Mine pit. Prior to mining activities at Caballo Mine, Tisdale Creek had a drainage area of about 19 square miles (sq mi), of which about 4.4 sq mi are downstream from the proposed Rocky Butte permit area. The premining drainage area of North Tisdale Creek was about 7 sq mi, of which about 3 sq mi are downstream from the Rocky Butte mine area. Gold Mine Draw, which has been affected to date only by the construction of the Caballo Mine rail loop, has a drainage area of about 10.5 sq mi, 6.5 of which are downstream from the Rocky Butte mine area. Only about 0.6 sq mi of the Dry Donkey Creek drainage area is within or upstream from the Rocky Butte mine area.

The drainage systems within the existing Rocky Butte lease area and the WRB tract consist of gently rolling topography. Streams within the proposed Rocky Butte permit area exhibit ephemeral streamflow; that is, they flow only in direct response to precipitation or snowmelt events. In general, the streams are typical for the region, and their flow events are closely reflective of precipitation patterns. Flow events of relatively small peak discharge can result from snowmelt during the late winter and early spring. Although peak discharges from such events are generally small, the duration and therefore percentage of annual runoff volume can be considerable. During the spring, general storms (both rain and snow) increase soil moisture, hence decreasing infiltration rates, and can result in both large runoff volumes and high peak discharges. General regional storms in May 1978 resulted in uncharacteristically large peak discharges for the area streams (Caballo Mine Permit Update, 1985). Brief, sometimes intense, summer thunderstorms can result in large peak flows, particularly on streams with small drainage areas. On the average, streams in this region experience from three to five separate runoff events in a typical year.

Surface water within the region surrounding the proposed and existing lease areas is commonly used

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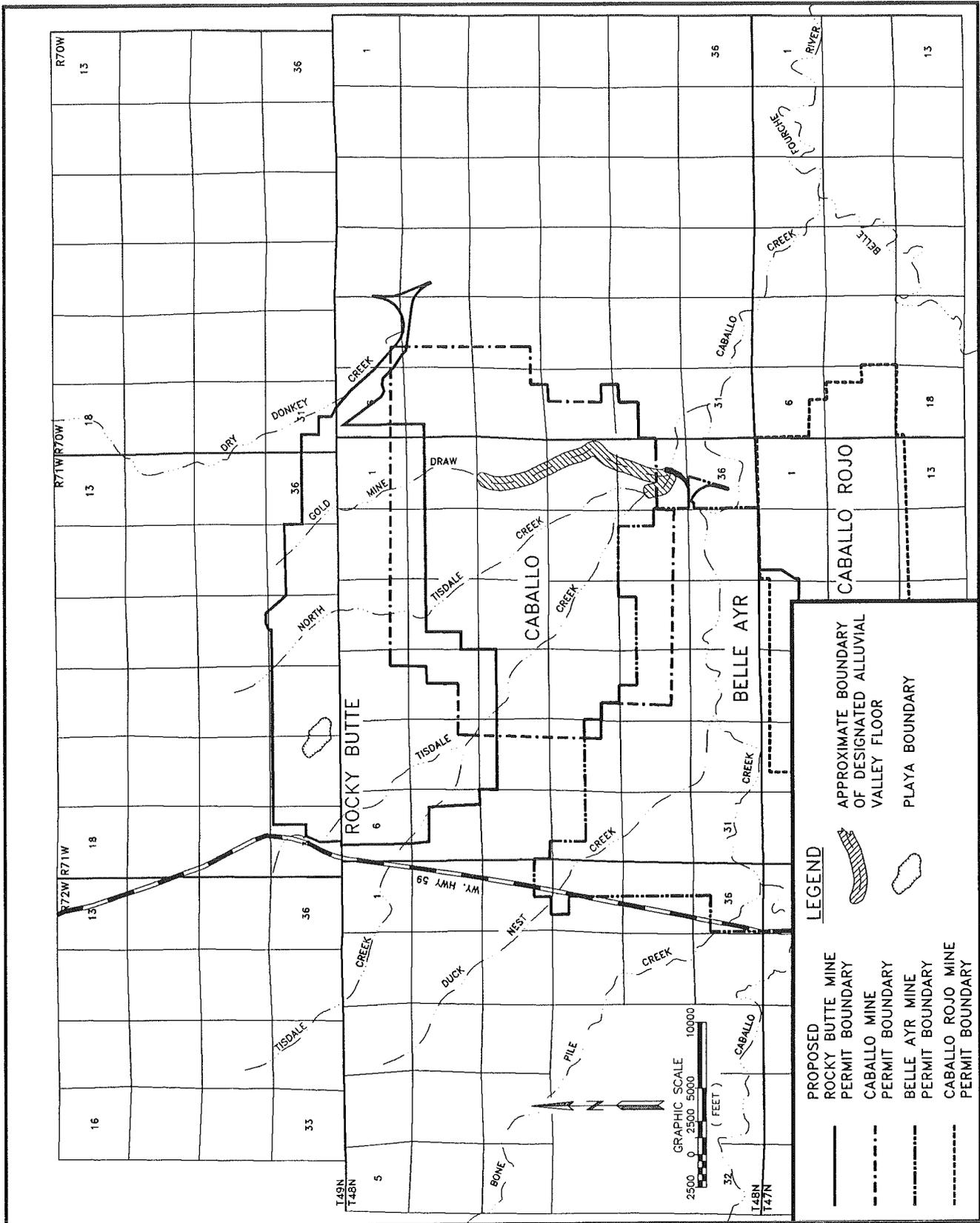


Figure 3-3. Surface Water Features in Vicinity of Proposed Rocky Butte Mine

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for wildlife, stock watering and limited irrigation. Irrigation in the vicinity of the Rocky Butte area is necessarily limited by the topography and the ephemeral characteristics of streamflow to small areas adjacent to stream channels. No irrigation facilities exist on the area to be disturbed by the Rocky Butte Mine.

Approximately 35 stock reservoirs are located within the proposed Rocky Butte permit area. These reservoirs fill with runoff derived from spring snowmelt and precipitation and provide water for stock and wildlife use. Often, these reservoirs provide the only water sources for stock and wildlife use during the late summer and early fall. One large stock reservoir is located on the North Fork of Tisdale Creek in the northwest corner of the proposed permit area. The reservoir, which is permitted with the Wyoming State Engineer as Permit No. P6465R, has a permitted capacity of approximately 82 acre-feet, but its existing capacity is most likely considerably less than this volume due to sediment deposition.

Surface water quality for streams within the vicinity of the existing and proposed Rocky Butte lease areas is generally suitable for livestock watering and irrigation during most flow periods. Streamflows generally exhibit high total dissolved solids (TDS) and low total suspended solids (TSS) concentrations during low-flow periods and low TDS and high TSS during high flow. Water quality in stock reservoirs is good early in the spring due to the inflow of fresh runoff, but generally deteriorates throughout the summer as surface runoff decreases and evaporation concentrates the dissolved mineral content in the reservoir pools.

3.5.2 Ground Water

Ground water occurs in five major geologic units of interest within and adjacent to the proposed Rocky Butte permit area. These units are the Wasatch overburden, Quaternary alluvium, clinker, the Wyodak-Anderson coal seam and Fort Union Formation sandstones underlying the coal. Of these, the alluvium and clinker occur in local and often discontinuous bodies. Both the Wasatch overburden and the Fort Union coal and sandstone aquifers extend westward into the Powder River Basin, in some cases for more than 50 miles.

Regional flow in all these units is toward the northwest. However, local discharge areas are often present, such as where streams have eroded into overburden sandstone units or where the larger streams cross the coal outcrop. One such area occurs approximately 5 miles south of the proposed Rocky Butte permit area where Caballo Creek crosses the coal outcrop. The premining potentiometric surfaces for the coal and overburden both exhibit gradients toward a discharge area along Caballo Creek near the coal cropline. This discharge area is located in sections 35 and 36 as can be seen on Figures 3-4 and 3-5. This gradient is probably now increased by the presence of the Caballo Mine's active pit to the south. A ground-water divide striking northwest across the permit area is present in the overburden (Figure 3-4). This divide is probably associated with the topographic divide between Gold Mine Draw and Dry Donkey Creek, which is in a similar position and orientation.

Alluvium occurs in valley floors and along the minor stream channels found in and around the proposed Rocky Butte permit area. The fine-grained texture of this alluvium is a result of the Wasatch sediments from which it is derived. The thickest deposits of alluvial sediments are present in the valleys of major streams such as the Belle Fourche River. Within the permit area, the alluvium is discontinuous and of very limited extent (Fullerton, 1977 and Fullerton and Kirkham, 1977). Because of this limited extent and thickness the alluvium is not a source of ground-water for any uses.

Water quality in alluvial sediments is variable but typically poor and of calcium-magnesium sulfate chemistry. This high concentration of sulfate salts results from the abundant gypsum present in the Wasatch overburden. The Carter Mining Company reports an average TDS concentration in alluvial wells of 6,990 milligrams per liter (mg/L). This value exceeds the Wyoming Class III livestock water standard of 5,000 mg/L. Wyodak Resources Development Corp. (Wyodak) reports an average TDS concentration of 4,340 mg/L in the alluvium. The worst water quality observed by the Wyodak mine ground water monitoring occurs in alluvial wells (Wyodak, 1990). Preliminary baseline data from the proposed Rocky Butte permit area indicate the average TDS concentration is 8095 mg/L in the alluvium.

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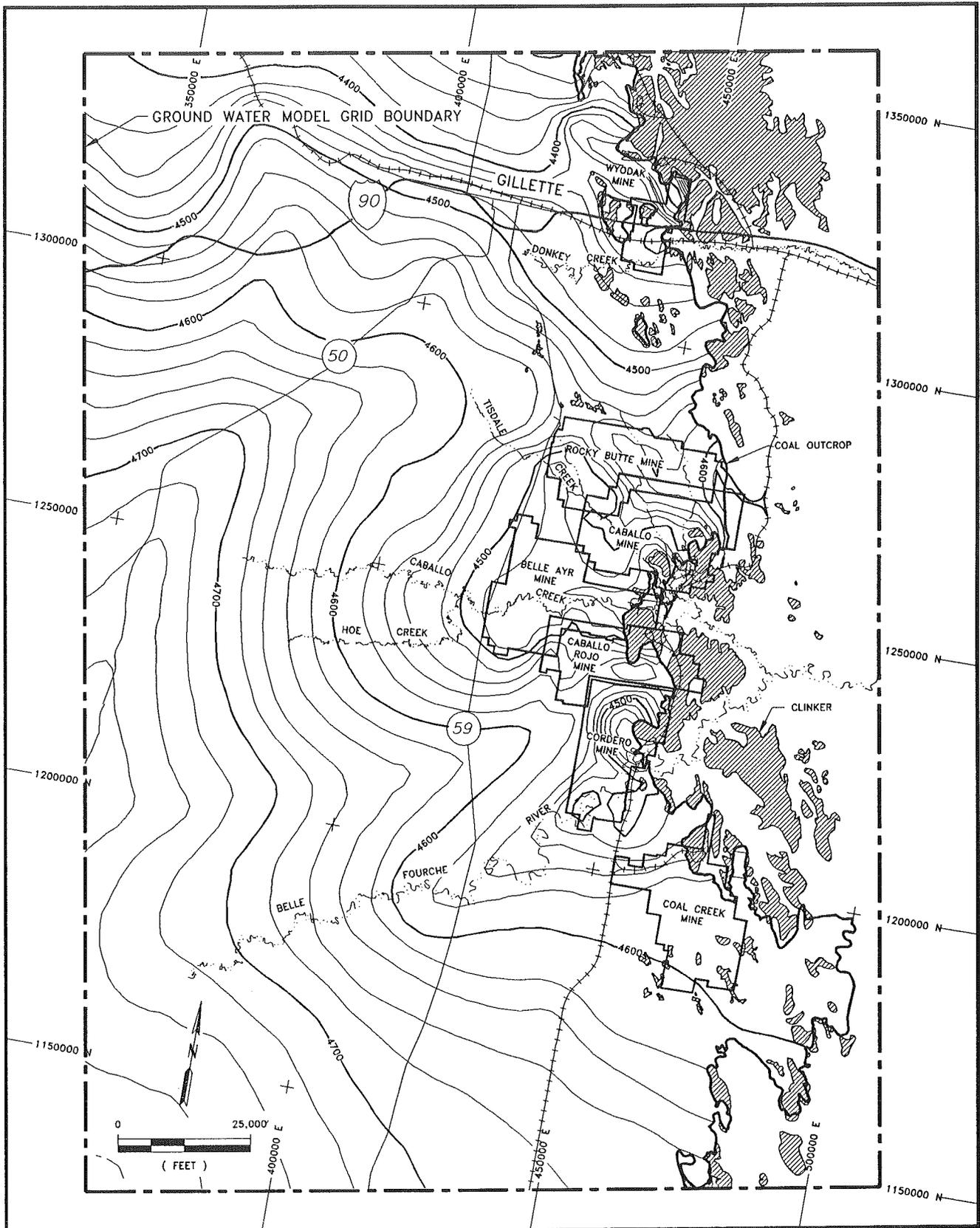


Figure 3-4. Regional Premining Static Water Levels in the Wasatch Overburden

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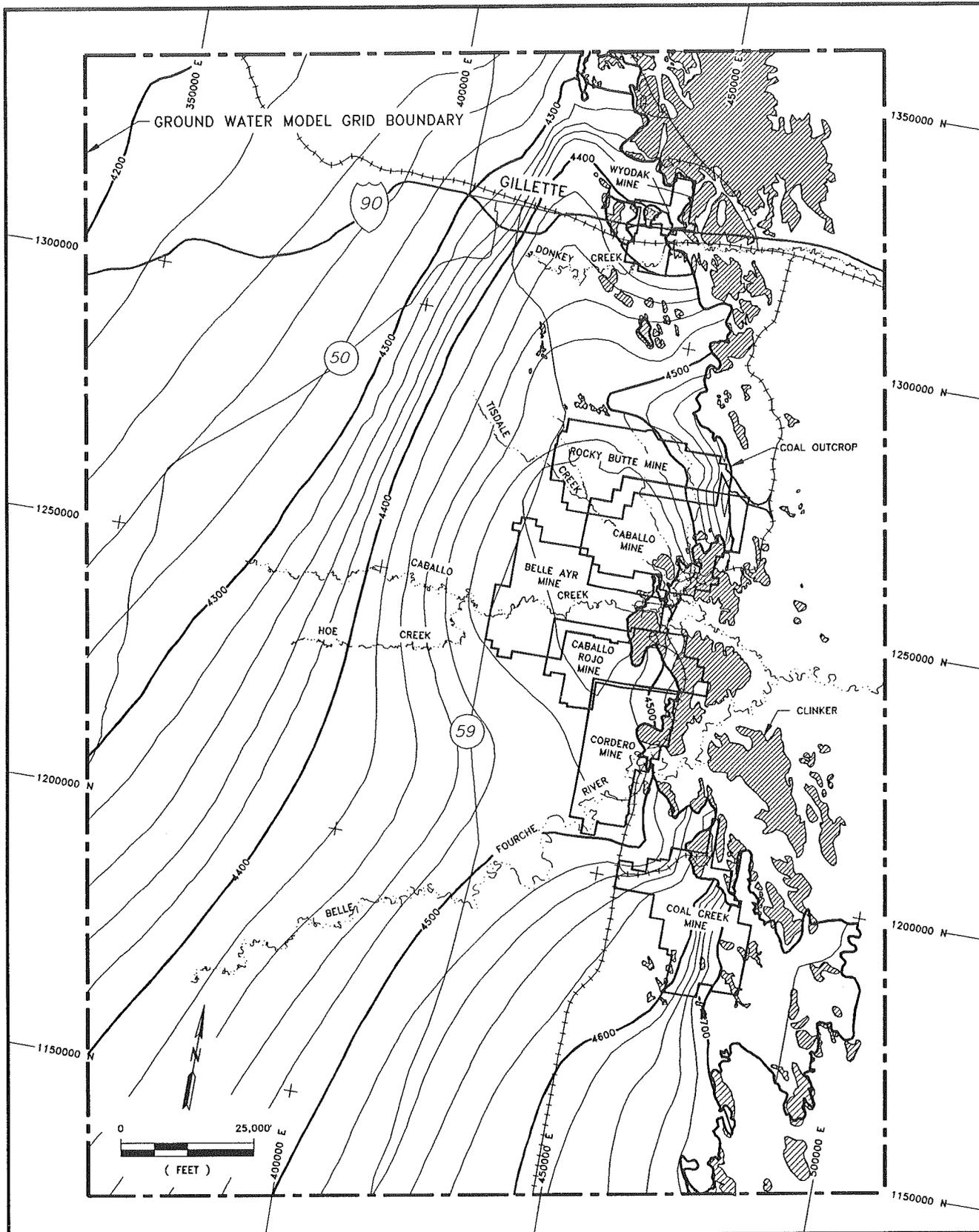


Figure 3-5. Regional Premining Static Water Levels in the Wyodak-Anderson Coal Seam

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The Wasatch overburden is regionally characterized by generally fine-grained sediments interspersed locally with sand bodies and lenses (see Figure 3-1). Very dense drilling patterns are usually required to delineate these sand bodies with any accuracy due to their irregular geometry and discontinuous nature. On a regional scale, this results in a low overall permeability and very slow ground-water movement in the overburden.

On a more local scale, however, wells completed in sandy zones can produce in excess of 25 gallons per minute of good quality water. Sand bodies often occur at two or more elevations in the stratigraphic sequence of the overburden. In the Rocky Butte permit area, this situation often results in perched water-table zones overlying semi-confined aquifers deeper in the overburden sequence.

The Wasatch sands described above have been exploited regionally and within the proposed Rocky Butte permit area for stock water and in some cases domestic water supplies. Several such wells used for domestic water supplies are completed within one mile of the western permit boundary. These wells are permitted to produce between 2 and 20 gallons per minute. There is considerable saturated sand in the Rocky Butte Mine area, particularly in the western half of the area.

Water quality in the overburden generally does not meet Wyoming Class I drinking water standards. Wyodak and Carter report average overburden TDS values of 1,630 and 2,960 mg/L, respectively. Preliminary baseline data from the proposed Rocky Butte permit area indicate the average TDS concentration in the overburden is 2,074 mg/L. However, many wells produce water with considerably better water quality which does meet the Class I standard. Water chemistry tends to be of a calcium-magnesium sulfate type, but bicarbonate is abundant in many wells.

Clinker is baked and partially fused Wasatch overburden. The heat required for this metamorphism was supplied in prehistoric times when the underlying Wyodak-Anderson coal burned. As the coal burned, 80 to 90 percent of its original volume was lost, causing the overlying clinker to collapse into the ensuing void. A highly permeable aquifer composed of coarse, resistant fragments resulted from these processes. Wells completed in

clinker are often capable of yielding 250 gallons per minute or more. Clinker is frequently in good hydraulic connection with both coal and unbaked overburden. Water levels and flow directions in the coal and overburden are often strongly influenced by the presence of saturated clinker. Regionally, saturated clinker is an important aquifer, particularly as a recharge source for the coal. However, no saturated clinker exists within the proposed Rocky Butte permit area.

Water quality in clinker is generally better than is reported for the overburden and somewhat worse than that found in the coal. Average TDS of 1,710 and 3,830 mg/L are reported by Carter and Wyodak, respectively. Clinker water chemistry is generally of a calcium-magnesium-sodium sulfate composition. Sulfate concentrations in particular are often high enough to exceed Wyoming's Class II water quality standard for irrigation. Clinker deposits are not found within the proposed Rocky Butte permit area.

The Wyodak-Anderson coal seam exhibits highly variable aquifer properties. This variability is governed by the extensive fracturing typical of the unit. Virtually all permeability and porosity associated with the coal arises from fractures. Near the outcrop, the coal is usually unconfined. As the coal dips to the west, it becomes progressively more confined. In some areas, the coal is divided by one or more partings. Up to 70 feet of parting in one or two splits can be found in the proposed Rocky Butte permit area. However, some areas have no parting and 15 feet is a more common parting thickness in the areas where it is present. The coal is used throughout the region as a source of stock water and occasionally for domestic use. Several stock water wells are currently permitted in the coal within the permit area.

Coal water quality usually does not meet Wyoming Class I or Class II standards. Average TDS concentrations of 1,210 and 2,120 mg/L are reported by Carter and Wyodak, respectively. Preliminary data from the proposed Rocky Butte permit area indicate the average TDS concentration in the coal is 1,223 mg/L. In most cases, water from coal wells is suitable for livestock use. Coal water chemistry is generally of a sodium-calcium bicarbonate-sulfate type. In general, the coal water quality trends from a calcium sulfate type water near recharge zones to a sodium bicarbonate type water away from recharge

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areas where the coal is a confined aquifer. Preliminary baseline data indicate the coal water quality at the Rocky Butte permit area is generally a sodium bicarbonate type.

The Wyodak-Anderson coal seam is generally taken to be top of the Fort Union Formation. The Fort Union Formation consists of three members which are, in descending order from the surface, the Tongue River, Lebo Shale and Tullock Members (Law, 1976). The average thickness of the Fort Union is about 1800 feet (Crist, 1991).

The coal seam is a regionally extensive aquifer in the Tongue River Member of the Fort Union Formation. Aquifer characteristics and water quality in the coal seam are described above. The Lebo Member, also referred to as "the Lebo Confining Layer" has a mean thickness of 711 feet in the PRB and a thickness of about 400 feet in the vicinity of Gillette (Lewis and Hotchkiss, 1981). The mean sand content of this unit is about 31 percent, indicating that it retards movement of water in general. However, where the sand content is locally large, caused by channel or deltaic deposits, the Lebo may yield as much as 10 gpm of water (Lewis and Hotchkiss, 1981).

The Tullock Member has a mean thickness of 785 feet in the PRB and a mean sand content of 53 percent which indicates that, on the average, the unit functions as an aquifer. According to available literature, yields vary locally and may be as much as 40 gpm; however, yields of 15 gpm are more common (Ibid.). Records from the State Engineer's Office indicate that maximum yields from wells completed in the Tullock Aquifer are approximately 300 gpm (McIntosh, et al., 1984). Water levels in the Fort Union Formation are discussed in Section 6.7.1 of this EIS.

Several major sandstone units are located in the Tullock Member of the Fort Union Formation. West of the coal outcrop, these sandstones are typically highly confined, with potentiometric surfaces several hundred feet above the top of the aquifer zone. These sandstones have been developed regionally for domestic and industrial uses. The City of Gillette is currently using eight wells completed in this zone to meet its municipal water requirements. Rocky Butte has backup plans to complete a well in these sandstones in the unlikely event that water obtained

by dewatering the overburden and coal during mining cannot meet mine water usage requirements.

Water quality in the Fort Union sands often meets Wyoming Class I drinking water standards. TDS concentrations less than 500 mg/L are commonly reported. Class I individual constituent standards are also seldom exceeded.

Within 3 miles of the proposed Rocky Butte permit area there are 222 water wells, excluding wells used solely for hydrologic monitoring. Of these, 96 wells (43 percent) are completed in the overburden, 65 (29 percent) are completed in sandstone units below the coal, 22 (10 percent) are completed in the Wyodak-Anderson coal seam, 16 (7 percent) are completed in both the overburden and the underburden, and 2 wells (1 percent) are completed in both coal and overburden. The remainder have unknown completion details.

3.6 Alluvial Valley Floors

Tisdale Creek, North Tisdale Creek, Gold Mine Draw and Dry Donkey Creek have all been studied to see if they exhibit alluvial valley floor characteristics as defined by Wyoming and federal surface coal mine regulations. The designation of a valley as an alluvial valley floor (AVF) by regulatory agencies has significant bearing on the requirements of the mine and reclamation plans in mine permitting. The lower reaches of Tisdale and North Tisdale Creeks and Gold Mine Draw were studied by The Carter Mining Company within the Caballo Mine in the early 1980s. At approximately the same time, TESI independently conducted AVF studies on the upper reaches of these streams within the Rocky Butte and WRB tracts. The TESI studies were described in the mine permit application that was submitted for the Rocky Butte Mine in 1984. TESI subsequently withdrew this permit application, and no AVF designations were made for the area of the Rocky Butte and WRB tracts. A preliminary AVF report of Dry Donkey Creek was recently submitted to the Wyoming DEQ/LQD by NWR as part of the permitting studies now underway for the Rocky Butte Mine.

The Caballo Mine studies of the AVF characteristics of Tisdale and North Tisdale Creeks and Gold Mine Draw were reported in the mine permit 433-T1 application. From these studies the

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OSM and Wyoming DEQ/LQD made the following AVF designations:

- Tisdale Creek is not an AVF west of Section 25, T.48N., R.71W., in the Caballo Mine permit area.
- North Tisdale Creek is not an AVF in the Caballo Mine area.
- The mouth of Tisdale Creek at its confluence with Caballo Creek is an AVF.
- Downstream Tisdale Creek (from the west boundary of Section 25 downstream to the AVF reach identified under no. 3 above) was not declared.
- Gold Mine Draw was declared an AVF downstream of the northern border of Section 13, T.48N., R.71W., in the Caballo Mine. Upstream of this border it was declared a non-AVF.

In the decision document for the approval of the Caballo Mine permit 433-T1, the Wyoming DEQ/LQD stated that the valley floor of Gold Mine Draw within the northern three-quarters of Section 13 is significant to farming and is therefore prohibited from mining.

Based on the AVF investigations of the two mining companies, there appear to be no distinguishing differences between the upper reaches of Tisdale Creek, North Tisdale Creek and Gold Mine Draw within the Rocky Butte and WRB tracts and the lower reaches of these same streams in the non-AVF reaches of the Caballo Mine. Throughout both areas these three stream valleys contain only intermittent alluvial deposits and the stream terraces are poorly defined. All three stream channels are largely developed in bedrock. Except for the channel floors themselves and along the fringes of channel impoundments, there is no enhanced vegetation or other evidence of subirrigation along the three stream valleys outside of the declared AVF reaches. Within the proposed Rocky Butte permit area both Tisdale Creek and North Tisdale Creek and some of their larger tributaries flow across broad areas of flat terrain. It is doubtful that any reach of Tisdale Creek, North Tisdale Creek or Gold Mine Draw in the Rocky Butte permit area meets the statutory definition of an AVF.

Dry Donkey Creek east and north of the Rocky Butte Mine permit area (Figure 3-3) probably does not meet the statutory definition of an AVF. The preliminary AVF study of this valley shows a well defined body of stream laid deposits that is generally 150 to 200 feet wide. Based on available monitoring well data, however, the deposits are usually dry. Eight channel impoundments collectively store approximately 43 acre-feet of water in the reach of the stream between the north boundary of Section 8, T.48N., R.70W. and the SE1/4 Section 31, T.49N., R.70W. With the exception of a reach of the channel some 1,000 feet long in the E1/2 Section 6, T.48N., R.70W., riparian vegetation was found only around the fringes of several of the channel impoundments. The riparian vegetation in Section 6 is sustained by ground-water seepage originating to the east of the Dry Donkey Creek valley floor.

A distinguishing characteristic of the Dry Donkey Creek valley is the presence of six large spreader dikes that span the valley floor in Section 31, T.49N., R.70W. The dikes were constructed in 1973 to trap and spread streamflow across approximately 80 acres of grass and alfalfa raised on the valley floor. The AVF investigation by NWR indicates that the agricultural productivity of Dry Donkey Creek near the proposed Rocky Butte Mine permit area is not significantly enhanced by flood irrigation or by natural subirrigation. At the time of this writing the DEQ/LQD has not yet made a formal declaration on preliminary AVF investigation of Dry Donkey Creek. Informal discussions with Wyoming DEQ/LQD personnel indicate that a negative declaration (i.e., declaration of no AVF's) is probable. It seems unlikely, based on similarities with other declared non-AVF areas, that any portion of the valley will be declared an AVF at least within the reach included in the AVF investigation.

Between 1963 and 1968 a system of impoundments and spreader dikes was constructed along lower Gold Mine Draw in Section 13 south of the Rocky Butte lease. This system has been used to irrigate approximately 90 acres of grass and alfalfa (CDM, 1984). This area is part of the declared AVF (see above).

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3.7 Fish and Wildlife

3.7.1 Fisheries

Approximately 35 ponds (about 100 acres), and numerous creeks (e.g., Tisdale Creek and Gold Mine Draw) and unnamed drainages occur on the permit area; however, no known fisheries occur in these waters. Additionally, all ponds on the permit area were less than seven feet deep in December 1991 (unpublished data, Mariah Associates, Inc., 1991), and are therefore unlikely to over-winter fish. Some warm-water species (e.g., green sunfish [*Lepomis cyanellus*]) and non-game species (e.g., plains killifish [*Fundulus sciadulus*], fathead minnow [*Pimephales promelas*]) may migrate upstream into deeper stock ponds located on and immediately adjacent to the area during spring runoff; however, no population data or fisherman use statistics are available.

3.7.2 Big Game Animals

Three big game species occur on the proposed permit area, pronghorn antelope (*Antilocapra americana*); mule deer (*Odocoileus hemionus*); and white-tailed deer (*O. virginianus*). Pronghorn antelope are the most abundant species. Figures 3-6 and 3-7 show the areas of occupied habitat for the three species.

Pronghorn antelope are found yearlong in the proposed permit area and have been observed in all vegetation types, including disturbed areas (e.g., oil pumping stations). The majority of animals observed during aerial and ground surveys occurred in sagebrush habitats (Figure 3-2); however, pronghorn also congregated on hay fields after cutting (unpublished data, Mariah 1991).

All pronghorn on the permit area are included in the Hilight herd (WGFD, 1991a) (Figure 3-6). Those animals in the two mile buffer around the permit area west of State Highway 59 are part of the Pumpkin Buttes herd. The permit area is all within antelope hunt area 24; areas west of State Highway 59 are entirely within hunt area 23.

The WGFD population objective for the Hilight herd is 11,000 animals, and the estimated end-of-year population in 1990 was approximately 10,900 (WGFD, 1991a). While the current pronghorn population is slightly under objective, the estimated 1991 population (based on trend counts) is approximately 12,000 animals, 1,000 animals above objective. During the 1990 pronghorn season, harvest (1,119 animals) was below WGFD objectives for the herd.

The population objective for the Pumpkin Buttes herd is 18,000 animals. Current population estimates for the herd indicate approximately 22,600 animals, well above the WGFD objective (WGFD, 1991a). This increased population is likely the result of several mild winters. During 1990, pronghorn harvest (2,368 animals) was below WGFD objectives.

No crucial winter pronghorn habitat occurs on the proposed permit area or within the two mile buffer. Pronghorn range on the proposed permit area is considered yearlong (i.e., a population or a substantial portion of a population uses the area yearlong) or winter/yearlong (i.e., a portion of the area is used yearlong, but during winter there is a significant influx of animals to this area from other seasonal ranges) (WGFD nd.) (Figure 3-6). Approximately 8,762 acres of winter/yearlong and 885 acres of yearlong pronghorn range are within the proposed permit area. This represents 1.3 percent and 0.1 percent of the 650,200 acres of occupied pronghorn winter/yearlong and yearlong habitat, respectively, in the Hilight herd.

Mule deer are found yearlong on the permit area, occurring primarily in the big sagebrush and cropland vegetation types in the northern and eastern portions of the area (Figure 3-7). These animals belong to the Thunder Basin herd (WGFD, 1991a). Deer in the two-mile buffer zone west of State Highway 59 belong to the Pumpkin Buttes herd. The permit area is contained in hunt area 21; areas west of State Highway 59 are in hunt area 20.

The WGFD population objective for the Thunder Basin herd is 13,000 animals, and the estimated end-of-year population in 1990 was approximately 12,600 (WGFD, 1991a). While the current mule deer population is under objective by approximately 400 animals, the estimated 1991 population (based on trend counts) is approximately 13,000 animals,

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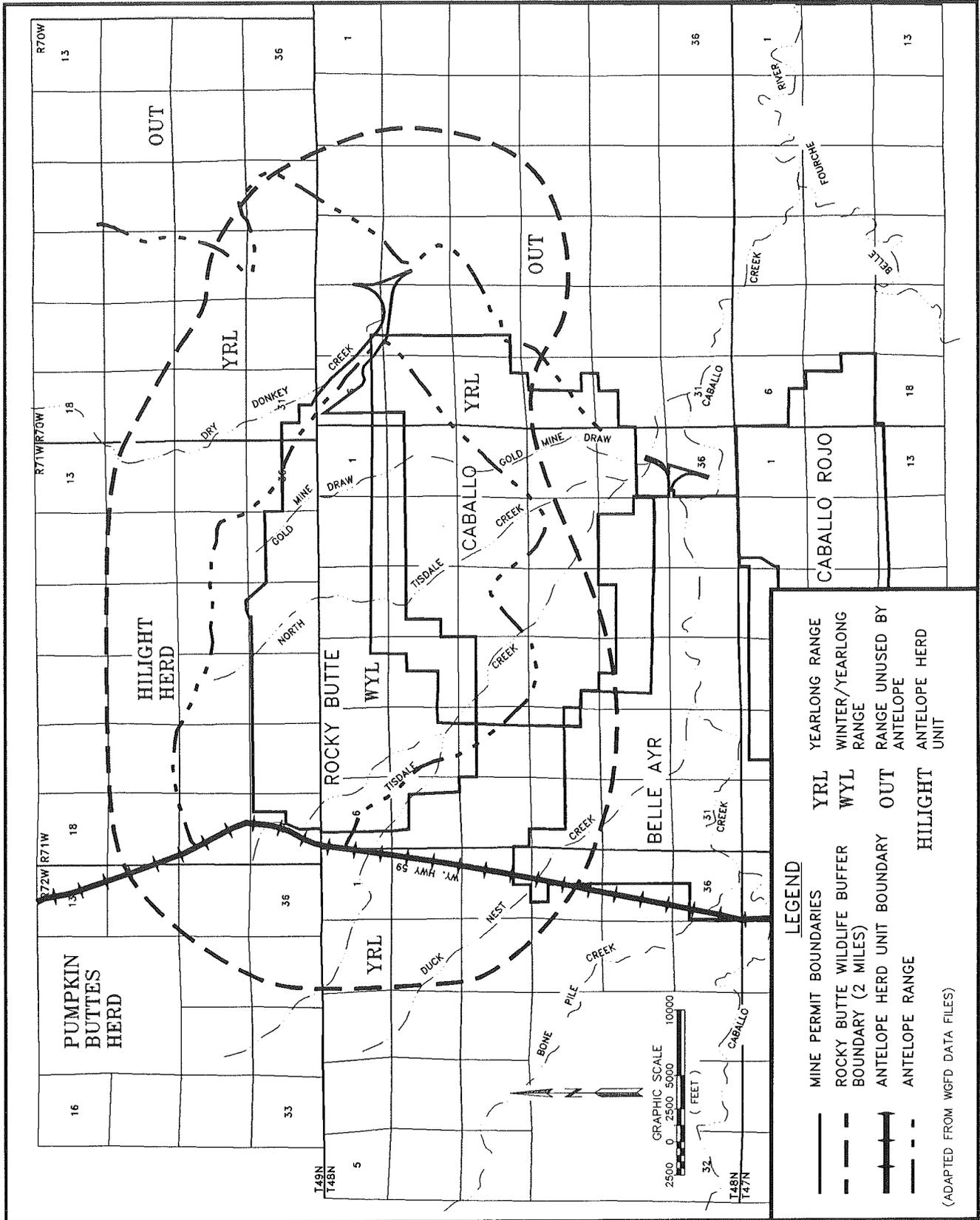


Figure 3-6. Pronghorn Antelope Ranges On and Near the Proposed Rocky Butte Mine

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precisely the WGFD objective. During the 1990 deer season, 1,063 animals were harvested. No WGFD objectives for harvest have been established.

The population objective for the Pumpkin Buttes mule deer herd is 11,000 animals. Current population estimates for the herd indicate a population size of approximately 10,970 animals, essentially at the WGFD objective (WGFD, 1991a). The end-of-year population estimate for 1991 is approximately 11,450, which is above the WGFD objective. The 1990 mule deer harvest (983 animals) was below WGFD objectives.

No crucial winter mule deer habitat occurs on the proposed permit area or within the two mile buffer. Northern portions of the proposed permit area are considered yearlong mule deer range (approximately 6,020 acres) and account for 0.3 percent of the 1,968,000 acres of mule deer range in the Thunder Basin herd. The remaining portion of the area is considered of limited importance to the species. Approximately 823 acres of the proposed permit area are considered unused by mule deer.

White-tailed deer have been observed on the proposed permit area, primarily in riparian habitats (Figure 3-2), and it is likely that some white-tailed deer occur on the area throughout the year. All animals occurring on the proposed permit area and within the two-mile buffer surrounding the area belong to the Thunder Basin white-tailed deer herd (WGFD, 1991a). The proposed permit area is all within hunt area 21; areas west of State Highway 59 fall entirely within hunt area 20.

The WGFD population objective for the Thunder Basin herd is 1,750 animals, and the estimated end-of-year population in 1990 was approximately 1,800 (WGFD, 1991a), so the current Thunder Basin white-tailed deer population is near the WGFD objective. During the 1990 deer season, 253 animals were harvested. No WGFD objectives for harvest have been established for the herd.

No crucial winter white-tailed deer habitat occurs on the proposed permit area, nor does any WGFD-designated white-tailed deer range. A small area (approximately 195 acres) in the northeastern portion of the buffer zone is designated as yearlong white-tailed deer range (Figure 3-7).

3.7.3 Raptors

Northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*B. swainsoni*), ferruginous hawk (*B. regalis*), rough-legged hawk (*B. lagopus*), Cooper's hawk (*Accipiter cooperii*), prairie falcon (*Falco mexicanus*), American kestrel (*F. sparverius*), golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), burrowing owl (*Athene cunicularia*), short-eared owl (*Asio flammeus*), and great horned owl (*Bubo virginianus*) have been observed on or immediately adjacent to the proposed permit area and two-mile buffer. Figure 3-8 shows all active and inactive raptor nests recorded since 1986 in this area (WGFD, 1991b; USFWS, 1991); many of the nests depicted on the map may no longer be present.

Five active raptor nests (three Swainson's hawk, two red-tailed hawk, one unknown) were found on the proposed permit area and adjacent buffer during surveys conducted in 1991. All nests located in 1991 were tree nests. Based on a large number of observations of newly fledged birds and/or observations of birds exhibiting nesting/breeding behavior, it is assumed that northern harrier, ferruginous hawk, American kestrel, short-eared owl, and great horned owl also nested on or adjacent to the permit area in 1991 (unpublished data, Mariah, 1991). Additional raptor nesting data was obtained from Ron Starkey, (personal communication, USFWS, 1991), WGFD (1991b), BLM (1985), and Larry Gerard (personal communication, BLM, 1991). These data indicate 30 nests occur on the proposed permit area and adjacent two-mile buffer, including nesting by ferruginous hawk (ground, cliff, and tree nests), golden eagle (cliff and tree nests), great horned owl (cavity and tree nests), short-eared owl (ground nest), and burrowing owl (burrow nests) (Figure 3-8). Golden eagle and red-tailed hawk apparently utilize the same nests on the area during different years.

3.7.4 Upland Game Birds

Three species of upland game birds, sage grouse (*Centrocercus urophasianus*), sharp-tailed grouse (*Tympanuchus phasianellus*), and mourning dove (*Zenaida macroura*), occur on the proposed permit area and adjacent buffer area. Two historic sage grouse leks occur on the proposed permit area as well as approximately 5,996 acres of potential

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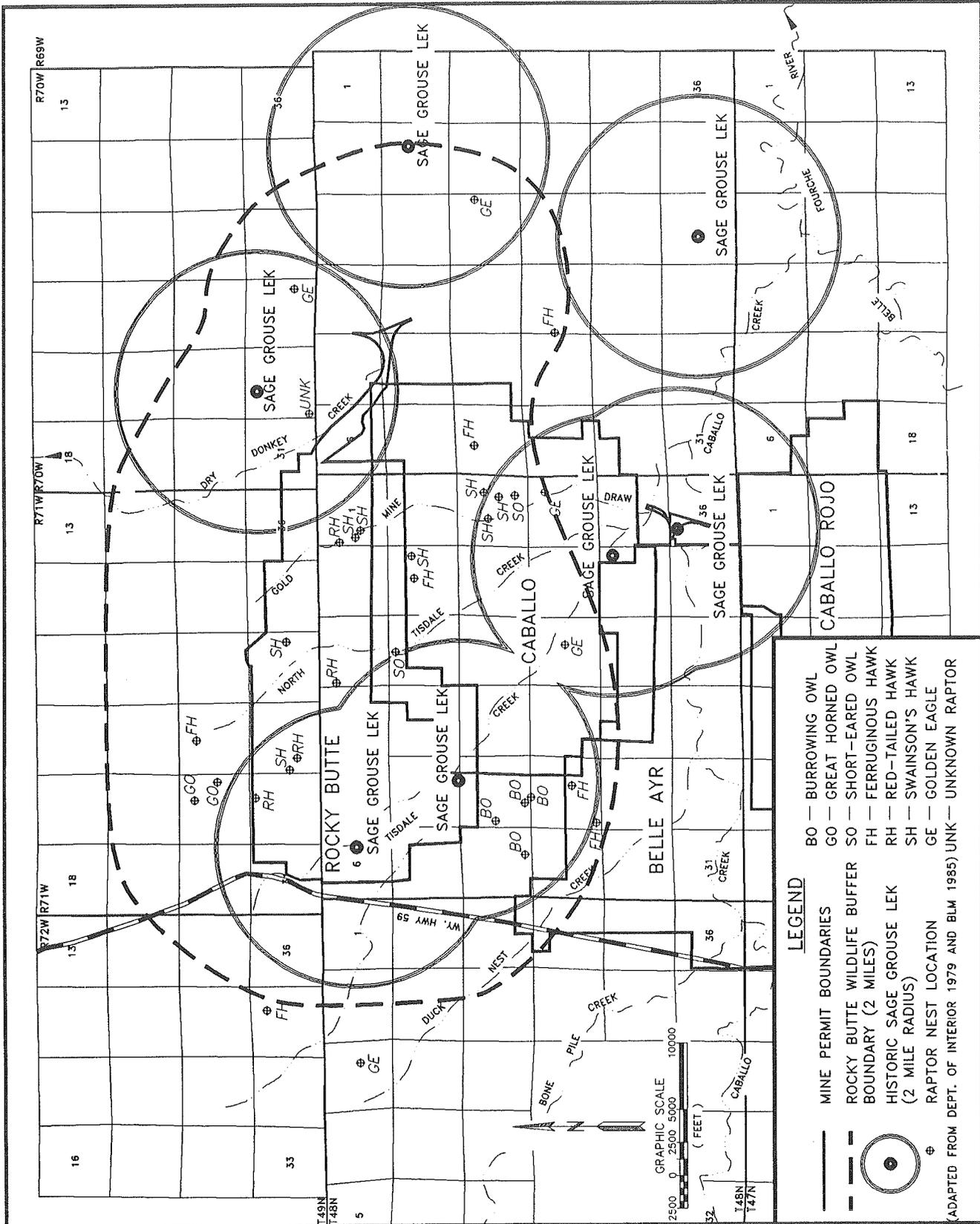


Figure 3-8. Raptor Nests and Sage Grouse Leks On and Near the Proposed Rocky Butte Mine

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sage grouse nesting area (i.e., area within a two-mile radius surrounding historic lek centers) (Figure 3-8). Numerous observations of sage grouse broods in the permit area were made during 1991, indicating that the area is also utilized by the species for rearing young (unpublished data, Mariah, 1991).

No WGFD observations of sharp-tailed grouse have been recorded for the proposed permit area (WGFD, 1991b). However, one observation of a sharp-tailed grouse brood was made during 1991 west of State Highway 59 within the two-mile buffer zone (unpublished data, Mariah, 1991).

Mourning doves were observed throughout the proposed permit area during 1991, primarily near shelterbelts and perching on powerlines.

3.7.5 Migratory Birds of High Federal Interest

Table 3-3 presents a listing of the migratory birds of high federal interest (MBHFI) that may occur on the proposed permit area. Ferruginous hawk, golden eagle, prairie falcon, and burrowing owl were all observed in the area in 1991 (unpublished data, Mariah, 1991). Bald eagles were observed in February 1988 approximately 0.5 mile southeast of the two-mile buffer (WGFD 1991b), suggesting that the area may be used for foraging by wintering bald eagles. Bald eagles present on the area during winter are likely from the Belle Fourche roost located approximately 10 miles southeast of the proposed permit area. Ferruginous hawk, golden eagle, and burrowing owl have all been observed nesting on the area or within the two-mile buffer, and as such also use the area for hunting. Prairie falcon nesting in the vicinity is unlikely due to the absence of appropriate cliff habitat; however, the species apparently uses the area for hunting.

Additional MBHFI that may sporadically utilize the proposed permit area and surrounding buffer include double-crested cormorant, Richardson's merlin, sandhill crane, mountain plover, and long-billed curlew. White pelican, peregrine falcon, and osprey may also feed on the area in some years during their migrations.

3.7.6 Threatened and Endangered Species

Bald eagle, peregrine falcon, and black-footed ferret (*Mustela nigripes*) are the only T&E species that may occur in the proposed permit area and adjacent two-mile buffer (personal communication, Ron Starkey, USFWS, 1991). No known bald eagle nests or winter roosts are present on the area; however, bald eagle have been observed approximately 0.5 mile southeast of the buffer area during winter. Migrating bald eagles and those wintering at the Belle Fourche roost may occasionally use the area for foraging. No known peregrine falcon nests occur on the area, nor have any peregrine falcons been observed. The absence of tall cliffs in the area precludes peregrine falcon nesting, although the area may be used occasionally for hunting by migrating peregrines. No confirmed black-footed ferret sightings have been recorded for the permit area. Since no prairie dog colonies were found during 1991 surveys of the proposed permit area and surrounding two-mile buffer, the presence of black-footed ferret on the area is highly unlikely.

A Wyoming Natural Diversity Data Base search for State sensitive wildlife species on the permit area and adjacent townships revealed no reports of occurrences (personal communication, Robin Jones, Nature Conservancy, 1991). The WGFD (personal communication, Sharon Ritter, 1991) has identified priority bird species that may be present on or near the proposed mine site. These include upland sandpiper (*Bartramia longicauda*), burrowing owl, ferruginous hawk, and long-billed curlew. The WGFD also identified mountain plover (*Charadrius montanus*), a candidate species for T&E listing, as potentially occurring on the site. Burrowing owl, upland sandpiper and ferruginous hawk were observed on the area in 1991 (unpublished data, Mariah, 1991); and long-billed curlew are known to occur in the Campbell County area (Oakleaf et al., 1990). Mountain plover has never been recorded in the area (Table 3-3).

3.7.7 Other Species

Five species of predator and/or predator sign were observed on the proposed permit area and adjacent two-mile buffer during 1991 (unpublished

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Table 3-3 Migratory Birds of High Federal Interest in Northeast Wyoming and Expected Occurrence On or Near the Proposed Rocky Butte Mine, Campbell County, Wyoming, 1991.

Common Name	Scientific Name	Wyoming Seasonal Status/Breeding Records in NE Wyoming ¹	Sighting Records ²	Expected Occurrence in and Adjacent to the Rocky Butte Permit area
White Pelican	<i>Pelecanus erythrorhynchos</i>	Summer/nonbreeder	None	uncommon/migrant
Double-crested cormorant	<i>Phalacrocorax auritus</i>	Summer/breeder	None	uncommon/breeder
Canvasback	<i>Aythya valisineria</i>	Summer/nonbreeder	None	rare/migrant
Ferruginous hawk	<i>Buteo regalis</i>	Resident/breeder	Mariah/WGFD/BAMP/CCMP	common/breeder
Golden eagle	<i>Aquila chrysaetos</i>	Resident/breeder	Mariah/WGFD/BAMP/CCMP	common/breeder
Bald eagle	<i>Haliaeetus leucocephalus</i>	Resident/nonbreeder	WGFD/BAMP/CCMP	uncommon/winter
Osprey	<i>Pandion haliaetus</i>	Resident/nonbreeder	None	uncommon/migrant
Prairie falcon	<i>Falco mexicanus</i>	Resident/breeder	Mariah/WGFD/CCMP	uncommon/breeder
Peregrin falcon	<i>Falco peregrinus</i>	Resident/nonbreeder	None	rare/migrant
Richardson's merlin	<i>Falco columbarius</i>	Resident/breeder	WGFD	uncommon/breeder
Whooping crane	<i>Grus americana</i>	Never recorded	None	very rare/migrant
Sandhill crane	<i>Grus canadensis</i>	Summer/breeder	CCMP	uncommon/migrant
Mountain plover	<i>Eupoda montana</i>	Never recorded	None	rare/breeder
Long-billed curlew	<i>Numenius americanus</i>	Summer/nonbreeder	BAMP	uncommon/migrant
Burrowing owl	<i>Athene cuniculara</i>	Summer/breeder	Mariah/WGF	uncommon/breeder
Lewis' woodpecker	<i>Asyndesmus lewis</i>	Summer/nonbreeder	None	rare/migrant
Dickcissel	<i>Spiza americana</i>	Never recorded	None	rare/migrant

¹ Compiled from Oakleaf et al. (1991); includes north and central Campbell County, northwest Weston County, and west Crook County.

² Mariah: 1991 field investigations
 WGFD: Observation records
 BAMP: Belle Ayr mine permit
 CCMP: Carter Caballo mine permit

data, Mariah, 1991). These species were coyote (*Canis latrans*); red fox (*Vulpes vulpes*), bobcat (*Felis rufus*), badger (*Taxidea taxus*), and striped skunk (*Mephitis mephitis*). Other predator/furbearing species that may occasionally occur on the area include grey fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), ermine (*Mustela erminea*), long-tailed weasel (*M. frenata*), and eastern spotted skunk (*Spilogale putorius*).

Three lagomorph species--desert cottontail rabbit (*Sylvilagus auduboni*), whitetailed jackrabbit (*Lepus townsendi*), and blacktailed jack rabbit (*L. californicus*)--were observed on the proposed permit

area during 1991 (unpublished data, Mariah, 1991). Other small mammals commonly occurring on the area include deer mouse (*Peromyscus maniculatus*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), and vole (*Microtus* spp.).

Common nongame birds on the area include horned lark (*Eremophila alpestris*), western meadow lark (*Sturnella neglecta*), lark bunting (*Calamospiza melanocorys*), killdeer (*Charadrius vociferus*), kingbird (*Tyrannus* spp.), loggerhead shrike (*Lanius ludovicianus*), and American robin (*Turdus migratorius*).

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Common nesting waterfowl on the area include mallard (*Anas platyrhynchos*), gadwall (*A. strepera*), and American widgeon (*A. americana*). Canada geese (*Branta canadensis*) were also observed feeding in grain fields on the area.

3.8 Historical, Archaeological, and Paleontological Resources

The Eastern Powder River Basin is associated with an important prehistoric and historic past. The area's archaeological record has been documented through surveys and excavations, while the historic record has been further documented by written records since 1850. In addition, Tertiary rock formations and overlying Quaternary deposits have potential to contain important paleontological remains.

Native American consultation is required by the Archaeological Resources Protection Act and the American Indian Religious Freedom Act. During scoping for this EIS, comments were solicited from the Bureau of Indian Affairs as well as from representatives of the Northern Arapahoe, Northern Cheyenne, Oglala Sioux and Shoshoni Tribes. No comments were received from these sources.

3.8.1 Archaeological Resources

The area around Gillette appears to have been inhabited by aboriginal hunting and gathering peoples for over 10,000 years. The known archaeological record indicates occupation of this portion of the Powder River Basin beginning in the Paleoindian period and continuing until the Historic period, when the Plains Indians were relocated by the encroaching Euroamerican population to reservations outside the Powder River Basin.

The lengthy cultural history of the Powder River Basin has been evidenced through numerous archaeological surveys in the last 15 years within the Rocky Butte permit area.

The entire proposed Rocky Butte permit area has been subjected to a Class III Cultural Resource inventory over the course of several years. Major field work was conducted within the Rocky Butte lease area by Science Applications, Inc. in 1981 for

Hampshire Energy (Southward and Friedman 1981); by Powers Elevation in 1981 for Environmental Research and Technology, Inc. (Persinger et al., 1981); by Powers in 1983 for Texas Energy Services, Inc. (Floodman and Friedman, 1983); and by Mariah in 1991 for NWR (1991, in prep.). Additional survey and mitigation work was carried out for The Carter Mining Company in the adjacent Caballo Mine lease by the Office of the Wyoming State Archaeologist between 1975 and 1981 (Eckles et al., 1980; Hauff and Eckles, 1982) and by Larson-Tibesar Associates in 1983 (Tibesar et al. 1983).

Class I cultural resource file search results provided by the State Historic Preservation Office (SHPO) indicate that eight smaller-scale Class III surveys have been accomplished in the permit area. Table 3-4 lists all of the Class III surveys conducted. A total of 59 sites have been compiled within the permit area, consisting of 26 historic and 29 prehistoric sites (Table 3-5). Four sites (48CA472, 48CA2702, 48CA2705, and 48CA2706) contain both historic and prehistoric components.

The cultural resource base includes diagnostic remains indicating aboriginal occupation of the proposed permit area during the Paleoindian; Middle and Late Plains Archaic; and Late Prehistoric periods. The prehistoric sites consist primarily of lithic scatters with some lithic resource procurement localities and open camps.

More intensive investigations have been carried out only at a few sites in the southwestern portion of the proposed permit area during cultural resource investigations associated with the Caballo Mine (Hauff and Eckles 1982). This work included detailed mapping, surface collections, and analysis at one historic site (48CA289) and both intensive surface documentation and excavations at a multicomponent prehistoric/historic site (48CA472). At the latter site, investigations were very productive, revealing hearths associated with abundant lithic remains and demonstrating occupation during much of the Archaic and Late Prehistoric periods.

The presence of Hell Gap and Agate Basin projectile points at two sites (48CA2707 and 48CA2723) recorded during the 1991 Mariah survey suggest that they and possibly a third adjacent site (48CA2708) with similar lithic characteristics comprise a Paleoindian site complex. This locality

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warrants further investigation and may contain significant information potential. Subsurface cultural materials recovered during testing at two additional sites (48CA2712 and 48CA2719) also indicate they may be eligible to the National Register of Historic Places (NRHP). One other site (48CA2717) in this inventory is associated with alluvium and indicates additional subsurface investigations are warranted. The rest of the prehistoric sites do not appear eligible, except for 48CA472 mentioned previously.

3.8.2 Historical Resources

Historic land use of the permit area began in Wyoming's Territorial Period (1868-1890) and has continued with increased intensity and variety to the present. Comprehensive historical overviews of the

eastern Powder River Basin by Markoff (1981) and Rosenberg (1991) have been prepared in conjunction with cultural resource investigations for recent coal development.

Campbell County was created in 1911, with Gillette as the new county seat. Shortly thereafter, changes in the homesteading laws, state sponsored recruitment efforts, and favorable crop prices combined to draw many potential dryland farmers to the marginal lands of Wyoming. Stock raising, of cattle and sheep, was more successful and expanded following the passage of the Stock Raising Homestead Act of 1916, which permitted entries of 640 acres.

Table 3-4 Cultural Resource Inventories in Rocky Butte Area

Survey	Total Acreage	Acres in Proposed Permit Area	Total Sites		Sites in Proposed Permit Area		Reference
			Historic	Prehistoric	Historic	Prehistoric	
Science Applications	2400	60	2	18	0	3	Southward & Friedman (1981)
Powers Elevation	2300	1450	2	3	1	1	Persinger et al. (1981)
Powers Elevation	4420	4420	9	8	9	8	Floodman & Friedman (1983)
Office of State Archaeologist	9440	548	21	23	3	1	Eckles et al. (1980)
Office of State Archaeologist	0	0	2	0	1	0	Hauff & Eckles (1982)
Larson-Tibesar Associates	1960	560	5	3	1	0	Tibesar et al. (1983)
Mariah Associates	4281	4281	14	20	14	20	Mariah (1991, in prep.)
Powers Elevation	40	40	0	0	0	0	Project #800005
Senco-Pheonix	48	48	0	0	0	0	Project #811321
Metcalf-Zier Arch. Cons.	40	40	0	0	0	0	Project #812098
John Greer	40	40	0	0	0	0	Project #830950
Pronghorn Anthro. Assoc.	10	10	0	0	0	0	Project #840111
Archaeological Energy Cons.	40	23	0	0	0	0	Project #850675
Bureau of Land Management	6	6	1	1	1	0	Project #870561
Frontier Archaeology	10	10	0	0	0	0	Project #880608
TOTAL	25035	11536	56	76	30	33	

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Table 3-5 Rocky Butte Archaeological Inventory

Smithsonian No.	Site Type	Site Period	Reference	Eligible	Area
48CA289	Homestead/Ranch	Historic	Eckles et al. (1980) Hauff & Eckles (1982)	No*	Within the mine area
48CA472	Open Camp	Middle & Late Archaic,	Eckles et al. (1980)	Yes**	Within the mine area
	Debris Scatter	Prehistoric/Historic	Hauff & Eckles (1982)	No*	
48CA473	Debris Scatter	Historic	Eckles et al. (1980)	No	Within the mine area
48CA1093	Lithic Scatter	Prehistoric	Southward & Friedman (1981)	No	Railroad corridor
48CA1094	Lithic Scatter	Prehistoric	Southward & Friedman (1981)	No	County road realignment
48CA1278	Lithic Scatter	Prehistoric	Persinger et al. (1981)	No	County road realignment
48CA1279	Lithic Scatter	Prehistoric	Persinger et al. (1981)	No	County road realignment
48CA1281	Homestead	Historic	Persinger et al. (1981) Mariah (1991)	No	Within the mine area
48CA1504	Homestead	Historic	Hauff & Eckles (1982)	No	Outside mine area
48CA1966	Homestead	Historic	Tibesar et al. (1983) Mariah (1991)	No	Outside mine area
48CA1968	Homestead	Historic	Floodman & Friedman (1981)	No	Within the mine area
48CA1969	Homestead	Historic	Floodman & Friedman (1981)	No	Within the mine area
48CA1970	Debris Scatter	Historic	Floodman & Friedman (1981)	No	Within the mine area
48CA1971	Homestead	Historic	Floodman & Friedman (1981)	No	Within the mine area
48CA1972	Homestead	Historic	Floodman & Friedman (1981)	No	Within the mine area
48CA1973	Homestead	Historic	Floodman & Friedman (1981) Tibesar et al. (1983)	No	Within the mine area
48CA1974	Homestead/Ranch	Historic	Floodman & Friedman (1981) Tibesar et al. (1983)	Yes	Within the mine area
48CA1975	Probable Homestead	Historic	Floodman & Friedman (1981) Tibesar et al. (1983)	No	Within the mine area
48CA1976	Ranch	Historic	Floodman & Friedman (1981)	No	Within the mine area
48CA1977	Lithic Scatter	Prehistoric	Floodman & Friedman (1981)	No	Within the mine area
48CA1978	Lithic Scatter	Prehistoric	Floodman & Friedman (1981)	No	Within the mine area
48CA1979	Lithic Scatter	Prehistoric	Floodman & Friedman (1981)	No	Within the mine area

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Table 3-5. Rocky Butte Archaeological Inventory (cont.)

Smithsonian No.	Site Type	Site Period	Reference	Eligible	Area
48CA1980	Lithic Scatter	Prehistoric	Floodman & Friedman (1981)	No	Within the mine area
48CA1981	Lithic Scatter	Prehistoric	Floodman & Friedman (1981) Tibesar et al. (1983)	No	Within the mine area
48CA1982	Lithic Scatter	Prehistoric	Floodman & Friedman (1981)	No	Within the mine area
48CA1983	Lithic Scatter	Prehistoric	Floodman & Friedman (1981)	No	Within the mine area
48CA1984	Lithic Scatter	Prehistoric	Floodman & Friedman (1981) Tibesar et al. (1983)	No	Within the mine area
48CA2483	Debris Scatter	Historic	SHPO, Records search (1991)	No	County road realignment
48CA2693	Homestead/Ranch	Historic	Mariah (1991)	Unknown	County road realignment
48CA2694	Road	Historic	Mariah (1991)	Unknown***	Within the mine area
48CA2695	Habitation/ Possible Homestead	Historic	Mariah (1991)	Unknown	Within the mine area
48CA2696	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Within the mine area
48CA2697	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Within the mine area
48CA2698	Debris Scatter	Historic	Mariah (1991)	Unknown	Within the mine area
48CA2699	Homestead/Ranch	Historic	Mariah (1991)	Unknown	Within the mine area
48CA2700	Agricultural Debris	Historic	Mariah (1991)	Unknown	Within the mine area
48CA2701	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Within the mine area
48CA2702	Lithic Scatter/ Debris Scatter	Prehistoric/ Historic	Mariah (1991)	Unknown	Within the mine area
48CA2703	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Within the mine area
48CA2704	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Within the mine area
48CA2705	Lithic Scatter/ Debris Scatter	Prehistoric/ Historic	Mariah (1991)	Unknown	Outside mine area
48CA2706	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Outside mine area
	Habitation/ Possible Homestead	Historic			
48CA2707	Lithic Scatter	Paleoindian	Mariah (1991)	Unknown***	Within the mine area
48CA2708	Open Camp	Possible Paleoindian	Mariah (1991)	Unknown***	Within the mine area
48CA2709	Debris Scatter	Historic	Mariah (1991)	Unknown	County road realignment
48CA2710	Farmstead	Historic/Modern	Mariah (1991)	Unknown	Outside mine area
48CA2711	Lithic Quarry	Prehistoric	Mariah (1991)	Unknown	Outside mine area
48CA2712	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown***	Outside mine area
48CA2713	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Outside mine area
48CA2714	Dump	Historic	Mariah (1991)	Unknown	Outside mine area

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Table 3-5. Rocky Butte Archaeological Inventory (cont.)

Smithsonian No.	Site Type	Site Period	Reference	Eligible	Area
48CA2715	Habitation/ Possible Homestead	Historic	Mariah (1991)	Unknown	Outside mine area
48CA2716	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Outside mine area
48CA2717	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown***	Outside mine area
48CA2718	Secondary Lithic Procurement	Prehistoric	Mariah (1991)	Unknown	Railroad corridor
48CA2719	Open Camp	Prehistoric	Mariah (1991)	Unknown***	Railroad corridor
48CA2720	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Railroad corridor
48CA2721	Stockherder Camp	Historic	Mariah (1991)	Unknown	Outside mine area
48CA2722	Lithic Scatter	Prehistoric	Mariah (1991)	Unknown	Outside mine area
48CA2723	Lithic Scatter	Paleoindian	Mariah (1991)	Unknown***	Within the mine area

* Site mitigated through data recovery.
 ** Site partially mitigated through data recovery.
 *** Believed eligible - final determination pending.

Homesteading in the region which includes the permit area began during the first decade of the twentieth century. The greatest number of homestead entries were made during a period beginning in the mid-1910s through the early 1920s. Livestock grazing continued as the primary economic land use of the central Campbell County area, although years of drought and the Great Depression of the 1930s caused the abandonment and foreclosure of many homesteads in the Powder River Basin. In many cases, failed ranches were acquired by those that survived.

Commercial coal and oil extractive industries began in Campbell County just before World War I. The Wyodak Coal Mine near Gillette, which began operation in 1923, was the only commercially successful coal mine until the 1970s. During World War II, coal production intensified in Campbell County. Demand for coal fell by the late 1950s, largely due the transition from coal to diesel as railroad fuel. However, by the late 1960s the demand for inexpensive low sulfur coals for power plants increased, spurring the development of many new mines in the Powder River Basin. The Burlington Northern line from Orin Junction to Gillette was constructed in the 1970s to serve these new mines. In the late 1940s many oil leases were taken up in the proposed permit area. The output of these

industries fluctuated with supply and demand cycles in the 1960s, 70s, and 80s.

A series of cultural resource inventories identified 30 historic sites within the area (Table 3-5). These sites are all associated with historic Euroamerican settlement, ranching, and agriculture in the permit area. The types of historic sites represented in the area include abandoned and occupied homestead/ranches, camp sites, dumps and debris scatters, and an early road. A total of 17 historic isolated finds have also been recorded within the area.

Three historic sites within the proposed permit area are believed eligible to the NRHP. One of these sites (48CA289) has previously been subjected to data recovery which appears to be adequate for mitigation of any adverse effects. One historic site listed in the SHPO files as eligible (48CA1974) required re-evaluation by Mariah in 1991, resulting in a finding of believed eligibility. One other historic site recorded in the Mariah survey (49CA2694) is also believed eligible. One site (48CA2483) encountered in the file search was unevaluated; historic evaluation conducted by Mariah during the 1991 survey indicated that this site is not believed eligible. None of the other historic sites in the cultural resource inventory is believed eligible.

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3.8.3 Paleontological Resources

The proposed permit area contains exposures of the sedimentary Eocene Wasatch and Paleocene Fort Union Formations. The Wyodak-Anderson Coal Bed, deposited approximately 55 million years ago in a northwesterly flowing, warm-temperate, intermontane basin fluvial system, occurs in the eastern Powder River Basin, in the Tongue River Member of the Fort Union Formation. Vertebrate, invertebrate, and paleobotanical fossils are known to occur within both the Wasatch and Fort Union Formations over a large area. Vertebrate fossils are considered most important, because of their rarity and scientific value.

A paleontological survey of the proposed permit area in 1991 (Breithaupt, 1991) did not detect the presence of significant vertebrate, invertebrate, or paleobotanical resources within the mine permit area. Fossil plant material consisting of leaf and stem impressions, as well as scraps of petrified wood and small fossilized stumps were found to occur in the permit area. These paleobotanical fossils were determined to be common and of poor

preservation quality, and thus unimportant. However, there exists the possibility that buried significant fossil remains, particularly those of vertebrate fauna, exist beneath the visible ground surface.

3.9 Recreation

Sport hunting is the principal recreational land use within the proposed permit area. Hunting for pronghorn antelope, mule deer, and white-tailed deer occurs on and adjacent to the proposed permit area. Mourning dove, sage grouse, waterfowl, and cottontail rabbit are also harvested. Since land ownership within the permit area is predominantly private--except for state school Section 36, T.49N., R.71W.--public access is limited; however, some landowners permit sportsmen to cross or to hunt on their lands, charging \$50-100 trespass fees (WGFD, 1991).

The proposed permit is within pronghorn Hunt Area 24 and within mule deer/white-tail deer Hunt Area 21. Boundaries for both Hunt Areas are the same, encompassing 225,000 acres. Hunter survey data are presented in Table 3-6.

Table 3-6. Hunter Survey for Hunt Areas 21 and 24 (Campbell County, Wyoming): Mule Deer, White-Tailed Deer, and Antelope, 1990.

	Hunt Area ¹	Hunters	Harvest	Hunter Success ²	Days/Harvest	Rec Days
MD	21	403	259	64.3	5.4	1402
WT	21	35	11	31.4	8.7	96
ANT	24	881	1119	127.0	2.0	2268

¹ MD - Mule Deer; WT - White-Tailed Deer; ANT - Antelope.
² Hunter success is expressed as a percentage. Many antelope hunters in this area harvest more than one antelope which accounts for the high success rate.

Source: McWhirter, Doug. Wildlife Biologist (Bio-Services). 1991. Wyoming Game and Fish Department, Cheyenne.

Approximately 60-70 antelope are harvested each year on the Rourke property, and in some years as many as 125-140 are taken. The Greer lease also has a significant antelope harvest. Five mule deer were harvested on the Rourke property in

1991. White-tails are infrequently harvested from the area (personal communication, Chuck Rourke, 1991).

Some non-consumptive use of wildlife (i.e., observation) takes place on the western border of

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the proposed permit area, both incidentally and through a self-guided "wildlife and natural history loop tour" developed by the WGFD (Campbell County, Wyoming, 1991).

3.10 Climate and Air Quality

3.10.1 Climate

The Eastern Powder River Basin has a high frequency of clear sky and dry air conditions, receiving approximately 67 percent of the possible sunshine (BLM, 1979) and having 55 to 60 percent average relative humidity. Radiative cooling contributes to large diurnal temperature variations. The average diurnal temperature differences are approximately 34°F in July and 22°F in January. Variations of up to 50°F are not uncommon. January is the coldest month with a mean daily temperature of 20°F. July, the hottest month, has a mean daily temperature of 71°F. Extreme values range from -34°F to 104°F in these same months. The Gillette area has an average frost-free growing season of 129 days. The 150-day average between the last spring and first fall occurrence of 28°F or below is a better indicator of growing season for native plants.

The climate is semi-arid with an average annual precipitation near 15 inches. Monthly precipitation is highest in May and June and lowest in December, January and February. About 40 percent of the annual precipitation falls as snow averaging 63 inches (Martner, 1986). Regional evaporation potential considerably exceeds precipitation.

Average annual wind speed is 12 miles per hour (mph) with winter gusts often reaching 30 mph and sometimes exceeding 40 mph. Regional wind speeds are highest in the winter and spring (BLM, 1979). Generally, the lightest winds occur during the summer months. Regionally, winds are predominantly westerlies, altered to northwesterlies by major topographic features. Secondary south and southwesterly winds occur in the summer. The absence of high topographic features in the immediate vicinity limits the formation and duration of temperature inversions. There are an average of 15 air-stagnation events annually with an average duration of 2 days (BLM, 1974).

Wind velocity data collected on the nearby Belle Ayr Mine site by Amax Coal Company is representative of conditions at the Rocky Butte Mine site (Figure 3-9). The pattern is one dominated by winds from the northwest, south and southwest.

3.10.2 Air Quality

The background rural annual geometric mean total suspended particulate (TSP) concentration is about 15 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Regulatory agencies also currently assume that the background concentration of suspended particulates smaller than 10 microns (PM_{10}) is also 15 $\mu\text{g}/\text{m}^3$. In and near populated areas and active mining operations, particulate levels are significantly higher than background levels (BLM, 1985). Visibility of more than 60 miles is common. Significant reductions in visibility are generally weather-related, although major forest fires to the west and northwest have impaired visibility in the Powder River Basin. A detailed description of the air quality of the area has been produced for the BLM (PEDCO, 1983).

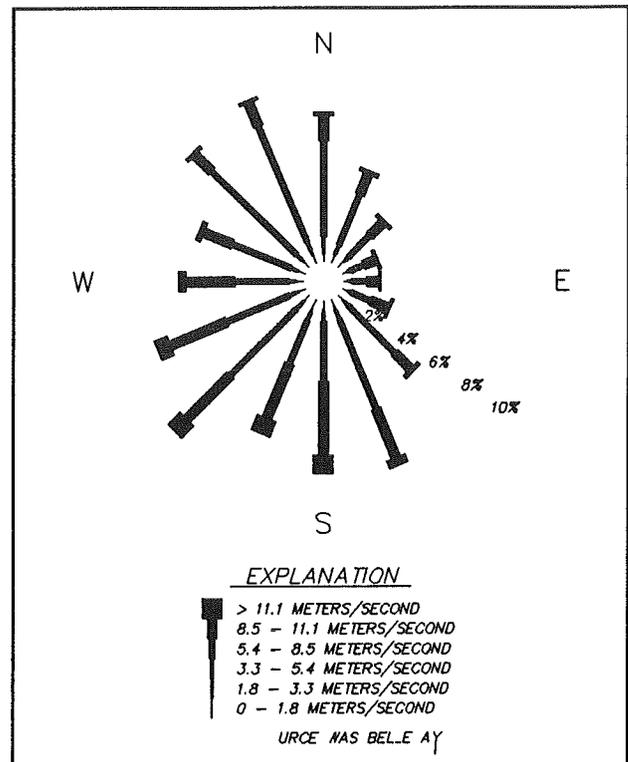


Figure 3-9. Wind Rose for Proposed Rocky Butte Mine Area

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The basic regulatory framework which governs air quality in Wyoming is the Environmental Quality Act, the accompanying Air Quality Rules and Regulations, and the State Implementation Plan (SIP) approved by EPA under the Clean Air Act. This regulatory framework includes state air quality standards, which must be at least as stringent as National Ambient Air Quality Standards (NAAQS),

and allowable increments for the prevention of significant deterioration (PSD) of air quality. The air quality standards which apply to coal mining are listed in Table 3-7. The large areas of disturbed land, crushing, loading and hauling of coal, and blasting associated with mining all produce dust which make the particulate standards the most important air quality issue for surface mining.

Table 3-7. Regulated Air Emissions for Wyoming

Emissions	Averaging Period	Wyoming Standard ($\mu\text{g}/\text{m}^3$)	National Standard ($\mu\text{g}/\text{m}^3$)
Total suspended particulates (TSP)	24-hour ¹	150	---
Particulate matter finer than 10 microns (PM_{10})	24-hour ¹	150	150
	annual ²	50	50
Nitrogen oxides (NO_x)	annual ²	100	100
Photochemical oxidants (O_3)	1-hour ¹	160	235
Sulfur dioxide (SO_2)	3-hour ¹	1,300	---
	24-hour ¹	260	365
	annual ²	60	80
Carbon monoxide (CO)	1-hour ¹	40,000	40,000
	8-hour ¹	10,000	10,000

¹ Standards not to be exceeded more than once per year.
² Annual arithmetic mean not to be exceeded.

The current particulate standards in Wyoming are for an annual average of $50 \mu\text{g}/\text{m}^3$ and 24-hour average of $150 \mu\text{g}/\text{m}^3$ for PM_{10} and a 24-hour average of $150 \mu\text{g}/\text{m}^3$ for TSP. The 24-hour standards are not to be exceeded more than once per year. The various motor vehicles used in mining and transport of coal and people also produce carbon monoxide, nitrogen oxides, sulfur dioxide and by secondary processes, ozone, though these are seldom at levels to cause regulatory concerns at Wyoming's surface coal mines.

The PSD program is designed to protect air quality from significant deterioration in areas already meeting state standards. In other words, an increase

or increment is allowed above baseline pollution levels so long as the state standard is not exceeded. The size of the increment allowable under PSD depends on the area's designation as a Class I, II, or III area with Class I areas allowed the smallest increment and Class III the largest. The mine area, as is all of Wyoming outside the national parks and wilderness areas, is Class II. Wyoming's PSD standards, which are identical to federal standards, are summarized in Table 3-8.

In November 1990, the State of Wyoming submitted to the EPA a proposed revision to the SIP. One purpose of the revision was to modify Section 24 of the Air Quality Division (AQD) regulations which

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Table 3-8. Maximum Allowable Increases for Prevention of Significant Deterioration of Air Quality in Wyoming

Emission	Averaging Time	Maximum Allowable Concentration Increase (micrograms per cubic meter)		
		Class I	Class II	Class III
Sulfur dioxide	Annual Mean	2	20	40
	24-hour ¹	5	91	182
	3-hour ¹	25	512	700
Total suspended particulates (TSP)	Annual Mean	5	19	37
	24-hour ¹	10	37	75

¹ Not to be exceeded more than once in any 12-month period.

deals with PSD. Another purpose was to modify ambient air quality standards for PM₁₀. Prior to submission to the EPA, the Wyoming DEQ/AQD held a series of public hearings. During one of the hearings, the Wyoming DEQ/AQD presented testimony documenting that while coal production had increased dramatically, the air quality resource had not been diminished.

A summary of the historical monitoring data for the years 1980 through 1988 is provided as Table 3-

9. During this period the number of mines producing coal increased from 10 to 16 while coal production escalated from 58.8 million tons to 139.1 million tons. The number of mines monitoring air quality increased from 12 to 16 (Table 3-9). The number of actual monitoring sites at the mines varied from a low in 1980 of 29 to a high of 46 in 1986. In 1988 there were 45 operating sites. Some of these sites include more than one sampler, so the number of actual high volume air samplers is greater than the number of monitoring sites.

Table 3-9. Summary of Air Quality Monitoring in Wyoming's Powder River Basin, 1980-1988

Year	Number of Mines (Producing/ Monitoring)	Number of Monitoring Sites	Coal (mmt)	Overburden (mmbcy)	TSP Average of All Geometric Means (µg/m ³)
1980	10/12	29	58.8	93.2	30.8
1981	11/13	34	68.9	108.0	30.4
1982	11/15	43	81.4	120.7	23.1
1983	13/15	41	88.0	157.2	24.3
1984	14/15	44	106.8	166.6	24.3
1985	16/15	45	113.8	196.3	24.3
1986	16/16	46	114.6	169.6	20.5
1987	16/16	45	124.6	180.9	25.6
1988	16/16	45	139.1	209.8	29.3

Note: Mines include Buckskin, Rawhide, Eagle Butte, Fort Union, Clovis Point, Wyodak, Caballo, Belle Ayr, Caballo Rojo, Cordero, Coal Creek, Jacobs Ranch, Black Thunder, North Antelope/Rochelle, Antelope, and North Rochelle.

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In an effort to summarize the monitoring data in comparative form, averages of the geometric means from all sites were calculated for each calendar year. The averages ranged from a high of 30.8 $\mu\text{g}/\text{m}^3$ in 1980 to a low of 20.5 $\mu\text{g}/\text{m}^3$ in 1986. Over 23,000 samples were collected during this period.

Table 3-9 shows that the average of the geometric means went up during 1987 and 1988. It is not clear exactly what caused this increase. Speculation is that it was due to mining activity approaching monitoring sites and to dry conditions due to the regional drought. The third quarter of 1988 may have been impacted by emissions from the forest fires in Yellowstone Park, the Big Horn Mountains and the Rochelle Hills.

Before the TSP annual standard was replaced by the PM_{10} standard, the TSP annual standard was 60 $\mu\text{g}/\text{m}^3$. As Table 3-9 shows, the annual geometric means measured at all regional mines are well below this former standard. Assuming that PM_{10} , which was not monitored during the years shown in Table 3-9, was about 30 percent of the TSP values, and further assuming that the geometric and arithmetic means are similar, it can be inferred from Table 3-9 that the Powder River Basin mines would have historically been well within the current annual PM_{10} standard of 50 $\mu\text{g}/\text{m}^3$.

The conclusion that can be drawn from the information presented by the Wyoming DEQ/AQD is that while coal production increased nearly 2.5 times in the 1980-1989 period, the air quality in the Powder River Basin was not adversely impacted. This is due in part to the conditions attached to air quality permits, which stipulate control measures that must be implemented by the mine operators. These measures can include increased sprinkling, use of chemicals to control dust, limiting the amount of disturbed area, temporary vegetation of disturbed areas, and contemporaneous reclamation.

EPA approved the SIP revision regarding PSD regulations on May 24, 1991 but is still processing the ambient air SIP revision. The ambient air SIP revision modifies the State's definition of "ambient air" for the PRB only, allowing the coal mining companies to restrict public access from portions of each lease that are determined to be necessary for coal mining operations. Only lands outside of these restricted areas are subject to ambient air quality

standards. Region VIII of EPA is in the process of proposing to approve this revision with conditions. These conditions include: (1) develop and operate a maximum concentration monitor for each active mining area in the PRB to adequately assess the ambient air quality, with a commitment by the State to initiate expeditious remedial action if the violation of NAAQS is detected by the monitoring network, and (2) once EPA completes an assessment and possible improvement of the existing modeling tools, the State must perform the 30-year modeling study utilizing EPA-approved modeling tools and initiate expeditious remedial action if the modeling predicts exceedences of the applicable ambient air quality standards. EPA is currently in final negotiation with AQD regarding the establishment of the maximum concentration monitoring network.

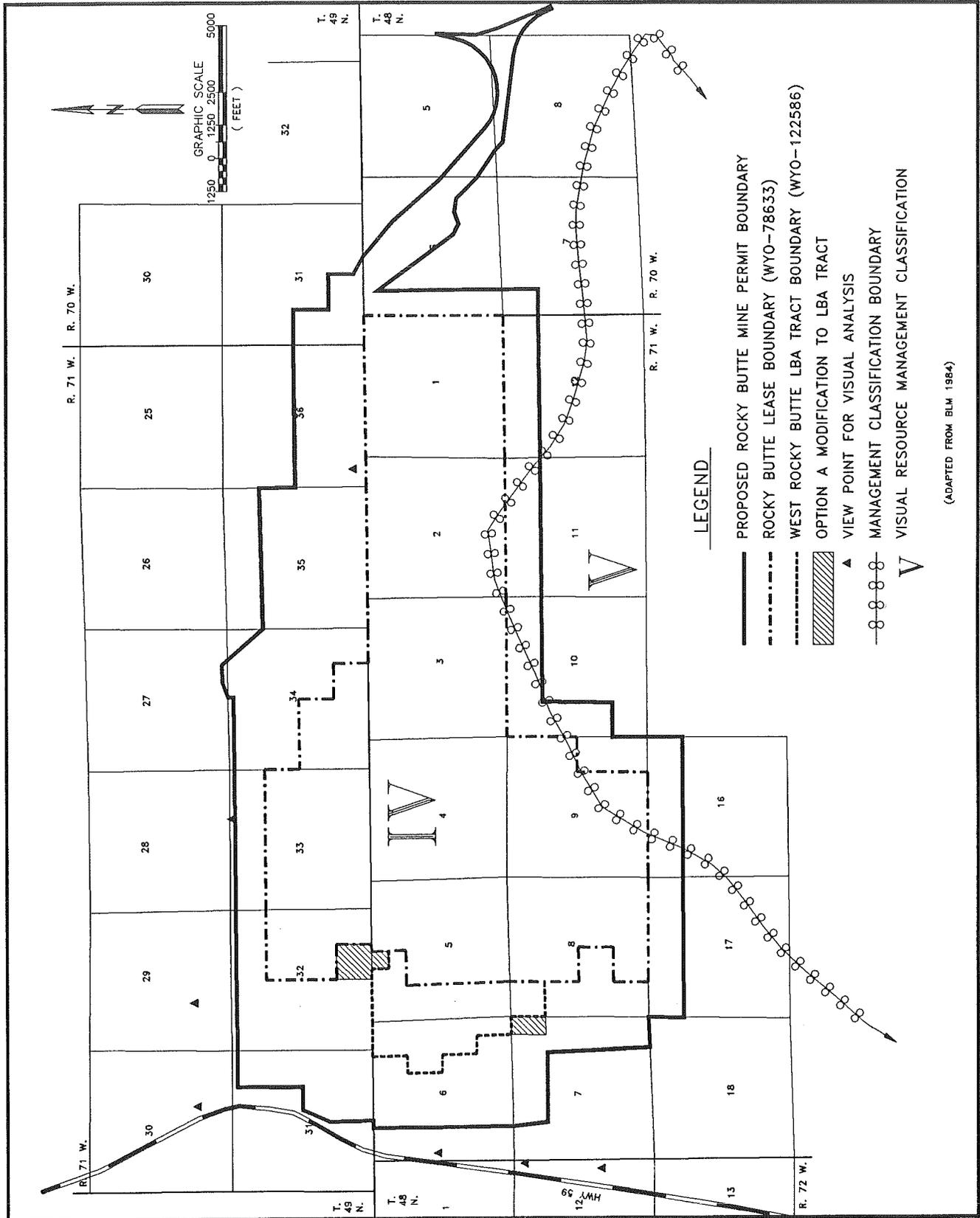
3.11 Visual Resources

A visual resource evaluation was made for the WRB lease tract and the proposed permit area by Mariah from several observation points along Wyoming Highway 59, the Four Corners Road, and the Fairview Road (Figure 3-10). This evaluation was made in accordance with the BLM's Visual Resource Management Program (BLM, 1980). The evaluation technique considers scenic quality classes, sensitivity levels, and visual (distance) zones.

Scenic quality classes are defined by a system that rates seven key factors: landform; vegetation; water; color; influence of adjacent scenery; scarcity; and cultural modification. Visual sensitivity levels are determined by people's concern for what they see and the frequency of travel through the area. Visual zones are divided into three categories: foreground/midground (0 to five miles from a travel route or observation point); background (from five miles to a maximum of 15 miles from an observation point); and seldom seen (along infrequently used roads or beyond 15 miles from an observation point).

In the Rocky Butte evaluation, the scenic quality was determined to be Class C (Appendix C). Class C areas are those that are fairly common to the physiographic region in which they occur. In the case of Rocky Butte, this means a rolling landscape with scattered buttes that lacks variety in land form, color, and contrast, with little variation in vegetation

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(ADAPTED FROM BLM 1984)

Figure 3-10. Visual Resource Management Classification and Visual Survey Area for Proposed Rocky Butte Mine

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and no unique factors. Major manmade intrusions exist as well, such as subdivisions, ranching, oil and gas development, and electric power transmission lines.

The viewer sensitivity level was estimated to be medium. This level was derived from the assumption that viewer sensitivity is low and traffic volume is high. Viewer sensitivity was assumed to be low because major observation points are along farm to market roads and major commuter routes to and from work areas (often coal mines) rather than along major tourist routes or routes to recreational areas.

When scenic quality class and viewer sensitivity level evaluations are combined with the visual distance zone, which in this case is the foreground/middleground, the visual management class for the Rocky Butte area is class IV (Appendix C).

The visual resource classification of IV for Rocky Butte area is in agreement with the BLM classification for the area south of Gillette that includes this area (BLM, 1984) (Figure 3-10). A portion of the area in the southern portion of the proposed mine permit area is rated as Class V. The class V area in this case includes the existing Caballo, Belle Ayr, Caballo Rojo, and Cordero mines to the south of the proposed permit area.

3.12 Noise

An individual's judgement of the loudness of a noise correlates well with the A-weighted sound level (dBA) system of measurement. The A-weighted sound level, or A-scale, has been used extensively in the U.S. for the measurement of community and transportation noises. Table 3-10 relates A-scale decibel readings to some typical sounds commonly heard in daily life.

The existing noise sources in the proposed lease area are wind, animal life, coal mining activities and limited agricultural activities. Traffic on U.S. Highway 59, which runs along the western side of the proposed Rocky Butte permit area, is an additional source of background noise for portions of the proposed permit area. This highway is the primary route to and from work for the Gillette residents employed at the mines south of Gillette. Traffic on this road is heaviest during daylight hours

and at shift changes and includes considerable numbers of large trucks in addition to passenger vehicles. From all these sources, the current noise level in the mine area is probably in the range of 40 to 50 decibels in the eastern part of the mine area and 60 to 70 decibels in the western and southern portions. Background noise levels would depend on time of day and location with respect to the highway and Caballo Mine activities, wind speed, and the presence of insects, birds, and other animals that contribute to background noise.

Figure 3-11 shows the locations of the nearest occupied dwellings to the proposed Rocky Butte Mine. The nearest dwellings to actual mining operations are those located between the proposed permit area and Highway 59. Dwelling no. 1 is more than 2,000 feet from the nearest disturbance, which will consist of the construction of an overburden stockpile during the development of the initial pit. Dwelling no. 2, the closest occupied dwelling to the mine area, will be 500 feet from the nearest disturbance and 125 feet from the permit boundary. Dwelling numbers 3, 4 and 5 are situated 1,250, 2,250 and 3,500 feet, respectively, from the nearest disturbance. Dwelling nos. 7 and 8 and the Nickelson Little Farms subdivision are located over one-half mile from the permit boundary and a mile or more from the nearest disturbance, the facilities area in Section 35.

3.13 Transportation Facilities

The primary transportation systems within Campbell County are a road system and a railroad system. Minor amounts of passengers and freight are carried by two regularly scheduled air lines and private and charter aircraft. The railroad lines, major highways and county roads in the region near the proposed Rocky Butte Mine are shown in Figure 2-2. A more detailed plan of the road and railroad system in and around the proposed Rocky Butte Mine site is shown in Figure 3-11.

3.13.1 Railroads

The main line of the Burlington Northern Railroad (BNR) runs east-west through Gillette. A 127 mile branch line, the Orin-Gillette line, runs south from the Donkey Creek Junction, 5 miles east of Gillette, to Orin Junction near Douglas.

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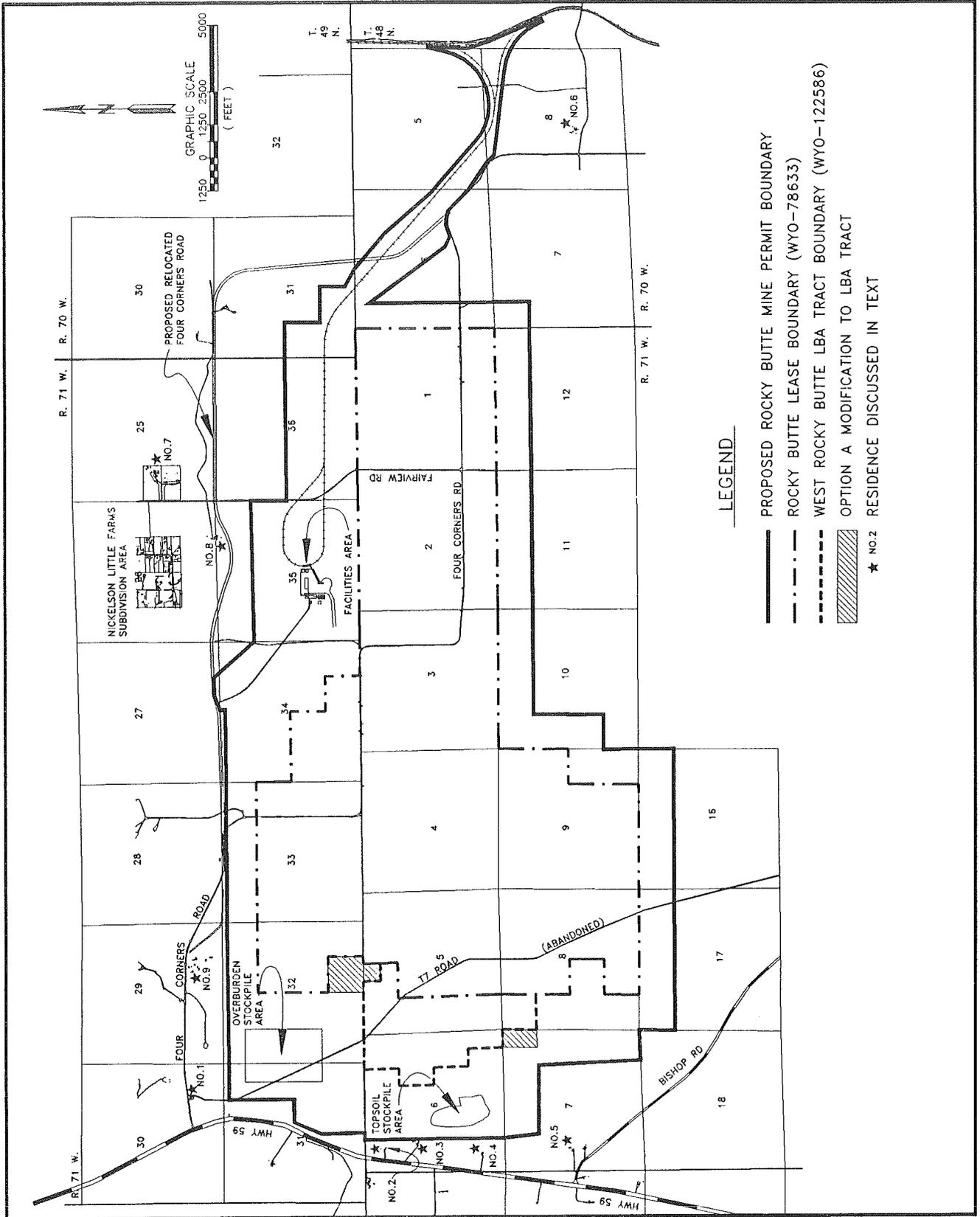


Figure 3-11. Locations of Residences Potentially Subject to Noise Impact and Transportation Facilities in Vicinity of Proposed Rocky Butte Mine

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Table 3-10. Typical Noise Levels of Common Occurrence

Noise Perception	Sound	Intensity Level dBA*
Permanent hearing damage	Saturn V moon rocket launch	180
Near permanent hearing damage	Jet aircraft engine (from 75 feet)	130-140
Threshold of pain	Loud rock music	120-130
Uncomfortably loud	Scraper-loader	110
Discomfort threshold	Jet airplane (from 1000 feet)	100
Very loud interferes with conversation	Heavy city traffic	90
Hearing damage threshold for prolonged exposure	Air Compressor (from 20 feet)	85
Nuisance level	Small outboard motor	80
	Vacuum cleaner	70
Quiet	Conversational speech	60
	Window air conditioner	50
	Rustling leaves	20

* dBA = logarithmic measure of noise intensity (based on the A scale).

Sources: Zilly, R.G., ed., Handbook of Environmental Civil Engineering, 1975.
 Shortley, G. and Williams, D., Elements of Physics, Vol. II, 3rd Ed., 1964.
 Merritt, F.S., ed., Standard Handbook for Civil Engineers, 2nd Ed., 1976.

This branch serves to transport coal from mines in the central and southern parts of Campbell County to mainlines in Gillette or Douglas. Mines currently served by this line include the Caballo, Belle Ayr, Caballo Rojo, Cordero, Coal Creek, Jacobs Ranch, Black Thunder, North Rochelle, Rochelle, North Antelope and Antelope mines. The Orin-Gillette branch would also serve the proposed Rocky Butte Mine. In 1990 an average of 59.5 unit train round trips per day, including both BNR and Chicago and Northwestern Railroad (CNW) trains, used the Orin-Gillette line. The Gillette main line averaged approximately 32.8 unit train round trips per day. The first three quarters of 1991 saw an average of 61.5 unit train round trips per day on the Orin-Gillette Branch Line (Basford, 1991).

3.13.2 Roads

The road system in Campbell County consists of over 400 miles of paved highway maintained by the State of Wyoming; 1000 miles of roads, 150 miles of that paved, maintained by the Campbell County Road and Bridge Department; and the city streets maintained by the various towns and cities within the county.

The main access to the proposed Rocky Butte Mine is via State Highway 59 and the Four Corners County Road (Figure 3-11). State Highway 59, running south from Gillette to Douglas, is a two lane highway except for the 3 mile section just south of Gillette where it is four-lane. The average 1990 traffic count on Highway 59 near the Four Corners Road intersection was 4200 vehicles per day (Urich, 1991). Level of Service (LOS) analysis for this area currently shows 645 vehicles per hour, about 36 percent of the capacity of the highway. The corresponding LOS is a low C value (Lane, 1991). The Four Corners Road is an unpaved, two-lane road serving local ranches and oil field sites. It originates at Highway 59, running generally east-southeast in several east and south legs connected by ninety-degree corners until it intersects Fairview Road. It then continues east and then south for approximately another 2.5 miles before ending. It does not link major activity points. No traffic studies have been done on the Four Corners Road.

3.13.3 Airlines

Gillette and Campbell County are served by two regularly scheduled regional carriers, Mesa Airlines operating as United Express and Continental Express. United Express has four arrivals and

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departures daily with 600 to 650 passengers departing and approximately the same number arriving per month. The load capacity factor for current operations is approximately 50 percent (Kemp and Bell, 1991). Continental Express also has four flights per day with an average of 900 arrivals and 900 departures per month. The load capacity factor for Continental Express is approximately 83 percent (Morgan, 1991). General and military aviation flights account for an average of 60 to 65 arrivals and departures daily with an unknown number of emplanements and deplanements. The present airport use is moderate, but the terminal building and commercial staging areas are congested. A new terminal building is planned with construction tentatively scheduled for sometime within the first half of the decade (Lundell, 1991).

3.14 Land Use and Ownership

3.14.1 Land Ownership

The proposed Rocky Butte permit area contains 9,647 acres of land. The surface area is comprised of 9,167 acres of private ownership and 480 acres of Wyoming State lands. NWR owns approximately 1,664 acres of the surface within the proposed permit boundary. Figure 3-12 shows the surface ownership within the proposed permit area. Private companies and individuals own the remainder of the land, on which NWR holds leases or will obtain them. All of the surface area over the WRB tract is leased by NWR for surface mining purposes.

The mineral ownership within the proposed permit area is very diverse. There are 259 acres of private coal and 8,908 acres of federal coal. The State of Wyoming owns 480 acres of coal within the permit area. Figure 3-13 provides the various types of mineral ownership. This figure reveals the fact that oil and gas ownership interests are considerably more diverse than the coal ownership. The diverse mineral ownership is the result of fee title to the lands being acquired under the earlier homestead acts.

The WRB tract, which consists of about 393 acres, includes about 326 acres of private oil and gas and about 67 acres of federally owned oil and gas.

3.14.2 Land Use

Oil and gas production has constituted the primary extractive, industrial-commercial land use within the proposed permit area since discovery of the Rainbow Ranch oil field in 1960 (see Table 3-11). Three other fields have subsequently been discovered in the vicinity of the permit area - Rourke Gap (1973), Butte Creek (1984), and WD (1989). Although some wells associated with these four fields are outside the permit boundary, eight producing oil wells are found within the permit area, with a combined production averaging 20,645 barrels of oil per month (BOPM) during 1991 (communication, Petroleum Information Corporation, 1992) (see Table 3-11 and Figure 3-13). The Rainbow Ranch field also produced an average of 54 thousand cubic feet (MCF) of natural gas per month during 1991 (Wyoming Oil and Gas Conservation Commission, 1992), but no natural gas is produced from wells within the permit area. Additionally, a number of injector wells, water source wells, and dry holes are located within permit boundaries (communication, Zora, 1992).

Public utility powerlines, telephone cables, oil and gas pipelines, roads, and private water lines exist within permitted rights of way (ROWs) in the permit area. Special-use permits have been issued to Mountain States Telephone and Telegraph, Tri-County Electric Association, Belle Fourche Pipeline Company, Panhandle Eastern Pipeline Company, Phillips Petroleum Company, Jesse and Helen Gray, Robbins Valley Estates, and Campbell County for these ROWs. Pipeline locations, some of which are on permanent easements, are shown on Figure 3-13.

Grazing land, which is composed of native shrublands and grasslands, occupies 4,375 acres (45 percent) of the permit area. Rangeland productivity ranges from 0.2 to 0.3 animal-unit months (AUMs) per acre (Table 3-12). Pasture land, which occupies 569 acres, has a carrying capacity of 0.2 to 1.25 AUMs per acre. Stock ponds have been constructed to support grazing activities.

Cropland and grazing land are the principal land use types within the Rocky Butte permit area; however, most land in the permit area supports multiple usage. Agricultural lands, in conjunction with stock ponds, wind breaks, and shelter belts, provide habitat for wildlife.

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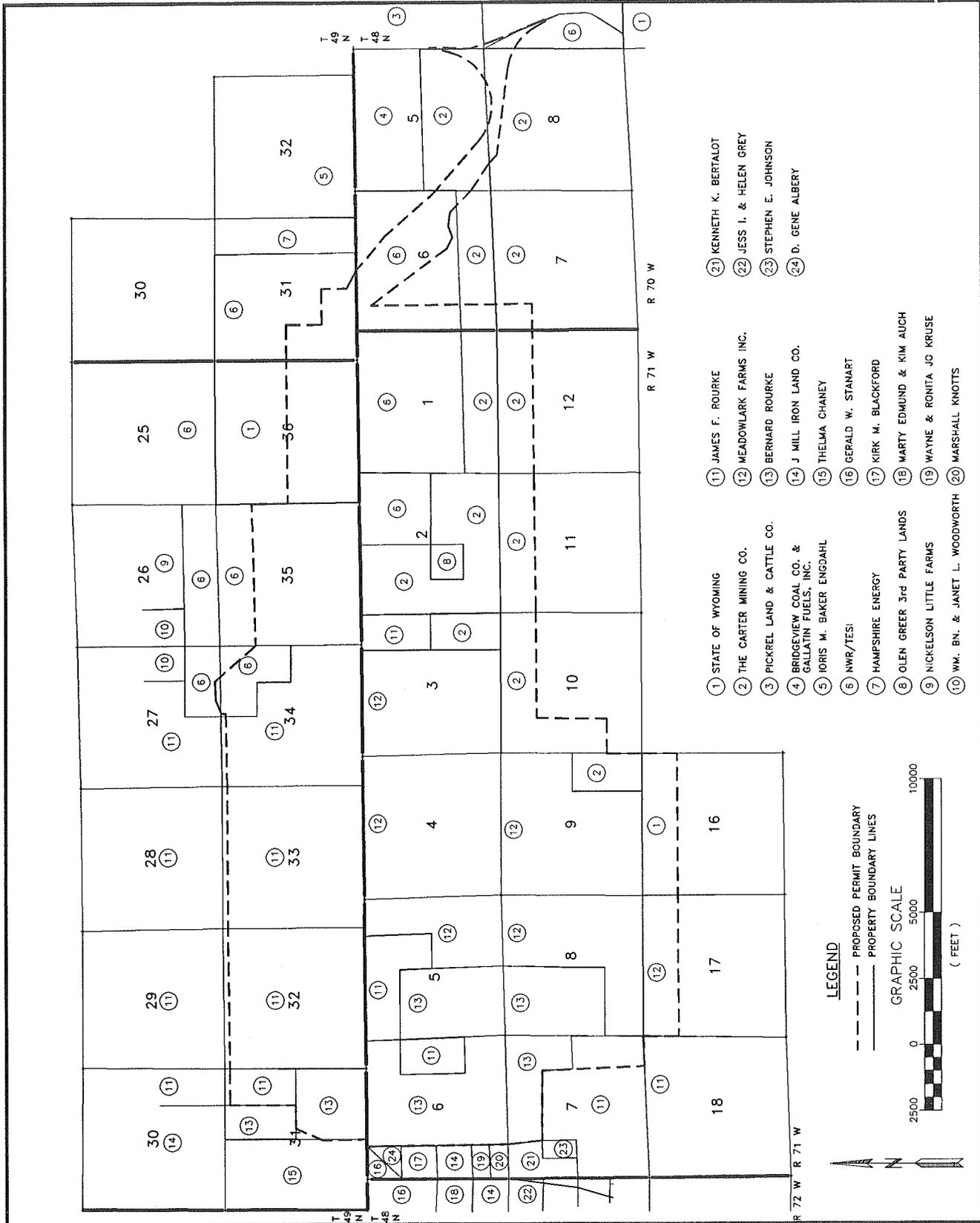


Figure 3-12. Surface Ownership On and Near the Proposed Rocky Butte Mine

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Table 3-11 1991 Oil Production Within the Proposed Rocky Butte Permit Area, Campbell County, Wyoming.¹

Field	Well	Map No. (Figure 3-13)	Monthly Oil Production (BOPM)	Operator	Legal Description	Year of First Mining Disturbance	Projected Final Year of Economic Production ²	Comments
ROURKE GAP	J.F. Rourke #3:8	1	513	Moncief Oil Co.	SWNW, Sec. 8, T48N, R71W	2002	1994	
	J.F. Rourke #4:5	2	6,847	Moncief Oil Co.	SWSW, Sec. 5, T48N, R71W	2000-2001	Production will remain economical through the projected life of mine ³	1995
BUTTE CREEK	J.F. Rourke #6:5	3	326	Moncief Oil Co.	SWNW, Sec. 5, T48N, R71W	1999	2011	
	Smith #1-4:4	4	1,750	Prima Exploration	NESE, Sec. 4, T48N, R71W	2011	2011	
RAINBOW RANCH	Wolf #1-35:35	5	247	Jerry Chambers Exploration Co.	NE, Sec. 35, T49N, R71W	Outside disturbance area	1989	Stripper well ²
	Ingram #34-35:35	6	2.5	True Oil Co.	SWSE, Sec. 35, T49N, R71W	Outside disturbance area	1987	Stripper well ²
WD	Wolf #34-34:34	7	10,683	Ampolex (Wyoming) Incorporated	SWSE, Sec. 34, T49N, R71W	2023	Production will remain economical through the projected life of mine ³	
	Federal #24-34:34	8	276	Ampolex (Wyoming) Incorporated	SESW, Sec. 34, T49N, R71W	2025	1991	Stripper well ²
Total monthly oil production = 20,645 barrels of oil.								

¹ Source: communication, Petroleum Information Corp. 1992.

² Wells producing less than 300 BOPM are considered "stripper wells" (communication, Whitman 1992). Once production reaches this level, tax incentives help maintain some profitability in keeping wells in production. However, when a 150 BOPM level is reached, the wells are generally capped (communication, Farmer 1992).

³ 2034 is the anticipated final year of mining for the proposed Rocky Butte Mine.

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Table 3-12. Crop and Forage Production, Campbell County, Wyoming.

Crop or Forage Type	Average Yield Per Acre	Average Total Yield	Average Total Yield (AUMs)
Wheat ^{1,2}	24.6 bu/acre	601,298 bu	90,195 ³
Oats ⁴	24.0 bu/acre	87,900 bu	6,153
Barley ⁴	25.5 bu/acre	34,750 bu	3,823
Alfalfa Hay ¹	1.0 ton/acre	33,301 tons	111,558
Tame Pasture ⁵	0.20-1.25 AUM/acre	4,604-28,775 ⁶ tons	10,405-65,032
Native Range ⁵			
Deep Soils	0.3 AUM/acre		549,568-824,352 ⁷
Shallow Soils	0.2 AUM/acre		

¹ U.S. Department of Commerce 1967, 1972, 1977, 1981, 1984, 1989.
² Greater than 90 percent of wheat harvested in Campbell County is winter wheat.
³ Wyoming DEQ-LQD, 1981.
⁴ Wyoming Agricultural Statistics Service, 1991.
⁵ Personal communication, July 30, 1991, with Mack White, District Conservationist, SCS, Gillette, Wyoming.
⁶ Assumes there are 23,020 acres of pasture land in Campbell County.
⁷ Assumes there are 2,747,840 acres of grazing land in Campbell County.

The proposed Rocky Butte permit area supports an uncharacteristically high percentage of cropland (44 percent); in comparison, Campbell County has only five percent cropland (Table 3-13; personal communication, October 25, 1991, with Tom Jewett, Deputy State Conservationist, SCS, Casper,

Wyoming). Hay and winter wheat are the most commonly grown crops. Spring wheat, barley, and oats also may be cultivated. Production within the proposed permit area falls within the range of average production for Campbell County (Table 3-12).

Table 3-13. Acreage of Land Use Types in Disturbed and Proposed Permit Areas, Rocky Butte Area, Campbell County, Wyoming.

Land Use Type	DISTURBED		PERMIT AREA TOTAL	
	Acres	Percent of Permit	Acres	Percent of Permit
Cropland	3,643	38	4,260	44
Grazing Land	3,020	31	4,375	45
Pasture Land	327	3	569	6
Ponds	52	1	66	1
Residential	12	<1	15	<1
Industrial/Commercial	104	1	137	1
Transportation Systems	130	1	166	2
Disturbed	45	<1	59	1
TOTAL	7,333	75	9,647	100

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There are three occupied residences and four abandoned homesteads within the permit area. Two major subdivisions, Robbins Valley Estates and Nickelson Little Farms, occur on adjacent lands (within 0.5 mile) to the west and north of the area, respectively. Robbins Valley Estates presently is composed of 11 residences, with eight double-wide trailers and three permanent homes (personal communication, October 29, 1991, with Chuck Rourke, Campbell County, Wyoming). Nickelson Little Farms presently is occupied by more than 110 mobile homes and 10 permanent homes and has potential for future growth (personal communication, August 28, 1991, with Judy Van Damme, Board Member, Nickelson Little Farms).

3.15 Socioeconomics

This section presents historical and current demographic, economic and infrastructure conditions

within the area of socioeconomic influence. The emphasis of the discussion is on those communities and political jurisdictions where the majority of mine employees are expected to live, the City of Gillette and Campbell County.

3.15.1 Demographic Characteristics

As Table 3-14 shows, Campbell County experienced a substantial population influx during the period between 1980 and 1985 (Wyoming Department of Administration and Information, Division of Economic Analysis, undated).

With the decline in oil and gas and other mineral activity after 1985, Campbell County population levels declined by more than nine percent. However, a comparison of population changes in Campbell County with those of Wyoming as a whole after 1987 indicates that the County has fared better than other areas of Wyoming in recent years.

Table 3-14. Population Change for Campbell County and Wyoming, 1980-1990

Year	Campbell County Population	Percent Change, Campbell County	Percent Change, Wyoming
1980	24,367	NA	NA
1981	30,893	26.8	4.4
1982	31,875	3.2	1.5
1983	31,509	(1.1)	0.2
1984	32,116	1.9	0.6
1985	34,195	6.5	0.8
1986	30,983	(9.4)	(2.5)
1987	28,979	(6.5)	(3.4)
1988	29,057	0.3	(2.4)
1989	29,150	0.3	(1.7)
1990	29,370	0.7	(0.7)

The City of Gillette is the largest incorporated community in Campbell County and serves as the primary transportation, trade and service hub for northeastern Wyoming, a five-county area.

Population trends in Gillette have largely mirrored those of Campbell County as a whole

(Gillette Department of Community Development, Planning Division, 1990). The population estimates made by the City of Gillette for 1980 and 1990 exceed the final Bureau of the Census estimates by 12 and 9 percent, respectively. It is not known which of the estimates is correct. However, because the analysis in this EIS relies extensively on Bureau of

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the Census data, the economic and demographic projections are benchmarked to these data.

As depicted in Table 3-15, average household size in the City of Gillette and Campbell County declined between 1980 and 1990 (U.S. Department of Commerce, Bureau of the Census, 1983 and Wyoming Department of Administration and Information, Division of Economic Analysis, 1991a). Households in portions of the county outside of Gillette are substantially larger than those in the city and currently average more than 3.1 persons per household.

The age distribution of a population is important in determining labor force availability. According to

the 1990 Census, the median age of the population in Campbell County and Gillette is 29.2 years of age (Wyoming Department of Administration and Information, Division of Economic Analysis, 1991a). This compares with a median age of 32 years for the state as a whole. The prime working years are between 18 and 64 years of age.

Table 3-16 indicates that about 61 percent of the population in both Campbell County and Gillette is between 18 and 64 years of age (Wyoming Department of Administration and Information, Division of Economic Analysis, 1991a).

Educational attainment levels can be a measure of the employability of a population and may indicate the type of work for which the labor force is suited.

Table 3-15. Households and Household Size, City of Gillette and Campbell County, 1980 and 1990

	1980		1990	
	City of Gillette	Campbell County	City of Gillette	Campbell County
Population	12,134	24,367	17,635	29,370
Households	4,259	8,085	6,241	9,968
Household size	2.85	3.02	2.78	2.95

Table 3-16. Age Distribution, 1990

Age Group	Gillette	Campbell County	Wyoming
17 years and under	34.4%	35.7%	29.9%
18 to 24 years	8.1%	7.4%	9.1%
25 to 54 years	47.9%	48.1%	42.8%
55 to 64 years	5.1%	5.1%	7.8%
65 years and over	4.5%	3.7%	10.4%
Total	100.0%	100.0%	100.0%

As Table 3-17 shows, educational attainment levels in Gillette and Campbell County compare

favorably with Wyoming as a whole (U.S. Department of Commerce, Bureau of the Census, 1983).

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Table 3-17. Educational Attainment Levels: Percent of Population 25 Years Old and Over

	Gillette	Campbell County	Wyoming
High school graduates	81.2%	80.1%	77.9%
College			
1 to 3 years	21.3%	21.9%	20.8%
4 or more years	16.9%	13.4%	17.2%
Median years of school	12.7	12.7	12.7

The ratio of total employment to the total number of households is useful in developing projections of the number of households. During the period between 1980 and 1990, workers per household decreased by more than eight percent (U.S. Department of Commerce, Bureau of the Census, 1983, Wyoming Department of

Administration and Information, Division of Economic Analysis, 1991 and Wyoming Department of Administration and Information, Division of Economic Analysis, 1991b). This decline is likely the result of a smaller labor force and reduced relative economic activity (Table 3-18).

Table 3-18. Workers Per Household, Campbell County

Year	Employment ¹	Households	Workers Per Household
1980	15,535	8,085	1.92
1990	17,595	9,968	1.76

¹ Includes full and part-time workers.

According to a citizen survey conducted annually by the City of Gillette, workers per household have generally declined since 1985 and averaged about 1.6 workers per household during the past eight years (Gillette Department of Community Development, Planning Division, 1991), slightly less than for the entire county (Table 3-18).

1990 (Table 3-19) (Wyoming Department of Employment, Division of Research and Planning, 1990 and 1991a). The number of unemployed persons and the unemployment rate were lower in 1990 than any year since the early 1980's. Since 1985, the unemployment rate in the county has exceeded the rate for the state as a whole.

3.15.2 Economic Characteristics

Campbell County economic characteristics are described in this section. Topics include employment and unemployment, personal income, the cost of living, housing availability, retail trade and assessed valuation.

Between 1985 and 1989, all economic sectors demonstrated declines in employment levels with the exception of public administration (see Table 3-20). Construction employment has dropped sharply. However, mining, trade and services continue to be the major Campbell County employment sectors (Employment Security Commission of Wyoming, Research & Analysis Section, undated and Wyoming Department of Employment, Division of Research and Planning, 1991b).

The Campbell County labor force and employment have declined between 1985 and 1990, but an improvement was evident between 1989 and

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Table 3-19. Employment Summary, Campbell County, 1985-1990, Annual Average

	Year					
	1985	1986	1987	1988	1989	1990
Labor force	18,592	17,377	16,061	15,585	15,788	16,504
Employment	17,280	15,610	14,549	14,503	14,577	15,446
Unemployment	1,312	1,767	1,512	1,082	1,211	1,058
Unemployment Rate	7.1%	10.2%	9.4%	6.9%	7.7%	6.4%

Table 3-20. Campbell County Employment by Industry, 1985 and 1989

Industry	1985		1989	
	Number of Persons	Percent ¹	Number of Persons	Percent ¹
Agriculture	NA ²	NA	43	0.3%
Mining	5,878	34.8	4,405	32.3
Construction	1,928	11.4	802	5.9
Manufacturing	188	0.1	128	0.9
TCU ³	921	5.4	701	5.1
Wholesale Trade	837	4.9	659	4.8
Retail Trade	2,489	14.7	2,282	16.7
FIRE ⁴	442	2.6	350	2.6
Services	3,593	21.2	1,623	11.9
Public Administration	634	3.7	2,652	19.4
Total	16,910	99.8%	13,644	99.9%

¹ Does not sum to 100 percent due to rounding.
² Agriculture, forestry and fisheries employment is included in the services sector.
³ Transportation, Communication and Utilities.
⁴ Finance, Insurance and Real Estate.

The decline in construction employment is partially indicative of the residential and commercial overbuilding that occurred during the early 1980's.

As shown in Table 3-21, the fourteen largest employers in Campbell County account for more than 5,000 jobs, or about one-third of total employment, in the county (Campbell County Economic Development Corporation, 1991).

Campbell County personal income by industry, as measured by the U.S. Bureau of Economic Analysis, is presented in Table 3-22 (Wyoming Department of Administration and Information, Division of Economic Analysis, 1991b). These data demonstrate the importance of mining in the Campbell County economy; it accounts for more than 46 percent of labor and proprietors' income. The data further illustrate the impact of the decline in construction on personal income in the county.

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Table 3-21. Major Employers in Campbell County, 1991

Employer	Number of Employees
Campbell County School District	1,084
Campbell County Memorial Hospital	500
Thunder Basin Coal Company	488
The Carter Mining Company	475
AMAX Coal Company	469
Kerr-McGee Coal Corporation	378
Burlington Northern Railroad	324
Campbell County Government	295
Powder River Coal Company	287
Cordero Mining Company	225
Pioneer Manor Nursing Home	204
Gillette City Government	155
Mobil Coal Producing	153
Pacific Power & Light	134

Table 3-22. Personal Income by Industry, Campbell County, 1981, 1985 and 1989

Industry	Thousands		
	1981	1985	1989
Agriculture	\$4,389	\$1,413	\$4,352
Mining	\$175,275	\$243,547	\$204,619
Construction	\$132,249	\$55,637	\$26,319
Manufacturing	\$3,497	\$3,504	\$2,612
TCU ¹	\$33,113	\$34,072	\$30,158
Wholesale Trade	16,464	\$23,627	\$19,203
Retail Trade	\$30,875	\$34,114	\$29,138
FIRE ²	\$9,055	\$10,233	\$8,303
Services	\$36,695	\$47,983	\$55,129
Public Administration	\$30,182	\$55,834	\$58,993
Total labor and proprietor's income by place of work	\$471,794	\$509,964	\$439,006
Other Income ³	\$57,199	\$78,748	\$98,701
Residence Adjustment	(\$20,107)	(\$14,365)	(\$9,117)
Total income by place of residence	\$508,886	\$574,347	\$528,590

¹ Transportation, Communication and Utilities
² Finance, Insurance and Real Estate
³ Includes dividends, interest, rent and net transfer payments

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As Table 3-23 shows, the City of Gillette is a relatively costly place to live when compared to fifteen other Wyoming communities (Wyoming

Department of Administration and Information, Division of Economic Analysis, 1988, 1989, 1990, 1991c).

Table 3-23. Cost of Living, City of Gillette, 1989-1991

	1989		1990		1991	
	January	July	January	July	January	July
Cost of living index	103.3	105.6	104.4	103.8	101.0	101.2
Rank (of 15 communities)	3	2	2	3	4	5

A historical overview of the housing stock in the City of Gillette is provided in Table 3-24 (Gillette Department of Community Development, Planning Division, 1990). The housing stock in Gillette has

remained quite stable since 1987 with most activity appearing as gains and losses in mobile homes (Table 3-24) (Gillette Department of Community Development, Planning Division, 1991).

Table 3-24. City of Gillette Housing Stock, 1987-1990

Type of Unit	1987	1988	1989	1990
Single family	4,446	4,443	4,443	4,452
Percent	59.2	60.3	60.1	60.6
Multi-family	1,683	1,684	1,688	1,688
Percent	22.4	22.9	22.8	22.9
Mobile homes	1,107	996	1,023	964
Percent	14.7	13.5	13.8	13.1
Other ¹	271	243	243	243
Percent	3.6	3.3	3.3	3.3
Total	7,507	7,366	7,397	7,347
Percent	99.9*	100.0	100.0	99.9*

¹ Includes transient quarters and occupied recreational vehicles.
* Does not sum to 100.0 percent due to rounding.

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The overall vacancy rate in Gillette was about eight percent in 1990, a decline of two percentage points from the previous year. Single family vacancy rates have held steady at about six percent, while multi-family vacancy rates declined from 24 percent in 1989 to 12 percent in 1990. Vacancy rates for mobile homes have remained stable at about eight percent.

Vacancy rates have declined considerably in 1991. The rental market is tight with vacancy rates at approximately two percent, and vacancy rates in the owner-occupied market are slightly higher (Sherry Okray and David Spencer, 1991). Substantial mobile home space, however, is currently available.

There are five financial institutions in Gillette which provide the bulk of financing for home

construction and purchasing in the Gillette area. Financing is readily available to credit-worthy developers and home buyers. Mobile home financing is difficult without the purchase of a lot.

As shown in Table 3-25, retail activity in Campbell County is beginning to show signs of recovery (Wyoming Department of Administration and Information, Division of Economic Analysis, 1991d). Several economic sectors, including wholesale trade and finance, insurance and real estate, have yet to regain their levels achieved in the early and mid-1980s. Certain other sectors, such as mining, construction and manufacturing appear to have made substantial gains, even exceeding levels evident in the mid-1980s.

Table 3-25. Retail Activity, Campbell County, 1985-1990

Industrial Sector	Millions of Dollars*						
	1985	1986	1987	1988	1989	1990	1991
Agriculture	\$0.7	\$0.9	\$0.6	\$0.7	\$0.8	\$0.8	\$0.7
Mining	81.9	79.9	48.9	69.8	71.2	71.6	102.5
Construction	12.9	8.9	7.7	10.1	10.9	10.0	18.5
Manufacturing	16.7	15.2	11.2	21.7	18.2	20.0	21.6
TCU ¹	36.3	36.1	28.4	39.0	36.9	37.5	34.3
Wholesale trade	70.7	57.4	31.7	32.7	33.2	35.6	34.0
Retail trade	178.6	167.9	138.1	139.9	135.9	141.4	143.5
FIRE ²	0.9	0.6	0.5	0.2	0.1	0.1	0.1
Services	48.0	49.3	31.8	39.4	37.2	39.4	54.6
Public Admin.	36.2	37.1	26.9	21.3	22.9	32.3	31.1
Total	\$482.9	\$453.3	\$298.9	\$353.5	\$367.3	\$388.7	\$440.9
Percent change from previous year	NA	(6.1)%	(34.1)%	18.3%	3.9%	5.8%	13.4%

¹ Transportation, Communication and Utilities.
² Finance, Insurance and Real Estate.
* These figures are not adjusted for inflation.

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3.15.3 Overview of Infrastructure and Public Sector Fiscal Conditions

Public facilities and services within the area of socioeconomic influence are situated mostly in the City of Gillette. This section describes the present condition of water and sewerage systems, public safety, health service delivery, welfare and other social services, and educational facilities. In addition, the current fiscal condition of the Gillette and Campbell County governments is described.

Water service in the City of Gillette is provided principally by the Gillette Department of Utilities. Water is provided outside the city limits to areas which are anticipated to be annexed to the city. All water use in Gillette is metered, and domestic irrigation water can be separately metered at the request of the user. About 25 percent of the households in Gillette are served by domestic water associations.

The source of water for the Gillette system is comprised of ground water from the Fort Union, Fox Hills and Madison Formations. Thirteen wells in Gillette access the Fort Union and Fox Hills Formations. Madison ground water is accessed through eight wells and piped 43 miles to the city. Gillette is obligated to deliver 700 gpm, 150 gpm and 1,000, respectively, to the towns of Moorcroft and Rozet and the Wyodak plant. Currently, these obligations are only partially exercised.

The current storage capacity of the Gillette system is 16 million gallons. According to the Public Utilities Department, an additional five to seven million gallons of storage are necessary. The design peak of the system is 11 million gallons per day (mgd). However, the actual peak is approximately 11.6 mgd. In order to attenuate peak period water use, the department curtails water use on city and county parks and at the CAM-plex. Notwithstanding, the Gillette water system has an Insurance Service Organization (ISO) rating of 1, considered quite good.

Water use in Gillette is fairly high. On a per capita daily basis, water use averages 300 to 350 gallons. High water use is due in part to the low water rates charged by the department. These rates were adopted more to encourage the "greening" of

Gillette than to cover the costs of operating the system (Gillette Department of Utilities, 1991).

Utility Department staff believe the current system can adequately serve an additional 10,000 to 15,000 residents with additional investment in "peaking" storage and policy changes to encourage conservation. This, however, would require a significant revision in the city's policies.

The current sewerage system is the culmination of a four-phase system update completed approximately one year ago. A substantial amount of federal monies was available to upgrade the system which currently meets its NPDES permit requirements (Gillette Department of Utilities, 1991).

The current system consists of collection lines and a treatment plant which is rated at approximately 3.85 mgd. Sewage treatment currently ranges from 2.2 to 2.5 mgd. The system was designed to serve 40,000 people through the addition of small, low cost treatment units at the plant.

The city-owned and operated electrical system has provided electricity to Gillette residents since 1915. In 1990, the city served 6,538 residential accounts, 1,077 small commercial accounts and 211 large power accounts. Total energy sales in 1990 were roughly 160,000 megawatt hours. The anticipated 1991-1992 winter peak is 40 megawatts. According to the city's Electrical Engineering Division, wholesale power contracts are adequate (Gillette Department of Utilities, 1991).

The Gillette Police Department provides law enforcement services in the City of Gillette, while the Campbell County Sheriff's Department serves the unincorporated portions of the county. Fire protection services are provided by the joint city/county fire department.

The Gillette Police Department staff currently consists of 53 persons including uniformed and non-uniformed, communication, animal control and support personnel. The police department is currently understaffed by five uniformed officers. A number of supervisory personnel, such as the sergeant, spend an inordinate amount of time responding to calls. The incidence of certain violent crimes is higher than what would be expected for a community like Gillette. According to the

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department, the level of service provided to Gillette residents will decline if calls rise appreciably without additional personnel (Gillette Police Department, 1991).

The Campbell County Sheriff's Department, which currently employs 106 persons, is responsible for operating the county jail and law enforcement in the unincorporated portions of the county. About 18 percent of the staff is support personnel. The sheriff's department also has concurrent jurisdiction with the City of Gillette. The department is currently understaffed by four uniformed patrol officers. Many of the department's calls are in response to minor theft and domestic violence (Campbell County Sheriff's Department, 1991).

The fire department has one fire chief, 10 full-time firemen and 160 volunteers. There are three substations and a training center located in Gillette. Rural portions of the county are served by substations located in Wright, Recluse, Reno Junction, Rawhide and Eston.

In Campbell County, short term medical care is provided by Campbell County Memorial Hospital. The 104-bed facility is currently at 47 percent occupancy.

Pioneer Manor Nursing Home is the only extended care medical facility in Campbell County. The 148-bed facility is currently near capacity.

The Northern Wyoming Regional Counseling Center is the focal point for mental health services in Campbell County. The staff of seven professionals is adequate given current caseload demand (Northern Wyoming Regional Counseling Center, 1991).

The Gillette office of the Wyoming Department of Family Services, Division of Public Assistance and Social Services (DPASS) provides welfare services in Campbell County. DPASS consists of two components. Family Services provides financial assistance to indigent persons, and Social Services assists children, disadvantaged adults and the elderly. Funding for DPASS is obtained from the state and federal governments. Current staffing is adequate given current caseload demands (Wyoming Department of Family Services, 1991).

The Campbell County School District serves all of Campbell County. The district consists of 22 schools. Of the 15 elementary schools, ten are in Gillette.

School enrollment has fluctuated in a narrow range on an annual basis recently (Table 3-26) (Wyoming Department of Education, selected years). Compared to the state as a whole, the student/teacher ratio in the Campbell County School District is high at 18:1. In addition, schools in the district tend to be more populated than elsewhere in the state (Wyoming Department of Education, 1990b).

Table 3-26. Campbell County School District Enrollment

Academic Year	Fall Enrollment
1986-1987	7,750
1987-1988	7,692
1988-1989	7,760
1989-1990	7,682
1990-1991	7,759

The school district is in adequate financial condition. Assessed valuation per student, nearly \$175,000, exceeds the state average of roughly

\$60,000. The school district currently has zero percent of its bonding capacity obligated (Wyoming Department of Education, 1990b).

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Campbell County is in sound fiscal condition due principally to its extraordinarily high tax base. For instance, the county accounted for nearly one-quarter of state-wide assessed valuation in 1989 (Campbell County, budgetary data, 1991).

In Campbell County, revenues are collected to fund general county operations as well as the county health department and seven boards which oversee the county airport, fair, library, museum, parks and recreation operations, weed and pest control and joint city/county fire department. However, the county does not budget revenues. Instead, the county budgets expenditures and estimates the amount of gross revenues available primarily from cash reserves and property and sales taxes.

Table 3-27 illustrates the budgeted appropriations and projected tax revenue requirement for the 1991-92 fiscal year. The county anticipates a county mill levy of 11.265 mills to generate the necessary revenues. This is below the county fund 12.000 mill limit.

The fiscal position of the City of Gillette is quite sound. The city has an aggressive debt restructuring program in order to retire all city debt by the end of the 1995 fiscal year (City of Gillette, Financial Management Program, 1991).

The city budget consists of 12 funds including the general fund. Total budgeted revenues for the 1992 fiscal year are \$38.3 million. Budgeted expenditures are \$33.0 million, yielding a surplus of roughly \$5.3 million.

The majority of general fund revenues in fiscal 1990 were derived from taxes and mineral royalties (Table 3-28).

In seven of the past nine fiscal years, the water enterprise fund has required a subsidy in order to make up cash shortfalls. The power fund will require a subsidy for the first time in fiscal year 1992. According to city staff, revenue shortfalls in these two funds are principally due to low water and power rates charged to city customers and high operating costs. These subsidies are typically obtained from the severance tax fund.

Table 3-27. Campbell County Budget Summary, 1991-92 Fiscal Year

Fund	Estimated Revenues	Estimated Appropriation	Estimated Tax Requirement	Mill Levy
	Thousands			
General Fund	\$32,314	\$44,765	\$12,451	8.139
Health Department	185	619	434	0.284
Airport Board	54	409	355	0.232
Fair Board	33	216	183	0.119
Library Board	58	1,350	1,292	0.845
Museum Board	4	45	40	0.026
Parks and Recreation Board	562	1,841	1,279	0.836
Weed and Pest Control Board	90	509	419	0.274
Joint Powers Fire Board	290	1,489	1,199	0.783

3.0 AFFECTED ENVIRONMENT

Table 3-28. City of Gillette, General Fund, 1990

Source	Amount (thousands)	Percent of Total
Taxes	\$4,353	66.0%
Mineral Royalties	1,061	16.1
Licenses and permits	250	3.8
Charges for services	505	7.7
Miscellaneous	422	6.4
Total	\$6,591	100.0%

A three percent state sales tax is levied in all Wyoming counties. The state sales tax is shared between the state and county-of-origin governments at rates of 63.33 percent and 36.67 percent, respectively. The current allocation rates are set to expire on June 30, 1992. Counties were granted the option in 1973 to impose an additional one percent sales tax through public vote. This tax revenue, less state administration costs, is returned to the county-of-origin to be used for general fund purposes. The state also imposes a three percent use tax to prevent sales tax avoidance. This tax revenue is shared with counties-of-origin on the

same basis as the sales tax. In addition, the optional county sales tax is coupled with a one percent use tax for use in the county's general fund. Sales and use tax revenues are shared between counties and municipalities on the basis of population.

As Table 3-29 shows, sales and use tax revenues for Campbell County as a whole increased by more than 14 percent between 1989 and 1990 (Wyoming Department of Revenue and Taxation, selected years). For the period between 1987 and 1990, tax revenues increased by more than 35 percent, or 10.7 percent annually.

Table 3-29. Distribution of Sales and Use Tax within Campbell County, 1987-1990

Jurisdiction	Thousands of Dollars*			
	1987	1988	1989	1990
Campbell County	\$2,897	\$3,397	\$3,409	\$3,897
Gillette	4,486	5,764	5,785	6,612
Wright	372	440	441	504
Total	\$8,115	\$9,601	\$9,635	\$11,013

* These figures are not adjusted for inflation.

In 1990, assessed value in Campbell County was more than \$1.45 billion. County mineral properties account for more than 80 percent of the total assessed valuation as shown in Table 3-30 (Wyoming Department of Revenue and Taxation, selected years).

In 1990, nearly \$86.7 million in tax revenues were collected in Campbell County, the majority of which are levied for the school district (Wyoming Department of Revenue and Taxation, selected years) (see Table 3-31).

3.0 AFFECTED ENVIRONMENT

Table 3-30. Campbell County Assessed Value, 1988-1990

Assessment Class	Millions of Dollars		
	1988	1989	1990
Land	\$6.38	\$6.24	\$4.41
Other Personal Property	92.43	102.85	115.60
Real Property	74.77	72.88	65.41
Utilities	30.97	31.47	33.10
Minerals	1,121.13	1,118.11	1,231.80
Total Assessed Value	\$1,325.68	\$1,331.55	\$1,450.32

Table 3-31. Taxes Levied, Campbell County, 1988-1990

	Thousands of Dollars		
	1988	1989	1990
School Foundation Program	\$15,908	\$15,979	\$17,404
County taxes	14,767	14,871	16,157
District taxes	5,207	4,948	4,891
School taxes	41,096	41,944	47,860
Special municipal taxes	426	411	381
Total taxes	\$77,404	\$78,153	\$86,693

For all Wyoming counties, the Foundation Program mill levy is 12.000 mills. The Campbell County School District mill levy is 32.500 mills. The mill limit on county taxes is 12.000 mills.

The total mill levy in Gillette for the year 1990 was 66.583 mills, yielding tax collections amounting to nearly \$3.1 million (Wyoming Department of Revenue and Taxation, selected years). The majority of property taxes collected in the city went to the Campbell County School District (see Table 3-32).

Table 3-32. Assessed Valuation and Taxes Levied, Gillette, 1988-1990

Year	Thousands of Dollars				
	Municipal Valuation	County Tax Levy	School Tax Levy*	Municipal Tax Levy	Total Tax
1988	\$53,134	\$788	\$2,285	\$395	\$3,468
1989	51,071	749	2,222	383	3,354
1990	46,504	666	2,069	361	3,096

* Includes Foundation Program.

3.0 AFFECTED ENVIRONMENT

Because of the cyclical nature of the mineral and oil industries, Gillette has been perceived as a "boom town". During periods of prosperity, the area experienced large population influxes as people in-migrated to take advantage of considerable employment opportunities. However, the decline in local economic activity in the mid-1980s led to considerable unemployment in the area and a substantial out-migration of residents.

A recent survey conducted by the Gillette Department of Community Development demonstrates that quality of life available to residents of Gillette has improved since the mid-1980's. In 1991, more than 93 percent of those surveyed would recommend Gillette as a place to live. This compares with 77.6 percent in 1986. On a scale of one to ten, where ten is high, Gillette received a rating of about 7.5 as a place to live. Gillette residents have more longevity in the area. In 1991, about 15 percent of the survey respondents indicated that they had resided in Campbell County for fewer than five years. This compares with more than 37 percent in 1986.

Residents are less concerned about the economy now than in 1987 when more than two-thirds of the survey respondents believed that economic development was the most important issue facing the area. Other considerations such as the environment and growth management have received higher emphasis.

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

The first subsection of this chapter describes the environmental effects of the Proposed Action, mining of the West Rocky Butte LBA tract and the Rocky Butte lease tract as an LMU. Effects are described for each of the environmental and socioeconomic disciplines described in the preceding chapter. The second subsection of this chapter describes the environmental effects of the No Action Alternative. Cumulative effects of the Proposed Action are described in Chapter 6.

Some of the effects are discussed in the context of their duration. Short-term impacts are those that occur during the 52-year period from premining development through the end of mine life, assuming a 10-year period for reclamation evaluation and bond release after reclamation activities are completed. Long-term impacts of the project are those that persist beyond the end of mine life.

The geographical limits for the analysis of impacts in this EIS are dependent upon the type of impact being analyzed. For some resources the impact analysis is confined to the permit area. Geographical limits for detailed analysis for resources where the analysis extends beyond the permit area are as follows:

- Air Quality - Impacts are analyzed for the six-mine cluster extending from Rocky Butte on the north to Coal Creek on the south.
- Water Resources - Impacts are analyzed for a region that encompasses the entire area within which the Wyodak-Anderson coal aquifer is subject to 5 feet or more of drawdown resulting from mining at the same six mines included in the air quality analysis plus the Wyodak Mine to the north.
- Wildlife - Impacts are analyzed generally within a locality consisting of a 2-mile wide buffer zone around the Rocky Butte life-of-mine area. Buffer zones for specific features of interest can extend beyond this limit.
- Socioeconomics - Impacts are analyzed for the Rocky Butte Mine and for a region

encompassing Campbell County and the city of Gillette where most of the employment impacts will occur.

- Transportation - Impacts are analyzed for the local infrastructure which serves the Rocky Butte Mine and the region encompassing the Campbell County mines in general, with particular emphasis on Highway 59, the BN and CNW railroads, and county roads on and near the life-of-mine area.
- Visual Resources - Impacts are analyzed for the life-of-mine area and for a region encompassing the six-mine cluster included in the air quality impact assessment.
- Noise - Impacts are analyzed for the area where noise from the mine would exceed ambient levels.

Impacts are also discussed in terms of their significance. The basis for conclusions regarding significance are the criteria set forth by the Council on Environmental Quality (CEQ) (40 CFR 1508.27) and professional judgement of the specialists performing the analyses. Significance of various impacts may range from insignificant to severe, and impacts can be significant during mining and reduce to insignificant following completion of reclamation.

Finally, some impacts are discussed in terms of their magnitude. The magnitude of an impact can range from negligible, such as effects on noise levels in the region, to major, such as effects on vegetation within the disturbed area during the mine life.

Table 4-1 summarizes the impact analysis and compares impacts for the two primary alternatives. Certain cumulative impacts are included in Table 4-1, but the analysis of cumulative impacts is not presented until Chapter 6.

As presented in the following analysis, mining would not severely interfere with the future usability of the region's or Nation's resources. The use of some resources, such as soils and vegetation for

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

example, would be decreased on the permit area for the 42-year life of the mine and into at least a portion of the reclamation evaluation period. However, the

permit area would support the main land uses of the region, grazing and wildlife habitat with some dryland cropping, after reclamation is completed.

Table 4-1. Summary of Impact Analysis for the Proposed Action and No Action Alternatives

Impact Topic by Environmental Resource	Significance or Magnitude and Duration of Impact	
	Proposed Action Alternative	No Action Alternative
GEOLOGY AND MINERAL RESOURCES		
Remove and replace topsoil, overburden and coal, replace topsoil and overburden.	Moderate; affects all horizons above base of coal within lease boundaries; major; long-term	No impact
TOPOGRAPHY		
Reduced slopes and decreased diversity on area affected by mining.	Moderate; long-term; affects all regional mines	No impact
SOILS		
Remove, mix and replace suitable topsoils; bury unsuitable soils.	Moderate; long term; affects all regional mines; insignificant	No impact
VEGETATION		
Reduction in vegetation diversity after reclamation.	Moderate short-term; minor long-term; affects all regional mines; insignificant	No impact
Reduction in shrub density	Minor; short-term; moderate to major long-term until shrubs become established; affects all regional mines; insignificant	No impact
WATER RESOURCES		
Reduction in streamflows due to water captured in mandated sedimentation ponds.	Minor; short-term	No impact
Lowering of water levels in surrounding aquifers.	Minor due to requirements for replacing damaged water supplies; long-term over a region extending well beyond the mine boundaries.	No impact
Replacement of coal and overburden aquifers with a spoil aquifer.	Insignificant during mining since need for this water is removed by mining. Moderate long-term since alternative sources must be used until spoil aquifer reaches equilibrium.	No impact
ALLUVIAL VALLEY FLOORS		
While a final determination has not been made by WDEQ/LQD, it is believed that there are no AVFs on the proposed permit area.	No impact	No impact
FISH AND WILDLIFE		
Reduction in deer habitat; increase in road kills due to increased traffic.	Minor; short term on the mine site and in entire region	No impact
Reduction in pronghorn winter/yearlong habitat, and conversion of winter/yearlong habitat to primarily summer habitat.	Minor; short term on the mine site; moderate to major; long-term in entire region until shrubs become established	No impact
Removal of at least five active raptor nests and reduction of raptor habitat.	Moderate; short term on the mine site and entire region	No impact

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

Table 4-1. Summary of Impact Analysis for the Proposed Action and No Action Alternatives (cont.)

Impact Topic by Environmental Resource	Significance or Magnitude and Duration of Impact	
	Proposed Action Alternative	No Action Alternative
Removal of two potentially active sage grouse leks, and associated sagebrush nesting and brood rearing habitat.	Major if leks are active and/or state shrub reclamation goals are not met, otherwise moderate; long-term until habitat is reestablished on the mine sites	No impact
T & E species	Moderate short-term for species which potentially breed in the area	No impact
Loss of nesting habitat or foraging areas for certain MBHFI.	Minor to moderate; short term; on the mine sites	No impact
Loss of habitat for predators and small mammals.	Minor to moderate; short term; on the mine site	No impact
CULTURAL RESOURCES		
At least 9 sites believed eligible for NRHP are in the area to be disturbed and must be mitigated or the area cannot be affected.	Impacts to cultural resources are not permitted; at least 9 sites would be mitigated through data recovery.	No impact
PALEONTOLOGICAL RESOURCES		
Overburden excavation could potentially expose fossils for scientific examination.	Significance and magnitude would depend on rarity and condition of any discoveries; short term; on the mine sites	No impact
RECREATION		
The area disturbed at any one time would be unavailable for hunting.	Insignificant on mine site; area is privately controlled and could be removed from hunting at any time. Moderate for region during mining since herd levels can exceed target values	No impact
Wildlife viewing from Highway 59 would be curtailed for the disturbed areas.	Minor; long-term, until wildlife habitats have been restored; on the mine site	No impact
AIR QUALITY		
Airborne particulates would increase but would remain within State and Federal Standards.	Moderate inside permit boundary; minor within 5 miles of permit boundary; negligible beyond 5 miles; short term	No impact
VISUAL RESOURCES		
Reduction from Class IV to Class V due to construction of high-profile structures and large stockpiles.	Major for nearby residents and travelers on local public roads; short term; on mine site and adjacent areas.	No impact
NOISE		
Increased noise levels for nearby residents.	Minor to moderate within 1.9 miles of active mine areas; short term	No impact
TRANSPORTATION		
Increased number of unit trains to haul coal from the Rocky Butte Mine.	Minor (10 percent increase); short term	No impact
Increased traffic on roads and highways due to mine employees.	Minor over most of the region, possibly moderate for short reaches of Highway 59 and Four Corners Road; short term	No impact
LAND USE AND OWNERSHIP		
Loss of agricultural productivity for disturbed lands.	Negligible impact on agricultural productivity of region; short term	No impact
Loss of occupied dwellings on mine site.	Major impact to individual homes, minor significant since owners have agreed to relocate; long term	No impact
SOCIOECONOMICS¹		
Additional payroll of about \$18 million per year.	Moderate; short term; affects entire county	No impact

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

Table 4-1. Summary of Impact Analysis for the Proposed Action and No Action Alternatives (cont.)

Impact Topic by Environmental Resource	Significance or Magnitude and Duration of Impact	
	Proposed Action Alternative	No Action Alternative
Average increase in retail and service trade of about \$12 million per year.	Moderate; short term; affects entire county	No impact
Population increase of 1,300 in Gillette and 1,500 in Campbell County.	Moderate; short term	No impact
Increased need for public facilities and services.	Minor; short term	No impact
Revenues from royalties and taxes to the Federal government would average \$14 million per year.	Moderate; short term	No impact
Revenues from royalties and taxes to the State government would average \$6.7 million per year.	Moderate; short term	No impact
City of Gillette would receive sales and use tax revenues averaging \$200,000 per year.	Moderate; short term	No impact
Housing market could experience availability constraints during beginning of operations.	Moderate; short term	No impact

¹ Employment and revenue impacts assume market exists for coal from Rocky Butte Mine and employees and production are not merely redistributed from existing mines.

4.1 Environmental Impacts of the Proposed Action

4.1.1 Geology and Mineral Resources

Approximately 2.6 billion cubic yards of sedimentary deposits, including topsoil, overburden and coal, would be disturbed over the life of the mine. With the exception of the coal, these materials would be backfilled into the resulting open cut. The natural lateral continuity of individual lithologic units in the overburden would be lost due to disruption by the mining process.

Compaction structures in the coal-bearing formations such as those which have allowed gas in the coal seam to vent at the surface near Rawhide Village (Law, 1976) have not been identified in the Rocky Butte area even after extensive drilling and subsurface investigations. The compaction structures are associated with no-coal channels (Law, 1976), also not found in the Rocky Butte permit area. In the absence of such structures, and because there are no reported gas vents in the immediate vicinity, it is unlikely that the situation that occurred at Rawhide Village could be repeated in the subdivisions near the Rocky Butte Mine. However, some of the coal monitor wells at the Rocky Butte

site do produce gas, indicating that gas is present in some areas in the coal seam. It is possible that as drawdowns of water levels in the surrounding coal occur (refer to Section 4.1.5), water wells completed in the coal could start to produce gas. This is unlikely since drawdowns at a well caused by mining will in most cases be less than drawdowns historically caused by pumping the well. This could affect approximately 10 percent of the wells within three miles of the permit area (see Section 3.5).

NWR would handle approximately 1.956 billion bcy of overburden in the course of mining. According to Dollhopf and others (1978), most unsuitable overburden disturbed by mining and reclamation activities is diluted as a matter of course, because it is mixed with suitable overburden in the spoil. After regrading and contouring, some spoil may still remain unsuitable for use in reclamation; this spoil would be characterized by high-clay texture, excessive acid-base potential, excessive nitrate-nitrogen concentrations, and selenium. NWR would bury the most undesirable spoil below the vegetation rooting zone, away from ground-water postmining phreatic surface, and outside the area of drainage channels or their floodplains. Sufficient suitable overburden material is available to place at least 4 feet of this material at the surface prior to replacing the topsoil. With 4.3 feet of topsoil

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

available, this means that the top 8.3 feet of regraded surface materials will meet Wyoming DEQ/LQD suitability guidelines.

It is concluded that the impact of unsuitable overburden at the proposed Rocky Butte Mine on revegetation success and ground-water quality would be insignificant over the long term. Any overburden unsuitability issues can be resolved during the mine permitting process.

Currently producing oil wells are present within the permit area (see the "Land Use" section of Chapter 3 for their locations). Comparison of the mine sequence with the planned production schedule of these wells indicates that two wells are projected to maintain production throughout the life of the mine. If they are still producing when encountered by the mine, these wells could be capped below the lowest coal seam and mined through. The oil-and-gas production zone underlying the proposed permit area occurs in the Muddy Sandstone, which is over 6,000 feet below the lowest coal seam to be mined, and from the Minnelusa sandstone, which is about 9,500 feet below the coal. Given the depth of these production zones, no damage to future oil-and-gas production would occur as a result of mining.

It is concluded that the impact of the proposed Rocky Butte Mine on geology and minerals other than coal within the proposed permit area would be insignificant. Geology from the base of coal to the surface would be subjected to a minor, long-term change, but there are no significant environmental impacts associated with this change.

4.1.2 Topography

Approximately 7,333 acres would be disturbed by mining and mining-related operations at the proposed Rocky Butte mine. The result of these operations would be that the final postmining elevation would average about 35 feet lower than premining elevation. The overall postmining topography would be slightly flatter than premining topography. Figure 4-1 shows a perspective view of the surface as it now exists, and Figure 4-2 shows the same view as it would appear at the conclusion of mining and reclamation.

Premining slopes average 2.3 percent, whereas the postmining slopes are expected to average 1.8 percent. The postmining slopes would range from 1 to 18 percent, thus maintaining some topographic diversity (Figure 4-2). The postmining surface has been designed by NWR to resemble the premining surface and restore surface drainage patterns.

Adverse impacts resulting from topographic moderation include the loss of wildlife habitat, (e.g., conversion of winter/yearlong range to primarily summer range), a reduction in vegetation and habitat diversity, and a potential decrease in big game carrying capacity. However, the generally flatter topography that will result from mining and reclamation could have two beneficial impacts on the reclaimed land surface. First, a flatter land surface would allow for greater infiltration of precipitation, thereby increasing the viability of the postmining vegetation. Second, a flatter land surface could result in a reduction in erosion of reclaimed soils by surface runoff.

The postmining topography of the proposed Rocky Butte mine (Figure 4-2) shows a ridge approximately a mile long, located in the western third of the proposed mine area essentially where the premining ridge occurred, simulating the original premining topography. The approximate original drainage pattern will be restored with stock ponds and retention reservoirs replaced to provide for future livestock requirements. The reduction of overall postmining slopes should minimize erosion by runoff and may accelerate recharge of the local ground-water system following mine completion. It is concluded that the impacts of slightly flatter slopes and larger closed basins will be long-term and moderate.

4.1.3 Soils

Construction and mining would progressively disturb topsoil on 7,333 acres during the life of the mine. Maximum annual surface disturbance would occur during the first two years of construction and mine development when 412 and 509 acres would be disturbed. After the sixth year, a cumulative total of about 1,497 acres would be disturbed. Reclamation would begin in the seventh year, and there would then be a progressive pattern of new disturbance and reclamation work each year. Throughout the remainder of the life of the mine,

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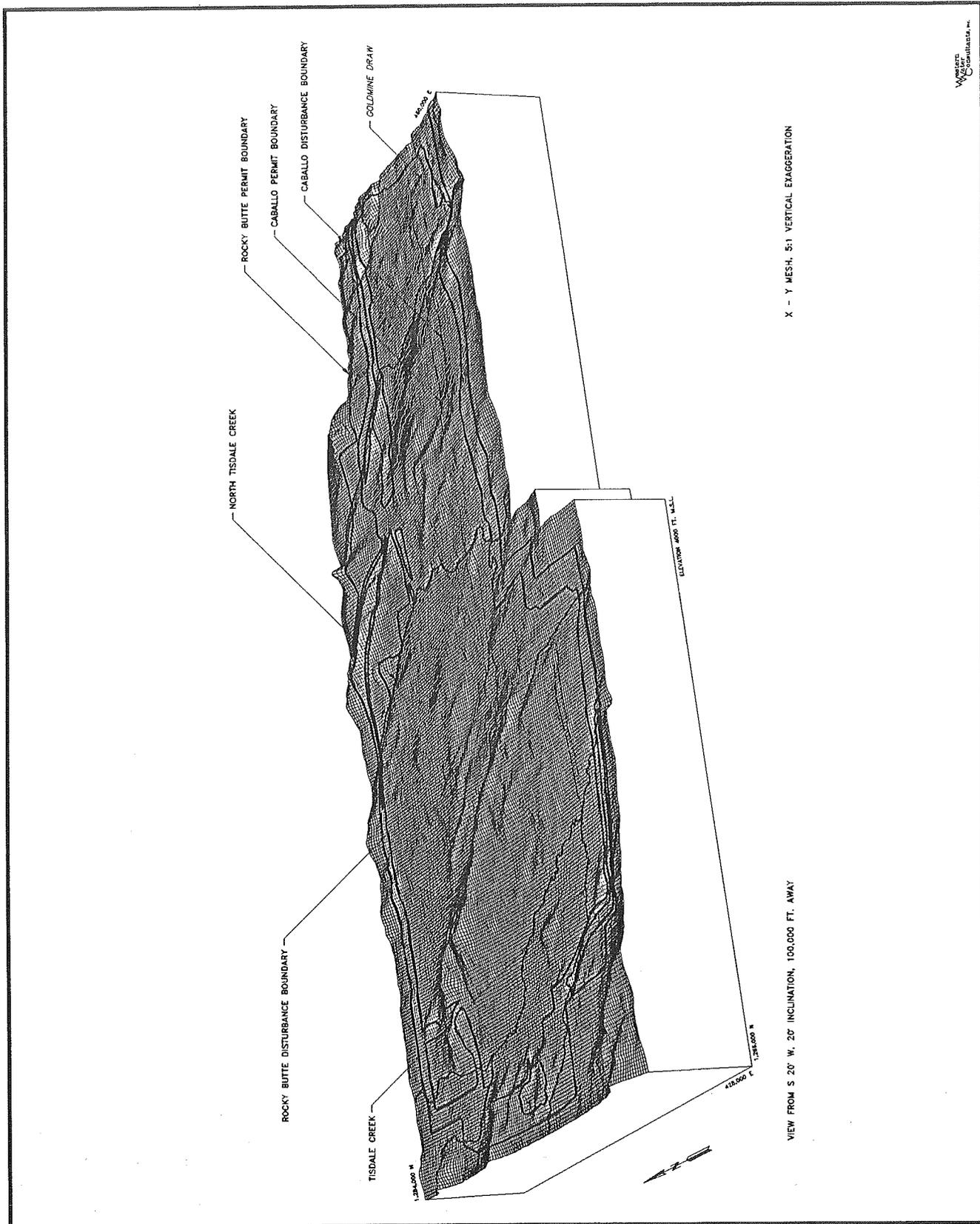


Figure 4-1. Premining 3-Dimensional Perspective View of Rocky Butte Mine Area

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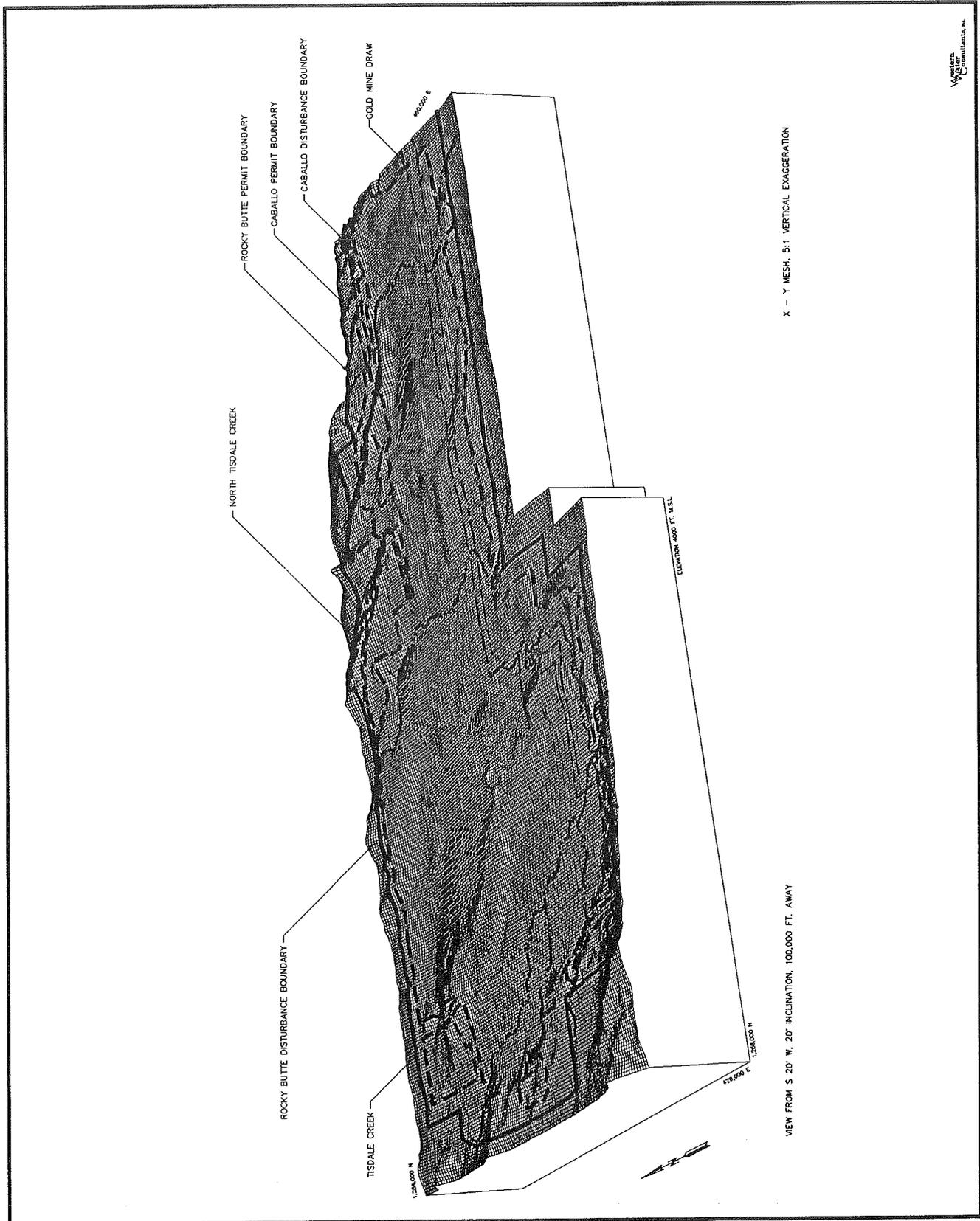


Figure 4-2. Postmining 3-Dimensional Perspective View of Rocky Butte Mine Area

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there would be about 1,850 acres of disturbed land, on which reclamation has not been initiated, at any given moment.

Impacts would result from the removal of topsoil and vegetation and from the handling of topsoil. Mining would disturb soil horizons and other soil characteristics that are the result of centuries of soil forming processes. Stockpiling topsoil for several years before it is redistributed would have negative effects on nutrient content, viability of plant seeds, and microbial activity in such topsoils. Some topsoil stockpiles would remain throughout the life of the mine. Erosion from both wind and water would increase on disturbed lands as compared to those same lands prior to disturbance.

Reclaimed soils would be unlike premining soils in texture, structure, color, organic matter content, and chemical composition due to mixing and storage. They would be more uniform in type, thickness, and texture than before disturbance. Dilution of the upper soil horizons by less fertile substratum material would decrease soil fertility. Subsoil material is also very low in organic matter, microbial activity, and major plant nutrients and may have undesirable physical composition. The destruction of soil aggregate structure would occur if heavy equipment was driven over moist soil during reclamation and would result in decreased permeability and infiltration. This would decrease air exchange rates and water holding capacity in the soils and would negatively affect vegetation production.

If all suitable topsoil from disturbed areas is salvaged and replaced uniformly over the disturbed area it would cover that area with about 4.3 feet of topsoil. This would be more than adequate to restore productivity from a soil thickness standpoint. With proper soil handling and reclamation techniques, postmining productivity on the reclaimed area would probably remain about the same as premining productivity, although productivity may change locally because:

- Reclaimed topsoil depths would be more uniform than premining soils.
- Shallow soils and poor soils (such as those with clayey texture or high salinity) would be buried

or mixed with other topsoil materials to a more uniform physical and chemical composition.

- Uniformity of soil texture would be increased after mining: clayey or sandy soils and those with well-developed topsoil-subsoil substratum horizons would inevitably become mixed with other materials during handling. Once these soils were redistributed across disturbed areas, soil productivity and soil erodibility would be more uniform.

Replaced topsoil in the permit area should support a stable and productive vegetative cover capable of sustaining planned postmining land uses, which include livestock grazing, cropland, and wildlife habitat. As the vegetation cover becomes reestablished, erosion would not significantly affect productivity.

It is concluded that impacts to the topsoil resource would be moderate, confined to the permit area, and the changes would be long term although productivity would be restored at the end of mining. Because vegetative productivity must be restored as a condition of bond release, the impact of the changes to topsoil is not significant.

4.1.4 Vegetation

Because the proposed mine permit area would be required to be reclaimed to meet state revegetation success standards, long-term impacts to most vegetation types would be negligible. If state shrub reclamation goals are not achieved, moderate to major long-term impacts to shrub communities would result. Additionally, state shrub standards may be inadequate for establishing sage grouse nesting and big game wintering habitats; however, the reclamation plan (Appendix B) would ensure that diverse, productive, and ecologically sustainable vegetation communities are established on reclaimed areas. Postmining communities would be compatible with the proposed postmining land uses of cropland, pasture, grazing land, wildlife habitat, and recreation and would also meet landowner requirements. All riparian vegetation communities would be reclaimed.

A reduction in topographic diversity, due to an overall lowering of the topography and loss of relief during recontouring, coupled with topsoil mixing

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

would limit vegetative diversity for years after mining. Geomorphic processes and natural succession would slowly create topographic and vegetative heterogeneity, such that permanent impacts to diversity would be minor or negligible.

Construction and coal production operations would cause localized major impacts to vegetation until affected areas were reclaimed. Approximately 1,850 acres of disturbance would exist through the life-of-mine. Impacts associated with the removal of vegetation over this acreage are loss of wildlife habitat, potential for increased soil erosion, and invasion by undesirable plant species. Because it takes several years for reclaimed areas to develop the structure and function of self-sustaining vegetation communities, moderate impacts to vegetation would persist for approximately five years following reclamation (SCS, 1982).

Cropland would be affected more than other types, with approximately 3,752 acres being disturbed during the life-of-mine (Table 3-2). This acreage represents 39 percent of land within the project area. Construction and life-of-mine impacts on agricultural production due to temporary removal of lands from crop production would be minor because agricultural uses will be restored as soon as practical (Section 4.1.14).

There are no known T & E or sensitive plant species within the project area, and therefore impacts to T & E or sensitive plants would be negligible. If any such species are discovered during construction and mining, mitigation measures would be taken immediately to ensure that there would be no adverse impacts to the population (Appendix D).

Major impacts to trees would occur when trees are removed during construction and stripping. During reclamation, all trees would be replaced such that tree density on the project area would be equal to or greater than premining density (one or more saplings established for each tree lost). The presence of saplings in place of full-sized trees would be a moderate impact that would exist in localized areas throughout the life-of-mine.

It is concluded that there would be a moderate, short-term reduction in vegetative diversity within the permit area. Over the long term the diversity would

be restored, such that the impacts of this change are not significant.

4.1.5 Water Resources

The incremental impacts to the surface drainage system caused by mining activities at the Rocky Butte Mine will be minor and short term. Two of the primary streams on the mine area, Tisdale Creek and North Tisdale Creek, have already been affected by mining within the adjacent Caballo Mine permit area. The lower reach of North Tisdale Creek near its confluence with Tisdale Creek has been mined through and reclaimed by The Carter Mining Company. Plans for the reclamation of Tisdale and North Tisdale Creeks and the protection of the Gold Mine Draw alluvial valley floor have been approved by the Wyoming DEQ/LQD during permitting of the Caballo Mine. These plans are designed to provide channel and drainage-basin erosional stability compatible with premining conditions. A formal application for a permit to mine containing similar restoration plans is being prepared by NWR for the proposed Rocky Butte Mine. These reclamation plans typically include postmining impoundments to replace existing stock reservoirs. As required by Wyoming DEQ/LQD regulations, the postmining impoundments will be compatible with proposed postmining land uses and the restored hydrologic system.

Impoundments placed on streams and utilized for flood and sediment control must be permitted with Wyoming DEQ/LQD and typically must be dewatered following major runoff events to provide storage space for the subsequent event. The water thus released will be available to meet the needs of any existing downstream water users. Additionally, impoundments used for mining must be permitted with the Wyoming State Engineer's Office. Permits issued by the State Engineer's office are conditioned and administered such that senior water rights are protected. Records of the State Engineer's Office show no adjudicated water rights on Caballo Creek downstream from the mouth of Tisdale Creek (Wyoming State Board of Control, 1990).

Surface water quality would not be significantly affected by mining, based on studies conducted by the USGS for the Belle Fourche River Basin (Bloyd, et al., 1986). Although reclaimed soils may be more

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

erosive for the first few years after reclamation, the larger sediment production would probably not be delivered to area streams due to sediment deposition as a result of flatter slopes on reclaimed lands and sediment trapping by mandated sedimentation ponds.

It is concluded that the Rocky Butte Mine would cause a minor, short-term reduction in streamflows due to water captured in sedimentation ponds. There would be no long-term surface water impacts due to regulatory requirements for rehabilitation of the drainage system.

The proposed Rocky Butte mining operation would completely remove the Wyodak-Anderson coal aquifer and any Wasatch overburden aquifers from an area of approximately 5,300 acres. The aquifers would be replaced with spoils whose origin is the overburden and interburden strata that are stripped away with the removal of the coal. The physical and chemical characteristics of mine spoils are highly dependent upon the parent material from which they are derived. Data collected thus far from Powder River Basin area mines show that once resaturated with ground water, mine spoils are usually able to provide small yields of ground water of a quality suitable for stock watering purposes. Martin et al. (1988) concluded that the final permeability of the mine spoils will likely be within the range of permeabilities for the undisturbed Wasatch aquifer and the Wyodak-Anderson coal aquifer.

Overall, the permeability of the spoils at the Rocky Butte Mine is expected to fall within the broad range of spoil permeabilities found at the other regional operating mines. The average permeability of the spoils over the west half of the Rocky Butte Mine would be expected to be skewed towards the higher end of the regional range of values because the overburden in these areas is especially sandy. There appears to be somewhat less sand in the overburden of the east half of the permit area, and there the final spoils permeabilities would be expected to fall near the lower limit of the regional values.

Considerable variability does exist in the replaced spoil, as is evidenced by the fact that spoil permeabilities vary by three orders of magnitude at the Gillette area mines. This variability is partially due to the extreme differences in the textures of the

overburden materials. Another factor causing hydraulic variability in spoils is the degree to which the spoils are mechanically sorted during backfilling. The mechanical sorting is the process by which large spoil fragments tend to roll farthest down the backfill bench where they accumulate at the bottom of the replaced spoil sequence. The sorting is most pronounced in dragline-cast spoils but is also observed in truck-dumped spoils. In truck-shovel spoils, overall permeabilities are generally lower than dragline spoils because the vehicular traffic of the truck-shovel emplacement causes some spoil compaction. The Rocky Butte Mine will be a combined truck-shovel/dragline operation, with approximately the lower half of the overburden removed by dragline. The product of the mechanical sorting is a spoil aquifer whose porosity and permeability decrease upwards from the pit floor.

Additional variability in spoil hydraulics exists because the geologic strata of the overburden are not completely mixed by the spoil placement process. The spoils would probably contain small zones of higher-permeability sands within a matrix of finer-grained material, similar to the sandstone channels contained in the premining Wasatch overburden.

The types of water that have been observed in resaturated spoils are chemically similar to those found in the premining Wasatch. However, the total dissolved solids (TDS) concentrations of the postmining ground waters are occasionally much larger than is found in the undisturbed Wasatch or Wyodak-Anderson coal aquifers. Ground waters that initially saturate replaced spoils have relatively high TDS concentrations derived from the dissolution of minerals exposed by the breaking up of the spoil materials in the mining and backfilling processes. At the Caballo Mine, average TDS concentrations in spoil ground waters were initially about 4,630 mg/L for the first two years after spoil emplacement, but they declined to 3,750 mg/L four years after spoil emplacement (TCMC, 1985). Some of the principal solutes of concern in these spoil ground waters include sulfate, nitrate and selenium. At other Gillette area mines the average TDS values in spoil ground waters have ranged from 700 to 25,000 mg/L (GAGMO, 1991a). Most spoil wells exhibit TDS values between 3,000 and 6,000 mg/L and, similar to the premining Wasatch aquifer, meet Wyoming Class III standards for use as stock water. The principal

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cations in the postmining ground waters are typically calcium, magnesium and sodium, while the predominant anions are sulfate and bicarbonate. Similar to the Caballo Mine, a number of other Gillette area mines have noted that TDS concentrations in their spoil ground waters have declined with time. Using data compiled from ten surface coal mines in the eastern Powder River Basin, Martin et al. (1988) concluded that spoil ground water quality improves markedly after the spoils are leached with one pore volume of water. One pore volume of water is the volume of water which would be required to fill the pore space or saturate the spoils following reclamation. Future postmining ground waters are therefore expected to be of better quality than what is observed today.

There are approximately 53 private water supply wells lying within 5,000 feet of the boundary within which blasting will occur over the life of the proposed Rocky Butte Mine. The closest private well lies some 1,400 feet west of the overburden removal boundary (approximate blasting boundary) of the proposed mine. Within this area the maximum allowable peak particle velocity for ground vibration from surface coal mine blasting is 1.00 inch per second (WDEQ/LQD, 1989). In general, a peak particle velocity below 2 inches per second (in/sec) will not cause damage; major damage will occur at a peak particle velocity of 7.6 in/sec and minor damage at 5.4 in/sec. Many variables, including type and condition of the structure, can affect these values (Pfleider, 1972).

In the coal fields of the eastern United States and in the Powder River Basin as well, there have been occasional instances where water well owners in such close proximity to operating strip mines have complained about the effects of blasting on the performance of their water wells. There is little published data pertaining directly to effects of blasting on wells or ground-water aquifers, and among the documented complaints there has been very little clear evidence that the well problems were blast related. In their studies of complaints of blast damaged wells in Appalachia, Philip Berger and Associates, Inc. (1980, 1982) concluded that natural factors and poor well design and construction practices were most often the factors responsible for changes in well behavior in blasting complaint cases. The authors based their studies on private wells and on a number of test control wells located at

operating coal strip mine pits. The authors reported no observable change in well conditions in their tests, even though the maximum ground vibration levels at the wells from blasting were as great as 5.4 in/sec. The 53 private wells that are in close proximity to the Rocky Butte Mine are not expected to be damaged by blasting vibrations. In keeping with the Rules and Regulations of the Wyoming DEQ/LQD (1989), owners of property lying within one-half mile of the Rocky Butte permit boundary are entitled to and may request a pre-blasting survey that includes documentation of the performance and condition of water wells.

Impacts to the sub-coal Fort Union (Tullock) sand aquifers will be limited to drawdown induced by withdrawals from wells. At this time NWR does not plan to complete a well in these sands unless mine water requirements cannot be met by near-surface sources. Under this plan, no impacts to the sub-coal sands would result from the Rocky Butte Mine.

NWR has operated a computer ground-water flow model of the coal and overburden in order to predict the magnitude and extent of drawdowns outside the permit area. The USGS computer model MODFLOW (McDonald and Harbaugh, 1988) was used in this analysis. This model simulates a three-dimensional, multi-layer system such as the coal/overburden complex using a set of finite-difference equations which describe ground-water flow. Vertical leakance between layers is simulated as are discharge and recharge sources.

Approximately 1,160 square miles are included in the modeled area which is shown on Figures 3-4 and 3-5. In order to simulate cumulative coal and overburden water level drawdowns, mining was simulated at the six closest surrounding mine sites in addition to proposed mining at Rocky Butte. Mining was simulated for the Wyodak, Caballo, Belle Ayr, Rojo Caballo, Cordero, and Coal Creek Mines. The permit areas for these operations are shown on Figures 3-4 and 3-5.

Model calibration was verified by comparing predicted 1990 drawdown in the Wyodak-Anderson coal seam to the five-foot drawdown contour reported by the Gillette Area Groundwater Monitoring Organization in its 10-Year Report (Hydro-Engineering, 1991b). This comparison is presented graphically on Figure 4-3. Making this comparison

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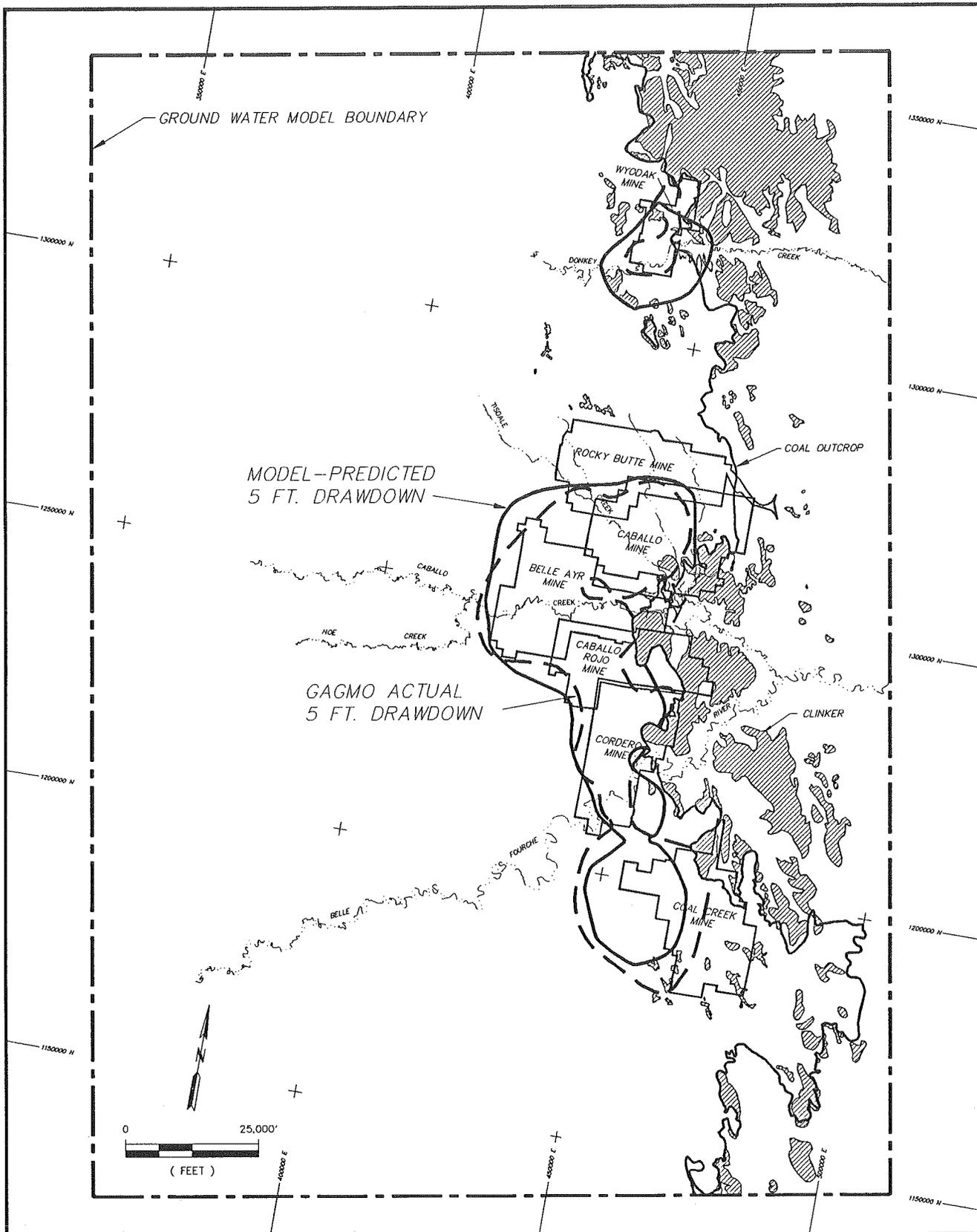


Figure 4-3. Predicted Drawdowns vs. Actual Drawdowns in the Wyodak-Anderson Coal at the End of 1990

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reveals very close agreement between predicted and observed drawdown in the Wyodak-Anderson coal seam. In general, the model is conservative since drawdown is slightly over-estimated in most areas. This over-estimation is probably due to local faults, partings and no-coal zones present in the Wyodak-Anderson coal seam but not simulated in the model due to lack of data outside the mine permit area. Geologic features of this type tend to lower the transmissivity of the coal on a regional scale.

The overburden is not a regionally extensive aquifer like the coal seam (refer to Section 3.5). Aquifers in the Wasatch Formation are characterized as discontinuous sand channels separated by shales and claystones of low permeability. For this reason, and since the modeled overburden drawdown is of much smaller extent than that in the coal, no attempt was made to compare the model-predicted drawdowns to the observed drawdowns for the overburden.

NWR operated its predictive model to simulate mining at each of the six mines mentioned above while excluding the proposed operations at Rocky Butte. The predicted extent of drawdown for this situation as represented by five-foot drawdown contours in the coal and overburden are presented on Figure 4-4.

The procedure was repeated with the Rocky Butte Mine included. The resulting five-foot drawdown contour for both the Wyodak-Anderson coal seam and the Wasatch overburden is presented on Figure 4-5. By comparing this figure to Figure 4-4, the approximate impacts due to the proposed Rocky Butte operation alone can be determined. Figure 4-4 can be considered the expected drawdown under the No Action Alternative for this EIS. For purposes of comparison, the five-foot drawdown contour predicted by the USGS in its CHIA study (Martin et al., 1988) of the Powder River Basin is also presented on Figures 4-4 and 4-5. With or without the Rocky Butte Mine, the extent of the 5-foot drawdown contour is similar to or less than the maximum extent shown in the CHIA.

As a requirement to obtain a permit to mine, the applicant must compile a list of all water rights within three miles of the permit area. One hundred fourteen wells recorded with the Wyoming State Engineer in this area have reported completions in

the overburden. An additional 24 permitted wells are reportedly completed in the Wyodak-Anderson coal within this limit. Coal wells lying within one mile of the permit area would undergo significant drawdowns possibly to the point of complete dewatering near the pit limits. Similarly, the overburden aquifer would experience significant drawdowns within one mile due west and northwest of the permit area. In all other directions only those overburden wells within 2,000 feet of the permit boundary are likely to observe mining-induced drawdown. Drawdowns will reach a maximum as mining makes its closest approach to each well. However, water levels will likely stabilize or even recover after that time.

Severity of water-level drawdowns depends upon amount of drawdown relative to amount of available drawdown. There are no guidelines that stipulate how much drawdown is acceptable for any given location. All coal mining companies are required to install wells to monitor drawdowns from their operations. All mining permittees are required to commit that the operator will replace the water supply of an owner of a well that is affected by contamination, diminution or interruption resulting from the mining operation. If an owner of a water-supply well believes that his or her well has been impacted by a mining operation, the owner can file a complaint and pay a \$100 fee to the State Engineer. The State Engineer's Office will then assemble available data, including well construction information and water-level monitoring data collected by the mine operator and submitted to WDEQ/LQD, and make a determination as to the amount of damage, if any, and the cause. If the State Engineer's Office determines that mining has impacted the well to the point that historic, beneficial uses are no longer possible, the mine operator would be required to take steps to correct the situation. The mine operator could be required to deepen a well, lower a pump or even drill a new well in a deeper, underlying formation (most likely the sub-coal Fort Union Formation).

During mining, the mine pit acts like a big well, and flow directions in the surrounding aquifers are down-gradient toward the pit. Thus there is no mechanism for contaminants to migrate away from the pit. The water which seeps into the pit must be dealt with in order that it does not interfere with mining operations. Typically, the water is collected

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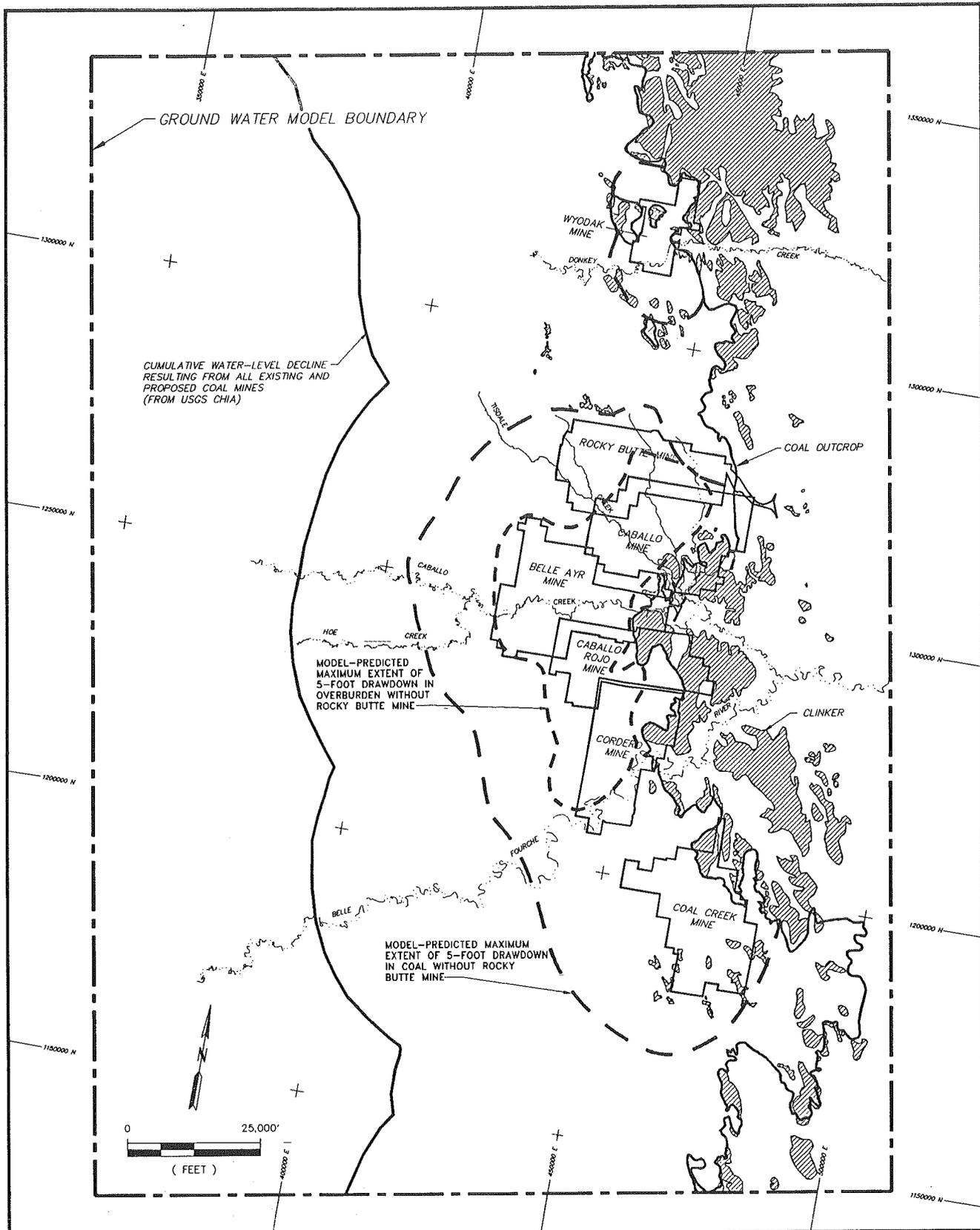


Figure 4-4. Model-Predicted Maximum Extent of Drawdown in Coal and Overburden Without Rocky Butte Mine

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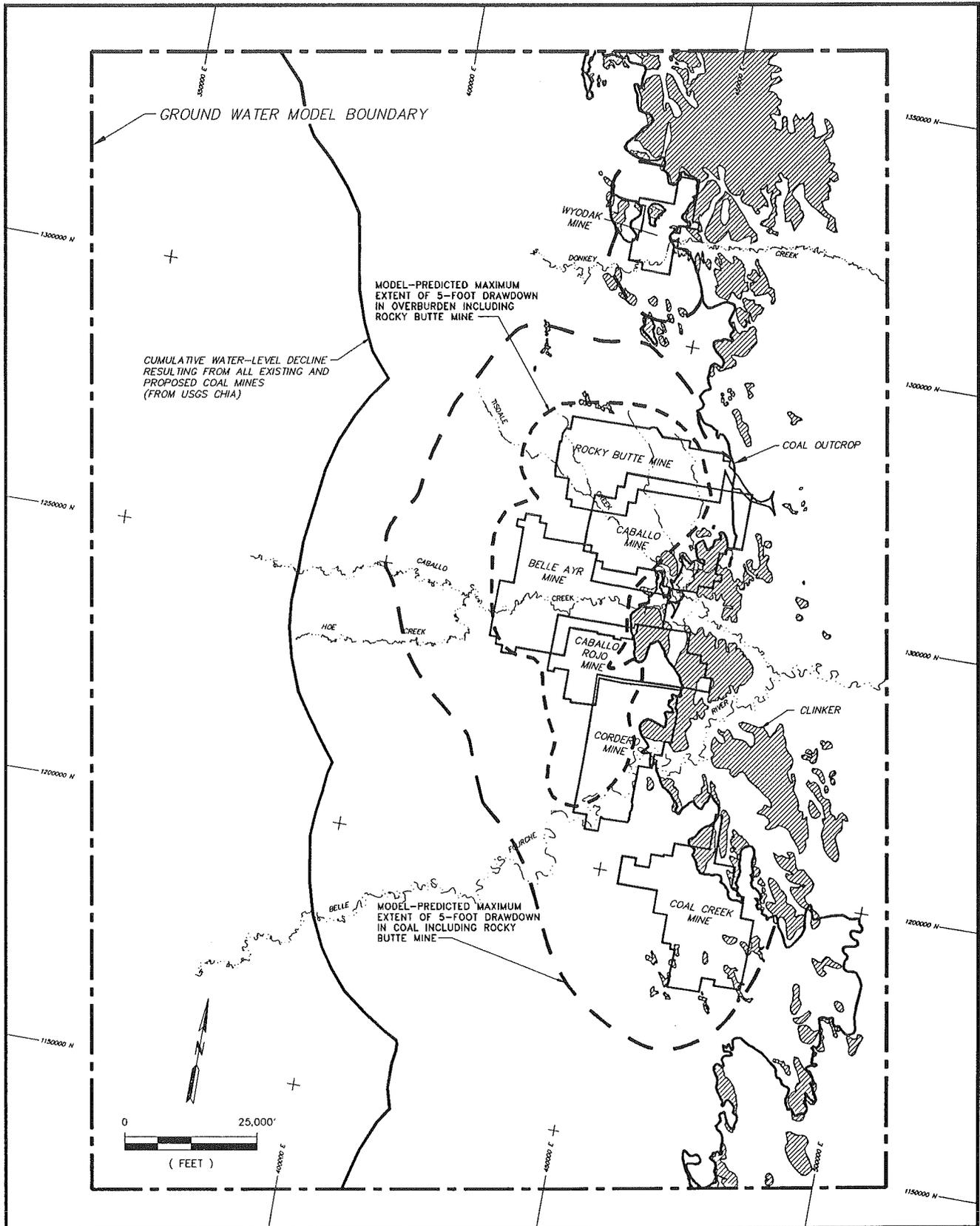


Figure 4-5. Model-Predicted Maximum Extent of Drawdowns in Coal and Overburden With Rocky Butte Mine

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in a sump on the pit floor and pumped to a settling pond to remove suspended solids. Much of the water is used for beneficial uses such as dust control. Water in excess of that needed for operations may be discharged subject to effluent limitations under the National Pollutant Discharge Elimination System. The water is a combination of overburden and coal water (refer to Section 3.5.2), and after conventional settling should pose no threat to surface waters (if discharged) or to ground waters (if it percolates downward from a settling pond to the water table).

Where extensive saturated sands are encountered in the overburden, such as those in the west half of the Rocky Butte property, dewatering wells may be installed in advance of mining to reduce pit inflows and promote highwall stability. The disposition of water from dewatering wells would be the same as that for pit inflows, except that it would not require treatment for suspended solids removal.

It is concluded that impacts from mining-induced drawdowns are minor since they must be mitigated by the operator if a water user is injured. Water levels in surrounding areas will not recover until sometime after mining ceases, and therefore this is a long-term impact. Within the mine area the coal aquifer and any overburden aquifers will be removed and replaced with spoil materials. Wells within the mine area which are completed in these zones will be destroyed by mining, but there is no impact from this since the need for the wells (i.e., stock or domestic water supplies) is also removed during mining. Abandoned wells and drill holes in the pit area that are not totally removed by mining must be capped and sealed according to State statutes (W.S. 35-11-404) to ensure aquifer separation. The wells used to define the ground-water hydrology of the permit area or to provide water for mining activities must be sealed according to State Engineer and WDEQ procedures. If the land owner desires the use of some of the wells, the mine operator may request the transfer of use at the end of their mining usefulness.

In time, the spoils will become saturated and the ground-water flow system will be reestablished. At least the first pore volume of water in the spoils will be elevated in dissolved constituents and will probably not be acceptable for uses other than stock

water. The first water to flow out of the spoils into the surrounding aquifers may temporarily degrade the water in these aquifers, particularly the coal. This effect should be temporary, although long-term, and there are some indications that conditions exist in the coal to reduce some of the dissolved constituents (Martin, et al., 1988, p. 93). In time, the soluble constituents will be leached out and a new equilibrium water quality will be established. This reduction in water quality will be long term but is a moderate impact since alternative sources of water are available.

The mining companies have no obligation to construct water-supply wells in the replaced spoils, but they are required to construct monitor wells to enable evaluation of water levels and water quality in the backfill. As water levels recover in the spoils after mining, the occupants of the land at that time may construct water-supply wells in the spoils. The EPA considers any ground water containing less than 10,000 mg/L TDS as a potential drinking water source. The backfill water is expected to meet this criterion, and should be suitable for livestock water without treatment.

Mining does not directly affect aquifers in the Fort Union Formation below the coal. Most of these aquifers are in the Tullock Member of the Fort Union Formation and are hydraulically isolated by the Lebo Confining Layer (refer to Section 3.5.2).

4.1.6 Alluvial Valley Floors

The mine permitting regulatory authorities (state and federal) have not yet formally declared whether or not there are any AVFs within the Rocky Butte Mine. However, within the proposed permit boundary of the Rocky Butte Mine the streams all appear to be hydrologically insignificant and are similar to areas approved for mining downstream. Therefore, it is doubtful that any portions of them meet the statutory criteria of an AVF.

Streamflows in Tisdale Creek, North Tisdale Creek and Gold Mine Draw at the Rocky Butte Mine will be diverted around the active mining areas in temporary diversion ditches or captured in flood-control reservoirs above the pit. If flood-control impoundments are used, it will be necessary to evacuate them following major events to provide space for the subsequent flood. Consequently,

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disruptions to streamflows which might supply downstream AVFs are expected to be negligible. Ground waters intercepted by the mine pits will be routed through settling ponds to meet state and federal quality criteria, and the pond discharges may actually slightly increase the frequency and amount of flows in these streams. Dry Donkey Creek will be temporarily impacted with the construction of the railroad spur. The upper reaches of this stream channel and its tributaries may be diverted in ditches around the spur, and in some areas the flows will be conveyed beneath the spur through culverts. These changes to the natural system will cause temporary increased sediment yields. The effect will be minor during the construction phase of the railroad and negligible thereafter.

Studies have shown that there is an absence of saturated alluvium within the Rocky Butte Mine permit area. There is no evidence of stream base flows sustained by ground-water contributions. There is no evidence of subirrigation outside of the stream channels themselves, and the agricultural productivity of the valley floors is not significantly better than the upland areas.

It is concluded that no AVFs will be impacted by the Rocky Butte Mine pending a final determination by Wyoming DEQ/LQD.

4.1.7 Fish and Wildlife

Although 27 of the approximately 35 ponds and all ephemeral drainages occurring on the project area would be temporarily removed and/or relocated during the life of the mine, no impacts to fisheries are anticipated from the proposed mining operation because no known fisheries exist on the area.

Approximately 3,165 acres of native habitat (i.e., 2,154 acres sagebrush, 959 acres grassland, and 52 acres riparian) and 3,752 acres of cropland (primarily hay species), the primary habitats used by pronghorn antelope and mule deer on the project area, would be disturbed during the life of mine (Table 4-2). This represents 1.1 percent of the 650,000 acres of pronghorn habitat and 0.2 percent of the 1,968,000 acres of mule deer habitat in the Hilight and Thunder Basin herds, respectively. Additionally, topographic moderation would reduce habitat diversity and result in the conversion of winter/yearlong range to summer range until shrubs

become established. Reclamation, including the establishment of palatable forage species, would begin approximately six years after project initiation (Appendix B), allowing no more than about 1,850 acres to remain disturbed at any one time over the life of the mine. Young grasses, forbs, and shrubs present on the newly reclaimed areas would provide forage for antelope and mule deer while mining operations continue elsewhere on the area.

Since no crucial habitat for the Thunder Basin mule deer herd exists within the project area and herd populations are near current WGFD objectives, impacts to mule deer populations resulting from the proposed project would be minor. Impacts to pronghorn antelope of the Hilight herd resulting from the conversion of winter/yearlong range to primarily summer range would result in a moderate to major long-term impact until shrubs become established. Greater mortality would likely result from increased road kills due to increased traffic levels. Animals in the disturbed areas would likely be temporarily displaced to suitable habitats adjacent to operations for the life of the mine. Minor impacts are also anticipated for antelope and mule deer in the Pumpkin Buttes herds due to increased competition caused by displaced animals moving off the project area. Additionally, if hunting on the proposed permit area is prohibited, the area may be used as a refuge by pronghorn antelope and mule deer, making adequate harvest levels difficult and increasing the likelihood of large winter die-offs.

Impacts to white-tailed deer are expected to be minor over the life of the mine since no WGFD designated white-tailed deer range exists on the project area, and only 52 acres of riparian habitat (i.e., habitat in which white-tailed deer were most frequently observed) is present (Table 4-2). Those white-tails that do occur on the area would likely be displaced to suitable habitats adjacent to operations. White-tailed deer may utilize newly reclaimed riparian areas as such areas are established (Appendix B). Minimal increases in mortality (i.e., road kills) resulting from increased traffic may occur as a result of the proposed operation.

Impacts to raptors resulting from the proposed project would be moderate in intensity and remain for the life of the mine. Six raptor nests would be removed within the disturbed area (Table 4-2), five of which were active in 1991. Four additional nests

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within 0.25 mile of the project area may also be unsuitable for use by some raptor species; however, species such as golden eagle are known to be tolerant of mining operations as shown by their nesting on highwalls within active pits (Mariah Associates, Inc., 1988a, 1988b). Increased mortality of raptors may also result from traffic fatalities and/or power line electrocutions and collisions. Mitigation measures have been designed to minimize these hazards (Appendix D).

Approximately 1,850 acres (Table 2-1) would, at any point in time, be unavailable as hunting and foraging habitat for some raptors (Table 4-2); however, many raptors will continue to use areas of active mining (Phillips and Beske, 1990). As lands are reclaimed and small mammals and birds reinvade these areas, greater numbers of hunting and foraging raptors would be expected to again utilize these sites. Mitigation measures designed to lessen impacts to raptors (e.g., raptor monitoring plan [Appendix D]) would reduce negative impacts resulting from the proposed project.

The proposed mining activity would have major, long-term impacts to sage grouse on the project area resulting from the loss of sage grouse leks (Table 4-2) and associated nesting and brood rearing habitats. Studies conducted in 1979 and 1980 on western and northeastern portions of the project area indicated that the two historic leks on the project area, as well as the historic lek occurring within the two-mile buffer (Figure 3-8), were not active (Harner-White Ecological Consultants, 1980). Additionally, breeding birds have been known to relocate if leks are disturbed and other suitable habitat exists nearby. Project impacts to sage grouse would last until sagebrush of adequate density and height becomes reestablished (approximately 10 to 20 years) (Appendix B). These impacts would result primarily from the loss of nesting, brood rearing and foraging habitat. Some additional mortality may also result from traffic accidents; however, mitigation designed to reduce these impacts would keep fatalities at minimal levels (Appendix D).

Table 4-2. Acreage of Life of Mine Disturbance Within Wildlife Habitats on the Proposed Rocky Butte Mine, Campbell County, Wyoming, 1991.

Species	Total Occupied Area (Acres)	Area of Occupied Habitats on the Project Area (Acres)	Acreage of Disturbance Within Occupied Habitats on the Project Area (Acres)	Percent of Habitat Loss on the Project Area ⁹	Percent of Habitat Loss Within Area of Occupancy ⁹
Pronghorn Antelope	650,200 ¹	8,958 ²	6,917	77.2	1.1
Mule Deer	1,968,000 ³	5,555 ²	4,269	76.8	0.2
White-tailed Deer	332,900 ⁴	66 ⁵	52	78.8	<0.1
Raptors	45,120 ⁶	9,647 ⁷	7,333	76.0	16.3
number of nests	27	8	6	75.0	22.0
Sage Grouse	23,726 ⁶	5,996	4,347	72.5	18.3
number of leks	6	2	2	100.0	33.3

¹ Hilight herd unit.
² Includes native and cropland vegetation types.
³ Thunder Basin herd unit.
⁴ Thunder Basin herd unit and riparian habitat on project area.
⁵ Includes riparian vegetation.
⁶ Includes project area and two mile buffer per WDEQ guidelines (1987).
⁷ Includes entire project area.
⁸ Area within two miles of lek centers on project area and two mile buffer.
⁹ Maximum effect for life-of-mine.

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No impacts are anticipated for sharp-tail grouse since they have not been observed on the project area. Impacts to mourning dove are expected to be minor since their numbers are relatively low and sufficient suitable habitat for the species exists outside the project area. Dove utilization of shelterbelts and other sites with trees on the project area would be interrupted until trees become reestablished on the area (approximately 10 to 20 years). Impacts to MBHFI vary from none for species not occurring on the area to moderate for nesting species. Impacts would result primarily from the loss of nesting and foraging habitat for the life of mine on no more than approximately 1,850 acres in any one year. Species which would likely be unaffected by the project are canvasback, whooping crane, Lewis' woodpecker, and dickcissel. MBHFI for which impacts could be minor (i.e., loss of foraging areas primarily during migrations) are white pelican, double-crested cormorant, bald eagle, osprey, American peregrine falcon, prairie falcon, Richardson's merlin, sandhill crane, mountain plover, and long-billed curlew. MBHFI for which impacts could be moderate (i.e., loss of nesting habitat) are ferruginous hawk, golden eagle, and burrowing owl.

Reclaimed areas would likely be used by most MBHFI foraging on the area soon after vegetation establishment, and additional mitigation designed for nesting species would further minimize impacts on these species. Increased mortality from traffic accidents (all MBHFI) could result from proposed activities, as could increased mortality from collisions (MBHFI raptors and cranes) and electrocutions (MBHFI raptors) resulting from powerlines. Appendix D discusses mitigation designed to alleviate these potential problems.

No impacts are anticipated for black-footed ferret from the proposed Rocky Butte Mine since no suitable habitat for the species is present. Minor impacts for bald eagles could result from the loss of foraging habitat on the project area for eagles wintering at the Belle Fourche roost and for migrating peregrine falcon. These impacts would last only for the duration of mining operations; however, continuous reclamation of mined areas would make many areas available for hunting and foraging by these species prior to cessation of mining operations.

No impacts are anticipated for State sensitive wildlife species; there have been no recent reports of these species on the project area and adjacent two-mile buffer (personal communication, Robin Jones, Nature Conservancy, 1991). Impacts to WGFD priority bird species including burrowing owl, ferruginous hawk, mountain plover, and long-billed curlew have been discussed above. Mountain plover, a candidate species for federal T & E listing, has not been observed in the area (Oakleaf et. al. 1991), and the USFWS has not identified it as a concern (personal communication, Ron Starkey, 1991). Upland sandpiper, also identified as a priority species by the WGFD (personal communication, Sharon Ritter, 1991), may occasionally breed on the area and could be moderately impacted over the life of mine. Mitigation for T & E and State sensitive/priority species is discussed in Appendix D.

Impacts to other wildlife species occurring on the area range from minor for highly mobile species that do not breed in the area (e.g., coyote, migrating birds), to moderate for breeding species and relatively sedentary species (e.g., red fox, numerous small mammal species, breeding birds). Impacts would remain for the life of the project and until habitat diversity is restored through reclamation and successional processes.

Predator species occurring on the project area would likely be displaced to suitable adjacent habitats during mining operations. Coyote and bobcat (i.e., nonbreeding species) would receive minor impacts, whereas red fox, badger, and striped skunk (i.e., breeding species) would receive moderate impacts. Increased mortality may result from increased competition for food in adjacent areas and increased mortality due to traffic.

Impacts to lagomorphs and other small mammals occurring on the area would also be moderate over the life of the mine, with increased mortality likely resulting during construction and mining operations and from increased road kills. Nongame birds and waterfowl known to breed on the project area would also suffer moderate impacts from the loss of nesting habitat for the life of the mine. As habitats are replaced these species can be expected to return to the area (Appendix B).

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4.1.8 Historical, Archaeological, and Paleontological Resources

A total of 59 cultural resource sites have been inventoried within the Rocky Butte lease area and adjacent areas in which proposed developments may take place. These sites are about evenly divided between historic (26 sites) and prehistoric (29 sites); another four sites are multicomponent with both historic and prehistoric occupations.

Of the total, nine are believed eligible for the NRHP. Seven of these sites may be directly affected by the proposed undertaking. The affected sites include five prehistoric and two historic sites. The prehistoric sites include the probable Paleoindian complex (Sites 48CA2707, 48CA2708, and 48CA2723) which could prove to be quite important and one site (48CA472) that has been partially excavated (Hauff and Eckles 1982). Only the latter site, however, has been fully evaluated. All five sites potentially contain important excavation and research potential and are believed eligible under NRHP Criterion D. The two historic sites include an historically important road (Site 48CA2694) believed eligible under Criterion A and a twentieth century homestead/ranch (Site 48CA1974) believed eligible under Criterion A. The other known cultural resources are believed not to be significant.

The effects on the potentially eligible prehistoric and historic sites resulting from the proposed mine are complete destruction due to surface strip mining excavation and construction of the proposed railroad spur. These impacts would constitute adverse effects in the Section 106 process as defined by the Federal Criteria of Effect (36 CFR 800.8) and Criteria of Adverse Effect (36 CFR 800.9).

Impacts to cultural resources cannot be permitted. Sites which cannot be avoided must be mitigated in accordance with procedures discussed in Appendix D.

Potential impacts to paleontological resources consist of losses of vertebrate, invertebrate, and paleobotanical fossils of importance to scientific research. The losses would result from destruction, disturbance or removal of fossil materials as a result of coal mining activities, unauthorized collection, and vandalism. A positive impact of coal mining activities

would be the exposure of fossils for scientific examination and collection which would otherwise not occur except as a result of overburden excavation and exposure of fossiliferous geologic strata.

No impacts to known significant paleontological resources are expected as a result of coal mining activities. However, there is potential for buried paleontological resources in the Eocene Wasatch and Paleocene Fort Union formations underlying the mine permit area.

4.1.9 Recreation

Game harvest on the proposed Rocky Butte Mine could be lost during the life of mine if the area is closed to hunting. However, access to the proposed permit area is currently controlled by private landowners and hunting on the area could be closed at any time. Since postmining reclamation and succession would eventually restore wildlife habitat to premining conditions, all impacts to this land use are considered minor, lasting until wildlife habitats have become reestablished (Appendix B).

During the years 1994 through 2004, mine pits, with associated stockpiles, are proposed for western portions of the Rocky Butte project area where indeterminate amounts of wildlife observation take place from Wyoming Highway 59. Until reclamation restores wildlife habitat sufficiently to support pronghorn antelope and other visible wildlife species (Appendix B), this recreational resource will be lost. However, impacts are expected to be minor over the life of mine, since no rest areas/observation points currently exist along Highway 59 near the Rocky Butte site.

4.1.10 Air Quality

Adding a sixth mine to the existing group of five mines south of Gillette would increase particulate concentrations in the vicinity of the proposed mine during the operating life of the new mine. The amounts and patterns of increase would vary as the mining proceeded. Insignificant amounts of other regulated atmospheric pollutants, sulfur oxides, sulfuric acid mist, sulfation, hydrogen sulfide, photochemical oxidants, hydrocarbons, nitrogen

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oxides, fluorides and carbon monoxide would be generated.

Modeling indicates maximum particulate emissions from mining activities would occur in year 7 of the mine plan. Calculated PM_{10} concentrations for that year show the contribution from the proposed Rocky Butte Mine falling below the significance level, $1 \mu\text{g}/\text{m}^3$ annual arithmetic mean, at a radius of approximately 10 kilometers. A plot of isoconcentration lines for year 2001, mining year 7, is shown in Figure 4-6. At the Boundary of the Lands That are Necessary to Conduct Mining Operations, hereafter referred to as the Boundary and coincident with the proposed Rocky Butte Mine permit boundary, a maximum contribution of $9.8 \mu\text{g}/\text{m}^3$ was calculated for mining activities in year 2001. Calculations for year 2009, mining year 15, indicated concentrations up to $13.0 \mu\text{g}/\text{m}^3$ may be generated when mining proceeds close to the Boundary.

When the background PM_{10} and emissions from the five neighboring mines to the south are added to the calculated emissions from Rocky Butte Mine, the maximum concentration along the Boundary, excluding that part of the Boundary contiguous with Caballo Mine, is $28.7 \mu\text{g}/\text{m}^3$ in the year 2001. The corresponding value for the year 2019 is $33.7 \mu\text{g}/\text{m}^3$. In both cases the PM_{10} concentration would be below the State and Federal standard of $50 \mu\text{g}/\text{m}^3$, annual arithmetic mean.

Lands within the Boundary would not be accessible to the general public. Consequently, that area is not subject to State air quality standards. Instead, emissions in that area are governed by MSHA respirable dust regulations. In 2001 Rocky Butte Mine operations would be relatively near Caballo Mine operations, and the major emission sources from the two mines would be roughly aligned with the prevailing winds. The result would be high concentrations of PM_{10} near the mining operations and along the contiguous boundary. When either the proposed Rocky Butte Mine or Caballo Mine is considered alone, neither mine generates enough PM_{10} emissions along the common boundary to cause a violation. Hence, even though the combined maximum, $53.3 \mu\text{g}/\text{m}^3$, is greater than the ambient air standard of $50 \mu\text{g}/\text{m}^3$, both mines meet the standard.

The State of Wyoming no longer requires short term air quality modeling for a permit application, contending the results are not meaningful. Nevertheless, compliance with the State 24-hour TSP and PM_{10} standards of $150 \mu\text{g}/\text{m}^3$ must be demonstrated by the required air quality monitoring program. Non-mining sources, such as agricultural and oil field disturbances can contribute to high 24-hour particulate concentrations. One exceedence of the 24-hour standard is allowed per year.

PM_{10} impacts would be moderate within the Boundary during the mine operations. Exceptions would be areas in close proximity to operations. These areas may be impacted heavily for a number of years while the mining operations are nearby. Outside the Boundary, impacts would be minor. In the long term, impacts from PM_{10} emissions from Rocky Butte Mine operations would be negligible. Impacts on neighboring mines would be moderate for the adjoining Caballo Mine and diminish to insignificant levels within the Belle Ayr Mine. Operations are scheduled to be ending in the neighboring mines from 2009 through 2025 resulting in a gradual decline in PM_{10} concentrations in the region during that period. In general, if the proposed Rocky Butte Mine is constructed, the Eastern Powder River Basin air quality will be decreased in the immediate vicinity of the proposed mine, but will still continue to meet Federal and State standards.

4.1.11 Visual Resources

Alterations in the natural character of the landscape due to mining and associated activities would change the Visual Resource Management classification of the proposed permit area from the existing Class IV to Class V and require rehabilitation to bring it back to the more stringent classification. The primary factors affecting this reduction in visual resource value include the mine pit, service and haul roads, overburden piles, and structures such as powerlines, offices, warehouses, and, especially, facilities to crush, handle, and load coal, including the silos and a new railroad spur. The movement of haul trucks and loaders across the landscape would also change the character of the area from premining status. The visual impact of the coal loadout facilities and large stockpiles could be considered major by nearby residents and travelers on local public roads during the life of mine.

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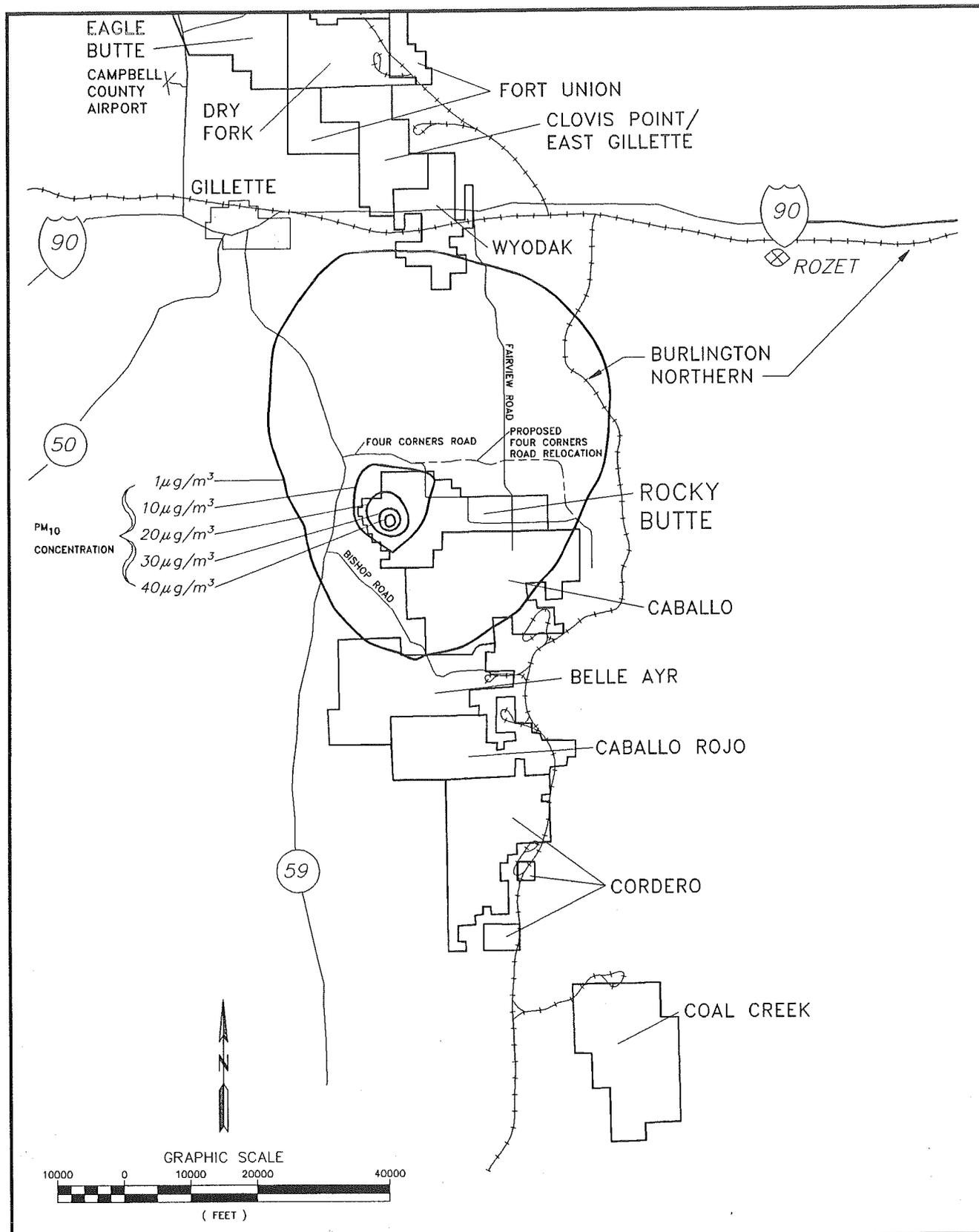


Figure 4-6. Isoconcentration Lines of PM₁₀ Emissions Generated from Planned Rocky Butte Mine Operations in Year 2001

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Reclamation and cessation of mining would restore the landscape to a scenic quality similar to the premining quality for the seven factors on which scenic quality is determined: landform; vegetation; water; color; adjacent scenery; scarcity; and cultural modifications. Premining evaluations of these factors resulted in each receiving the lowest possible score in the rating system except for landform and cultural modifications which were awarded intermediate values (Appendix C). Sensitivity levels would not be expected to change, nor would visual distance zones, so the management class would return to the premining Class IV after reclamation.

4.1.12 Noise

Ambient noise levels are believed to be in the 40 to 70 decibel range, depending upon location within the property with respect to Highway 59 and to Caballo Mine operations. The noise level in the immediate vicinity of mining operations is in the range of 85 to 95 decibels. The psychological property of sound called *loudness* is intimately connected with the *intensity* of a sound wave. For a pure tone of given frequency, loudness increases with increasing intensity, but in general the relation between the loudness of a sound and its intensity is not simple. Loudness cannot be measured in physical terms, since it depends on the ear and judgement of the individual observer.

Using intensity as an indicator, it is possible to estimate approximately the distance one would have to be from a sound source of 100 decibels in the mine area to have the sound reduced to ambient levels. This estimate is based on the fact that energy is inversely related to the square of distance and that the logarithm (base 10) of the ratio of two sound intensities is called the difference in intensity level, or *bels*. Ten times this logarithm is called the difference in intensity level in decibels, and this difference is ordinarily used to compare intensities of two sounds. A sound 10 times as intense as another has an intensity level 10 decibels (db) higher. A sound 100 times (10^2) as intense as another has an intensity 20 db higher. Thus a sound of 100 db has an intensity level one million times (10^6) higher than a sound of 40 db. If the 100-db sound is measured, say, 10 feet from the source, the sound intensity would be reduced to 40 db at a distance of about 10,000 feet (1.9 miles) from the source, assuming no attenuation of the sound. In other words, the sound of 100 db

at 10 feet from the source would be reduced to near ambient levels within 10,000 feet from the source. Thus, residents of homes more than 1.9 miles from the active mine area would be unlikely to hear the sounds of the mine above ambient sound levels. There are several occupied homes closer than this distance from the mine. The nearest residence is only 500 feet from one mine activity, the construction of a topsoil stockpile during the first year of pit construction. This residence is also within 500 feet of Highway 59 and so has a higher ambient noise level than is normal for the region. Assuming that there is a sound level of 90 db measured 10 feet from the highway, the sound would be reduced to about 56.6 db at a residence 500 feet from the highway. Since the highway is a part of the existing environment for this particular residence, the 56.6 db may be considered the ambient noise level for this residence. If the construction of the topsoil pile imposes a sound source of 100 db at the same distance from the house as the house is from the highway, the new noise source would be reduced to 66.6 db at the residence. This is 10 db higher, or 10 times as intense, as the calculated ambient level. According to Table 3-7, this would place the noise level at the house at between the "quiet" and "nuisance" level.

Once the stockpile is built, sound levels at this residence would be reduced as the distance from the residence to actual mine activities increases. The presence of the overburden and topsoil stockpiles, once built, could help attenuate noise effects by deflecting and absorbing sound waves from the mine. All the calculations above neglect the effects of attenuation of sound waves.

Based on these calculations and assumptions, it is concluded that the six residences along the northwest and west sides of the Rocky Butte Mine would experience increased noise levels during certain periods of the mining operation. These noise levels would be increased most notably during the earliest and latest years of the operation, when an overburden stockpile and topsoil stockpile are built and then removed. The noise levels at the residences from those operations could reach the lower limit of what is generally considered the nuisance level. This impact could be of moderate significance for the nearest two or three residences for periods of up to a year or more during the life of the mine.

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With proper design and operation procedures, blasting will not cause unacceptable noise levels. The blast itself occurs within the overburden or coal where the sound is muffled by the material being blasted and by stemming (replaced drill cuttings) in the blast holes. Historically, the major source of noise in blasting has been from detonator cord on the surface. Recently, noise reduction from blasting by 50 percent and more is possible with the use of noiseless non-electric initiation systems. With this system and proper care, noise from blasting is reduced to a very tolerable level (Doug Emme, personal communication, May 19, 1992).

4.1.13 Transportation Facilities

Construction and operation of the proposed Rocky Butte Coal Mine could induce increases in both rail and highway traffic in and around the Gillette area. Minor increases in air travel could be expected from increased business and social travel. In general, minor to moderate increases in congestion, noise and probability of accidents would result.

At full production, the proposed Rocky Butte Mine would add 30 to 31 round trips per week over the Orin-Gillette branch line using the present railroad rolling stock, or about a 10 percent increase in unit train traffic. Because the Rocky Butte Mine spur would be less than 10 miles from the Gillette main line, it is likely most of the resulting increased train traffic would use that line. From the mine location the train traffic radiates to points-of-use. Impacts from railroad operations would be greatest near the proposed mine, but would occur along the entire routes of the coal shipments. The 10 percent increase in train traffic is considered minor.

Highway traffic accidents and delays at grade crossings have been identified as the most severe problems resulting from train traffic. For those communities which straddle the railroad lines, intermittent isolation of parts of the community may result, particularly where grade-separated crossings are not available or are inadequate. Inconvenience and delays in the delivery of essential community services may result (OSM, 1988). If train traffic increases, these problems would be aggravated. In addition, increased noise and decreased air quality along the railroad routes could be expected.

Both the Gillette main line and the Orin-Gillette branch line have sufficient capacity to handle the projected increase from the proposed Rocky Butte Mine. However, the BNR has begun a test program for coal rail cars with a 35 percent greater capacity than the 100-ton cars now in use. These cars, together with precision loading facilities at most mines, will significantly increase the tonnage hauled per train. Even with increased coal production, the number of unit trains per day could temporarily decline over the next few years. With this development the impacts from increased coal haulage on the railroad system from the proposed Rocky Butte Mine would be minor or negligible (Basford, 1991).

Increased traffic volumes would occur within the regional road network beginning in 1993 with the start of mine construction. The greatest impact would result from employee and industrial service travel to the proposed mine site over the section of State Highway 59 south from the intersection with I-90 to the Four Corners Road intersection and along the Four Corners Road to the proposed Rocky Butte Mine entrance. Increases in traffic volumes would generally decrease as the distance from this main artery increased. Secondary increases in traffic volumes would result from increased population in Campbell County and the City of Gillette, both from direct employment at the proposed mine and multiplied secondary economic activity. The increased traffic volumes could result in increased traffic congestion, noise and accidents, decreased air quality and increased maintenance requirements for the road network.

By the seventh year of mining (year 2001) the Rocky Butte Mine could cause from 500 to 600 additional vehicle trips daily along Highway 59 and the Four Corners Road to the mine entrance. LOS analysis by the Wyoming Department of Transportation for this scenario shows 770 vehicles per hour, approximately 43 percent of the highway capacity (vs 1990 values of 645 and 36, see Section 3.13.2). The LOS would decline from a low C value to a high D value (Lane, 1991).

Improvements are planned for the Four Corners Road to make the road suitable for carrying the projected traffic load. Planned improvements include widening and paving the road from the intersection with Highway 59 to the mine entrance, a distance of

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approximately 3.4 miles, and relocating the road out of the mining area, removing the majority of the ninety-degree corners in the process. With these improvements the Four Corners Road is expected to be adequate for the increased traffic flow.

Although isolated problems can be expected to occur, previous development of the road network in Campbell County, induced by rapid growth of the energy industry and implemented by local, State and Federal governments, has equipped the County with a road infrastructure that is generally adequate for estimated future use. Particular attention has been given to traffic circulation within the City of Gillette, over Highway 59 south from the I-90 intersection and outward to the mines to the northeast and northwest of Gillette. In the long term, the impact of increased traffic flow over the County wide road network and over the internal circulation routes of the City of Gillette is expected to be minor. In the short term, impact within the City of Gillette is also expected to be minor, and the impact on the County wide network is expected to be minor with possible moderate areas on Highway 59 and the Four Corners Road.

By the seventh year of mining, year 2001, the Rocky Butte Mine is estimated to cause an increase of 3 to 4 percent in departures and arrivals on commercial flights. A higher percentage increase

is expected during the construction phase, possibly as high as 20 percent, caused by increased construction-related travel. The load capacity factor would be increased for United Express, which may help to stabilize air service at its present level (Kemp and Bell, 1991). Continental Express is currently considering adding another plane to their schedule. If they have not done so by the time construction begins on the Rocky Butte Mine, the increase in airline passengers would probably trigger the addition of a plane to their schedule (Morgan, 1991). Minor increases may be seen in charter and private aircraft use of the Campbell County Airport. Planned improvements to the terminal and commercial passenger loading/unloading areas along with the rest of the existing infrastructure would be adequate to serve projected growth in air travel from the Rocky Butte Mine. The increases could be handled with the present facilities with some increase in congestion in the terminal.

4.1.14 Land Use and Ownership

The principal impact to land use would be the loss of the agricultural productivity of land during mining and prior to reclamation (Table 4-3). However, because affected agricultural lands would be restored to the approximate acreage existing prior to mining (Appendix B), long-term impacts to agricultural productivity would be negligible.

Table 4-3 Areas of Projected Disturbance of Land Use Types Within Campbell County, the Rocky Butte Permit Area, and Within the Total Permitted Acreage of All Mines in Campbell County, Wyoming.

Land Use Type	Acreage Occupied by Type, Campbell County ¹ (Acres)	Disturbance of Type, Rocky Butte		Portion of Campbell County Disturbed (Percent)	Disturbance of Type, All Mines		Portion of Campbell County Disturbed (Percent)
		(Acres)	(Percent) ²		(Acres) ³	(Percent) ²	
Cropland	158,000	3,643	2.3	0.1	5,457	3.5	0.2
Grazing land	2,747,840	3,020	0.1	0.1	62,477	2.3	2.1
Pastureland	23,020	327	1.4	<0.1	5,877	25.5	0.2
Developed Water	1,800	52	2.9	<0.1	159	8.8	<0.1
Residential	18,110	12	0.1	<0.1	32	0.2	<0.1
Industrial/Commercial	58,070	104	0.2	<0.1	131	0.2	<0.1
Transportation Systems	Included in Industrial/ Commercial Use	130	0.2	<0.1	239	0.4	<0.1
Disturbed	NA ⁴	45	NA	<0.1	4,012	NA	0.1
Total	3,043,840⁵	7,333	--	≈0.2	78,384	--	≈2.6

¹ Personal communication, October 25, 1991, with Tom Jewett, Deputy State Conservationist, USDA Soil Conservation Service, Casper, Wyoming.

² Relative to the acreage occupied by the type in Campbell County.

³ Data in this table were compiled from mine permits held by WDEQ-LQD, Cheyenne; and the permit, in preparation, for the Rocky Butte project. Due to variability in permit presentation of land use data, acreages presented herein represent a general summary of data for all mines in Campbell County, Wyoming.

⁴ Data not available.

⁵ Total includes acreage for woodlands (36,000 acres in Campbell County, Wyoming).

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Assuming that 20 percent of the project area is affected in any given year (Table 2-1), construction and life-of-mine impacts to production would be minor or moderate (Table 4-4). To facilitate comparison of potential losses, crop and forage production values are expressed as AUMs. The reduction in crop production would range from 1,275 to 2,732 AUMs, depending on the type of crop lost. Loss of native grazing land productivity would range from 121 to 242 AUMs. Loss of productivity from pastures would range from 13 to 19 AUMs.

Because wildlife habitat would be an important postmining land use that would be recreated during reclamation, permanent impacts to wildlife habitat would be negligible (Section 4.1.7). There would be major short-term impacts to habitat during construction and throughout the life of mine due to loss of vegetation, water resources, and topographic features used by wildlife. With respect to available habitat in the region, the short-term loss of this habitat is insignificant.

Table 4-4. Estimated Reduction in Agricultural Productivity Due to Mining in Campbell County and in the Rocky Butte Project Area.

Projected Affected Area	Cropland/(Acres)				Grazing land (Acres)	Pasture land (Acres)
All Mines (including Rocky Butte)	5,457				62,477	5,877
Rocky Butte	3,643				3,020	327
	Wheat ¹	Hay	Barley	Oats	Native Range ² (Shallow Soils)	(Deep Soils) Crested Wheatgrass ³
Potential Loss	Animal Unit Months					
20% of all Mines	4,093	3,656	3,001	1,910	2,499	4,998
20% of Rocky Butte	2,732	2,441	2,004	1,275	121	242
Percent loss due to mining at Rocky Butte	67	67	67	67	5	5
¹ Assumes yields of 25 bu/ac wheat, barley, and oats, and 1 ton/ac hay. Estimated forage values were 0.15 AUM/bu wheat, 3.35 AUM/ton hay, 0.11 AUM/bu barley, and 0.07 AUM/bu oats (WDEQ-LQD 1981). ² Estimated carrying capacities of 0.2 to 0.4 AUM/acre. ³ Estimated carrying capacities of 0.2 to 0.3 AUM/acre.						

Owners of occupied and abandoned residences in the affected area have already agreed to relocate. These residences would not be replaced during reclamation.

One Rourke Gap Field well (J.F. Rourke #4:5), within the permit area, and one WD Field well (Wolf #34-34:34) are projected to maintain economic production throughout the life of the mine and beyond the final anticipated year (2034) of mining. If production projections are correct, a potential conflict could exist between oil production from these

two wells and planned mining activity (see Table 3-11).

However, economic forecasts for the productive lives of individual wells are highly variable and are based on estimated operating costs and current technology. Significant changes in prices, taxes, technology, operating costs, or other factors could significantly affect these projections (communication, Zora 1992). Additionally, production decline curves (indicating projected future production) for each well are generated by a computer modeling system that is based, in part, on the production history of that

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well. Therefore, for a well with a short production history, such as the WD Field well (Wolf #34-34:34), the production decline curve cannot be accurately projected (communication, Zora 1992).

Both Rainbow Ranch Field wells within the permit boundary are located outside the proposed disturbance boundary for the Rocky Butte Mine. All other existing wells within the permit area in the Rourke Gap, Butte Creek, and WD Fields are projected to be depleted (or would be operating at or below economic production) by the first year of initial mining disturbance. Three of the eight producing wells are currently classified as stripper wells, producing less than 10 barrels of oil per day (BOPD) (Whitman, 1992) (see Table 3-13).

4.1.15 Socioeconomics

The socioeconomic impact area is composed of those political jurisdictions and population centers which will experience the bulk of the social and economic impacts from the proposed Rocky Butte Mine. The impact area includes communities in which project employees will reside, plus jurisdictions that will incur financial effects from mine-related tax revenues or public facility or service expenditures as a result of the project.

The delineation of the area of socioeconomic influence is normally based on a host of considerations, depending upon the local area under study. In this instance, the primary determinants are the size and distance of Gillette, settlement patterns of other similarly located coal projects in Campbell County, certain labor force conditions, and migration patterns.

As discussed in Sections 1.4 and 2.4, the Rocky Butte Mine plan analyzed in this EIS, in which coal production begins in 1995 and occurs at a constant rate of 16 million tpy from 1997 through the end of mining, is not consistent with coal demand forecasts for the Powder River Basin. This chapter presents an assessment of the socioeconomic impacts of the mine plan assuming that production occurs at these planned rates; however, employment and revenue projections which are based on this plan may not represent new impacts on the area. Unless coal demand growth exceeds BLM's current projections, or unless NWR is able to transfer to the Rocky Butte Mine new contracts not considered in current

demand forecasts, the employment and revenue impacts from the Rocky Butte Mine may occur by transfer from other local or regional mines and may not represent new employment and new revenues.

Coal production from the Rocky Butte Mine, if it begins in 1995, will add to a situation in which supply capability exceeds demand in the Powder River Basin. Thus the Rocky Butte Mine could depress coal prices which are already under heavy pressure. Lower coal prices mean smaller severance tax and royalty revenues unless they are offset by increased production rates. Financial projections in this section are based on a constant coal sale price FOB the Rocky Butte Mine of \$3.80 per ton, which is near the low end of the range of recent spot-market prices (McGraw-Hill, 1991).

The effects of the Clean Air Act Amendments on the market for low-sulfur PRB coal are not yet known. Under Phase I of the Act, coal-fired power plants are required to reduce stack emissions by January 1, 1995. Switching to clean coal will increase the demand for PRB coal, but some states are in the process of enacting legislation to require scrubbing of stack gases, thereby possibly preserving the market for higher-sulfur eastern coals (Geological Survey of Wyoming, 1991b). Coal-demand forecasts are subject to change as the effects of the Clean Air Act Amendments become known.

According to the Bureau of Census, the City of Gillette had an estimated 1990 population of about 17,635 persons (Table 3-15). The Gillette urban area, which includes the city and urbanized but unincorporated areas nearby, had an estimated population of 21,800 in 1990 (Gillette Community Development Department, Planning Division, 1990). These estimates are derived from different and conflicting sources. They are presented here in order to provide a rough approximation of the number of persons residing outside of but in proximity of the City of Gillette.

To serve these residents, Gillette offers a well developed housing market, commercial and service base, plus commensurate public facilities and services. Gillette is about a 15-minute drive from the proposed Rocky Butte Mine employee entrance. This suggests that the Gillette area would have a strong initial attraction to the mine employees.

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Residency data from other coal mines near Gillette provide an indication of what might occur with the Rocky Butte Mine (Carter Mining Company, AMAX Coal Company, 1991). These data are shown in Table 4-5.

According to Wyoming Department of Employment data, there were about 16,500 persons in the Campbell County labor force in 1990 (Wyoming Department of Employment, Division of Research and Planning, 1990 and 1991a). About 1,060 of these were unemployed, for an unemployment rate of 6.4 percent. Based upon an interview with the local job service office in Gillette, there are an estimated 4,000 persons actively seeking work in Campbell County, primarily in the coal industry (Job Service of Wyoming, 1991).

In 1984, a comprehensive survey of the coal companies in Campbell County corroborated the settlement or commuting patterns indicated in Table 4-5 (Stearns Catalytic Corporation, 1984). About 90 percent of the mine employees working at coal mines located in the Gillette vicinity resided in the Gillette area in 1984. The majority of these were located within the City of Gillette. An additional seven percent lived in Campbell County but outside the Gillette area or the Town of Wright. An estimated three percent of the employees at coal mines in this region commuted to work from homes outside Campbell County. There is a sizeable labor pool within Gillette and Campbell County skilled in those industries needed by the Rocky Butte Mine. As of the second quarter 1989, there were about 2,800 persons employed at Campbell County coal mines.

Table 4-5. Settlement Patterns of Nearby Projects

Place of Residence	The Carter Mining Company Rawhide and Caballo Mines	Amax Coal Co. Belle Ayr Mine
Gillette Area	78%	84%
Other Campbell County	16%	3%
Subtotal Campbell County	94%	87%
Outside Campbell County	6%	13%
Total	100%	100%

A heavy construction workforce of about 320 persons was also evident, suggesting that these construction workers might not be readily available when Rocky Butte begins development. The workforce characteristics suggest that sufficient numbers of persons are both available and skilled within Campbell County to fill the coal mining jobs at the Rocky Butte Mine during the operational phase.

Based upon the Campbell County labor force characteristics and historical experience of other mines in Campbell County, almost all the operational workforce at the Rocky Butte Mine will be hired from among existing Campbell County residents. An estimated 90 percent of the operational or permanent workforce will come from persons living in Campbell County. Ten percent of this workforce will be in-migrants.

For the construction workforce, it is likely that the bulk will be hired from outside Campbell County. There could be additional pressure on the construction workforce from a planned expansion of the Black Hills Power & Light power plant at the same time. Outside contractors will also likely be used. This suggests that 75 percent of the mine construction force will be hired from outside Campbell County. These individuals will temporarily reside in the Gillette area for the project's development phase and probably leave thereafter unless other construction work can be found.

On the basis of the above data, the majority of mine-site employees, including operational and construction workers, are expected to reside in the Gillette area (Table 4-6). Therefore the area of socioeconomic influence is defined as the Gillette

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Table 4-6. Projected Rocky Butte Commuting Patterns

Place of Residence	Portion of Direct Project Employment
Gillette Area	90%
Other Campbell County	5%
Subtotal Campbell County	95%
Outside Campbell County	5%
Total	100%

area and Campbell County, which would incur financial effects from the project.

The socioeconomic impact analysis is based upon the schedule depicted in Table 2-1. Mine impacts are projected and evaluated through the year 2000 when mine related impacts, tax revenues and secondary effects would have the sustained maximum effect. The level of impact would continue through the life of the mine at approximately the same level. Proportionate cumulative impacts would diminish as impacts are constant and baseline Campbell County conditions expand over time. Employment effects attributable to the Rocky Butte Coal Mine would consist of direct employment during the construction and operational phases of the mine as well as induced, or secondary, employment. This indirect type of employment stems from mine employee expenditures in the local area along with the mining company's direct purchases of goods and services in Campbell County. As these dollars circulate throughout the local economy, they generate additional jobs.

Direct employment at the mine includes temporary construction workers and the more permanent operational employees. The distinction is important from a socioeconomic standpoint because operational employees have larger, longer term socioeconomic impacts as compared with coal mine construction workers.

Construction employment is projected to be an annual average of 125 persons in 1993 and 130 persons in 1994. A peak construction employment of 200 persons is anticipated during 1994. The mix of heavy construction and special trades job

opportunities will be typical for surface coal mine development projects in this region.

Table 2-3 depicts the operational employment schedule for the Rocky Butte Mine by year. Operational employment at the mine would begin during the development phase, primarily to accomplish overburden removal and to bring certain project facilities into operation. Employment buildup would occur until about 1997 when more than 400 total mine employees are anticipated. Between the year 2001 and project completion in the year 2034, total employment would fluctuate modestly but average about 420 persons.

Based upon the commuting patterns projected earlier, 90 percent of the operational or production employees will reside in the Gillette area while 5 percent will commute from homes elsewhere in Campbell County and an additional 5 percent will commute from outside Campbell County. Construction worker settlement patterns should be similar to these.

Based upon previous studies of the Campbell County economy, the basic employment to local service employment ratio, or employment multiplier, is assumed to equal 1.0 (Stearns Catalytic Corporation, 1984). That is, for every basic job such as those from the Rocky Butte Mine, one additional local service job opportunity would be generated. Hence, induced or indirect employment stemming from the Rocky Butte Mine would amount to over 400 persons at sustained operating capacity.

Total employment impacts from the Rocky Butte Mine include direct and indirect employment. During 1993, for instance, total employment effects equal

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the sum of 125 construction workers, 161 mine employees, and 161 local service employees. Total employment attributable to the mine in 1993 is therefore 447 employees. Due to the modest construction work force of the mine, its temporary nature, and the size of the Campbell County economy, no local service response is anticipated from mine construction employment.

In 1995, total employment effects would equal 688 persons. Employment effects would drop in the next year as the construction work force diminishes and then gradually build up to a sustained maximum of approximately 820 total job opportunities.

Economic impacts from the Rocky Butte Mine would consist of increases in personal income levels and resulting gains in commercial activity. Both direct and indirect effects would follow from the establishment of this mine.

The direct effects of the mine stem in part from the wages and salaries paid to construction and production employees. It is estimated that the average wage or salary for construction and mine employees would be about \$16,700 per year and \$34,600 per year, respectively, excluding all benefits (Wyoming Department of Employment, Research and

Planning Division, 1989). Applying these earnings assumptions to projected employment levels, the total payroll from the Rocky Butte Mine can be projected by year as presented in Table 4-7. At sustained maximum operation, the Rocky Butte Mine would add a payroll of about \$14 million per year to the Campbell County economy directly from its employees.

In addition, the Rocky Butte Coal Mine would make direct expenditures for other goods and services throughout the life of the mine. During the construction phase, an estimated \$150.7 million (1991 constant dollars) would be expended for various mine facilities and mining equipment, including an estimated \$8 million for engineering services. During the course of the mine operation, additional capital expenditures would be made for equipment and facilities totaling about \$4.4 million per year or \$181.5 million in total for the life of mine. Assuming sales and use tax permits are required, the mine would generate substantial sales and use tax revenues for the state as well as local government entities. Additional but more modest expenditures will be made annually for mine supplies and contract services; except for the latter, almost all of the other expenditures will be made outside Campbell County.

Table 4-7. Estimated Wages and Salaries for the Rocky Butte Mine, Millions of 1991 Dollars

Year	Construction Workers	Operational Employees	Total Direct Wages and Salaries
1993	\$2.1	\$5.6	\$7.7
1994	2.2	9.6	11.8
1995	--	11.1	11.1
1995	--	12.8	12.8
1997	--	14.9	14.9
1998	--	13.9	13.9
1999	--	15.4	15.4
2000	--	16.7	16.7
Average - 2001 to 2034	--	14.1	14.1
Total - Life of Mine	\$4.3	\$579.6	\$583.9

Source: Based upon NWR estimates and Wyoming Department of Employment data for 1989, escalated to 1991 dollars.

Induced employment generated as a result of the Rocky Butte Mine will also add to the payrolls of Campbell County. Assuming an after-benefits annual wage of about \$9,000 per year, total indirect wages

and salaries will range from \$1.5 million to \$4.5 million per year with a life-of-mine total of about \$155 million (Wyoming Department of Employment, Research and Planning Division, 1989). The average

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annual earnings from indirect employees attributable to the Rocky Butte Mine will be approximately \$3.6 million annually. The total payroll resulting from the mine (about \$18 million per year) would have a moderate effect on total wages in the county.

Table 4-8 provides projected earnings, excluding benefits directly and indirectly attributable to the Rocky Butte Mine. These projections are believed to be understated in part because other purchases for goods and services at the mine are not accounted for.

Expenditures for mine-related wages and salaries and other goods would stimulate the localeconomy in a positive way. Most household expenditures are devoted to retail purchases and various services. Projected increases to CampbellCounty retail and service trade attributable to the Rocky Butte Mine are set forth in Table 4-9. At sustained maximum operations, the Rocky Butte Mine would account for about \$4.8 million in Campbell County retail trade and \$7.6 million in service trade for a total contribution to the economy

Table 4-8. Total Earnings Attributable to the Rocky Butte Mine, Excluding Benefits, Millions of 1991 Dollars

Year	Direct Employees	Indirect Employees	Total Earnings
1993	\$ 7.7	\$ 1.3	\$ 9.0
1994	11.8	2.8	14.3
1995	11.1	2.9	14.0
1996	12.8	3.3	16.1
1997	14.9	3.9	18.8
1998	13.9	3.6	17.5
1999	15.4	4.0	19.4
2000	16.7	4.4	21.1
Average - 2001 to 2034	14.1	3.8	17.8
Total - Life of Mine	\$583.9	\$155.0	\$735.4

Source: NWR, Wyoming Department of Employment and BBC estimate, October 1991.

of about \$12.4 million, a moderate impact that would be felt for the life of the mine. For the life of mine, Rocky Butte would contribute nearly \$512 million to the commercial base of Campbell County. Mine related employment in many instances means that new households and additional population would be brought into the area. In this instance, almost all of the operational employees at Rocky Butte would likely be hired from among existing residents in the Gillette area and in Campbell County. The indirect employees attributable to the mine are also likely to be drawn from among the ranks of the unemployed and those currently outside the labor force but living in the County. Even so, at least a portion of the job openings left by those going to work at the Rocky

Butte Mine would be replaced by others, which might include persons in-migrating to Campbell County.

Typically, there is a general switching and upgrading of jobs which occurs, resulting in lower unemployment, more workers per household, and an upgrading of jobs among existing residents. A certain amount of replacement of job openings with persons in-migrating from outside Campbell County would occur. Potential impacts may be mitigated when this happens. Those who upgrade jobs generally do not require additional governmental services but contribute more tax revenue. In-migrants who fill vacated jobs may or may not require services beyond the amount received by

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Table 4-9. Total Campbell County Retail and Service Trade Attributable to the Rocky Butte Mine, Millions of 1991 Dollars

Year	Retail	Service	Total Trade
1993	\$2,440	\$3,874	\$6,314
1994	3,841	6,096	9,937
1995	3,772	5,987	9,759
1996	4,321	6,858	11,179
1997	5,045	8,007	13,052
1998	4,863	7,432	12,295
1999	5,196	8,248	13,444
2000	5,628	8,934	14,562
Average - 2001 to 2034	4,786	7,605	12,391
Total - Life of Mine	\$197,819	\$313,996	\$511,815

Source: BBC estimates based upon U.S. Department of Commerce data, 1991.

those who upgraded their jobs. Thus the net effect on service requirements is difficult to gauge.

To maintain a worst-case perspective for this EIS, it is assumed that all new jobs would ultimately be replaced by persons in-migrating to the County. In reality, this is only likely to occur to a partial extent. Incremental households and populations attributable to the Rocky Butte Mine are set forth in Table 4-10. At sustained maximum operations, approximately 530 households and almost 1,600 persons would be directly or indirectly attributable to the Rocky Butte Mine. A peak of about 1,850 persons would be attributable to the mine in the year 2000. A large proportion of the total households and population attributable to the mine would be located within Campbell County, and of these, the bulk would be situated within the City of Gillette. Based upon the commuting pattern established earlier 95 percent of the households and population would be located within Campbell County. An estimated 90 percent of the total households and population would likely be located in the Gillette area. It is assumed that the City of Gillette will account for 90 percent of the Gillette area in the future. Based upon these assumptions and the previous impact projections, households and population related to the mine are projected for Campbell County and the City of Gillette. At sustained maximum, the City of Gillette will have about 1,300 mine-related residents compared with 1,500 mine related residents in

Campbell County. This is considered a moderate impact on population.

Incremental impacts on the local housing market would vary by project phase, by location, and by housing unit type. Impacts would generally be positive on the housing market which appears to be capable of responding to this stimulus.

Operational employees and local service workers in-migrating to Campbell County and the Gillette area would impact the single family and apartment markets to a large extent. If almost all of these workers come from among the existing residents in Campbell County and are not replaced by in-migrants, there will be little or no impact on the housing market. To the extent that replacement occurs from in-migrants, the impacts would be most pronounced at the beginning of the operational phase of the project and lessen over time. The private housing industry appears able to accommodate and respond to such demands. Temporary housing can be employed to lessen potential impacts.

During the construction phase of the project there would be an additional demand for about 80 temporary dwelling units in Campbell County, mostly in the Gillette area. These could include RV spaces, mobile homes, or apartments. There are a substantial number of empty mobile home spaces

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Table 4-10. Projected Households and Population Directly and Indirectly Attributable to the Rocky Butte Mine

Year	Households			Population			City of Gillette		Campbell County	
	Direct	Indirect	Total	Direct	Indirect	Total	Households	Population	Households	Population
1993*	190	101	291	495	285	770	236	640	277	751
1994*	272	174	446	742	511	1,263	362	1,015	425	1,190
1995	215	202	417	657	590	1,247	338	1,010	396	1,185
1996	247	231	478	751	675	1,426	387	1,248	492	1,464
1997	288	270	558	876	787	1,663	452	1,347	530	1,580
1998	267	251	518	811	729	1,540	420	1,248	492	1,464
1999	297	278	575	899	808	1,707	466	1,383	546	1,621
2000	321	301	622	972	874	1,846	504	1,495	591	1,753
Average - 2001 to 2034	270	255	525	820	729	1,561	427	1,265	501	1,484

*Includes construction-related households at 1.5 workers per household, 2.0 persons per household and no local service response.
Source: BBC Estimates, 1991.

and RV spaces in the Gillette area, but demand in the early to mid 1990's for these types of units could be substantial, also.

The incremental impacts of the Rocky Butte project on public facilities and services would be felt by Campbell County, Campbell County School District #1 and the City of Gillette. The levels of these impacts are somewhat problematic because it is uncertain whether any in-migration would occur during the project operational phase. If none occurs, there should be little or no incremental impacts on public facilities or services as a result of the Rocky Butte Mine. Under worst-case circumstances, the incorporated jurisdictions within Campbell County would be required to provide services for the population and households directly and indirectly related to the mine.

If they occur, impacts to Campbell County would focus on protection services. Campbell County Sheriff's Department and Fire Department could have incremental demands associated with the mine. These would be particularly important during the construction phase when more than average per capita burdens are likely to occur. However, total construction worker households are likely to amount to fewer than 90 households in 1993 and 1994. Emergency health services could also be important during this time period, but the proximity of the mine and accessibility to Gillette would reduce that

burden. In sum, impacts on Campbell County's public facilities and services, if any, would be minor.

Impacts on Campbell County School District #1 would be largely related to new students directly and indirectly attributable to the mine. During the 1993 and 1994 time frame, an additional 340 students might occur with a peak of about 480 by the year 2000. These students would be at different grade levels and schools mostly in the Gillette urban area. Classroom space and operating expenditures as well as other costs would be required to accommodate these students. Property tax revenues should be adequate to accommodate these burdens, should they occur.

The additional population in Gillette, should it occur, could represent a burden on the water, wastewater and utility system, protection services and recreational facilities. On the whole, the various Gillette utilities should be able to accommodate the incremental growth associated with the Rocky Butte Mine. The Gillette Police Department could be burdened during the construction phase of the project when disproportionate per capita demand might occur. The Police Department is understaffed, and these impacts deserve attention.

The Rocky Butte Mine, through the payment of various taxes, royalties and fees, would generate additional monies for federal, state and local governments. In addition, employees directly and

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indirectly attributable to the mine would also pay taxes to various levels of government. Depending on the level of in-migration, modest cost increases might occur but should be more than offset by incremental revenues.

Federal revenues for royalties, black lung taxes and AML (abandoned mine land) taxes would average \$14.0 million per year; these do not include federal income taxes from either the company or mine related employees. This is a moderate impact on federal revenues from the EPRB.

The State of Wyoming would receive revenues directly and indirectly attributable to the Rocky Butte Mine over its mine life. From severance taxes, and the state's share of royalties and sales and use taxes, the mine would generate a combined annual average revenue of \$6.7 million. These projections exclude other state fees and revenue sources. The State's share of federal royalties is distributed to numerous accounts. The State Foundation Program

receives nearly 50 percent of the State's share. The Rocky Butte Mine would generate severance tax revenues for the state averaging about \$2.6 million over the life of the mine, expressed in constant 1991 dollars. Severance tax revenues are distributed to seven State funds. The General, Highway, Permanent Mineral Trust, and Water Development Funds are the largest beneficiaries. The revenues to the state would have a moderate impact on total state revenues lasting over the entire mine life.

Each incorporated jurisdiction within Campbell County would receive revenues as a result of the Rocky Butte Mine. Major mine-related revenues are projected in Table 4-11. These jurisdictions would be required to provide facilities and services for mine-related population which might or might not be in Campbell County already. Even if substantial in-migration results, these revenues should more than offset additional expenditures incurred by local governments.

Table 4-11. Selected Local Government Revenues Generated Directly from the Rocky Butte Mine

Millions of 1991 Dollars Average Annual	
<u>Campbell County</u>	
Property Taxes (mine and coal production only)	\$0.1
Sales/Use Taxes	
Mine facilities and equipment	\$0.1
Mine related employees	0.0*
Subtotal - County	\$0.2
<u>Campbell County School Districts</u>	
Property Taxes (mine and coal production only, prior to State Foundation Program or recapture)	\$1.7
<u>City of Gillette</u>	
Sales/Use Taxes	
Mine facilities and equipment	\$0.1
Mine related employees	0.1
Subtotal - Gillette	\$0.2
<u>Wright</u>	
Sales/Use Taxes	
Mine facilities and equipment	\$0.0*
Mine related employees	0.0*
Subtotal - Wright	0.0*
* Less than \$50,000	
Source: BBC estimates based on information from NWR and local governments.	

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

Campbell County would receive, at a minimum, property taxes on mine production, mine facilities, and equipment. These would diminish over time and are subject to changes in mill levies. Sales and use tax revenues would also accrue to the County, primarily in the early project phases. Total average annual revenues would approximate \$1.0 million, representing a moderate increase in total local revenues.

The Campbell County School District would receive property taxes in a manner similar to the County but at much higher levels because of its mill levy. However, because of the Wyoming State Foundation Program only a portion of the net benefits would be realized.

The City of Gillette would have the largest responsibility for serving mine-related residents but would not receive the bulk of mine-related property tax revenues. Gillette would charge mine-related residents, similar to current citizens, for certain services such as water, sewer, power, and solid waste. Presumably, these charges would be set at a level to repay the City's investment. Sales and use taxes comprise about 50 percent of the City's general fund revenues; the Rocky Butte Mine would result in additional revenues of \$200,000 per year on average.

A concern has been expressed by certain residents related to the various impacts of the mine on homes or other residential properties near the mine site. These impacts could stem from mine dust, noise, traffic congestion or visual impacts. Each of these is addressed in other sections of this EIS. However, in the aggregate, such impacts reflect upon quality of life and even property values. There are a small number of dwelling units in the vicinity of the mine. Visual impacts should be reduced for subdivisions and dwellings to the north because of the existing and planned changes to the terrain.

There are a number of coal mines in proximity to residential developments in the Gillette area. It is unclear whether or not these mines have had negative impacts on the quality of life or property values for these homeowners. Given the uncertain evidence of such impacts and the small number of dwellings affected, these impacts are assumed to be minor. Those homeowners requiring relocation

because of the mine plan will be compensated accordingly, based upon fair market value.

4.2 Analysis of the No Action Alternative

4.2.1 Geology and Mineral Resources

The primary alternative to the Proposed Action is the No Action Alternative, in which case the Rocky Butte Mine would not open as planned. The geology and overburden within the mine area would not be disrupted, and the coal would remain available for mining at some time in the future.

4.2.2 Topography

Under the No Action Alternative topography on the proposed permit area would not be altered from its present condition.

4.2.3 Soils

If the Rocky Butte tract is not mined, use of the permit area would likely continue as in the past. Soil horizons would not be mixed, erosion would continue at present rates, and soils would continue to support livestock grazing and wildlife.

4.2.4 Vegetation

Under the No Action Alternative, there would be no impacts to vegetation.

4.2.5 Water Resources

Under the No Action Alternative, impacts to area water resources would be limited to those projected to occur due to existing mining operations. Tisdale Creek and North Tisdale Creek will be mined and reclaimed in the Caballo Mine permit area. Groundwater drawdowns will still occur, but without the incremental increases from the Rocky Butte Mine.

Without the Rocky Butte Mine, there would presumably be no potential for blasting impacts to local water supply wells. In a public scoping meeting, some area residents stated that they can feel ground vibrations from blasting conducted at the Caballo Mine. There was no indication, however,

4.0 ANALYSIS OF PROPOSED ACTION AND ALTERNATIVES

that the vibrations have caused any damage. Without the Rocky Butte Mine the subject area will still be subject to some ground vibration from blasting as the Caballo Mine continues its mining progression in a general westwardly and northwestwardly direction.

4.2.6 Alluvial Valley Floors

Under the No Action Alternative streamflows in Tisdale Creek, North Tisdale Creek, Gold Mine Draw and Dry Donkey Creek would not be disturbed by mining at Rocky Butte. The quality and quantity of the streamflows would remain unchanged from existing conditions.

4.2.7 Fish and Wildlife

Impacts to wildlife under the No Action Alternative will be limited to those that will occur due to ongoing mining operations in the region.

4.2.8 Historical, Archaeological, and Paleontological Resources

The No Action Alternative would result in no effect on cultural resources. The No Action Alternative will negate the positive impacts to paleontological resources of possible exposure of specimens and data recovery resulting from excavation of fossiliferous geologic formations.

4.2.9 Recreation

Under the No Action Alternative, recreational opportunities for hunting and wildlife observation would remain unchanged.

4.2.10 Air Quality

Air quality effects of mining would be limited to those that will result from existing mines.

4.2.11 Visual Resources

Should the Rocky Butte Mine not be built, visual resources would likely remain similar to existing conditions, and the area would remain a Class IV area.

4.2.12 Noise

Under the No Action Alternative incremental noise sources from the Rocky Butte Mine would not be imposed.

4.2.13 Transportation Facilities

Should the proposed Rocky Butte Mine not be constructed, railroad traffic, road network traffic and air traffic would not increase above those levels produced by current economic and social activities in the region, and no associated impacts would occur.

4.2.14 Land Use and Ownership

Under the No Action Alternative, there would be no changes in land use above and beyond those that would occur due to current management practices.

4.2.15 Socioeconomics

The No Action Alternative would result in no socioeconomic impacts since the job opportunities, stimulus to the local economy and net public sector financial benefits stemming from the Rocky Butte Mine would not occur. This assumes that if West Rocky Butte is not leased and the Rocky Butte lease is not mined, the coal is never recovered.

Certain minor negative impacts would also not occur if the mine were not developed. The additional pressure on the temporary housing market during the construction would not occur. The eventual loss of jobs and revenue sources when the mine closes also would not occur.

5.0 MITIGATION

Surface mining and reclamation are reaching a mature stage in Wyoming and the EPRB. Advances in reclamation technology have taken place in part due to a progressively advancing regulatory framework that began with Wyoming's 1969 Open Cut Land Reclamation Law, was further developed under Wyoming's 1973 Environmental Quality Act, and has culminated in today's Wyoming State Program approved under the 1977 Federal Surface Mine Control and Reclamation Act.

Many measures to reduce or eliminate (mitigate) adverse effects of surface mining have now become standard industry practice. Examples are listed in Appendix D.

Work done in the preparation of this EIS has not identified any environmental features at the Rocky Butte property which would make it unusually difficult to mine or reclaim using conventional technologies. However, considerable work remains to be done before a permit to mine can be issued, even if the Proposed Action is taken and the WRB lease tract is sold. During the permit process, any remaining environmental issues would be identified by Wyoming DEQ and OSM, and the mine PAP would be revised to address these issues. Minor issues left unresolved at that stage may result in permit conditions or stipulations. The permittee's response to these conditions can be considered mitigation, but specific measures cannot be predicted at this time.



6.0 CUMULATIVE IMPACTS

Cumulative environmental impacts are those which result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions, regardless of who is responsible for such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). This EIS addresses cumulative impacts as the incremental impacts that would result from mining and mining-related activities at the proposed Rocky Butte Mine when added to the impacts that would result from mining and mining related activities at other regional coal mines.

Some cumulative impacts have necessarily been addressed in Chapter 4 of this EIS as dictated by the types of impacts being examined. For example, air quality impacts must, from both a practical and regulatory standpoint, be evaluated with full consideration of the adjacent operating mines. Hydrologic impacts have also been analyzed in light of the fact that the Rocky Butte Mine is adjacent to a cluster of existing mines and is in an area now undergoing water-level drawdowns in the shallow aquifer system.

The Rocky Butte tract has been considered in two of the four regional coal leasing EIS's in the Powder River Basin. This section examines the predicted coal and coal-related developments and their related impacts as presented in these four regional EIS's in light of the coal development and related impacts that have already occurred. Specific emphasis is placed on developments in Campbell County, Wyoming.

There are currently 7.797 billion tons of federal coal underlying 102,426 acres under lease in the Wyoming portion of the Powder River Basin. The six LBA's received to date propose to add approximately 1.035 billion tons of federal coal underlying 8,428 acres. This amount of coal would be offered over the next 3 to 4 years, and even though offered, some may not be leased due to many factors. The amount of coal in these LBA areas represents an increase of 13 percent of leased federal coal and an increase in acreage of 8.2 percent. Since the 1990 coal production for the Wyoming portion of the Powder River Basin was 162.6 million tons, the coal underlying the proposed leases represents

approximately 6.4 years of reserves for the basin as a whole. The 1990 coal production for Campbell County was 154.7 million tons. The coal which would be added by the six pending LBA's is therefore equivalent to about 6.7 years of production at the 1990 Campbell County production rate.

6.1 Actual and Predicted Coal Activity in the Eastern Powder River Region

This section presents a review of the cumulative analysis which is contained in each of four regional EIS's prepared during the 1970s and early 1980s. The four analyses are:

- Final Environmental Impact Statement, Eastern Powder River Coal Basin of Wyoming, BLM, October 1974.
- Final Environmental Impact Statement, Eastern Powder River Coal, BLM, March 1979.
- Final Environmental Impact Statement, Powder River Coal Region, BLM, December 1981.
- Draft Environmental Impact Statement, Round II Coal Lease Sale, Powder River Region, BLM, January 1984.

This review provides an assessment and analysis of cumulative environmental impacts based on the current coal production outlook and presently anticipated levels of regional development activity. The analysis reviews cumulative impacts identified in the above-referenced EIS's as compared to actual development activity which occurred. This cumulative analysis also incorporates data, monitoring results and research done since the EIS's were done, or in response to impacts identified in these EIS's which will provide further assessment of cumulative impacts resulting if the lease-by-applications currently pending before BLM are approved.

The coal region in which the current lease-by-applications are located can be defined as the Eastern Powder River Coal Region and is generally considered to include Campbell and Converse

6.0 CUMULATIVE IMPACTS

Counties in Wyoming. In the 1970s and early 1980s there was a great deal of interest and activity in mining existing leases and acquiring new federal coal leases. As a result, the four referenced regional EIS's were prepared, and each identified and discussed the regional, cumulative impacts resulting from coal development, coal-related development, and other regional activities based on reasonably

foreseeable development scenarios at the time. All the mines currently operating, including those requesting LBA's, in the Eastern Powder River region were specifically addressed in one or more of the referenced EIS's, as shown in Table 6-1. Each regional EIS contained predictions of mining activity into the future, including the number of mines, production levels, and acreage requirements.

Table 6-1. Mine Sites Addressed in Prior Regional Coal Development EIS's

Mine	Operator	1974 EIS	1978 EIS	1981 EIS	1984 DEIS
Antelope	Antelope Coal Co.	x		x	x
Belle Ayr	Amax Coal Co.	x	x	x	x
*Black Thunder	Thunder Basin Coal Co.	x	x	x	x
Buckskin	Triton Coal Co.		x	x	x
Caballo	Carter Mining Co.		x	x	x
Caballo Rojo	Mobil Coal Producing		x	x	x
Clovis Point/East Gillette	Kerr-McGee Coal Corp.		x	x	x
Coal Creek	Thunder Basin Coal Co.		x	x	x
Cordero	Cordero Mining Co.	x	x	x	x
Dave Johnston	Pacificorp	x	x	x	x
Dry Fork	Dry Fork Coal Co.			x	x
*Eagle Butte	Amax Coal Co.	x	x	x	x
Fort Union	Fort Union Ltd.			x	x
*Jacobs Ranch	Kerr-McGee Coal Corp.	x	x	x	x
Keeline	Neil Butte Co.			x	x
*North Antelope	Powder River Coal Co.	x	x	x	x
North Rochelle	Shell Mining Co.			x	x
Rawhide	Carter Mining Co.	x	x	x	x
*Rochelle	Powder River Coal Co.	x	x	x	x
*Rocky Butte	Northwestern Resources Co.			x	x
Wyodak	Wyodak Resources Dev.	x	x	x	x
TOTALS:		11	15	20	20
* LBA application on file					

6.0 CUMULATIVE IMPACTS

Coal-related developments, such as power plants, coal gasification, and other coal conversion industries were predicted. Other regional activities such as oil and gas, uranium, and any other known major development activities were also predicted. An analysis was developed to identify and evaluate impacts of all of these activities taken together.

Table 6-2 shows what activity has actually taken place in the region, and also shows the cumulative total of the activity that has actually taken place added to the activity predicted based on the LBA's which are currently pending before BLM. The table also illustrates the predictions of coal, coal-related

and other regional development activity upon which the cumulative impact analysis for each of these regional EIS's is based.

Table 6-2 shows that the actual level of development which occurred by 1990 is within the range of predictions made in the referenced EIS's. The 1979 EIS was the closest prediction, which is explained by the fact that the 1981 and 1984 EIS's were assuming high levels of new leasing and new development of pending preference right lease applications. Market conditions have not favored the development of new mines.

Table 6-2. Cumulative Regional Activity, Eastern Powder River Coal Region (Campbell and Converse Counties, Wyoming)

	1990 Actual Activity	1990 Actual Activity + LBA's	1974 Predictions Of 1990 Activity	1979 Predictions Of 1990 Activity	1981 Predictions Of 1990 Activity	1984 Predictions Of 1990 Activity
Number of Producing Mines	18	19	14	15	40 ¹	37 ^{1,2}
Number of Power Plants	3	3	6	2	3	3
Number of Gasification Plants	0	0	2	1	0	0
Leased Federal Coal (Millions of Tons)	7,796.5	8,831.5	Not Available	Not Available	Not Available	Not Available
Acres of Leased Federal Coal	102,426	110,854	93,075	Not Available	Not Available	Not Available
Coal Production (Millions of Tons Per Year)	162.6	178.6	150	174.3	332.9 ¹	292.1 ^{1,2}

1. Calculated from Wyoming and Montana totals in EIS. This EIS covered the entire Powder River Basin.
 2. Baseline or "No Action" alternative used from this EIS as the 1984 was not finalized and, therefore, the actions proposed were never taken.
 Sources of 1990 data: 1990 Annual Mine Reports for Eastern Powder River Region mines and BLM Casper District records.

Many of the impacts of the development activities are related to the amounts of surface disturbance, new employment, and resources consumed by the activity. Table 6-3 shows the 1990 predictions for each regional EIS as to acres disturbed and reclaimed, employment, and population. This table also illustrates surface disturbance and reclamation, employment and population that actually had occurred or existed in 1990.

Cumulative surface disturbance to date is about 32,000 acres. This is within the range of predictions of the referenced EIS's and, with all the pending LBA's added, represents less than one tenth of one percent of the region. The acreage disturbed has been specifically analyzed in the referenced EIS's, and no unique soils or vegetation types were identified as being impacted. The disturbed acreage is being reclaimed, with about one third of the already-disturbed area having been contoured, topsoiled and reseeded.

6.0 CUMULATIVE IMPACTS

Table 6-3. Cumulative Surface Disturbance, Employment and Population -- Actual and Predictions -- Without the Lease-By-Applications, Eastern Powder River Coal Region (Campbell and Converse Counties)

	Actual 1990 Levels	1974 Predictions of 1990 Levels	1979 Predictions of 1990 Levels	1981 Predictions of 1990 Levels	1984 Predictions of 1990 Levels
Acres Disturbed	31,744	13,887	22,794	43,550 ¹	40,900 ^{1,2}
Acres Reclaimed	9,199	4,132	12,666	24,200 ¹	22,800 ^{1,2}
Coal Employment	2,862	5,200	3,899	11,900	11,500 ²
Total Population	40,498	65,600	59,400	69,000	62,300 ²

1. Calculated from Montana and Wyoming totals in EIS. This EIS covered the entire Powder River Basin.
 2. Baseline or "No Action" alternative used from the DEIS as the 1984 EIS was not finalized, and therefore the actions proposed were never taken.

Sources of 1990 data: 1990 Annual Mine Reports for Eastern Powder Basin Mines, BLM Casper District Records, 1990. Census Results for Wyoming Counties/Municipalities, "Annual Report of Mines of Wyoming" through December 31, 1990.

Cumulative transportation impacts are related to coal production and employment levels and are therefore well within the level of impacts identified in the referenced EIS's.

Table 6-4 presents a comparison between actual 1990 coal production in Campbell County and the predicted 1990 level of production as evaluated in the 1981 regional EIS. That EIS contained predicted coal production levels by mine (or by lease tract) for the seventeen Campbell County coal mines that were in operation or permitted in 1981, the nine additional properties under lease in 1981, and for eight additional Campbell County tracts proposed for bidding in the 1982 Eastern Powder River Basin lease sale. As the table shows, actual production in Campbell County in 1990 was 154.7 million tons, or about 47 percent of the 1990 level as predicted in the 1981 regional EIS.

6.2 Actual and Predicted Coal Activity in Campbell County

Of the new lease tracts proposed for sale in 1982, four (Little Rawhide, Duck Nest Creek, Fortin Draw and Spring Draw) became maintenance tracts for existing mines. No mine has been permitted for

the other four leases, one of which is the Rocky Butte lease.

Table 6-5 provides a comparison between the hypothetical Rocky Butte tract mine developed for the 1981 regional EIS and the Rocky Butte Mine as currently proposed by NWR, including the WRB tract. The mine and reclamation plan for the Rocky Butte tract as described in the 1981 regional EIS was more fully described in the Rocky Butte Tract Profile (BLM, 1981). Table 6-5 indicates that the current proposal has a larger coal reserve, reflecting both the addition of the WRB tract and more complete geologic information based on additional drilling done since 1981. The recovery factor is also larger in the current proposal, reflecting development of a more detailed mine plan and the fact that the 90-percent recovery assumed in the 1981 tract profile is believed to be conservatively small by current standards.

The coal production rates for the two scenarios are similar (15.1 million tpy in the 1981 tract profile vs. 16 million tpy in the NWR proposal). Disturbed area has increased from 5,000 acres predicted in the 1981 tract profile to 7,333 acres in the NWR mine plan. This increase is probably reflective of the more complete mine plan available from the NWR proposal.

6.0 CUMULATIVE IMPACTS

Table 6-4. Comparison Between 1990 Campbell County Coal Production by Mine As Predicted in 1981 Regional EIS and As Actually Occurred

Mine Name	Operator	1990 Production Predicted in 1981 Regional EIS ² (mmtpy)	Actual 1990 Production ³ (mmtpy)
EXISTING MINES (AS OF 1981)			
Black Thunder	Thunder Basin Coal Co.	20.0	27.9
Jacobs Ranch	Kerr McGee Coal Corp.	14.0	16.7
Belle Ayr	Amax Coal Co.	19.0	15.5
Eagle Butte	Amax Coal Co.	20.0	15.4
Caballo	The Carter Mining Co.	12.0	14.3
Cordero	Cordero Mining Co.	15.0	12.9
Rochelle	Rochelle Coal Co.	11.0	12.0
Rawhide	The Carter Mining Co.	24.0	11.4
Caballo Rojo	Mobil Coal Producing	15.0	8.6
North Antelope	North Antelope Coal Co.	1.6	8.2
Buckskin	Triton Coal Co.	1.5	7.7
Wyodak	Wyodak Resources Development Corp.	5.0	2.9
Dry Fork	Dry Fork Coal Co.	8.0	0.8
Coal Creek	Thunder Basin Coal Co.	10.0	0.1
Ft. Union	Fort Union Coal Co.	1.2	0.0
North Rochelle	Shell Mining Co.	8.0	0.0
Clovis Point	Kerr McGee Coal Corp.	4.0	0.0
PROPOSED MINES ON EXISTING LEASES (AS OF 1981)			
Pronghorn	Mobil Coal Producing	5.0	0.0
East Gillette	Kerr McGee Coal Corp.	11.0	0.0
South Rawhide	Fort Union Coal Co.	7.0	0.0
Wildcat Creek	Gulf Oil Co.	10.0	0.0
Wymo	Wymo Fuels, Inc.	4.4	0.0
South Gillette	Peabody Coal Co.	2.0	0.0
Thunderbird	El Paso Energy Co.	3.5	0.0
Thunderbird II	Wold and Jenkins	5.2	0.0
Wildcat Creek Area	Consolidation Coal Co.	4.5	0.0
SUBTOTAL		241.9	154.7
NEW TRACTS FOR 1982 LEASE SALE			
Rocky Butte	Northwestern Resources Co.	15.5	0.0
Timber Creek	NA	6.5	0.0
Keeline	NA	6.8	0.0
Kintz Creek	NA	8.1	0.0
Little Rawhide ¹	Amax Coal Co.	20.0	0.0
Duck Nest Creek ¹	Amax Coal Co.	10.5	0.0
Fortin Draw ¹	Wyodak Resources Development Corp.	5.0	0.0
Spring Draw ¹	Triton Coal Co.	14.3	0.0
SUBTOTAL		86.7	0.0
GRAND TOTALS		328.6	154.7

¹ Leased as production maintenance tracts for existing mines.
² BLM, 1981
³ Wyoming Coal Information Committee, 1991.

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Table 6-5. Comparison Between Rocky Butte Mine Proposal as Assumed for 1981 Regional EIS and as Proposed by NWR

Item	Proposed Action from 1981 EIS ¹	Proposed Action for WRB EIS (excludes Option A)
Total strippable reserves (million tons)	502	625
Recoverable reserves (million tons)	452	608
Percent recovery	90	97
Mine life (years)	30	42
Annual production rate (million tons)	15.1	16
Mining method	truck/shovel	dragline and truck/shovel
Total disturbed area (acres)	5,000	7,333
Employment (peak)		
- during construction	230	279
- during mining	580	500
Water requirements (acre-feet per year)	318	320
Water supply wells destroyed	20	20
Particulate emissions (tons/year)	1,946 to 3,908	1,644 to 3,102
Maximum particulate concentration increase ($\mu\text{g}/\text{m}^3$ annual geometric mean)	55	43
Trains per year (round trips)	1,510	1,600
Maximum increase in vehicles per day (round trips)	243	250-300
¹ Information taken from Tract Profile for Rocky Butte Tract prepared by BLM as supporting document for the 1981 Round II Coal Lease Sale EIS.		

Predicted employment requirements are similar for the two mine plans, with the 1981 EIS prediction slightly smaller during the construction period and about 16 percent larger during peak production.

Water requirements are similar for both predictions. The primary difference is that the 1981 tract profile predicted that a water-supply well would be drilled to a depth of 2,000 feet into the sub-coal Fort Union Formation to provide 16 acre-feet annually (10 gallons per minute) of potable water. The NWR proposal assumes that potable water will be purchased from a bottled-water service and all other water requirements will be obtained by ground

water collected in the mine, overburden dewatering wells, and surface runoff collected in sediment-control ponds.

Under both scenarios 20 water wells would be destroyed by mining activities. Air quality modeling done as part of NWR's permitting activities shows that particulate emissions should be less than what was predicted in the 1981 tract profile. Because coal production rates and predicted employment requirements are similar for the two scenarios, the predicted levels of train and vehicle traffic are also similar.

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From the foregoing discussion it is concluded that the mine plan proposed by NWR, which would be enabled under the Proposed Action, is substantially similar to the hypothetical mine plan presented in the 1981 tract profile for the Rocky Butte lease tract. This hypothetical mine plan was incorporated into the 1981 regional EIS to evaluate both the mine-specific and cumulative impacts of the Rocky Butte mine.

Actual developments in the Campbell County coal mining industry, including coal production, disturbed acreage, and traffic, are within the ranges predicted in the four regional EIS's. Employment levels, and therefore population, are well below earlier predictions, an indication that productivity (in terms of coal produced per employee) is higher than was predicted a decade ago. Therefore many of the conclusions reached in the 1981 EIS, which ultimately led to the sale of the Rocky Butte lease tract in 1982, are still valid and even on the conservative side.

The following sections update the cumulative impact analyses for the Rocky Butte Mine in light of developments and changes that have occurred since the 1981 regional EIS was prepared and new data that are available from an additional 10 years of mining and reclamation experience in the region.

6.3 Geology and Mineral Resources

The Powder River Coal Region encompasses an area of about 20,000 sq mi and contains nearly 240 billion tons of subbituminous coal resources (BLM, 1979). The 127,000 acres in Campbell County within coal mine permit areas comprise about 1 percent of this region and contain about 3 percent of the coal resource. Campbell County has a total surface area of about 4,760 sq mi, of which some 4 percent is within current mine permit boundaries. The Eastern Powder River Basin, which includes all of Campbell County and a portion of Converse County, consists of approximately 7,800 sq mi (BLM, 1979).

Within the permit boundaries, the geology will be disrupted, with the coal recovered and the overburden and topsoil removed and replaced. The natural stratification of these shallower layers will be destroyed, and the replaced spoils will be a more

homogeneous mixture of sands, silts and clays. The coal reserves mined represent a small percentage of the total resource but a large percentage of the shallowest (hence, most economically recoverable) reserves in the county and region.

6.4 Topography

After mining and reclamation are complete, the topography within about 1 percent of the Powder River Coal Region, about 2 percent of the Eastern Powder River Basin (EPRB) and about 4 percent of Campbell County will be flatter than before mining. The reduced relief and subdued topography can have benefits such as reduced erosion and increased precipitation infiltration. However, the flatter topography can be less attractive to some observers. Also, some topographic features that are beneficial to wildlife (e.g., breaks, incised drainages, rock outcrops, and playas) can not be entirely mitigated during reclamation. This would result in the loss of habitat on up to 4 percent of the county, decreasing bio-diversity and wildlife carrying capacities.

6.5 Soils

A total of approximately 111,000 acres on 19 mines including the proposed Rocky Butte mine (Table 6-2) will be progressively disturbed by surface coal mining. This represents approximately 2 percent of the entire EPRB. All of these areas will in time be reclaimed by planting appropriate species to restore soil productivity and prevent erosion, making the cumulative impacts to soils negligible.

6.6 Vegetation

Cumulative impacts to vegetation from strip mining were evaluated for the entire EPRB which encompasses all of Campbell County and the northern portion of Converse County (BLM, 1979). The analysis was based on information contained in the permits to mine for each mine in the Powder River Basin.

Cumulative effects of strip coal mining on vegetation within the EPRB will be negligible or minor because all mines are required to meet state reclamation success standards to obtain bond release (WDEQ-LQD, 1986). Furthermore,

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reclamation plans for all mines propose to replace the major types of vegetation originally found within the permit area for the mine in the approximate acreage the types occupied prior to mining.

Collectively, the mines are projected to disturb about 111,000 acres, or two percent of the EPRB (Table 6-6). At the end of 1990, 31,744 acres (28.6 percent of the projected value and 0.6 percent of the

EPRB) had been disturbed by coal mining. Of this disturbed land, about 9,200 acres had been reclaimed, leaving 22,540 acres disturbed. The proposed Rocky Butte Mine would add an average of 1,850 acres to this disturbance at any given point in time and would represent four to eight percent of the total disturbance. These values will fluctuate depending on production levels and reclamation schedules.

Table 6-6. Total Acres and Percentages of Projected and Actual Disturbance of Vegetation Types Within the Eastern Powder River Basin (EPRB), the Rocky Butte Permit Area, and Within the Total Permitted Acreage of All Mines in the EPRB, Converse and Campbell Counties, Wyoming.

Projected Disturbed				Actual Disturbed to Date				
EPRB ¹ (Acres)	Rocky Butte (Acres)	Rocky Butte (Percent of EPRB)	All Mines ² (Acres)	All Mines (Percent of EPRB)	All Mines (Acres)	Percent of Projected Disturbed	All Mines (Percent of EPRB)	Area Reclaimed ² (Acres)
4,978,560	7,333	0.1	111,000	2.2	31,744	28.6	0.6	9,199

¹ Source: BLM (1979)

² Data presented in this table were compiled from mine permits held by WDEQ, Cheyenne; and the permit, in preparation, for the Rocky Butte project. Due to variability in permit presentation of vegetation data, acreage presented herein represent a general summary of data for all mines in the EPRB.

Big sagebrush is the most common vegetation type in the EPRB, covering 84.1 percent of the land area of the region (Table 6-7). Ponderosa pine woodland, riparian areas, and cropland are next most abundant, occupying 577,328 acres, or 13.6 percent of the EPRB. Other vegetation types, such as greasewood grassland, lowland grassland, pasture, saline big sagebrush, scoria/roughlands and silver sagebrush, although uncommon, are also found in the EPRB.

Approximately 38 percent of all cropland in the EPRB disturbed by mining would be disturbed by the Rocky Butte mine. However, effects of losses of agricultural lands on regional productivity due to all mines, including Rocky Butte, would be minimal (Section 4.1.14). Because cropland is the principal vegetation type in the Rocky Butte project area, the contribution of Rocky Butte to impacts on other vegetation types is proportionally small.

While most vegetation types that will be impacted can be restored using conventional reclamation procedures, the scoria/roughlands type would be difficult to restore because the scoria buttes and ridges where the type occurs will be lost during mining. Thus, a cumulative effect of mining the EPRB will be the permanent loss of approximately 11,300 acres of scoria/roughlands type vegetation. However, Rocky Butte would not affect this type. Additionally, areas dominated by sagebrush would be lost for 10 to 20 years or more until sagebrush of similar heights and density becomes established on these areas. Minor vegetation types, including those associated with saline soils or other areas where soil conditions are undesirable or difficult to duplicate, probably would not be restored. For example, there would be a net loss of approximately 1,100 acres of the saline big sagebrush type, 299 acres of which would be disturbed by Rocky Butte.

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Table 6-7. Areas and Percentages of Projected Disturbance of Vegetation Types within the EPRB, Rocky Butte Permit Area, and Within the Total Permitted Acreage of All Mines in the EPRB, Campbell and Converse Counties, Wyoming.

Vegetation Type	Acreage Occupied by Type, EPRB (Acres)	Disturbance of Type		Rocky Butte Portion of EPRB Disturbed (Percent)	Disturbance of Type		All Mines Portion of EPRB Disturbed (Percent)
		Rocky Butte (Acres)	Rocky Butte ² (Percent)		All Mines ³ (Acres)	All Mines ² (Percent)	
Big Sagebrush and Upland Grassland	4,188,150	1,901	<0.1	<0.1	66,700	1.6	1.3
Cropland	124,464 ⁴	3,752	3.0	0.1	10,000	8.0	0.2
Disturbed	NA ⁵	89	NA	<0.1	8,400	NA	0.2
Greasewood Grassland	82,960	0	0	0	1,100	1.3	<0.1
Lowland Grassland	NA	124	NA	<0.1	1,700	NA	<0.1
Pasture	NA	327	NA	<0.1	1,800	NA	<0.1
Riparian/Reservoirs	224,500	52	<0.1	<0.1	2,700	1.2	<0.1
Saline Big Sage	NA	299	NA	<0.1	1,100	NA	<0.1
Scoria/Roughlands	27,300	0	0	0	11,300	41.4	0.2
Silver Sage	36,900	789	2.1	<0.1	2,700	7.3	<0.1
Ponderosa Pine Woodland	328,400	0	0	0	0	0	0
Other Types	90,350	0	0	0	3,500	3.9	<0.1
TOTALS	4,978,560	7,333	--	0.2	111,000	--	2.2

¹ Source: BLM (1979).
² Relative to the acreage occupied by the type in the EPRB.
³ Data presented in the table were compiled from mine permits held by WDEC, Cheyenne; and the permit, in preparation, for the Rocky Butte project. Due to variability in permit presentation of vegetation data, acreages presented herein represent a general summary of data for all mines in the EPRB.
⁴ Computed - Cropland occupies 2.5% of land in the EPRB (BLM 1979).
⁵ Data not available.

Due to a reduction in relief and in the number of vegetation types and plant species that would be reestablished, there would be a regional loss of vegetative diversity which would persist for years after closure of all mines. Geomorphic processes and natural succession would slowly create topographic and vegetative heterogeneity, such that permanent impacts to diversity would be minor or negligible.

6.7 Water Resources

Surface coal mining affects both the surface- and ground-water systems. These effects have been monitored over the years of mining activity. The potential and actual extent of these effects have also been the subject of several regional studies. This

new data is identified and assessed in this cumulative analysis.

6.7.1 Ground Water

The cumulative impact of surface coal mining on ground water is an issue which was raised during scoping conducted for the currently proposed coal leasing.

Concern over the effects of large-scale surface coal mining on ground water around the mines has resulted in the establishment of a monitoring program which is administered by the State of Wyoming. Each mine is required to monitor ground-water levels in the coal itself as well as in shallower aquifers in the area surrounding their operations. There are also requirements for drilling monitoring

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wells in the backfill areas of the mines in order to measure the recharge in these areas. The Gillette Area Groundwater Monitoring Organization (GAGMO), which was formed in 1980, assembles the hydrogeologic monitoring data collected by the coal mining companies operating in the EPRB of Wyoming, from the Buckskin Mine north of Gillette to the Antelope Mine in northern Converse County. GAGMO is composed of the companies with operating or proposed mines in that area, the Wyoming DEQ, the Wyoming State Engineer's Office, the BLM, and the OSM, which joined in 1991. Each year, GAGMO contracts with an independent firm to publish the results of the monitoring for that year. In 1991 GAGMO published two reports, an annual report for 1990 and a ten-year report. The ten-year report summarizes the data accumulated during the last ten years of monitoring in the GAGMO study area (Hydro-Engineering, 1991). According to the GAGMO ten-year report, 646 monitoring wells were operated at 21 coal mine sites (seventeen active mines sites and four inactive or never-mined sites) in 1990. The Dave Johnston Mine located near Glenrock and the Rocky Butte lease are not currently part of GAGMO.

The major ground-water issues are:

- The effect of the removal of the coal aquifer and any overburden aquifers within the mine area, and replacement of these aquifers with spoil material.
- The extent of the temporary lowering of static water levels in the aquifers around the mine due to dewatering associated with removal of these aquifers within the mine boundaries.
- The effect of the use of water from the sub-coal Fort Union Formation by the mines. Most mines in the PRB have water-supply wells completed in the sub-coal Fort Union Formation.
- Change in water quality as a result of mining.

The cumulative effects of large-scale surface coal mining for each of these issues are discussed in the following paragraphs.

The effects of replacing the coal aquifer and overburden with a spoil aquifer is the first major ground-water concern. The following discussion of

recharge, movement, and discharge of water in the spoil aquifer is excerpted from the Powder River Basin CHIA, a regional study of surface coal mining impacts in the Powder River Basin prepared by the USGS (Martin, et al., 1988):

The potential for recharge to the backfilled spoil would be greater than in areas not disturbed by mining. The natural bedding will be destroyed, creating a more isotropic condition in the spoil, resulting in generally greater vertical permeability than exists in undisturbed areas. The infiltration capacity of the backfilled and reclaimed spoil will be greater than that of the undisturbed Wasatch aquifer and Wyodak coal aquifer. However, the infiltration rate for reclaimed soils is less than that for natural soils due to the lack of root structure and other paths for vertical movement of water. After several years, infiltration rates for reclaimed soils will increase to approximately the same rates as for undisturbed soils. As infiltration rates increase to approximate premining conditions, ground-water recharge rates also will increase to approximate premining conditions.

Although the recharge potential of the reclaimed mine areas will increase, the actual recharge rate after reclamation probably will approximate or be somewhat greater than premining recharge. Actual recharge will depend on how well the surface contours are restored. A flatter average slope of the reclaimed land would increase the potential recharge by decreasing the rate of runoff from reclaimed areas. Recharge will increase locally where water is allowed to pond in surface impoundments. Also, some increase in recharge along re-constructed channels probably will occur during the infrequent periods of surface runoff.

Postmining recharge rates and mechanisms will not change in areas where lateral movement of ground water from adjacent clinker is a major source of recharge. This is because, in general, the clinker will not be disturbed by mining operations. After mining and reclamation have been completed, water will move laterally from clinker to the spoil aquifer.

Recharge to the spoil aquifer will be from infiltration of precipitation, lateral flow from the undisturbed clinker and the Wasatch aquifer and Wyodak coal aquifer, and leakage from surface-water impoundments and stream channels. Estimates of the time required for the ground-water system to re-

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establish equilibrium varies from a few tens of years to hundreds of years. The anticipated potentiometric surface of the spoil aquifer will resemble a composite of the premining potentiometric surfaces in the Wasatch aquifer and Wyodak coal aquifer. After equilibrium is re-established, ground-water flow patterns will approximate premining conditions. Discharge from the spoil aquifer will flow into the undisturbed Wasatch aquifer and Wyodak coal aquifer to the west (regional flow) or to reclaimed stream channels (local flow).

According to the GAGMO ten-year report, 56 backfill monitor wells had been drilled as of 1990. The report listed the current water levels in these wells and compared them to the 1980 water-level elevations, which were estimated from the 1980 coal water-level contours. Of these 56 backfill wells, six (10.7 percent) were dry (the water levels in those locations were below the total depth of the well), 29 (51.8 percent) reported water at levels less than the water levels estimated for 1980, and 21 (37.5 percent) reported water at levels equal to or higher than those estimated for 1980. The presence of water in 89 percent (50 of the 56) of the backfill wells drilled as of 1990 indicates that recharge is occurring in the backfill.

Since reclamation is done concurrently with mining, and the monitoring data indicate that recharge of the backfill is occurring, it is not anticipated that additional significant impacts will occur as a result of the leasing proposed in the LBA's received to date nor in the opening of the Rocky Butte Mine.

Clinker, the baked and fused rock formed by prehistoric burning of the Wyodak-Anderson coal seam, is believed to be the major recharge source for the spoil aquifer, just as it is for the coal. Although some clinker is mined for road surfacing material, saturated clinker is not generally mined since abundant clinker exists above the water table and does not present the mining problems that would result from mining saturated clinker. There is little clinker in the Rocky Butte mine area. Therefore, the major recharge source for the spoil aquifer is not being disturbed by mining and will not be affected by the Rocky Butte Mine.

The second major ground-water issue is the extent of water-level drawdown in the coal and shallower aquifers in the areas surrounding the mines. Most of the monitoring wells reported by GAGMO (578 wells) are completed in the coal beds, in the overlying sediments, or in sand channels or interburden between the coal beds. These wells range from 9 feet to 420 feet in depth. The changes in water levels in the coal seams after ten years of surface coal mining are shown in Figure 6-1, which was taken from the 1991 GAGMO ten-year report. This map shows the actual area where drawdown in the coal seam has been greater than five feet in ten years in comparison with the predicted worst-case five-foot drawdowns derived from ground-water modeling done by the mines. Wyoming DEQ/LQD policy is to have the mining companies determine the extent of the five-foot drawdown contour. In general, drawdowns do not extend east of the mines because the mines are located on or near the coal outcrop line. The actual ten-year five-foot drawdown contours have not exceeded the predicted worst-case drawdowns in any of the mines, and, in most cases, the drawdown contours are well within the mines' predicted worst-case drawdowns.

Drawdowns extend farther in the coal than in the shallower aquifers because the coal is a confined aquifer and because it is areally extensive, whereas the shallower aquifers (sandstone in the Wasatch, alluvium, and clinker) are generally discontinuous and of limited extent. Therefore, the area in which the shallower aquifers have experienced a five-foot drawdown would be smaller in each case.

The actual five-foot drawdown levels are also well within the cumulative drawdown predicted by the USGS in the Powder River Basin CHIA (Martin, et al., 1988). This study predicts the approximate area of five-foot or more water-level decline in the Wyodak-Anderson coal aquifer which will result from all anticipated coal mining. All anticipated coal mining as referred to in the CHIA includes 16 surface coal mines operating at the time the report was prepared and six additional mines proposed at that time. The proposed mines include two mines which are now producing, one mine which did produce for a short time but is currently inactive, and the proposed Rocky Butte mine. The study assumes that water-supply wells in the coal may be affected as far away as eight miles from mine pits, although at this distance the effects would be minimal. Wells in the

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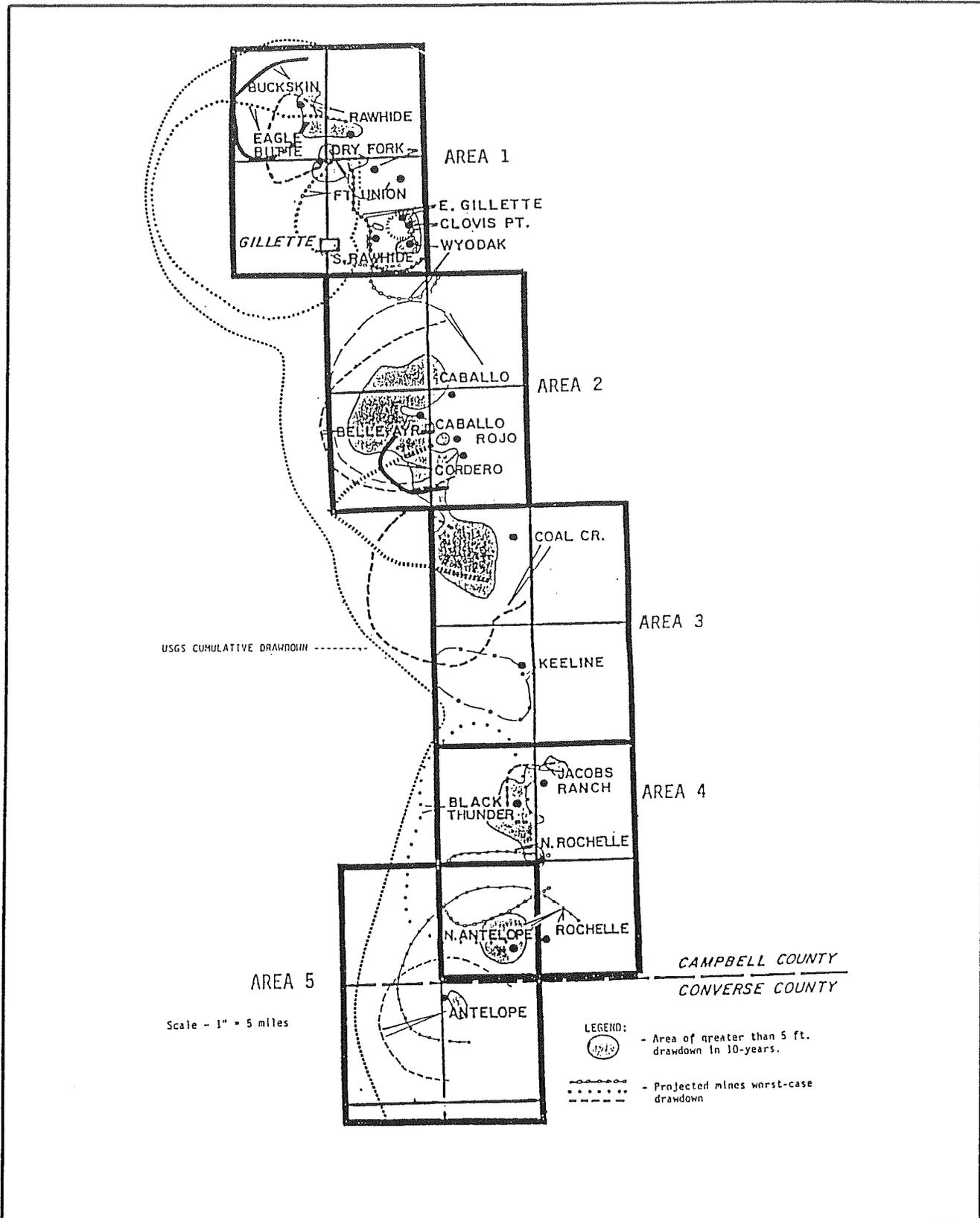


Figure 6-1. Comparison Between the 1990 Cumulative Drawdowns and the Mines Worst-Case and the USGS Predicted Drawdowns (Modified from Hydro-Engineering, 1991)

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Wasatch are generally considered to be impacted by drawdowns only if they are within 2,000 feet of a mine pit (Martin, et al., 1988, p. 29).

Based on the above assumptions Martin, et al. (1988) show that there are about 3,000 wells in the area subject to impact by current and anticipated mining in Wyoming's Powder River Basin. Of these, about 1,200 wells are outside the actual mine areas (i.e., will not be removed by mining). About 1,000 of these wells supply water for domestic or livestock uses, and about 200 supply water for other uses. The remaining 1,800 wells are used by coal-mining companies: about 1,700 wells are monitor wells only, and the other 100 are used for water supply and/or dewatering at mine sites.

Of the 1,200 water-supply wells in the area potentially subject to impact, about 580 are completed in Wasatch aquifers, about 100 in the Wyodak-Anderson coal aquifer, and about 280 in strata below the coal. There is no completion data available for the remainder of these wells (about 240). They could be completed in any of the above aquifers.

Since the actual ten-year drawdowns lie well within the cumulative drawdown predicted by Martin, et al. (1988), the cumulative impacts to water wells have not reached the levels described in that report.

The USGS, in cooperation with the Wyoming State Engineer's Office, has recently completed an evaluation of ground-water level changes in the vicinity of Gillette (Crist, 1991). The study area for that report included an area of about 220 square miles around Gillette, where energy-related developments have caused a dramatic population increase since about 1960. This report states that water levels in the Wasatch Formation around Gillette declined by about 9 feet between 1965 and 1974 and now appear to be rising. This is probably because the City of Gillette stopped using its Wasatch wells after 1981, when the city started using its Madison pipeline. Data from 18 observation wells completed in aquifers below the Wasatch indicate declining water levels. Pumpage for municipal use by Gillette and for public supply by local subdivisions is the principal cause of water-level decline from 1972 to 1985 in the upper Fort Union (i.e., the Fort Union from the base of the Wyodak-Anderson Coal down to 750 feet below that level). A water-level

measurement in 1985 indicates that the water levels in this zone have stabilized. Water-level changes in the lower part of the Fort Union Formation (i.e., more than 750 feet below the Wyodak-Anderson Coal) are not well documented due to a lack of data.

The additional ground-water impacts which would be expected as a result of extending mining as proposed in the LBA's received to date including the Rocky Butte mine would be to extend the drawdowns in the areas surrounding the proposed new leases. The actual drawdown contours for the mines which have proposed LBA's to maintain their current operations are well within the cumulative drawdown anticipated in the report by Martin, et al. (1988), and some recharge was already occurring in 14 of the 15 backfill wells which had been drilled by those mines by 1990. Therefore, additional significant impacts in water-level drawdown for the maintenance leases are not anticipated. The results of ground-water modeling of the Rocky Butte Mine is described in Section 4 of this EIS and includes cumulative impact analyses.

Potential water-level decline in the sub-coal Fort Union Formation is the third major ground-water issue. According to the Wyoming State Engineer's records, fourteen mines hold permits for 42 wells which are between 400 feet and 10,000 feet deep. That number does not represent the actual number of wells potentially completed in the Tullock Member, because the zone of completion of these wells is not always specified and not all of the wells are currently producing (for example, three of the permits are held by an inactive mine, and one of the wells Black Thunder has permitted has not been used since 1984).

Water-level declines in the Tullock Member have been documented in the Gillette area. These declines are most likely attributable to withdrawal at subdivisions and trailer parks in and near the city of Gillette (M.A. Crist, USGS, written communication, 1987, in Martin, et al., 1988, p. 30). Most of the water-level declines in the sub-coal Fort Union wells occur within one mile of the pumped wells (Ibid). The mine facilities in the Powder River Basin are separated by distances of a mile or more, so little interference between mine supply wells would be expected. For the Rocky Butte Mine, it is anticipated that drinking water will be purchased from a bottled-water service and other water requirements will be

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met by overburden dewatering, pit inflows, and sediment-control ponds. A deep Fort Union well would be drilled only in the unlikely event that these sources prove insufficient.

In response to concerns voiced by regulatory personnel, several mines which have deep Fort Union water-supply wells have conducted impact studies of the sub-coal Fort Union Formation. The OSM commissioned one cumulative impact study of the sub-coal Fort Union Formation to study the effects of mine facility wells on this aquifer unit (McIntosh, et al., 1984). Kaman-Tempo (1983) performed a similar study for NERCO, and Western Water Consultants, Inc. (WWC) performed similar studies for Amax (WWC, 1983a) and Phillips Coal (WWC, 1983b). Conclusions from all these studies are similar and may be summarized as follows:

- Because of the discontinuous nature of the sands in this formation, and because most large-yield wells are completed in several different sands, it is difficult to correlate completion intervals between wells.
- In some areas, most notably around the City of Gillette where the city and several subdivisions are utilizing water from this formation, regional water levels are probably declining. (Note: Gillette is using this water as a back-up source at this time.)
- Because large saturated thicknesses are available in this aquifer unit, generally 500 feet or more, drawdowns of a few hundred feet in the vicinity of a pumped well would not dewater the aquifer.

The mines adjacent to the currently proposed maintenance-tract LBA's all have permits from the State Engineer for deeper wells. Extending the lives of these mines would result in additional water being withdrawn from the Tullock Member. The additional water withdrawals would not be expected to extend the area of water-level drawdowns over a significantly larger area because of such factors as leakage and recharge which tend to make drawdown curves asymptotic with time.

The Tullock Member of the Fort Union Formation is the lowermost unit in the formation, and it crops out at the surface east of the area being

mined. Therefore, recharge to the Tullock Member from the outcrop area is not affected by mining.

The fourth issue of concern with ground water is the effect of mining on the water quality. Specifically, what effect does mining have on the water quality in the surrounding area, and what are the potential water quality problems in the spoil aquifer following mining?

Ground-water quality in areas surrounding the mines is not impacted during mining. While the pits are open, ground-water flow directions are toward the pit, and there would be no mechanism for contaminants to migrate off-site even if contaminants were introduced into the ground water.

In the regional study of the cumulative impacts of coal mining, the median concentrations of dissolved solids and sulfates were found to be larger in water from spoil aquifers than in water from either the Wasatch overburden or the Wyodak-Anderson coal aquifer. This is expected because blasting and movement of the overburden material exposes more surface area to water, increasing dissolution of soluble materials, particularly when the spoil materials were situated above the saturated zone in the premining environment. However, as discussed in Section 4.1.5, the ground water in the spoils is expected to be suitable for livestock use, similar to the use-suitability of premining ground water, and should improve over time. On the basis of studies done in North Dakota, it was estimated that at least one pore volume of water must leach the spoil before the dissolved-solids concentration in the water would be similar to the premining dissolved-solids concentration (Houghton, et al., 1987). The time required for one pore volume of water to pass through the spoil aquifer is greater than the time required for the postmining ground-water flow system to re-establish equilibrium.

The first water to flow out of the spoils into the surrounding aquifers may temporarily degrade the water in these aquifers, particularly the coal. This effect should be temporary, although long-term, and there are some indications that conditions exist in the coal to reduce some of the dissolved constituents (Martin, et al., 1988, p. 93). In time, the soluble constituents will be leached out and a new equilibrium water quality will be established.

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6.7.2 Surface Water

There are two potential issues relating to cumulative surface-water impacts:

- Possible changes in runoff rates due to changes in precipitation infiltration rates.
- Possible changes in surface-water quality.

Some studies indicate that soil infiltration rates are smaller on reclaimed lands than on premining lands. A reduction of up to 29 percent has been found, with this reduction declining over time until the postmining infiltration rates recover to premining levels (Martin et al., 1988, p.106). However, the reduction in topography after reclamation will provide enhanced opportunity for precipitation infiltration and will likely more than offset this temporary decrease in soil infiltration rates.

Surface-water quality should not be significantly affected by mining based on UGSG studies of the Belle Fourche River Basin (Bloyd, et al., 1986, pp.33-41). Sediment yield should not increase in streams. Although reclaimed soils may be more erosive for a few years after reclamation, the larger sediment production would not be delivered to streams due to sediment deposition due to flatter slopes on reclaimed lands and sediment trapping by mandated sedimentation ponds.

6.8 Alluvial Valley Floors

Effects on AVFs can include several of the ground and surface water changes listed above. Alluvial aquifers can be subject to water-table drawdowns, channels subject to changes in flow patterns, and the interaction between surface water and ground water can be altered. Impacts to designated AVFs are not permitted unless the AVF is insignificant to farming or unless the permit to affect the AVF was issued prior to the effective date of SMCRA. It is not anticipated that any AVFs will be affected by the Rocky Butte Mine.

6.9 Fish and Wildlife

Cumulative impacts to key wildlife species resulting from the proposed action and other mining activities in the area are presented in Table 6-8.

Approximately 42,846 acres of sagebrush/upland grass habitat would be disturbed as a result of the proposed action and other coal mining activities within the 650,200 acres occupied by the Hilight pronghorn antelope herd (Table 6-8). Only 6,917 acres (1.1 percent) of pronghorn habitat would be disturbed by the proposed Rocky Butte Mine. While approximately 6.6 percent of the total herd area would be disturbed by the proposed action and other coal mining activities, it is likely that some areas within existing mine permits are classified by the WGFD as unoccupied by pronghorn, and many newly reclaimed areas at these mines are probably used by the species. However, mines located within the area occupied by the Hilight herd are situated more within winter/yearlong range than other range types. While only about 6.6 percent of the total herd area would be disturbed by the proposed action and other area coal mining activities, approximately 25 percent of the winter/yearlong range type would be disturbed (personal communication, Joe White, WGFD, Cheyenne, 1992). Alterations within this range type (i.e., conversion of winter/yearlong range to primarily summer range) could result in increased winter die-off of antelope during severe winters, if insufficient habitat is available. Cumulative impacts to antelope resulting from the proposed action and other coal mining activities for the Hilight herd would be moderate to major until vegetative diversity is restored.

Of the approximately 1,968,000 acres of mule deer-occupied areas within the Thunder Basin herd, only 39,443 acres (2.0 percent) of suitable mule deer habitat occur within existing and proposed mining operations (Table 6-8). Losses to the Thunder Basin white-tailed deer herd amount to less than 0.8 percent of the 332,900 acres occupied by that species. Only 4,269 acres (0.2 percent) of mule deer habitat and 52 acres (<0.1 percent) of white-tailed deer habitat would be disturbed by the proposed Rocky Butte project. Cumulative impacts to both mule deer and white-tailed deer populations would, therefore, be minor during the years that mining operations continue in the area.

Phillips and Beske (1990) quantified the number of active raptor nests at approximately 590 in Campbell and northern Converse Counties, Wyoming (Table 6-8). Whereas approximately 111,000 acres (3.1 percent) of the 3,596,355 acres in the region (7,333 acres on the Rocky Butte project area) and

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Table 6-8. Cumulative Wildlife Impacts from Surface Mining in the EPRB, Wyoming, 1991.

Species	Occupied Area (Acres)	Acreage of Disturbance Within Occupied Habitats (Rocky Butte/All Mines)	Percent Loss (Rocky Butte/All Mines)
Pronghorn Antelope	650,200 ¹	6,917/42,846 ²	1.1/6.6
Mule Deer	1,968,000 ³	4,269/39,443 ⁴	0.2/2.0
White-tailed Deer	332,900 ⁵	52/2,700	<0.1/0.8
Raptors	3,596,355 ⁷	7,333/111,000	0.2/3.0
number of known nests	590 ⁷	6/50 ⁷	1.1/8.5
Sage Grouse	4,225,050 ⁹	4,347/69,400	0.1/1.6
number of known leks	28 ¹¹	2/5 ¹¹	7.1/17.8

¹ Hilight herd unit.
² Includes native and cropland vegetation types on all mine permit areas within the Hilight herd unit.
³ Thunder Basin herd unit.
⁴ Includes native and cropland vegetation types on all mine permit areas within the Thunder Basin herd unit.
⁵ Thunder Basin herd unit and riparian habitat on the proposed Rocky Butte Mine permit area.
⁶ Includes riparian habitat on all EPRB mine permit areas (see Table 6-7).
⁷ Includes Campbell and northern ¼ of Converse counties (adapted from Phillips and Beske, 1990).
⁸ Includes entire disturbed area of all mine permits in EPRB (see Table 6-6).
⁹ Includes all sagebrush and upland grass vegetation types in EPRB (BLM, 1979).
¹⁰ Includes all sagebrush and upland grass vegetation types on all mine permits in EPRB (see Table 6-7).
¹¹ Adapted in part from BLM (1979).

approximately 50 raptor nests (six on the project area, 5 active in 1991) would be disturbed as a result of the proposed action and other surface mining activities in the region, raptor mitigation measures identified in mine-specific permits, EA's and EIS's effectively reduce potential nesting losses to zero. Furthermore, only a portion of the 111,000 acres slated for disturbance would be disturbed at any one time, as reclamation would be an ongoing process. Regarding sage grouse, approximately 69,400 acres (1.6 percent) of the 4,225,050 acres of sagebrush/upland grass habitat in the EPRB, and five (17.8 percent) of the 28 known leks would be disturbed as a result of the proposed action and other surface mining activities in the region (Table 6-8). Only 4,347 acres (0.1 percent) and two known leks (7.1 percent) would be disturbed by the proposed Rocky Butte Mine. Since only a portion of the area would be disturbed at one time, habitat losses would be minor for the species. However, if only 28 leks occur in the EPRB and five of these leks would be disturbed, impacts to sage grouse could result from the combined effects of the proposed project with other surface mining activities in the

region over the life-of-mine activities. Since many of the sage grouse leks in the area have been identified as a result of surveys conducted in conjunction with mine permitting activities, many of the known leks are associated with existing mining operations; numerous additional leks likely occur in the region that have not been identified. Additionally, some of the leks identified within disturbance areas may no longer exist, further reducing the potential cumulative impacts to the species.

Minor cumulative impacts from the proposed action and similar activities in the region could occur for some MBHFI (i.e., ferruginous hawk, golden eagle, and burrowing owl), T&E species (i.e., bald eagle), State sensitive/priority species (i.e., upland sandpiper), and other species breeding in the area (e.g., waterfowl, predators, etc.). The relatively small area (2.2 percent) of the EPRB impacted as a result of current and proposed mining activities in the area combined with standard practices limit impacts to these species.

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Topographic moderation resulting from mining activities has decreased wildlife habitat diversity in the region, and has resulted in a decrease in carrying capacity for some species. This cumulative impact may be major and permanent for some species if suitable habitats are not restored.

6.10 Historical, Archeological and Paleontological Resources

All cultural resource sites that cannot be avoided must be mitigated. Thus, no cumulative impacts will occur.

6.11 Recreation

The additive effects of 18 existing coal mines and three proposed mines within the EPRB (including the proposed Rocky Butte Mine) could have major effects on recreational activities, such as hunting, for the life of the mines. However, if hunting is limited or prohibited on mine sites, opportunities for wildlife observation may increase in some areas, concurrent with expected increases in wildlife abundance in areas prohibiting hunting.

Pronghorn antelope hunting is a major land use and deer hunting a negligible recreational activity for the Rocky Butte site. Total harvest figures for Rocky Butte are not available; however, a harvest of 1,119 antelope occurred on Hunt Area 24 (Table 3-6). About four percent (9,647 acres) of Hunt Area 24 (225,000 acres) is within the proposed mine site.

Six operating coal mines (Caballo, Belle Ayr, Caballo Rojo, Cordero, Coal Creek, and Jacobs Ranch) are within antelope Hunt Area 24 and mule deer/white-tailed deer Hunt Area 21. The total permit area occupied by the six mines is 54,150 acres, representing 24 percent of the land within Hunt Areas 21 and 24. However, only four percent of Hunt Areas 21 and 24 have been disturbed to date.

Each mine has the option of closing the entire site to hunter use or opening selected areas. Some mines currently do allow bow hunting and black powder (muskets) in some areas. If hunting is restricted or prohibited on major areas of the mine sites, herd sizes could exceed WGFD target values,

and animal populations could experience large die-offs during severe winters.

6.12 Air Quality

The TSP standard was based on all particle sizes which could be trapped using a high volume air pump and a particular type of filter. Recently, the federal standard was amended to account for the greater health risk due to particles less than 10 micrometers in diameter (the PM₁₀ standard). The particulate standard change from TSP to PM₁₀ is more lenient toward mining activities since mining produces mostly larger particles. Monitoring has indicated that at similar distances from the active pit, PM₁₀ levels are roughly 30 percent those of TSP. The Wyoming DEQ has kept the 150 µg/m³ 24-hour TSP standard in addition to the new 150 µg/m³ 24-hour PM₁₀ standard. The new annual average standard is 50 µg/m³ PM₁₀.

Tables 6-9 and 6-10 use the TSP standard in order to assess how well the previous regional impact assessments fit the current actual impacts. While it was not possible to predict with exact certainty which specific mines would be developed and what their sizes would be, the overall number and productivity of the mines in the Eastern Powder River Basin was projected for the period 1979 to 1990 with reasonable accuracy in the regional EIS's.

Particulate emissions are controlled by the amount of regulation imposed as well as by coal production. Actual emission rates are less than the projected emission rates since regulations have become more strict during this time period. In particular, treatment of haul roads and stockpiles, covering of conveyors, and more rapid revegetation of disturbed areas have become the norm rather than just being used in special cases.

As can be seen from Tables 6-9 and 6-10, the ambient concentrations across the region are usually well below past and current standards. With the major current standard being for finer particles which settle out more slowly, the area of potential cumulative impacts (the area where monitoring would pick up concentrations of 1 µg/m³ as a result of all contributing sources) may be greater.

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Table 6-9. Particulate Concentration by Mine in the Eastern Powder River as Projected for 1990 and as Measured for 1990 for the Annual Ambient Air Quality Standard

Mine Name	Projected 1990 Annual Avg. TSP Concentration ¹ ($\mu\text{g}/\text{m}^3$)	Measured 1990 Annual Avg. TSP Concentration ² ($\mu\text{g}/\text{m}^3$)
Antelope	30-40	29
Belle Ayr	30-40	40
Black Thunder	30-40	46
Buckskin	20-40	33
Caballo	30-40	33
Caballo Rojo	30-40	29
Clovis Point	20-40	Idle
Coal Creek	30-40	22
Cordero	30-40	43
Dave Johnston	30-40	28
Dry Fork	20-40	28
Eagle Butte	30-40	32
Fort Union	20-40	29
Jacobs Ranch	30-40	40
North Antelope/Rochelle	30-40	31
Rawhide	20-40	30
Wyodak	20-40	29
AVERAGE ³	20-40	33

¹ The technical report for the 1984 DEIS projected that mines south of Gillette would be between 30 and 40 $\mu\text{g}/\text{m}^3$ and those north of Gillette would span a greater range of between 20 and 40 $\mu\text{g}/\text{m}^3$.

² Wyoming DEQ.

³ Average of all sites making measurements in 1990 with 40 or more observations.

Since most large particles from mining processes drop out of the air quickly, cumulative impacts tend to occur only when the actual mine activities are within about 10 miles of each other. The trend over the past 10 years and with the currently proposed maintenance tracts is for activities at the mines to spread apart, increasing the distance between them.

Section 4.0 of this EIS presents an analysis of the cumulative impacts of the Rocky Butte Mine and

neighboring mines on regional air quality. The selection of mines, time periods, and other modeling parameters was done in consultation with Wyoming DEQ.

6.13 Visual Resources

Cumulative visual impacts from other mines in the area would be nonexistent as far as Rocky Butte mine area is concerned due to local topography. Cumulative impacts would result from more of the

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Table 6-10. Particulate Emissions by Mine in the Eastern Powder River Basin as Projected for 1990 and as Estimated from Actual Mining Activities in 1990

Mine Name	Projected 1990 Particulate Emission Rates (tons/year) ¹	Actual 1990 Particulate Emission Rates (tons/year) ²
Antelope	NA	228
Belle Ayr	4520	2127
Black Thunder	3744	1912
Buckskin	1276	531
Caballo	3651	1126
Caballo Rojo	NA	2701
Clovis Point	1492	Idle
Coal Creek	3432	1383
Cordero	9241	2477
Dave Johnston	961	NA
Dry Fork	NA	750
Eagle Butte	3096	1101
Fort Union	NA	278
Jacobs Ranch	3149	1869
North Antelope/Rochelle	2318	471
Rawhide	2218	1388
Wyodak	682	338
Total	39780	18680

¹ PEDCo, 1983.
² Tentative figures from various regional EIS's, to be checked with the Wyoming DEQ.

area south of Gillette being visually impacted by mining activities, but this would be obvious only by driving throughout the area or observing it from the air, rather than from any given point on the ground surface. These cumulative impacts would be eliminated as the mines within the area cease operations and reclamation is completed.

6.14 Noise

Because of distances involved between mining operations, noise impacts are not expected to be cumulative.

6.15 Transportation Facilities

Cumulative effects of the Rocky Butte Mine on local and regional transportation facilities are addressed in Section 4.0 of this EIS.

6.16 Land Use and Ownership

Because all mines plan to restore mined lands to approximate premining land uses, most permanent cumulative impacts of mining on land use in Campbell County would be negligible. Cumulative impacts on agricultural land uses due to construction

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and coal production would be minor or moderate (Table 4-3). Assuming that 20 percent of affected land in Campbell county would be affected in any given year, loss of production would range from 1,910 to 4,093 AUMs for cropland, or about three percent of the average crop production for Campbell County. Approximately 67 percent of the loss of production from cropland would occur due to the Rocky Butte project. Potential losses of grazing land and pasture land due to all mines would be 2,499 to 4,998 AUMs and 235 to 353 AUMs, respectively. However, the Rocky Butte project would contribute only five to six percent to these losses.

There may be a net loss in residential land use in non-urban areas; however, growth in urban areas may be stimulated (Section 4.1.15). The Rocky Butte Mine could potentially conflict with two producing oil wells (J.F. Rourke #4:5 and Wolf #34-34:34), and oil production could be temporarily cut off during mining operations. Should this occur, it is estimated from decline curves (Petroleum Information Corporation, 1992) that an average of 5,383 BOPM would be lost during the four years of mining operations. This represents 0.25 percent of Campbell County's 1991 oil production of 2,176,774 BOPM (Wyoming Department of Revenue, 1991). The impact to Campbell County's oil production from Rocky Butte mining operations would not be significant, however, the impact could be significant to the oil and gas lessees and royalty owners with an interest in these two wells. The cumulative loss of oil production arising from other area coal mines, proposed or in operation, is not known. Similarly, Rocky Butte would not contribute to county-wide cumulative impacts on roads, because impacts would be mitigated during mining operations.

6.17 Socioeconomics

This section describes the cumulative socioeconomic impacts associated with the proposed project. Baseline, or without the Rocky Butte project, employment and population projections are presented for Campbell County. The baseline scenario is developed in order to evaluate the incremental impacts associated with the project within the context of likely future socioeconomic conditions. Cumulative impacts were derived by adding the forecasted impacts of the project to the baseline conditions projected for the county.

6.17.1 Baseline Socioeconomic Projections

The Campbell County economy is currently dominated by mineral (primarily coal) and energy-related activity. Future baseline socioeconomic conditions of the county will reflect the influence of anticipated developments in these industries. For example, a further decline in the state's oil industry will influence employment prospects in Campbell County. However, recent federal Clean Air legislation appears to have heightened at least the short term market prospects for coal produced in Campbell County.

6.17.2 Mineral and Energy-Related Developments

In addition to the Rocky Butte project, a number of mineral and related developments are anticipated in Campbell County. The Dry Fork Mine, located northeast of Gillette, began operation in 1990 and produced about 815,000 tons of coal (Geological Survey of Wyoming, 1991). The output of the mine is dedicated to the coal requirements of the Laramie River Power Station. In 1990, 37 people were employed at the mine. However, during the anticipated life of the mine, an average annual level of 313 employees is expected (OSM, 1988).

Three new coal mines, in addition to Rocky Butte, have been proposed for Campbell County. These include the East Gillette Federal mine to be located east of Gillette and the Wymo and Keeline mines to be located in southern Campbell County near the town of Wright. These mines are currently in various stages of the planning process. The East Gillette Federal mine is owned by Kerr-McGee. Wymo is owned by Kansas City Power and Light, and prospects for developing the project appear dim (Wyoming Geological Survey, 1991). The Keeline Mine, owned by Ranchers Energy, was permitted and is approaching the five-year permit renewal. It was never constructed and WDEQ/LQD is terminating the permit. Employment levels arising from the development of these mines are unknown.

Campbell County leads all other Wyoming counties in oil production and ranks seventh in natural gas production. The outlook for oil production in Wyoming is not promising (Wyoming

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Oil and Gas Conservation Commission, 1991). At the state level, oil production has declined about four to five percent annually in recent years (ibid.). This is due primarily to the age, 50 to 70 years, of the major oil fields in the state. Continued low oil prices have slowed exploration and will likely cause further declines in state and Campbell County oil production. Thus, employment gains for this industry are not anticipated; declines are more likely.

Black Hills Power and Light has proposed the construction of a new 80 megawatt generating station near the existing Neil Simpson station located east of Gillette (Black Hills Power and Light, 1991). The station is currently in the permitting and preliminary design phase. Construction is scheduled to begin in 1994 and last three years. A peak construction-phase work force of 300 to 400 persons is anticipated. The station is scheduled to go on line in 1997 and will permanently employ about 45 persons, most of whom will likely be Campbell County residents.

6.17.3 Baseline Employment Projections

Baseline employment projections were derived by the following process:

- Adjustment of current (1989) estimates of Campbell County employment by economic sector for county residency and full time employment equivalency (Stearns Catalytic Corporation, 1984).
- Adjustment of Wyoming Department of Administration and Information employment forecasts for Campbell County for residency and full time employment equivalency (Wyoming Department of Administration and Fiscal Control, 1988).
- Adjustment of projections for employment expansions in the mining sector which are not fully accounted for in the Wyoming Department of Administration and Information forecasts (Geological Survey of Wyoming, 1991).

The baseline employment projections indicate that between 1990 and 2000, the resident Campbell County labor force will increase by nearly 5,000 persons, and resident, full-time employment will increase by about 4,200 jobs (see Table 6-11).

The annual unemployment rate is assumed to remain constant at about six percent during the forecast period.

The rate of employment growth is projected to slow during the forecast period. On average, county-wide employment is projected to grow at annual rate of 2.7 percent.

6.17.4 Baseline Household and Population Projections

Projections of occupied households and population were derived directly from employment and labor force forecasts. Households were estimated by assuming a worker-to-household ratio of 1.6. Population was estimated by applying a persons-per-household factor to the projected number of households. The number of persons-per-household in Campbell County in 1990 was 2.95. On the basis of recent historical trends, the number of persons per household is projected to decline to 2.90 by the year 2000 (see Table 6-12).

6.17.5 Cumulative Employment and Population Projections

This section presents the cumulative employment and population projections for Campbell County and the City of Gillette. County populations are allocated to the City of Gillette on the basis that 60 percent of the county population currently resides in the city. Cumulative projections are composed of the previously described baseline projections and the direct and indirect employment and population impacts forecasted for the Rocky Butte project. The incremental impacts of the project are discussed in Section 4.1.15.

As a result of the project, employment in Campbell County would increase from 2.7 percent to 4.9 percent over baseline employment levels. With the proposed project, employment in the county would grow by nearly 3.3 percent annually during the forecast period (Table 6-13).

As a consequence of the proposed Rocky Butte Mine, the population level in Campbell County would exceed baseline conditions by nearly five percent in the year 2000. The population increase in Gillette

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Table 6-11. Projected Baseline Labor Force and Employment, Campbell County

Year	Projected Labor Force	Projected Employment	Percent Change Employment
1991	16,310	15,330	3.0
1992	16,820	15,810	3.1
1993	17,330	16,290	3.0
1994	17,830	16,760	2.9
1995	18,330	17,230	2.8
1996	18,830	17,700	2.7
1997	19,330	18,170	2.7
1998	19,830	18,640	2.6
1999	20,310	19,090	2.4
2000	20,790	19,540	2.4

Table 6-12. Projected Baseline Population, Campbell County and City of Gillette

Year	Campbell County	City of Gillette
1990	29,370	17,635
1991	30,010	18,006
1992	30,900	18,540
1993	31,790	19,074
1994	32,640	19,584
1995	33,520	20,112
1996	34,370	20,622
1997	35,210	21,126
1998	36,050	21,630
1999	36,860	22,116
2000	37,670	22,602

Note: The population of Campbell County is projected to increase by nearly 8,300 persons, or 2.5 percent annually, during the period between 1990 and 2000. The City of Gillette's population is projected to increase by almost 5,000 persons during the same period.

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Table 6-13. Cumulative Employment Impacts, Campbell County

Year	Employment	Percent Change over Baseline with Rocky Butte
1991	15,330	0.0
1992	15,810	0.0
1993	16,737	2.7
1994	17,448	4.1
1995	17,876	3.8
1996	18,440	4.2
1997	19,034	4.8
1998	19,442	4.3
1999	19,980	4.7
2000	20,504	4.9

would exceed baseline conditions by more than six percent by the year 2000 (Table 6-14).

Because nearly all of the direct mine employees and the indirect service workers would reside within the Gillette urban area, the city would experience a proportionately larger impact relative to baseline

conditions than the county as a whole. This is considered reasonable in light of the 5-percent annual growth projected for the county's coal industry by the Geological Survey of Wyoming (1991). Actual City of Gillette population levels in the future will be directly tied to the city's annexation policies, which are subject to change.

Table 6-14. Cumulative Population Impacts, Campbell County and City of Gillette

Year	Campbell County Population	Percent Change over Baseline	Gillette Population	Percent Change over Baseline
1991	30,010	0.0	18,006	0.0
1992	30,900	0.0	18,540	0.0
1993	32,541	2.4	19,714	3.4
1994	33,830	3.7	20,599	5.2
1995	34,705	3.5	21,122	5.0
1996	35,725	3.9	21,777	5.6
1997	36,790	4.5	22,473	6.4
1998	37,514	4.1	22,878	5.8
1999	38,481	4.4	23,499	6.3
2000	39,423	4.7	24,097	6.6

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6.17.6 Cumulative Economic Impacts

The principal economic impacts arising from the proposed Rocky Butte project would be increased employment opportunities, personal income and consumer expenditures and housing in Campbell County. The cumulative employment impacts are discussed above.

Under the baseline conditions, personal income (as measured by the U.S. Bureau of Economic Affairs in constant 1991 dollars) in Campbell County is projected to increase from about \$500 million in 1990 to more than \$640 million by the year 2000 (Wyoming Department of Administration and Information, Division of Economic Analysis, 1991b). As a result of the proposed project, personal income in the county would exceed baseline income by two to three percent during the forecast period.

Baseline retail purchases in Campbell County are forecasted to increase from nearly \$134 million in 1990 to about \$177 million by the year 2000. Retail spending by direct mine workers and indirect service workers would increase retail sales in Campbell County by about 2.6 percent to 3.3 percent over the projection period. Services purchased in the county, increasing from about \$212 million in 1990 to more than \$280 million in 2000, would experience similar percentage increases.

Currently, there is little available capacity in the Gillette area housing stock. Furthermore, housing demand in Gillette will increase by about 185 units per year under baseline conditions. To maintain an adequate housing stock, about 195 units should be added annually during the forecast period. As a consequence of the Rocky Butte project, an additional 525 housing units would be required by the year 2000.

This analysis does not project the supply/demand relationship for specific unit types. Such an analysis should be performed prior to project construction. Based on historical experience, most mine employees would prefer permanent, owner-occupied dwelling units. This would also likely be the case for the local service work force. The temporary construction work force would likely reside in temporary housing such as apartments and mobile homes.

Cumulative impacts on the housing market, especially the temporary housing market, could be a concern. A number of projects are anticipated in the near future which would cause shortages in the temporary housing unit market without appropriate response from the local housing industry. The local housing industry will need to respond with sufficient lead times to larger demands than in the recent past. Careful monitoring and ongoing analysis of the housing market would be desirable.

6.17.7 Cumulative Infrastructure and Public Sector Financial Impacts

Annual average water use in Gillette is currently about 6.0 mgd. Assuming current water use patterns continue, average daily water use by the year 2000 could total 7.2 mgd. This represents a twenty percent increase over current usage and is considered a moderate to significant impact.

Peak period water demand could be a concern because actual peak use exceeds the system's design capacity by about five percent. However, the Gillette Utility Department staff believe that peak use can be sufficiently attenuated through practicable conservation measures.

Sewage treatment currently ranges from 2.2 to 2.5 mgd, well below the system's 3.85 mgd capacity. The system was designed to cost-effectively serve approximately 40,000 persons. Although population growth will require additional investment in the plant, the cumulative population growth projected for the city would likely not impact the system negatively.

The city-owned and operated electrical system currently has in place sufficient capacity to serve a peak of 40 megawatts. Capacity and other system expansions will likely be necessary to serve projected baseline population growth. The extent to which the incremental growth arising from the Rocky Butte project would impact the future operations of the system is not known with certainty, although it is believed to be moderate.

6.17.8 Public Safety

The Gillette Police Department is currently understaffed by five uniformed officers (Gillette Police Department, 1991). These and new positions will

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need to be staffed in order to provide police protection for the baseline population growth projected for Gillette. Assuming a ratio of 1.5 officers per 1,000 residents, the police department would require two additional officers as a result of the Rocky Butte project, and nine additional officers overall. Since this excludes the five officers the City presently lacks, staff increases, including support staff and equipment, will clearly be needed with or without the Rocky Butte Mine.

The rural portion of Campbell County is served by the Campbell County Sheriff's Department. Because most of the projected baseline and incremental population growth will occur in Gillette, additional resources required by the department will be relatively modest. However, the peak period construction work force may cause unique problems for the department (Campbell County Sheriff's Department, 1991).

Because the city-county fire department is funded largely through property taxes, it directly benefits by increases in county assessed valuation. Under baseline conditions, perhaps two full-time and 25 volunteer firefighters will need to be added to the department assuming the current ratio of personnel to population served. The incremental requirements due to Rocky Butte would be six additional volunteer firefighters.

6.17.9 Health Facilities and Services

The Campbell County Memorial Hospital is currently staffed by 30 physicians and a number of visiting physicians. Assuming the current ratio of one physician per 1,000 population, county baseline population growth will require eight additional physicians. One additional physician would be required as a result of the proposed Rocky Butte mine.

In addition to population levels, the mental health needs of Campbell County and Gillette are determined by a host of social factors over which little control can be exerted. However, mental health services in the county will likely expand in accordance with population growth (Northern Wyoming Regional Counseling Center, 1991). In comparison with baseline conditions, the additional requirements which might arise as a result of the proposed project would not be significant.

Several contradictory influences make forecasting social services needs complex (Wyoming Department of Family Services, 1991). For example, the expansion of job opportunities would imply a reduced need for social services such as AFDC. However, the prospects for landing lucrative coal mining jobs may attract job seekers who would require at least temporary services from the Department of Family Services and city and county governments. On the whole, cumulative impacts could be a concern during the construction phase but should be manageable.

6.17.10 Educational Facilities

Enrollment in the Campbell County School District has fluctuated since the mid-1980's with no net increase since the 1986-1987 academic year. However, under baseline conditions, school enrollment is projected to increase by about 2.6 percent per year. The effect of the proposed project would be to increase annual enrollment above the baseline by four percent to 4.8 percent (see Table 6-15). Increased enrollment under the baseline may require the construction of new schools, but the incremental impact associated with the Rocky Butte mine would be negligible. With the county's high property tax base, sufficient funds should be available.

6.17.11 Public Sector Fiscal Conditions

The fiscal position of both the city and county governments is currently quite strong due to the prevalence of mineral-related revenues.

Under baseline conditions, mineral assessed valuation due to the expanded coal production is projected to increase by more than four percent annually between 1991 and 2000. The impact of the proposed project would be to increase mineral assessed valuation up to 4.5 percent beyond baseline conditions. Because nearly all of the Rocky Butte direct mine and local service employees are projected to settle in Gillette, the county should experience minimal, if any, budgetary impacts. The City of Gillette does not directly benefit from mineral-related increases in assessed valuation. However, the city does receive a substantial amount of money from mineral royalties and severance taxes. In the past, the city has diverted these monies from the general fund to cover cash shortfalls in certain

6.0 CUMULATIVE IMPACTS

enterprise funds. Furthermore, the city receives a substantial portion of sales and use tax revenues distributed in Campbell County.

Mineral royalty, severance taxes, and sales and use taxes are allocated to the city on the basis of the city's percent of total county population. This allocation is based on the results of the 1990 census and is fixed until the next census is taken in 2000. If the city's percentage of total county population increases during this ten-year period, the city will need to serve these new residents without a commensurate increase in revenues. Combined with declining mineral royalty and severance tax revenues, the cumulative fiscal impacts may be moderate.

6.17.12 Cumulative Impacts on Social Well-Being

The social well-being of Campbell County residents relates to the ability of residents to maintain a desirable quality of life and is highly dependent on the availability of employment opportunities, access to public services and adequate health care and access to cultural recreational and other aesthetic resources.

The current social well-being of county residents could be considered good. Per capita income is

among the highest in the state. County residents have access to a number of cultural and recreational amenities. Furthermore, the county economy is regaining ground lost in the mid-1980's, which was a priority for local citizens.

The proposed project would enhance the employment opportunities for county residents, and personal income would increase as the project begins operations. Furthermore, the mine presents an opportunity to attract long-term residents to the county which would add to the social stability of the community. These represent positive impacts on the social well-being of county residents.

Gillette was selected to host the National High School Finals Rodeo for a three-year period beginning in 1993. According to city officials, this is the largest rodeo in North America (David Spencer, 1991). In addition, the city will host the Cowboy State Games in 1991 and 1992. Both of these events will bring a large number of visitors to the area. In concert with baseline growth and projected growth associated with the Rocky Butte project, the delivery of certain services such as police protection and mobility could be significantly impacted. Temporary lodging may be problematic as the rodeo begins at the same time construction of the proposed project commences. Although potential impacts could result, they are short term in nature and should not be significant.

Table 6-15. Campbell County School District Enrollment

Academic Year	Baseline Enrollment	Cumulative Enrollment
1991-1992	8,135	8,135
1992-1993	8,382	8,608
1993-1994	8,622	8,968
1994-1995	8,870	9,193
1995-1996	9,110	9,480
1996-1997	9,350	9,782
1997-1998	9,590	9,991
1998-1999	9,822	10,267
1999-2000	10,054	10,536

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES AND SHORT-TERM USE OF ENVIRONMENT VS LONG-TERM PRODUCTIVITY

7.1 Irreversible and Irretrievable Commitment of Resources

For purposes of this section, the proposed action affects the commitment of a resource "irreversibly" when the current and/or potential productivity of that resource is lost and, once lost, cannot be regained (that is, the loss of this productivity cannot be reversed). The proposed action affects the commitment of a resource "irretrievably" when the current and/or potential productivity of that resource is lost during the life of the proposed action, but can be regained at some future time (that is, the loss of the productivity can be reversed).

The major irreversible commitment of resources resulting from the proposed action would be the mining and consumption of 608 million tons of coal to be used for electric power generation and other purposes during the 42 years of mining. An additional 18.75 to 31.25 million tons of coal resources lost during the course of mining would not be recovered during this period. There would be an irreversible commitment of petroleum, oil and lubricants during the life of the mine. Certain metals used in the construction of transmission lines and other facilities and in the manufacturing of mining equipment would be committed for the life of the mine but would be salvageable upon abandonment.

The quality, structure and characteristics of approximately 51.4 million cubic yards of topsoil located on 7,333 acres would be irretrievably changed by mixing. Soil formation processes, though continuing, would be irretrievably altered by these activities. Newly formed soil material would be unlike that in the natural landscape in the surrounding undisturbed areas; however, the productivity of the reclaimed soils would be at least equal to that of undisturbed soils and erosion potential would not increase materially.

Air quality would be irretrievably degraded and visibility irretrievably reduced by suspended particulates emitted during the life of the mine. These effects would be most pronounced during periods of calm weather and temperature inversions and most noticeable when mining operations are closest to the western and northern permit boundaries.

There would be an irretrievable commitment of surface- and ground-water resources during and after mining. Little change in surface-water quality is anticipated. TDS levels in the spoil aquifer are expected to be elevated for the long term, and it may take 100 years or more for water levels to achieve a postmining equilibrium and for the first pore volume of spoils water to be flushed out of the spoils. Both during and after mining, alternative sources of water would be required for these areas until the spoils aquifer can sustain water uses. Once the spoils aquifer resaturates and a steady-state flow pattern is established, water quality in the down-gradient coal aquifer may be temporarily degraded. Geochemical modeling by the USGS suggests that the coal aquifer may contain elements capable of improving the quality of the water flowing out of the spoils aquifer (Martin, et al., 1988, p. 93). Additional data are needed to confirm this.

Lowering of water levels would occur in the overburden and coal aquifers in the vicinity of the mine until mining is completed. The drawdowns would extend to the north and west; to the south they would be limited by the Caballo mine and to the east they would be limited by the coal outcrop. Drawdowns would extend out several thousand feet in the overburden and several miles in the coal, but would be insignificant at these extreme distances. Although the coal aquifer drawdowns toward the west (down gradient) of the mine become less important as the depth to coal increases (fewer wells are completed in the coal to the west), these drawdowns could persist for several years. Water levels would recover to premining levels in most cases after mine-related withdrawals cease.

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES AND SHORT-TERM USE OF ENVIRONMENT VS LONG-TERM PRODUCTIVITY

The cropland, grassland, and associated grazing and wildlife habitat that the affected lands provide would be irreversibly and irretrievably lost during the period of mining and reclamation. Some of the vegetation diversity would be irreversibly lost.

Loss of human life and disabling injuries could occur due to both the mining operations and vehicular traffic associated with the mining operations. This would be an irreversible and irretrievable commitment of human resources.

There would be an irretrievable and irreversible commitment of revenues generated by the mine by local jurisdictions to sustain levels of public services and facilities.

Disturbance of all known historic and prehistoric sites and paleontological resources on the mine site would be mitigated. However, any accidental destruction of currently known or unknown archeological or paleontological items would be irreversible and irretrievable.

Recreational services and facilities provided by local communities would be sustained through the life of the mine at current levels of demand which would be an irretrievable and irreversible commitment of these resources. Hunting and wildlife observation activities would be curtailed within the mine permit area until mining and reclamation are complete.

The natural topography of the area, which is already quite flat, would have even less relief and smaller average slopes after reclamation which would be an irretrievable and irreversible commitment of resources. The subdued relief on the permit area and other mine areas in the region could improve vegetative production and reduce erosion by increasing the precipitation infiltration rates, but the flatter topography may be visually less pleasing and detrimental to certain species of wildlife which rely on more dramatic topographic features.

7.2 Short-Term Use of the Environment vs Long-Term Productivity

At anticipated production levels, the Rocky Butte Mine would be committed to coal production and reclamation for 42 years. BLM considers the impacts of mining the proposed life of mine area to be short term if they would occur during these years and long term if they persist beyond 42 years.

Sale of the WRB tract to NWR, formation of an LMU and approval of a mining permit for the Rocky Butte Mine would enable mining of about 608 million tons of coal over a 42-year period to help meet national energy demands with a coal that is in compliance with sulfur dioxide emission standards. This assumes that a market exists for the coal (refer to Section 1.4). Although the Rocky Butte Mine would be a new mine, coal mining is already a major factor in the socioeconomic and environmental setting of Gillette and Campbell County. The Rocky Butte Mine would be adjacent to an existing mine, Caballo Mine, which is currently at the north end of a cluster of four adjacent mines along the north-south trending outcrop of the Wyodak-Anderson coal seam. The proposed Rocky Butte permit area is currently used for livestock grazing, dryland crop production, wildlife habitat and oil and gas production.

During the life of the mine, mining would result in the construction of additional roads, powerlines, fences and other facilities and structures in the area. Over the short term, mining would continue the process of change to the environment and commitment of resources. Over the long term, the area affected by mining would be reclaimed and returned to grazing land, dryland crop production, wildlife habitat and oil and gas production uses.

The coal removed from the Rocky Butte Mine represents nearly 8 percent of the coal currently under lease in the Wyoming portion of the Powder River Basin (7 percent considering leased coal and the 1.035 billion tons contained in six pending LBA's). A small amount of coal (3 to 5 percent or 18.75 to 31.25 million tons) would be unrecoverable due to normal mining losses.

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES AND SHORT-TERM USE OF ENVIRONMENT VS LONG-TERM PRODUCTIVITY

The primary short- and long-term effect of mining on the hydrologic balance would be from the removal of the shallow aquifers within the permit area and from drawdowns in the shallow aquifers north and west of the mine for the short term. Resaturation of the replacement spoils may take several decades. Over the long term, water levels in the shallow aquifers would begin to recover to premining levels in most areas after mine-related withdrawals cease. There would be little change in the surface- and ground-water quality over the short and long term.

Visibility within the proposed permit area would be reduced and TSP and PM₁₀ within and adjacent to the permit area would increase over the short term but remain within regulatory standards.

During mining, about 1,850 acres would be out of production at any one time. Within three to five years after revegetation, productivity would be restored. In the long term, soil productivity in the area would be suitable for premining uses of livestock and wildlife habitat.

Approximately 7,333 acres of land within the proposed permit area would be progressively disturbed by construction and mining during the life of the mine. During mining, about 1,850 acres would be disturbed at any one time. There would be long-term changes to the existing topography from backfilling and grading operations; however, the modified topography would support and in some places enhance the proposed postmining land uses of grazing, dryland crop production and wildlife habitat. Productivity of soils over the long term would return to or exceed premining productivity because the reclaimed soils would be more uniform in depth, texture and chemical and physical composition than the premining soils.

There would be loss of vegetation on the 7,333 acres and an accompanying disturbance of wildlife habitat, dryland crop production, grazing land and oil and gas production. Introduced and native grasses and shrubs and trees would be planted after mining to restore vegetation in the disturbed areas. BLM has determined that the mine site would be returned over the long term to an equivalent or better production capacity than that offered by the existing vegetation. In addition, although the productive

capacity would be increased, the long-term support of the proposed postmining land uses would be dependent upon an adequate water supply.

Wildlife over the short term would be affected during the mining and reclamation period. Some of the species dependent upon the diversity offered by the current vegetation would be displaced by other wildlife species more adaptable to the new environment. Over the long term, wildlife would utilize the cover and habitat provided by the reclaimed vegetation areas. Other wildlife species would benefit over the short term from the sedimentation ponds and impoundments built during mining.

Mine related traffic would be sustained on the public roads outside the proposed permit area over the short term. Recreational use of the proposed permit area would be suspended over the short term until reclamation is completed. The demand for public recreation facilities provided by the surrounding communities would be sustained over the life of the mine.

Over the short and long term, knowledge of cultural resources and past lifestyles could decrease because vandals could destroy information, mining could destroy undiscovered sites, and current technology and methodology could cause researchers to overlook data that in the future may be important to the interpretation of past lifestyles. Without continuing identification, impacts on cultural resources would be long term and permanent.

Residents living close to the proposed permit area would continue to be subjected to noise from blasting and other mining activities. Long term effects would be diminished and eventually eliminated when reclamation is completed.

The short-term use of the environment would result in the project area changing from a Visual Resource Management Class IV to a Class V. In the long-term the area should return to its premining class IV status as a result of land reclamation and facilities removal.

Residual socioeconomic impacts stemming from the Rocky Butte Mine would relate primarily to the generation of jobs, income and revenue to the

7.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES AND SHORT-TERM USE OF ENVIRONMENT VS LONG-TERM PRODUCTIVITY

Campbell County economy which would continue during the life of the mine and cease when the mine closes. The residual impact would be felt by those individuals and public entities which have made permanent investments or have otherwise come to rely on the mine's continuation. However, given the long mine life, these residual impacts suggest adequate time for amortization of such investment and lead time to adjust personal plans or other impacts when the time for mine closing arrives.

8.0 CONSULTATION AND COORDINATION

8.1 Team Organization

During the September 6, 1991 meeting of the Powder River Regional Coal Team, the decision was made for the Wyoming State Office of the BLM to proceed with the processing of the WRB lease application. The applicant, NWR, was instructed to meet with the BLM to plan and schedule the processing of the LBA and assure full compliance with NEPA. On September 30, 1991, during a meeting held at the BLM Wyoming State Office between representatives of NWR, BLM, OSM and the Wyoming Governor's Office, the decision was made to proceed with the preparation of an EIS.

The Wyoming State Director of BLM was assigned lead responsibility for the preparation of this EIS. OSM agreed to be a cooperating agency.

Jim Melton, BLM Coal Team Leader, was the project coordinator for the draft EIS. Nancy Doelger was the project coordinator for the final EIS. BLM provided professional specialists in the following disciplines: air quality, mine engineering, cultural resources, wildlife biology, range science, geology and economics. OSM provided review of the EIS by specialists in the fields of hydrology, mine engineering and reclamation. The U.S. Fish and Wildlife Service was consulted regarding MBHFI and T & E species and related wildlife issues. The State Historic Preservation Officer was consulted with respect to the findings of the cultural resources survey and mitigation plans.

The following consultant services were secured by contract. Western Water Consultants, Inc. (WWC) of Sheridan, Wyoming prepared the draft and final EIS, designed the mine and reclamation plan, and analyzed impacts to water resources, air quality, transportation, noise, geology and alluvial valley floors. Mariah Associates of Laramie, Wyoming under subcontract to WWC, prepared the sections dealing with soils, vegetation, land use, fish and wildlife, history, archeology, paleontology, recreation and visual resources. Browne, Bortz, and Coddington, Inc. (BBC) of Denver, Colorado, also under subcontract, prepared the socioeconomics sections of this EIS. Names of individuals who assisted with the preparation of this EIS are listed below.

WESTERN WATER CONSULTANTS, INC.

Doyl M. Fritz, P.E.	Project management, engineering, hydrology
Nick Tiffany, CPH	Surface-water hydrology, AVF
Scott Morton	Air quality, mine engineering
Mike Evers and Ursula Wiersma	Ground-water hydrology, modeling
Ray Olton	Mine modeling
Mike Wolf	Geology, overburden
Bob Muller	CADD
Boyd Jensen	CADD
Amy Calvetti	Typing, layout
Rebecca Desmond	Typing, layout

MARIAH ASSOCIATES, INC.

Phil Ogle	Coordinator
Karyn Coppinger	Vegetation and Reclamation Planning
Peter Guernsey	Wildlife
Jason Marmor	History
Craig Smith	Cultural Resources
Gary Brown	Cultural Resources
Patricia Fazio	Land Use, Recreation
William Glenn	Soils
Brent Breithaupt	Paleontology
Mary Kamby	Socioeconomics

BROWNE, BORTZ & CODDINGTON, INC.

Edward F. Harvey	Socioeconomics
W. Ashley Ahrens	Socioeconomics

8.2 Consultation and Coordination

During the preparation of the EIS, members of the team consulted personnel from the following federal, state and local agencies:

- Bureau of Land Management
- Office of Surface Mining Reclamation and Enforcement
- Soil Conservation Service
- U.S. Fish and Wildlife Service
- Wyoming Department of Environmental Quality

8.0 CONSULTATION AND COORDINATION

- Wyoming Department of Health and Social Services
- Wyoming Department of Revenue and Taxation
- Wyoming Game and Fish Department
- Wyoming Geological Survey
- Wyoming Governor's Office
- Wyoming Oil and Gas Conservation Commission
- Wyoming Recreation Commission
- Wyoming State Engineer
- Wyoming State Historical Preservation Office
- Wyoming Transportation Department
- Wyoming Department of Employment/Division of Research and Planning
- Wyoming Department of Administration and Information/Division of Economic Analysis
- Wyoming Department of Family Services
- Campbell County Engineer
- Campbell County Parks and Recreation Department
- Campbell County Sheriff's Department
- City of Gillette, Department of Utilities
- City of Gillette Police Department
- City of Gillette/ Campbell County Department of Planning and Development
- Job Service of Wyoming
- Gillette-Campbell County Airport
- Nature Conservancy
- Nickelson Little Farms
- Northern Wyoming Regional Counseling Center

Representatives of the following private industries and groups and the following individuals provided additional information:

- Amax Coal Company
- The Boardwalk
- Black Hills Power and Light
- Burlington Northern Railroad
- Chuck Rourke
- The Carter Mining Company
- Cordero Mining Company
- EnTech, Inc.
- Tri-County Electric Association

8.3 Coordination in the Review of the EIS

Copies of this EIS are being sent to the following agencies and interested groups with requests for review and comments.

FEDERAL

Advisory Council on Historic Preservation
Bureau of Indian Affairs--Norris Cole *
Bureau of Land Management--Billings, Montana *
Bureau of Land Management--Buffalo, Wyoming
Bureau of Land Management--Bob Janssen
Bureau of Land Management--Hillary Oden
Department of Energy--Dan Newquist
Environmental Protection Agency, Region VIII
National Park Service--Office of Environmental Review
NPS Devils Tower National Monument--William Pierce *
NPS Energy Mining & Minerals Division--Michael Duwe
Office of Surface Mining Reclamation and Enforcement
--Ranvir Singh *
Sen. Alan Simpson
Congressman Craig Thomas
US Army Corps of Engineers
US Fish & Wildlife Service--Art Anderson
US Fish & Wildlife Service--Gary Wood
US Fish & Wildlife Service Region 6--Kemper McMaster *
U.S.G.A.O. - Dever Regional Office--Ron Belak
US Geological Survey Mail Stop 972--Joseph Hatch *
US Soil Conservation Service--Frank Dickson
US Fish & Wildlife Service--Steve Torbit
USFS, Medicine Bow National Forest--Doug Larson *
USFS, Thunder Basin National Grassland
Sen. Malcolm Wallop

STATE

Rep. Susan Anderson
Sen. Hank Coe
Rep. William A. Cross
Wyoming Department of Agriculture--Don Christianson
Sen. Jerry Dixon
Sen. Michael B. Enzi
Geological Survey of Wyoming--Gary Glass
Rep. John J. Hines
Sen. John Perry
Rep. Marlene Simons
State Planning Coordinator--Allan Edwards *
Gov. Stan Stephens, Montana *
Rep. William Tibbs
Sen. Jim Twiford
Rep. Lauris L. Tysdal
University of Wyoming Field Representative
Rep. Dick Wallis
Wyoming Dept. of Commerce, Tourism & State Marketing Division--
-Gene Bryan
Wyoming Dept. of Commerce, Economic & Community
Development--Dale Hoffman
Wyoming Dept. of Commerce, Parks and Cultural Resources--John
Keck
Wyoming Dept. of Environmental Quality--Dennis Hemmer
Wyoming Dept. of Transportation--Harry Underwood
Wyoming Economic Development & Stabilization Board
Wyoming Game & Fish Dept.--Bill Helms
Wyoming Game & Fish Dept.--Bob Lanka
Wyoming Game & Fish Dept.--Olin Oedekoven
Wyoming Game & Fish Dept.--Pete Petera
Wyoming Water Development Commission--Mike Purcell
Wyoming Oil & Gas Conservation Commission

* Powder River Regional Coal Team Member

8.0 CONSULTATION AND COORDINATION

Wyoming State Engineer's Office--Jeff Fassett
Wyoming Public Service Commission--John Smyth
Wyoming State Historic Preservation Office--
-Tom Marceau
Wyoming State Land Commissioner--Paul Cleary
Wyoming Transportation Department--Dave Hanlin
Wyoming Industrial Siting Administration--Gary Beach
Sen. Russell Zimmer
Rep. Melvin Zumbunnen

LOCAL

Big Horn County, Montana--John Young *
City of Gillette--City Administrator
City of Gillette--Mayor
City of Gillette Dept. of Community
Development--David Spencer *
Converse County--Superintendent
Converse County Board of Commissioners
Gillette City Council
Inyan Kara Grazing Assoc.--Wayne Christensen
Nickelson's Little Farms Water Co.
Powder River County, Montana--Ted Fletcher *
Rosebud County, Montana--Ed McCaffree *
Weston County Commissioners
Weston County School Superintendent

NATIVE AMERICAN ORGANIZATIONS AND INDIVIDUALS

William C'Hair
Arapahoe Traditional Elder--Francis Brown
Steve Brady
Dull Knife College
Crow Tribal Council Chairman
John Hill
Clifford Long
Northern Arapahoe Tribal Council Chairman
Northern Cheyenne Tribal Council--Danny Sioux
Northern Cheyenne Tribe Inc.--Edwin Dahle *
Shoshone Traditional Leader--Haman Wise
Shoshone Tribal Council--Starr Weed
Ogalala Sioux Tribal Council--Chairman
Bill Tallbull--Northern Cheyenne Cultural Committee
John Tarnesse--Shoshone Spiritual Leader

NON-PROFIT INTEREST GROUPS

Audubon Council of Wyoming--Charles Nations
Big Horn Audubon Society--Scott Posner
Cheyenne High Plains Audubon Society--Mark Gorges
Citizens Against Ruining the Environment--Marge Linderman
Douglas Chamber of Commerce--John Rider
Friends of the Bow
Gillette Chamber of Commerce
Medicine Wheel Alliance--Nicol Price
Murie Audubon Society--Bart Rea
Powder River Basin Resource Council---Chesie Lee, Jill Morrison
Sierra Club--Kirk Koepsel
Weston County Dev. Committee
Wyoming Heritage Society--Bill Schilling
Wyoming Multiple Use Coalition
Wyoming Outdoor Council--Stephanie Kessler
Wyoming Public Lands Council
* Powder River Regional Coal Team Member

Wyoming Wildlife Fed.--John Zelazany
Wyoming Wildlife Fed.--Mark Winland

PRIVATE INDIVIDUALS AND ORGANIZATIONS

ABO Petroleum Corporation
A. M. Culver Company
Abraxis Production Corporation
Adah Macauley Trust Partnership
Samuel Adams
Burton J. Ahrens
Nissim Alhadeff
AMAX Coal Company
American Oil & Gas Corporation
American Petroleum
AMPOL Exploration (USA) Inc.
AMPOLEX (Wyoming) Inc.
Andarko Petroleum Corporation
Anderson Minerals Ltd.
Andover Partners
John & Judy Andrikopoulos
Antelope Coal Company
Antelope Production Company
Apache Corporation
Mary Apple
Aqua-Terra Consultants, Inc.
Robert E. Bailey
Robert & Judith Barday
W.C.C. Barnes
James & Carol Bates
Bergen Oil Company
Betty Barnes Trust No. 1--William C.C. Barnes
Barry Doig Estate--Robert Piper, Personal Rep.
Lee M. Bass
Perry R. Bass
Robert M. Bass
Sid R. Bass
Beartooth Oil & Gas Company
Berco Resources
Glen Berger
Rod Bernasek
Kenneth & Angela Bertalot
Matthew T. Biggs
William Bishop
Kirk & Teresa Blackford
Blackhills Oil & Gas Corporation
Fred T. Blakeney
M. Robert Blakeney
Thomas L. Blakeney
Nellie A. Bliss
Francis A. Bolen
Rebecca A. Boone
Douglas G. Boyd
Richard G. Boyd
Michael Boyle
L. T. Braun
A. Wayne Breeland
Bridgeview Coal Company--Harry Wall
Forrest & Arline Brimmer
William A. Buckovic
Jean R. & Doris Buell
Donald E. Burns
John & Sarah Burns
Neil Bush
Diana W. Butler

8.0 CONSULTATION AND COORDINATION

CNG Producing Company
C-T Minerals Inc.
Bruce Cabot
Carl & Katherine Callaway
Thomas R. Campbell
Cambria Oil Company
Alexander B. Campbell, V
Campbell County School Superintendent
Cardinal Petroleum Company
Oliver T. Carr, Jr.
Dorothy H. Carter
Frank C. Cassidy
Sara G. Cassidy
Celsius Energy Company
Chandler & Associates
Henry E. Chandler
Chevron USA Inc.
John & Joan Chorney
Cities Service Oil & Gas
City National Bank--Leo Terbieten Trust
Claire T. Blakeney Agency
The Carter Mining Company
Allen Clark
Glen L. Clark
Melvin D. Clark
George & Dana Clay
Castal Oil & Gas Company
Columbia Gas Development Corporation
J. Mark Connally
Cordero Mining Company
Cramer Oil Company
Council on Historic Preservation
Brenda J. Crowder
C. L. & Geraldine Culver
Alice E. Cundy
Cecil Cundy
Arnold Cunningham
Herma L. Czaplá
D. L. Hannifin Family Trust
George M. Davis
DeCalta International
Fernando & Patricia DeLeon
Virginia DeLeon
Denver Expoloration Inc.
Harry & Erma DeSelms
Hazel DeSelms
Diamond Shamrock Company
Dice Exploration Company
Steven K. Dodds
Charles Steven Doe
Thomas G. Dorough
Frank & Bertha Dougherty
Dry Fork Coal Company
Don Duerr
Charles M. Duhon
Dunbar Well Services
Shirley M. Dymond
Eastern American Energy Corporation
Kathryn D. Edwards
Laurie Edwards
ENRON Oil & Gas Company
Farm Credit Bank of Omaha
Farmer's Union Central
Glen Felt
Roger Felt

First Australian Resources Corp.
First Interstate Bank of Commerce
James M. Fitzpatrick, III
James P. Foraker
Fort Union Ltd.--Raymond W. Short
Ladd Frary
Richard & Mary Ann Frasch
David E. Frye
Betty Fyfe
GA-FCG 1986 Limited Partnership--c/o General Atlantic Energy Corp.
GAJH 1986 Limited Partnership
GAGLG Energy LP
Ralph & Mildred Galyen
Robert F. Garnin
Bill Gaulcy
General Atlantic Resources Inc.
Gail C. George
Geotech Production Inc.
Byron & Sarah Gibson
Lavonta Gilchrist
Gillette News Record
Richard & Carol Goerke
Edmond A. Gorek
Goldman Sachs Company
Charles M. Grace--Meyer Handelman Company
Jess & Helen C. Gray
Grayrock Corporation
Ray & Bernita Greeley
Jack & Elsie Greer
Olin C. Greer
William & Glenis Greer
Aren Griffith
Lysle A. Gust
HNG Oil Company
Jake Haas
Bill & Peggy Hampton
Jerome R. Handran
John M. Handran
Thomas W. Handran
William E. Handran
Harkin Exploration Company
SiesHarry R. Underwood & Associates
M. J. Harvey, Jr.
J. Floyd Hatch
Mary Ann Heaps
Max E. Hentz
Philip L. Herrington
Jack & Blanche Hinman
Harold Hoffman
Hans E. Hohl
Timothy L. Hoops
Hrubetz Oil Company
Nancy E. Hussey
ILQ Inc.
William J. Isaacs
Izaak Walton League of America
J. Mill Iron Land Company
JNB Exploration Company
JNB Minnelusa Fund, Ltd., 1983-A
Kathryn P. Jackson
John E. Jacobs
James Cassidy Smith Inc.
William E. Jeffers
Morris & Loretta Jennings

8.0 CONSULTATION AND COORDINATION

Jerry Chambers Exploration Company
Jim's Water Service
Emmett Johnson
H. L. Johnson
Stanley Johnson
James & Joyce Johnston
James B. Judd
Joel Jurgens
K. W. Bergner & Co.
Kaiser Energy Inc.
Clinton & June Kellgreen
Kerr-McGee Corporation
Richard & Diane King
Major Donovan Kirkpatrick
John C. Kirkpatrick
Marshall D. Knots
Karl F. Koch
Curtis & Georgia Kofoed
Marvin E. Kraft
Albert G. Kutz
Betty Jean Kutz
Susan D. Kutz
L-K-E Inc.
Lancaster Corporation
Lario Oil & Gas Company
Demetra Larremore
Patsy L. Larson
LASMO Energy Corp.
Latex Petroleum Corporation
Thomas B. Leary
William R. Leer
Louisiana Land & Exploration Co.
N. B. Loundagin
Eric C. Ludvigsen
Karl E. Ludvigsen
Bryce Lundell
Kelly McBride
McBride & Thames
Ed McCaffree
McFarland Energy Inc.
Betty Ann McGee
Daniel W. McGee
Rusty & Tina McGee
Thomas D. McGee
J. R. & Rubye F. McKibben
Joseph K. McMahon
Francis V. McPike
M. L. Associates
MYCO Industries
Louis S. Madrid
Hubert T. Mandreville
Mike & Carolyn Manley
Robert L. Manning
Kit L. Maris
Markwest Energy Partners Ltd.
Marshall & Winston Inc.
Bruce Martens
Lola B. Martin
Marvin Martin
Zonimir & Mary Ann Martinovich
Maxus Exploration Co.
Maynard Oil Company
Meadowlark Farms Inc.
Meridian Oil Inc.
Bernard Messinger

Robert R. Michlin
MidCon Exploration Company
Frances E. Miller
Harvey & Gladys Miller
Larry K. Miller
Minerals Management Service--Mike Throckmorton
Mining Association of Wyoming--Bob Holcomb
Misty "B" Corp.
Mobil Coal Producing Inc.
W. A. Moncrief
Albert W. Moore
Steven & Sherry Moore
Morenergy Exploration
Jessie M. Morrow
Douglas D. Mounce
Mountain States Telephone & Telegraph Company
Mule Creek Oil Company
Richard M. Mullen
Robert B. Mullen
John R. Munford
Murphy Operating Corp.
William Murphy
NBB Oil & Gas Partners (USA)
Evans Nash
National Coal Association--Marty Rogers
National Coal Association--Hal Quinn
Neil Hecomovich
Charles M. Newman
Randall H. Nichols
NICOR Exploration Company
Henry S. Noble
Theodore N. Noel
Norex, Inc.
Northwestern Mutual Life Insurance Co.
Jim Nyenhuis
R. K. O'Connell
Michael W. O'Shaughnessy
Theodore & Jan Obenchain
Odyssey Partners Ltd.
Old South Royalty Company
Helen Ruth Oliver
Dick Olson
W. L. (Bill) Orister
Axel & Rosemary Ostlund
Panhandle Eastern Pipeline Company
David B. Park
Mary Louise Patterson
Peak Resource Management, Inc.
Charles W. Peck
Frank & Marion Pedric
Jim & Laura Pedric
Joseph & Betty Pedric
Maxine E. Peebles
Michael S. Perry
James H. Peterson
Peggy Peterson
Petrolex 86
Petrolex Corporation
Kerry L. Phelps
Phillips Petroleum Company
Robert M. Pickard
David N. Pierce
Plains Petroleum Operating Company
Presidio Exploration Inc.
Price Oil & Gas Investments Trust

8.0 CONSULTATION AND COORDINATION

Prima Exploration Inc.
Puckett Investment Company
Bernard M. Ramsay
Ranch Oil Company
John J. Redfern, III
C. R. Reiter
Colleen Reynolds
Kathy Richard
Dwight A. Rigney
Lester & Anna Mae Rigney
Robert & Karen Rigney
Michael Riley
Arthur E. Risley
Howard Robb
James & Mary Robb
John Robb
William & Kathryn Robb
Eugene L. Robbins
Thomas L. Robbins
Robert C. McGhee Estate
Corbin J. Robertson
Elizabeth L. Robinson
William T. Rogers
Ronadero Company Inc.
Stephen Rooth
Carole Rosenbloom
Bernard C. Rourke
Paul D. Rourke
Lura L. Rouzer
Laverne & Barbara Rude
SBL Resource Management
SHV Oil & Gas Company
Andrew Sabin
Robert Sabin
John & Helen Sampson
Santa Fe Energy Operation Partners LP
W. James Saul
Paul F. Sawyer
Paul E Schnurr
Seabrook Corporation
Larry Seright
S. Craig Settle
Sid & Ardyth Severson
Wesley & Dorothy Severson
Shakespeare Oil Company Inc.
Craig Shanor
Shaw Resources Inc.
James Sheidenberger
Malcolm & Lorelei Shepard
William H. Short
Gary & Nancy Siebold
Charles T. Slack
Donald C. Slawson
John Smillie
D'Lo Smith
Furman F. Smith
Harry P. Smith
Hester M. Smith
Wendall & Elaine Smith
Margaret B. Spies
Mark Squillance
Star Exploration
Sterling Montana Inc.
Richard B. Stevens
Bert Storall

Sun Exploration & Production Company
Sunset Realty Corp.
TFS Trust
Taurus Exploration USA Inc.
Joyce S. Taylor
Texaco Producing Inc.
Thomas G. Dorough Trust Partnership
M. Ray Thomasson
Thru-Line Inc.
Thunder Basin Grazing Assoc.
Steve A. Tofte
Gladys M. M. Totsch
Tri-County Electric Association
David True
True Oil Co.
Fred E. Tucker
Forrest Twilford
Tyrex Oil Company
United Mine Workers Assoc.--Bob Guilfoyle
Cat Urbigit
Gordon S. Utter
Grady H Vaughn, III
Robert P. Vernon
Victoria Exploration Inc.
Vintage/P Limited Partnership
W. A. P. A.
WDS Petroleum Ltd.
Wesley Wagner, Jr.
John Wall
E. D. Wallace
Dwight & Carolyn Wallam
James P. Wason & Nancy Cohen
Jean M. Wenande
Western Water Consultants--Doyle Fritz
Marilyn M. Wheelhouse
Whiting Petroleum Corporation
Sam D. Winegrad
James & Jennifer Winter
Jeanne F. Winter
Debbie Wold
Donald & Dorothy Wolff
Gary C. Wolff
Keith R. Wolff
Kenneth R. Wolff
Louis F. Wolff
Loverretta A. Wolff
Nancy K. Wolff
William J. Wolff
Alice Manning Wray
Wright Chamber of Commerce--Gary Kipp
Laneil Strapp Wright
Wyodak Resource Development Corp.
Wyoming Banker's Association
Wyoming Geological Association
Wyoming Mining Assoc.--Marion Loomis & Jack Ratchye
Wyoming National Bank of Gillette
Wyoming Stock Growers--Bob Budd
Wyoming Wool Growers Association--Carolyn Paseneaux
Robert A. Yarber
Zimmerman Resources Company

Scoping for the EIS was initiated on October 4,
1991 with the mailing of a Public Notice of Comment

8.0 CONSULTATION AND COORDINATION

Period to over 650 persons and organizations. This list includes all persons and organizations known to have an interest in BLM's coal leasing activities. A Notice of Intent (NOI) to prepare the EIS was published in the Federal Register on October 9, 1991. A public scoping meeting was held in Gillette, Wyoming on October 22, 1991. The public comment period for the scoping process remained open until November 1, 1991.

The public scoping meeting was attended by residents of dwellings near the Rocky Butte and WRB lease tracts and by representatives of other regional mining companies, in addition to BLM and NWR representatives and the contractors preparing portions of the EIS. BLM personnel conducted the meeting and opened with a description of NWR's mining proposal and a historical perspective of the coal leasing program in the Powder River coal region. The LBA process, and the situation of the WRB tract with respect to that process, were explained by BLM. BLM personnel explained the BLM leasing process, including the regional leasing process and the LBA process which is in effect since decertification of the RCT due to declining interest in regional leasing activity.

The tentative schedule for the WRB lease sale and EIS process were described to the October 22, 1991 meeting attendees, and opportunities for public input into the process were explained. Following BLM's presentation, the meeting was opened for public discussion and identification of issues. Comments were offered only by nearby residents. The following is a brief synopsis of these comments and questions.

- What will happen to adjacent property owners? Will there be another situation like the one that occurred at Rawhide Village? How will blasting affect water wells and structures? Will property values decline as a result of the new mining operation? Will it be necessary to relocate Highway 59?
- Will Section 6, T.48N, R.71W, be mined?
- How will adjacent land uses be affected? Will people be relocated? Will livestock and wildlife uses be affected?
- What is the one-half mile "permit buffer" for? This includes a large number of houses.

- The Nickelson Little Farms Subdivision is just north of the proposed facilities area. Will there be noise and traffic impacts at this subdivision?
- How will air quality be affected?
- When will mining operations start?
- What mining methods are proposed?
- The mine plan map shows an overburden storage area in the northwest corner of the mine area. How large will this stockpile be and how will dust be controlled?
- How will blasting be controlled so houses along the east side of Highway 59 are not adversely affected? Blasting from the Caballo Mine is noticeable in this area. Who pays for pre-blast surveys?
- How will solid waste from the mine be handled?
- Will the access road be paved? How about the Four Corners County Road?
- What will be the effect on the fox farm nearby? These animals are sensitive to any disturbance.

The draft EIS was issued on January 17, 1992. Public comments were received until March 31, 1992. A public hearing on the draft EIS was held in Gillette, Wyoming on February 26, 1992. No new issues were identified during this public hearing. The official transcript of this hearing is available for review at the Casper District Office of the BLM.

Thirty-six comment letters were received regarding the DEIS. These comments and BLM's responses are included in Appendix E of this EIS.

8.4 Where Copies Can be Inspected

Copies of the EIS will be available for public review at Bureau of Land Management offices in Casper, Buffalo and Cheyenne, Wyoming and at public libraries in Campbell, Natrona, and Sheridan counties. Single copies are also available upon request from the Bureau of Land Management in Casper, Wyoming as long as supplies last.



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APPENDIX A

**VALIDATION OF UNSUITABILITY CRITERIA
FOR WEST ROCKY BUTTE TRACT**

APPENDIX A. VALIDATION OF UNSUITABILITY CRITERIA FOR WEST ROCKY BUTTE TRACT

Table A-1. Validation of Unsuitability Criteria for West Rocky Butte Tract

UNSUITABILITY CRITERIA	FINDINGS FROM BUFFALO RESOURCE AREA RMP (BLM, 1985)	VALIDATION FOR WEST ROCKY BUTTE TRACT
1. Federal Land Systems. With certain exceptions that do not apply to this tract, all federal lands included in the following systems are unsuitable for leasing: National Parks, National Wildlife Refuges, National System of Trails, National Wilderness Preservation System, National Forests and federal lands in incorporated cities, towns and villages.	None of the listed federal lands categories are present within the Buffalo Resource Area coal development review area.	Not applicable to West Rocky Butte.
2. Rights of Way and Easements. Federal lands that are within rights of way or easements or within surface leases for residential, commercial, industrial or other public purposes, or for agricultural crop production on federally owned surface are unsuitable for leasing.	Rights of way and buffers for mainline railroads, I-25 and I-90 were declared unsuitable.	None of these rights of way are on the WRB tract, and the area is available for further consideration.
3. Buffer Zones for Rights of Way, Communities, and Buildings. Federal lands within 100 feet of a right of way of a public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.	Within the study area there were 390 acres around dwellings that were considered unsuitable.	None of the occupied dwellings are within 300 feet of the tract, and the tract is therefore available for further consideration.
4. Wilderness Study Areas. Federal lands designated as wilderness study areas are unsuitable while under review for possible wilderness designation.	A portion of the Fortification Creek wilderness study area is within the review area but not near the WRB tract.	There are no unsuitable findings, and the WRB tract is available for further consideration.
5. Scenic Areas. Scenic federal lands designated by visual resource management analysis as Class I (outstanding visual quality or high visual sensitivity) but not currently on National Register of Natural Landmarks are unsuitable.	No lands on the review area meet the scenic criteria as outlined.	There are no unsuitable findings, and the WRB tract is available for further consideration.
6. Land Used for Scientific Study. Federal lands under permit by the surface management agency and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments are unsuitable for the duration of the study except where mining would not jeopardize the purpose of the study.	No lands in the review area are under permit except small enclosures being used to gage reclamation success on existing mines.	There are no unsuitable findings, and the WRB tract is available for further consideration.
7. Historic Lands and Sites. All districts, sites, buildings, structures, and objects of historic, architectural, archeological, or cultural significance on federal lands included in or eligible for inclusion in the National Register of Historic Places and an appropriate buffer zone are unsuitable.	On the basis of the consultation with the State Historic Preservation Office, there were no unsuitable findings under this criterion in the review area. No sites in the review area are listed on the National Register for Historic places.	There are no unsuitable findings, and the WRB tract is available for further consideration.
8. Natural Areas. Federal lands designated as natural areas or National Natural Landmarks are unsuitable.	The Dry Creek Petrified Tree Natural Area was identified as unsuitable. This is not on or near the WRB tract.	There are no unsuitable findings, and the WRB tract is available for further consideration.
9. Critical Habitat for Threatened or Endangered Plant and Animal Species. Federally designated critical habitat for T & E plant and animal species, and essential habitat for T & E species are unsuitable.	There is no federally designated critical habitat for T & E plant or animal species within the review area. Prairie dog towns were considered acceptable pending further study.	There are no unsuitable findings, and the WRB tract is available for further consideration.

APPENDIX A. VALIDATION OF UNSUITABILITY CRITERIA FOR WEST ROCKY BUTTE TRACT

Table A-1. Validation of Unsuitability Criteria for West Rocky Butte Tract (continued)

UNSUITABILITY CRITERIA	FINDINGS FROM BUFFALO RESOURCE AREA RMP (BLM, 1985)	VALIDATION FOR WEST ROCKY BUTTE TRACT
10. State Listed Species. Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as T & E shall be considered unsuitable.	Wyoming does not maintain a state list of T & E species of plants or animals. Therefore, this criterion does not apply.	There are no unsuitable findings, and the WRB tract is available for further consideration.
11. Bald or Golden Eagle Nests. An active bald or golden eagle nest and appropriate buffer zone are unsuitable unless the lease can be conditioned so eagles will not be disturbed during breeding season or unless golden eagle nests will be moved.	The BLM found numerous eagle nests, and buffer zones were established, and determined that about 116,000 acres are unsuitable under this criterion.	No active eagle nests were found on or near the WRB tract. There are no unsuitable findings, and the WRB tract is available for further consideration.
12. Bald and Golden Eagle Roost and Concentration Areas. Bald and golden eagle roost and concentration areas on federal lands during migration and wintering are unsuitable unless mining can be conducted in such a way as to ensure that eagles shall not be disturbed.	No golden eagle roost or concentration areas occur on the review area. Bald eagle roosts and buffer areas encompassing about 980 acres were declared unsuitable.	None of the bald eagle roosts are on the WRB tract, and the WRB tract is available for further consideration.
13. Federal lands containing an active falcon (excluding kestrel) cliff nesting sites and a suitable buffer zone shall be considered unsuitable.	About 5,700 acres were determined unsuitable because of prairie falcon nests and buffer areas.	None of the sites are on the WRB tract, and the WRB tract is available for further consideration.
14. Habitat for Migratory Bird Species. Federal lands which are high priority habitat for migratory bird species of high federal interest shall be considered unsuitable.	About 460 acres were declared unsuitable due to two active merlin nests.	Neither of the sites is on the WRB tract, and the WRB tract is available for further consideration.
15. Fish and Wildlife Habitat for Resident Species. Federal lands which the surface management agency and state jointly agree are fish and wildlife habitat of resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable.	About 13,300 acres were declared unsuitable under this criterion.	None of the unsuitable areas are on the WRB tract, and the WRB tract are available for further consideration.
16. Floodplains. Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable unless stipulated methods of mining can be undertaken without substantial threat of loss of life or property.	After consultation with the USGS, it was determined that floodplains can be mined with site specific stipulations and resource protection safeguards to be developed during mining and reclamation planning. Therefore, all lands within the review area are available for further consideration.	There are no unsuitable findings, and the WRB tract is available for further consideration.
17. Municipal Watersheds. Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.	There are no municipal watersheds in the review area.	There are no unsuitable findings, and the WRB tract is available for further consideration.
18. National Resource Waters. Federal lands with national resource waters, as identified by states in their Water Quality Management Plans, and 1/4-mile buffer zones shall be unsuitable.	There are no natural resource waters within the review area.	There are no unsuitable findings, and the WRB tract is available for further consideration.

APPENDIX A. VALIDATION OF UNSUITABILITY CRITERIA FOR WEST ROCKY BUTTE TRACT

Table A-1. Validation of Unsuitability Criteria for West Rocky Butte Tract (continued)

UNSUITABILITY CRITERIA	FINDINGS FROM BUFFALO RESOURCE AREA RMP (BLM, 1985)	VALIDATION FOR WEST ROCKY BUTTE TRACT
<p>19. Alluvial Valley Floors. All lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue or preclude farming, are unsuitable. Additionally, when mining federal lands outside an AVF would materially damage the quality or quantity of water in surface or underground water systems that would supply AVFs, the land shall be considered unsuitable.</p>	<p>Lands along prominent drainages were considered potential AVFs pending a final determination by the state. These lands are placed in an "available pending further study" category and are not considered unsuitable.</p>	<p>Tisdale Creek was included in the potential AVFs. Tisdale Creek is being mined and reclaimed downstream, and it is considered available for further consideration pending a determination during mine permitting.</p>
<p>20. State or Indian Tribe Criteria. Federal lands to which is applicable a criterion proposed by the state or Indian tribe located in the planning area and adopted by rulemaking by the Secretary are unsuitable.</p>	<p>The state has no applicable criteria and there is no Indian tribe located in or near the planning area. Therefore there is no unsuitability finding.</p>	<p>Various tribal entities were notified during scoping process. None expressed concerns. Thus the WRB tract is available for further consideration.</p>



APPENDIX B
RECLAMATION PLAN



APPENDIX B. RECLAMATION PLAN

Introduction

This section describes the lease applicant's proposed reclamation plan for the Rocky Butte Mine. This plan would be implemented as a part of the activities that would take place under the Proposed Action. The reclamation plan, as with the mining plan, has not yet been approved by the Wyoming DEQ and OSM and therefore may be subject to change during the mine permitting process.

The goal of reclamation at the Rocky Butte Mine would be to establish a diverse and sustainable ecological system that is compatible with proposed postmining land uses and with adjacent lands. Erosion control, establishment of self-regenerating native plant communities and productive hay and croplands, restoration of wildlife habitat, and conformance with landowner requests would be the principal objectives of reclamation. To assist in reaching these objectives, reclamation activities would be initiated as soon as practical after an area is mined. Final reclamation would be required to meet state reclamation success standards.

This plan describes postmining land use objectives and presents generalized reclamation procedures that would be used at the Rocky Butte Mine. The scope of this plan includes topsoil storage and replacement, short and long term erosion control, seedbed preparation, seed mixtures and seeding methods, post-seeding maintenance, and development of diverse wildlife habitat.

Postmining Land Use

The proposed postmining land use would be similar to premining and historic uses of land within and adjacent to the Rocky Butte project area (Table 3-10). Cropland, grazingland, pastureland, and wildlife habitat would be the principal postmining land uses.

Three native and two tame vegetation types would be established during reclamation. The combined area occupied by the big sagebrush, silver sagebrush, and saline big sagebrush types (2,154

acres of the proposed disturbed area) would be reclaimed as sagebrush shrubland. Upland grass and lowland grass types would be restored to the approximate acreages existing prior to mining. Acreage occupied by pasture would be converted to haylands. Approximately 3,752 acres of land would be restored to cropland capable of producing hay and small grain crops.

Recreational land use, which is primarily big game hunting, would be restored with restoration of wildlife habitat. Stockponds and reservoirs would be constructed throughout the project area during reclamation. The distribution and dimensions of these water sources would be designed to maximize potential use by livestock and wildlife and to meet the requirements of landowners.

Occupants of residences within the proposed affected area have agreed to move permanently. Thus, there are no plans to reestablish a residential land use. None of the premining industrial-commercial/lands or transportation systems would be reestablished during reclamation.

Reclamation Plan

Surface Preparation

Prior to construction and mining of each mine unit, all topsoil suitable for plant growth would be stripped to a maximum depth of 60 inches and either stockpiled for later use during reclamation or backhauled directly to areas prepared for reclamation. If topsoil is to be stockpiled for more than six months, a temporary cover of grasses and forbs would be established on stockpiles to minimize erosion.

After mining pits are backfilled, surfaces would be graded and smoothed to conform, as much as possible, with the surrounding landscape. Final slopes would be 5:1 (horizontal:vertical) or less. Headwalls would be benched and terraced to reduce erosion potential and promote establishment of vegetation. Graded slopes would be ripped to

APPENDIX B. RECLAMATION PLAN

roughen surfaces and promote cohesion between topsoil and subsurfaces.

Topsoil spreading and seedbed preparation would be completed before April 15 or after October 1 prior to the ground freezing (Parker and Alden, 1978). Topsoil would be spread evenly over prepared surfaces. The minimum depth of topsoil replacement would be 18 inches. Seedbeds would be disked to scarify soils and to incorporate soil amendments, if needed. Tillage and seeding operations would be conducted along contour wherever possible.

Topsoil would be analyzed for nutrient content and potential toxicity to determine the need for soil amendments. Toxic or otherwise unsuitable soils would be buried below the rooting zone and above the water table. If soil analyses indicate the need for amendments such as fertilizer or lime, additions would be incorporated into soils during seedbed preparation.

Seed Mixtures and Seeding Methods

Three permanent native seed mixtures, two permanent tame mixtures, and three temporary mixtures would be used to revegetate affected areas (Table B-1). Species included in the native seed mixtures were selected to provide erosion control, forage for livestock and wildlife, and wildlife habitat and to promote vegetative diversity and sustainability. The species are well adapted to the climate and the variety of soil characteristics that are encountered in the project area (Cook et al., 1974, and SCS, 1982, 1988).

Permanent Seed Mixtures and Seeding Methods

Erosion control and soil and water conservation are primary considerations in reclamation planning in the region (Cook et al., 1974, and Monsen and Plummer, 1977). After seedbed preparation, a preparatory crop of an annual grain (Table B-1) would be planted to assist in mitigating both of these problems. The preparatory crop would be planted before April 15 or after October 1 before the ground freezes, depending on when seedbed preparation is completed and the type of crop planted. Seeding would take place within 14 days after topsoil is spread to reduce soil losses due to wind and/or water erosion. If it becomes impossible to plant

seeds within 14 days, exposed soil surfaces would be roughened to reduce erosion.

The preparatory crop would be mowed at the end of the first growing season, prior to seedhead development. Stubble and mulch would be left in place to prevent erosion, reduce soil moisture loss due to evaporation, and to reduce soil compaction due to raindrop impact. An additional benefit of using a cover crop is the input of organic matter into soils from the decaying roots of annuals (Barbour et al., 1980).

Because postmining topography and drainage control the distribution of runoff, snow capture, and therefore soil moisture, characteristics of the postmining landscape would be used to determine where each permanent seed mixture should be applied. Hayland and cropland would be established on gently sloping surfaces that are easily accessible with farming equipment. Tame mixtures would be planted, maintained, and harvested using conventional farming techniques.

The upland and lowland grass mixtures include a variety of grasses (cool season, warm season, sod-forming and bunch grasses) which would stabilize soils and provide substantial forage for livestock and wildlife. Several forbs and shrubs would be included to provide important quality forage for wildlife and improve the visual quality of reclaimed areas. Shrubs also provide additional erosion control and snow catchment. Legumes would be included as forage species and to enhance nitrogen availability in soils.

The upland grass mixture would be applied to approximately 835 acres of the reclaimed area. This mixture would be used to revegetate drier sites, including but not limited to hilltops, ridges, and/or upland and south-facing slopes. The lowland grass mixture would be applied to approximately 124 acres. This mixture would be used to revegetate banks of channels, stockponds, reservoirs, and other areas with high potential for elevated soil moisture.

APPENDIX B. RECLAMATION PLAN

Table B-1. Comparison of Premining and Proposed Postmining Acreage of Vegetation Types, Rocky Butte Mine

Vegetation Type	Approximate Acreage Affected	Percent of Project Area	Vegetation Type	Approximate Acreage to be Restored	Percent of Project Area
Big Sagebrush	1,066	11	Sage Shrubland	2,154	22
Silver Sagebrush	789	8			
Saline Big Sagebrush	299	3			
Upland grass	835	9	Upland grass	835	9
Lowland grass	124	1	Lowland grass	124	1
Cropland	3,752	39	Cropland	n.a. ¹	n.a.
Pasture	327	3	Pasture	327	3
Riparian	52	1	Riparian	52	1
Disturbed	89	1	Disturbed	0 ²	0
Total Affected Acreage	7,333		Total Reclaimed Acreage	7,333	

¹ 3752 acres would be restored to a condition capable of supporting cropland. During the life-of-mine, these areas would be planted to upland grass, lowland grass, pasture, crops and/or a temporary plant cover.

² The 89 acres of disturbed land would be reclaimed with the seed mixtures used to reclaim surrounding areas.

There has been marginal to good success establishing shrubs on reclaimed areas at other coal mines in the Eastern Powder River Basin (personal communication, October 11, 1991, with Paige Smith, WDEQ/LQD, Cheyenne; October 16, 1991, with Scott Rexcoat, Carter Mining Co., Gillette). Because shrub seedlings are less drought tolerant and develop more slowly than many grasses and forbs, competition for water often prevents good shrub establishment (Monsen and Plummer, 1977). Shrub-dominated communities would be created using shrub mosaic mixtures. Establishment of shrubs included in the upland and lowland grass mixtures would improve the overall distribution of shrubs in the project area.

The shrub mosaic mixture would be applied in areas where there is good potential for the higher soil moisture required for shrub establishment.

These areas would include the banks of ephemeral drainages, swales, toeslopes, north-facing slopes, or other areas where water and/or snow may accumulate.

Approximately 2,154 acres of the reclaimed area would be seeded with the shrub mosaic mixture. To enhance the quality of wildlife habitat of reclaimed areas, the mixture would be planted in patches that conform with the anticipated rolling topography, rather than in trapezoidal patches. Final shrub density within patches would be one shrub per square meter.

Permanent native seed mixtures would be planted directly into the preparatory crop stubble in the spring (before April 15) or fall (after October 1 but before the ground is frozen) of the year following crop growth (Parker and Alden, 1978). Seeds,

APPENDIX B. RECLAMATION PLAN

except winterfat, would be planted 0.25 to 0.5 inch deep with a rangeland or similar drill equipped with an agitator and two seed boxes to ensure uniform

distribution of seeds. Because winterfat seed is too fluffy to drill, it would be broadcast prior to drill-seeding other species.

Table B-2. Seed Mixtures for Permanent and Temporary Reclamation, Rocky Butte Mine

	Permanent ¹					Temporary ²		
	Upland Grass	Lowland Grass	Shrub Mosaic	Pasture	Cropland	Upland Grass ³	Lowland Grass ⁴	Preparatory Crop
<i>Agropyron smithii</i>	4.00	3.00	1.50			8.00	6.00	
<i>Agropyron dasystachyum</i>	2.00	1.00	0.50			6.00		
<i>Agropyron riparium</i>		3.00	1.00				6.00	
<i>Bouteloua gracilis</i>	2.00	2.00	1.00					
<i>Poa sandbergii</i>	3.00	2.00	1.00			4.00		
<i>Sporobolus airoides</i>		1.00	0.50				4.00	
<i>Stipa viridula</i>		3.00						
<i>Spartina pectinata</i>		1.00	0.50					
<i>Elymus cinereus</i>		1.00	0.50				2.00	
<i>Calamovilfa longifolia</i>	2.00					2.00		
<i>Achillea millefolium</i>	0.50							
<i>Psoralea argophylla</i>	0.50	0.50	0.25					
<i>Sphaeralcea coccinea</i>	1.00	1.00	0.50					
<i>Onobrychis violaeifolia</i>	.50	.50						
<i>Thermopsis</i> spp.	0.25	0.25	0.25					
<i>Pentstemon</i> spp.	0.25	0.25	0.25					
<i>Artemisia cana</i>	0.25	0.25	4.00					
<i>Artemisia tridentata wyomingensis</i>	0.25	0.25	4.00					
<i>Artemisia frigida</i>	0.25	0.25	1.00					
<i>Krascheninnikovia lanata</i>	1.00 ⁵	1.00 ⁵	2.00 ⁵					
<i>Chrysanthamnus nauseosus</i>			1.00 ⁵					
<i>Atriplex canescens</i>	0.50	0.50	0.25					
<i>Rosa woodsii</i>	0.25	0.25	0.25					
<i>Ribes cereum</i>			0.25					
<i>Agropyron cristatum</i>				10.00				
<i>Medicago sativa</i>				1.00		0.50	0.50	
<i>Triticum</i> spp.								12.00 ⁷
<i>Avena</i> spp.								12.00 ⁷
<i>Hordeum</i> spp.								12.00 ⁷
TOTAL PLS/ACRE	19.50	21.00	20.75	11.00	30.00	20.50	18.50	12.00

¹ Pounds Pure Live Seed (PLS) drilled per acre.

² Pounds PLS broadcast per acre.

³ To be used on stockpiles, around facilities, and along rights-of-way.

⁴ To be used around sediment ponds and stream diversions or ditches.

⁵ Broadcast seed prior to drill seeding other species.

⁶ One of these grains or other appropriate crops would be planted as a cash crop.

⁷ One of these grains would be planted as a preparatory crop.

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If the terrain to be revegetated is unsuitable for drill-seeding, no annual crop would be planted, and a temporary or permanent mixture would be planted immediately following seedbed preparation. Seeding rates would be doubled and seeds would be broadcast and surfaces raked with a chain or harrow to cover seed. Areas that have been broadcast seeded would be mulched with two tons per acre straw or hay mulch to reduce erosion and soil moisture loss due to evaporation (Kay, 1978). Mulch would be anchored by crimping. It would be free of mold, undesirable weed seeds, and insects.

Drill-seeding, broadcast-seeding and hydroseeding each may be an effective technique for planting the shrub mosaic mixture (personal communication, October 16, 1991, with Scott Rexcoat, Carter Mining Company). Success rates obtained using each of these planting techniques would be evaluated as reclamation progresses, and shrub establishment procedures would be modified as necessary.

Temporary Seed Mixtures and Seeding Methods

Temporary seed mixtures would be used to stabilize soils in certain areas. The upland grass temporary mixture will be used on the grounds of administrative facilities, slopes along the grade for the railroad spur, topsoil stockpiles, haul road rights-of-way, the Four Corners Road relocation, and any other upland areas requiring immediate stabilization. The lowland grass temporary mixture would be used to stabilize areas such as the banks of disturbed channels, ditches, sediment ponds, and dewatering facilities.

Temporary mixtures would be broadcast over the areas to be stabilized as soon as construction or mining activities permit. The surface would then be raked with a chain or harrow to cover seeds. If the temporary cover should fail to stabilize soils, mitigation measures such as reseeding and/or application of mulches, netting, or other erosion control devices would be applied so that soil loss is minimized. At the close of mining, or as mining activities allow, areas seeded with temporary mixtures would be reclaimed with permanent vegetation.

Trees

Several species of trees would be established around selected stockponds and reservoirs. Root-stock or containerized saplings of peachleaf willow (*salix amygdaloides*), plains cottonwood (*populus deltoides*), green ash (*fraxinus pennsylvanicus*), and box elder (*acer negundo*) would be planted around water resources to develop windbreaks for livestock and wildlife. If feasible, larger trees may be transplanted to developed ponds to provide immediate shelter and habitat for local fauna. Approximately 688 trees (Section 3.4) would be planted at densities ranging from three to 20 individuals per acre.

Post-Seeding Maintenance

Fences would be constructed around newly seeded areas to prevent damage by cattle and vehicular use. Fences may be constructed around tree saplings until they are mature enough to withstand the presence of livestock. Signs would be posted to discourage incidental trespass by humans. Reclamation success would be evaluated according to WDEQ/LQD rules and regulations. State laws require reclamation efforts to be repeated if standards are not met.

Wildlife Habitat Diversity

Establishment of grasses, forbs, shrubs, and trees would provide forage, browse, and shelter for wildlife. Essential structural elements of wildlife habitat would be created during reclamation by providing diversity in the landscape itself (i.e., lowlands, uplands, shrublands, ponds, drainages, and rockpiles). This diversity of landscape and vegetation would promote the reestablishment of wildlife species and numbers found in the premining project area. Establishment of a landscape/vegetation mosaic similar to premining patterns also creates habitat edges important for many species. Construction of stockponds and reservoirs would create key habitat for waterfowl and provide a primary resource for many other animals inhabiting the project area. Carefully situated rockpiles would provide cover and resting, denning, and nesting sites for numerous wildlife species. One rockpile would be established per 100 acres of reclaimed land.

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Raptor nests occurring within the areas scheduled for disturbance would be moved to appropriate locations outside the project area. In some instances artificial nest structures may be used. Trees planted during reclamation should reach heights suitable for raptor nesting in 10 to 20 years.

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APPENDIX C
VISUAL RESOURCE MANAGEMENT EVALUATION



APPENDIX C. VISUAL RESOURCE MANAGEMENT EVALUATION

The Visual Resource Management (VRM) evaluation was based on techniques used by the BLM (1980). It is an analytical process that identifies, sets, and meets objectives for the maintenance of scenic values and visual quality, and is based on research designed to objectively assess aesthetic qualities of the landscape. The technique is used in various situations, including environmental assessments.

The VRM classification ratings range from I to V as follows:

Class I - Natural ecologic changes and very limited management activity is allowed. Any contracts (activity) within this class must not attract attention.

Class II - Changes in any of the basic elements (form, line, color, texture) caused by an activity should not be evident in the landscape.

Class III - Contrasts to the basic elements caused by an activity are evident but should remain subordinate to the existing landscape.

Class IV - Activity attracts attention and is a dominant feature of the landscape in terms of scale.

Class V - This classification is applied to areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to the level of one of the other four classifications.

The inventory/evaluation process consists of three steps: 1) assessment of the landscape's scenic quality; 2) estimating the sensitivity of the people to change; and 3) determining the viewing distance. Scenic quality is evaluated by giving a numerical rating to each of seven factors, with higher ratings indicating higher quality visual resources (Table C-1). A summation of the seven numerical ratings determines scenic quality. In the case of the Rocky Butte Mine area, the total score of 6 places it in the Class C scenic quality category, which means it is an area with features common to the physiographic region.

Sensitivity levels are determined by combining two factors--user attitude and use volume. User attitude reflects the concerns the public expresses about proposed changes in scenic quality. Use volume reflects the frequency of travel through the area. For the proposed Rocky Butte Mine area, user attitude was rated LOW and use volume HIGH (Table C-2), resulting in an overall value of MEDIUM.

The viewing distance is divided into foreground-middleground (zero to five miles), background (five to 15 miles), and seldom seen (more than 15 miles or infrequently observed). For the Rocky Butte area the foreground/middleground was most involved.

By combining the sensitivity level (MODERATE), the scenic quality (C), and the viewing distance (foreground/middleground), the WRB area is classified as Management Class IV (BLM, 1980:24).

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APPENDIX C. VISUAL RESOURCE MANAGEMENT EVALUATION

Table C-1. Scenic Quality Inventory/Evaluation Ratings and Scores for the Proposed Rocky Butte Mine Area, Campbell County, Wyoming

	Factor						
	Landform	Vegetation	Water	Color	Adjacent Scenery	Scarcity	Cultural Modification
Possible Scores*	1,3,5	1,3,5	0,3,5	1,3,5	0,3,5	1,2,6	-4,0,2
Rocky Butte Score	3	1	0	1	0	1	0

* Higher scores indicate better scenic values.

Table C-2. Sensitivity Level Ratings and Scores for Proposed West Rocky Butte Mine Area, Campbell County, Wyoming

	Factor	
	User Attitude	Use Volume
Possible Scores	Low, Medium, High	Low, Medium, High
Rocky Butte Score	Low	High

APPENDIX D
MITIGATION



APPENDIX D. MITIGATION

This appendix describes measures and techniques that lessen or eliminate impacts. In considering mitigation one must be aware of the complex legal framework that governs the mining process from land use planning to leasing, acquisition of permits, and finally actual mining and reclamation.

The Buffalo Area RMP (BLM, 1985) states that the following general types of mitigating measures will be complied with in the development of federal coal lands:

- **Cultural Resources:** Field inventories and procedures for protection of cultural resources
- **Paleontological Resources:** Survey and resource recovery
- **Existing Rights:** Negotiation procedures
- **Soils:** Separation of "B" horizon material from underlying material
- **Survey Markers:** Protection from damage; provision for replacement
- **Raptors:** Buffer zones around nesting areas and restrictions as necessary on surface mining
- **Black-Footed Ferret Habitat:** Monitoring and inventory in accordance with prescribed guidelines
- **Migratory Birds of High Federal Interest:** Habitat recovery and replacement
- **Buffer Zones and Rights-of-Way:** Buffer zones unsuitable for surface mining for existing public facilities
- **Alluvial Valley Floors:** Mitigation or designation of unsuitability pending final determinations by authorized agencies

Mitigation can be applied as standard and special lease stipulations, conditions on mining permits and other regulatory permits, or as revisions to the

mining and reclamation plan during the permit review process. The need for and the types of mitigation applied through lease stipulations and permit conditions have changed over the past decade as experience has been gained in mining and reclamation in the Powder River Basin. The special lease stipulations that BLM would impose on the West Rocky Butte lease tract would include the following:

In addition to observing the general obligations and standards of performance set out in the current regulations, the lessee shall comply with and be bound by the following stipulations. These stipulations are also imposed upon the lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the lessee to comply with the terms of the lease. The lessee shall require his agents, contractors and subcontractors involved in activities concerning this lease to include these stipulations in the contracts between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the lessor and the lessee at any time to adjust to changed conditions or to correct an oversight.

• CULTURAL RESOURCES

(1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the authorized office of the BLM or of the surfacing managing agency, if different, on portions of the mine plan area and adjacent areas, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. The inventory shall be conducted by a qualified professional cultural resource specialist (i.e., archeologist, historian, historical architect, as appropriate), approved by the authorized officer of the surface managing agency (BLM, if the surface is privately owned), and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Assistant Director of the Western Support Center of the Office of Surface Mining, the authorized officer of the BLM, if activities are associated with the coal exploration outside an approved mining permit area (hereinafter call Authorized Officer), and the Authorized Officer of the surface managing agency, if different. The lessee shall undertake measures, in accordance with instructions from the Assistant Director or Authorized Officer to protect cultural resources on the lease lands. The lessee shall not commence the surface disturbing activities until permission to proceed is given by the Assistant Director or Authorized Officer.

(2) The lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

APPENDIX D. MITIGATION

(3) The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Assistant Director or Authorized Officer, or the Authorized Officer of the surface managing agency. The lessee shall not disturb such resources except as may be subsequently authorized by the Assistant Director or Authorized Officer. Within two (2) working days of notification, the Assistant Director or Authorized Officer will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the Authorized Officer of the BLM or of the surface managing agency, if different.

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

• PALEONTOLOGICAL RESOURCES

If a paleontological resource, either large and conspicuous, and/or of significant scientific value is discovered during construction, the find will be reported to the Authorized Officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological value. Operations within 250 feet of such discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The lessee will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant interest discovered during the operation.

• RESOURCE RECOVERY AND PROTECTION

Any proposed bypass of Federal coal determined to be economically recoverable must have the written approval of the authorized officer of the BLM in the form of an approved modification to the Resource Recovery and Protection Plan (R2P2) prior to the Federal coal being bypassed (43 CFR 3482.2(c)(2)). Failure to comply with this requirement shall result in the issuance of a Notice of Noncompliance by the authorized officer. The Notice of Noncompliance will include the amount of damages to be assessed for the unauthorized bypass of Federal coal as determined by the authorized officer. The amount of damages, at a minimum, will be the amount of royalty to be assessed as determined by the authorized officer to compensate the Federal government for the unauthorized bypassed Federal coal.

• PUBLIC LAND SURVEY PROTECTION

The lessee will protect all survey monuments, witness corners, reference monuments, and bearing trees against destruction, obliteration, or damage during operations on the lease areas. If any monuments, corners or accessories are destroyed, obliterated, or damaged by this operation, the lessee will hire an appropriate county surveyor or registered land surveyor to reestablish or restore the monuments, corners, or accessories at the same

location, using surveying procedures in accordance with the "Manual of Surveying Instructions for the Survey of Public Lands of the United States". The survey will be recorded in the appropriate county records, with a copy sent to the Authorized Officer.

• OIL AND GAS RESOURCES

The BLM realizes that coal mining operations conducted on leases issued within producing oil and gas fields may interfere with the economic recovery of oil and gas, just as oil and gas leases issued in coal mining areas may inhibit coal production. BLM retains complete authority to alter and/or modify coal operations or oil and gas operations on lands covered by Federal leases so as to obtain maximum resource recovery of either or both resources with due regard to valid existing rights.

The following mitigation is specifically directed toward conditions found on and near the proposed Rocky Butte permit area and described in Chapter 3.0 of this EIS.

Topography

Impacts to topography caused by mining can be mitigated by proper design of the postmining surface. The design of the postmining topography (PMT) will be reviewed by Wyoming DEQ/LQD during the permit application process. Specific recommendations pertinent to the Rocky Butte Mine include providing topographic diversity in landforms and hillslopes, stable channels having natural-appearing meanders and pools, and rockpiles and shrub mosaics designed and located so as to give a natural appearance and provide wildlife habitat and cover. The PMT design will be required to approximate original contours which, as generally agreed, means that the shape of the land after mining should be about the same as before, though not necessarily at the same elevation (Martin, et al., 1988, p. 118).

Soils

Impacts to soils can be mitigated by proper identification and handling of topsoils, protection of stockpiled and replaced soils from erosion hazards, and revegetating replaced soils as rapidly as possible. Nutrients lost during handling or stockpiling can be replaced. A properly designed and implemented erosion control, reclamation and revegetation program can ensure successful erosion control and restoration of all land disturbance. Salvage of soils otherwise unsuitable for reclamation

APPENDIX D. MITIGATION

due to heavy texture or high salinity may be acceptable for use in special reclamation practices such as restoration of wetlands or playas.

To the extent practical, heavy equipment traffic should be minimized on soils during removal from native surfaces and replacement on reclaimed surfaces, especially when soils are moist, to avoid compaction and destruction of aggregation. Localized areas that become compacted during soil replacement should be ripped to loosen the soil.

Vegetation

Continued emphasis on increasing vegetal species diversity on reclaimed lands, and particularly on establishing shrublands and riparian areas, will help restore wildlife habitat on reclaimed lands. Playas, which rely on topography, soil types and vegetation, provide special habitats that should be restored in the PMT. Continued sampling, monitoring and grazing demonstration studies such as those proposed at the adjacent mines will provide valuable data for continuing improvements in revegetation practices.

Disturbance to vegetation should be minimized in areas adjacent to construction and mining. Reclamation and revegetation measures should be employed to establish diverse, productive, and ecologically sustainable plant communities that are comparable with postmining land uses and adjacent lands. Some important features of the reclamation plan are as follows:

- topsoil salvage and replacement;
- surface grading and contouring;
- seedbed preparation;
- soil erosion control, including establishment of temporary and permanent vegetation;
- establishment of permanent, self-regenerating, and diverse plant communities;
- replacement of all riparian/wetland habitats;
- restoration of agricultural productivity and wildlife habitat;
- post-reclamation monitoring; and
- evaluation and attainment of reclamation success.

If any T & E or sensitive plant species are discovered during construction or coal production, occupied area(s) and similar habitats will be avoided

until proper authorities determine that populations can be transplanted (or that other appropriate mitigation can be taken). Additionally, a thorough survey of similar habitats will be made.

Water Resources

Impacts to ground-water quality can be mitigated by special handling of chemically undesirable overburden material to assure that these materials are not placed so as to adversely affect water quality. All mine permit applications submitted to Wyoming DEQ/LQD must include baseline data on overburden geochemistry and special handling plans for unsuitable material to comply with state and federal surface mining regulations.

Provision of ponds and reservoirs on the reclaimed surface helps conserve surface water resources and provides a recharge source for the spoil aquifer. All mine permits require that water uses which are interrupted by mining be mitigated by replacement with water from an alternative source of equivalent quality and quantity. Typically wells which go out of production due to mine-related drawdowns are replaced with deeper wells completed in a sub-coal formation. NWR, like all mine permit applicants, will be required to place a commitment in the Rocky Butte Mine PAP to replace the wells that will be mined through and adjust the pump setting or type of pump in the wells that are expected to be subject to drawdown. The permit documents will also contain the required commitment that NWR will "...replace the water supply of an owner of interest in real property who obtains all or part of his supply of water for domestic, agricultural, industrial, or other legitimate use from an underground or surface source where the supply has been affected by contamination, diminution or interruption proximately resulting from the surface coal mine operation" (W.S.35-11-415(b)(xii)).

Special care must be taken to provide stable channels in the reclaimed surface. The design of stable drainage basins is critical to the success of the overall reclamation plan, and this issue receives considerable attention during the permitting process. In the case of the Rocky Butte Mine, this may require coordination between NWR and The Carter Mining Company, which will mine through and reclaim portions of Tisdale and North Tisdale Creeks and Gold Mine Draw.

APPENDIX D. MITIGATION

Alluvial Valley Floors

Based on the discussion in Chapter 3.0 it is not anticipated that AVFs will be an important issue at the Rocky Butte Mine.

Fish and Wildlife

Wildlife impacts can be mitigated by continuing to consider wildlife habitat in the reclamation planning. Topographic features such as rockpiles and playas, riparian features such as channel potholes and impoundments, and revegetation features designed for wildlife, such as shrublands and trees where conditions permit, will all help to restore and enhance wildlife habitat on reclaimed land. Continued monitoring will provide important feedback concerning the effectiveness of these measures and, hence, important data for future designs. Mitigation efforts should continue to include relocation of affected raptor nests and consideration of raptor nest sites in reclamation planning.

- Subject to landowner preferences and agreements with NWR, all mitigation identified in this document should be adhered to on both state and private lands.
 - Impacts to habitats of high wildlife value (e.g., rim rock, riparian areas) should be minimized both on and off the project area, where possible.
 - Speed limits on the project area should be consistent with safe operating conditions, and limits should be strictly enforced; speed limit signs would be posted at advantageous locations along all roads on the project area.
 - Where possible, raptor nest sites should be avoided during the nesting season. If the area must be impacted, project activities should occur outside the nesting season. Raptor nests on the project area and within the two-mile buffer should be monitored annually, and if potential conflicts arise, appropriate raptor mitigations should be employed. Raptor mitigation and monitoring plans will be developed in coordination with USFWS, WGFD, and BLM.
- To mitigate impacts to raptors resulting from electrocution and collision with powerlines, measures identified in Olendorff et al. (1981) should be employed as directed by the USFWS, WGFD, and BLM.
 - Prior to disturbance, the entire project area and two-mile buffer should be surveyed during early April to determine whether active sage grouse leks are present. Disturbance within active leks will be curtailed during the breeding season, and disturbance within a 2-mile area surrounding each lek will be curtailed where possible during all years leks are active. Reclamation activities providing appropriate breeding, nesting, and rearing habitat would be provided on areas within a 2-mile radius of active lek centers, where possible.
 - Prior to land disturbance, areas slated for impact would be surveyed for T or E species, MBHFI, and State sensitive/priority species. Annual wildlife monitoring of the permit area and 2-mile buffer would also be conducted to determine if these species are present. If T or E, MBHFI, or State sensitive/priority species are found on the area, species-specific mitigations may be used as directed by the USFWS, WGFD, and/or BLM.
 - Rock piles (coarse rocks > 2.5 ft in diameter) approximately 12 ft (L) X 15 ft (W) X 6 ft (H) should be placed at various strategic locations (e.g., lee slopes near ridges for raptor perches, bottom lands for small mammals [Proctor et al. 1983]) on reclaimed areas (see Appendix B).
 - Wetlands, ponds, and other riparian areas disturbed during project implementation should be replaced on a one for one basis as appropriate for aquatic and waterfowl species occurring on the project area; trees occurring in these areas should also be replaced at a minimum of one for one (see Appendix B).

Archaeological Resources

NRHP eligible archaeological resources which cannot be avoided by the proposed action must be subjected to data recovery. Mitigation by data recovery of NRHP eligible sites listed under Criterion D will result in no adverse effect to those cultural

APPENDIX D. MITIGATION

resources, as defined under the Section 106 process.

Historical Resources

NRHP eligible historical resources which cannot be avoided by the proposed action must be subjected to mitigation. Mitigation of adverse effects may include historical research and documentation, as well as photographic documentation of historic structural remains to the standards of the Historic American Buildings Survey.

Paleontological Resources

Mine personnel should be instructed to observe for and recognize vertebrate fossils and large, well-preserved petrified tree trunks which might be uncovered during mining excavations. If such finds are made, a qualified paleontologist should be contacted immediately to evaluate the find(s). Excavation in the immediate vicinity of the fossil discovery should be halted until the paleontological evaluation can be made.

Visual Resources

No specific mitigation is recommended for visual resources. Land reclamation and removal of structures, as discussed in the project description, would result in the area returning to its premining status of a Visual Resource Management Class IV.

Noise

Options to mitigate noise impacts are limited. Tree lines and hedges can be effective noise filters but take years to establish in this climatic zone. The measures should be applied only where the duration of impacts will be five years or more. Most of the residences subject to noise impact will only be impacted for a relatively short time when mining activities are occurring nearby (i.e., 1 or 2 years). For short-term impacts, proper placement of stockpiles can deflect or absorb noise and help mitigate impacts. Timing can be planned for the noisiest activities (e.g., blasting) so these activities are as unobtrusive to nearby residents as possible.

Land Use

During reclamation, all pre-mining land uses except residential land would be restored unless otherwise requested by landowners (Appendix B). Reclamation will commence as soon as it is practical during the life of mine, thereby reducing the amount of time that a particular land use is impacted. Cropland would be restored to current or higher productivity levels within one year after backfilling mining pits. Pasture and rangeland would be relatively productive within two to five years after backfilling (Cook et al., 1984). Wildlife habitat would be restored with the establishment of diverse and self-regenerating plant communities, water resources, trees, and specialized topographic features (see above and Appendix B). Landscape diversification by natural processes may take a few decades after reclamation, but reclamation practices will provide wildlife habitat within two to five years after backfilling.

No residential areas will be reestablished during reclamation. Mitigation for oil production losses could include the purchase and abandoning of oil wells by the coal operator or temporary plugging of oil wells during mining, with the intention of reestablishing production after the area is reclaimed. Because there would be negligible impacts to public utilities, pipelines, water lines, telephone lines, and roads, no mitigation would be necessary.

Socioeconomics

Socioeconomic impact mitigation for the proposed mine would be developed in conjunction with local governments on a mutually agreeable basis. The lessee should encourage construction contractors and others to obtain Campbell County sales and use tax permits to increase local sales tax revenues. In addition, efforts should be made to hire locally and purchase from local businesses. The company should keep local government entities well informed of the project so that appropriate planning can occur.

Recreation

To limit impacts to hunting and wildlife observation, wildlife habitat should be reclaimed to approximate premining conditions (Appendix B).



APPENDIX E
COMMENT LETTERS AND RESPONSES ON THE DEIS



APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

1



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
399 18th STREET, SUITE 500
DENVER, COLORADO 80202-2466

MAR 30 1992

Ref: 8WM-EA

Jim Melton, EIS Coordinator
Bureau of Land Management
Casper District Office
1701 East E Street
Casper, Wyoming 82601

Re: Draft Environmental
Impact Statement for the
West Rocky Butte, Wyoming
Coal Lease Application

92 APR - 2
BUREAU OF LAND MANAGEMENT
CASPAS DISTRICT OFFICE

Dear Mr. Melton:

In accordance with the responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act (CAA), the Region VIII Office of the Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the West Rocky Butte Coal Lease Application. The following comments are offered for your consideration.

EPA commends the Bureau of Land Management (BLM) for the document's level of analysis, particularly in the area of cumulative environmental impacts. Considering the high level of existing coal mining activity in Wyoming's Powder River Basin (PRB), this type of analysis for the proposed mine is especially critical in order to avoid potential impacts.

Our comments focus on two areas, a proposed revision to the Wyoming State Implementation Plan (SIP) for ambient air quality standards and groundwater related issues. The SIP comments are provided to clarify the current status of this revision. Additionally, EPA has expressed concerns regarding protection of the project area's groundwater resources that should be addressed in the Final EIS.

Based on the procedures EPA uses to evaluate the adequacy of the information in the EIS and the environmental impacts of the proposed action and alternatives, the Draft Environmental Impact Statement (DEIS) for the West Rocky Butte Coal Lease Application will be listed in the Federal Register in category EC-2 (environmental concerns, insufficient information). This category indicates that EPA has identified areas of potential impacts, specifically concerning the preservation of groundwater quality, which should be avoided in order to fully protect the environment. Also, the EIS requires supplementary groundwater resource information in order to fully assess environmental impacts that should be avoided.

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If we may provide further explanation of our concerns, please contact Larry Kimmel of my staff at (303) 293-1697 / FTS 330-1697. For questions related to air quality and groundwater issues, please contact, respectively, Mike Silverstein at (303) 293-1754 / FTS 330-1754 and Bill Monheiser at (303) 294-1127 / FTS 330-1127. Enclosed are detailed comments discussing specific issues in the Draft EIS.

Sincerely,

Robert R. DeSpain
Robert R. DeSpain, Chief
Water Management Division
Environmental Assessment Branch

Enclosure

cc: Dennis Hemmer, Wyoming Department of Environmental Quality

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DETAILED COMMENTS BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY: THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE WEST ROCKY BUTTE, WYOMING COAL LEASE APPLICATION

1 o Air Quality

EPA Region VIII has been closely tracking surface coal mining activities in the Powder River Basin (PRB) with respect to air quality issues. EPA has classified surface coal mines as "minor sources" under the federal Prevention of Significant Deterioration (PSD) regulations and, thus, only State minor source permits are required for air quality. However, a revision to Wyoming's State Implementation Plan (SIP) has been submitted to EPA which will impact the Rocky Butte mine. This revision regards ambient air quality standards for PM₁₀ as opposed to the specific PSD-related revisions cited in the DEIS (page 3-28). EPA approved the EIS-referenced SIP revision on May 24, 1991, but is still currently processing the ambient air SIP revision.

The ambient air SIP revision revises the State's definition of "ambient air" for the PRB only, allowing the coal mining companies to restrict public access from portions of each lease that are determined to be necessary for coal mining operations. Only lands outside of these restricted areas are subject to ambient air quality standards. Region VIII is in the process of proposing to approve this revision with conditions. These conditions include: 1) develop and operate a maximum concentration monitor for each active mining area in the PRB to adequately assess the ambient air quality, with a commitment by the State to initiate expeditious remedial action if the violation of the National Ambient Air Quality Standards (NAAQS) is detected by the monitoring network; and 2) once EPA completes an assessment and possible improvement of the existing modeling tools, the State must perform the 30-year modeling study utilizing EPA approved modeling tools and to initiate expeditious remedial action if the modeling predicts exceedances of the applicable ambient air quality standards.

EPA is in final negotiations with the State Air Quality Division (AQD) regarding the establishment of the maximum concentration monitoring network. Because these conditions are part of EPA's SIP approval, the Final EIS should reflect adherence to all SIP conditions described above.

2 o Groundwater

Page 4-11: The description of the sub-coal Tullock member is incomplete. The characteristics for all aquifers should be included (water table aquifer, coal aquifer, and sub-coal aquifers). The discussion should include hydraulic

3

characteristics as well as the presence of aquifer confinement and upward / downward vertical gradients.

- 3 Page 4-15: The document should discuss the mechanism for compensation of an impacted well owner if the owner has not obtained a pre-mining well characterization.
- 4 Page 4-15, paragraph 3: The EIS notes that the mining pit will act as a "big well" during mining, resulting in water flow toward the pit. What method will be used for disposition of accumulated water? In addition, what procedures are planned to handle water, in excess of process water requirements, from large storm events? The Final EIS should also discuss the mine's protection mechanisms to prevent aquifer infiltration by low quality water from ponds and ditches used to collect and transfer process water and water derived from sedimentation ponds.
- 5 Page 4-15, paragraph 4: The EIS notes that groundwater wells located within the mining area will be eliminated by mining activities. The Final EIS should discuss the plug and abandonment requirements for the wells to be eliminated. It should also be noted that aquifers containing less than 10,000 mg/l total dissolved solids (TDS) are considered as potential future sources for drinking water. Will wells eliminated by mining activities be replaced in the near-term or post reclamation?
- 6 Page 4-15, paragraph 5: What will be the impacts to the regional groundwater system from the salt-contaminated water originating in the spoils? Could this result in a salt plume migrating within the groundwater flow system?
- 7 Page 6-10: What is the potential for water trapped within the spoil aquifer to eventually re-enter the regional flow pattern? What impact to water quality in the flow system could be expected?
- 8 Page 6-13, paragraph 7: What mitigation steps will be practiced to prevent pit inflows, sediment-control pond waters and dewatering waters from infiltrating the sub-coal aquifer? How will the confining (and protecting) layer over the Tullock member aquifer be protected from breaching by overburden removal and mining activities?
- 9 Page 6-14, paragraph 2: What are the water quality impacts of vertical leakage and recharge on the Tullock member from the spoil aquifer following reclamation?

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APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

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STATE OF WYOMING
OFFICE OF THE GOVERNOR
CHEYENNE 82002

March 24, 1992

MIKE SULLIVAN
GOVERNOR

Mr. James W. Monroe
BLM Casper District Office
1701 East "E" Street
Casper, WY 82601

Dear Tim:

Agencies of the State of Wyoming have reviewed the Draft Environmental Impact Statement (DEIS) for the West Rocky Butte Coal Lease Application. Enclosed for your consideration and use are comments resulting from that review.

The Wyoming Game and Fish Department (WGFD) has commented on the adequacy of the state shrub reclamation standard and on access needs for big game harvest in the mine area. These comments are similar to concerns that WGFD raised in their comment letter on the Environmental Assessment for the West Black Thunder Coal Lease Application. I refer you to my December 4 letter to you for my positions on these two matters.

The Office of Industrial Siting Administration has raised concerns about the availability of housing in the Gillette area to accommodate increased numbers of workers. I concur with their suggestion that this topic should receive further analysis in the final EIS.

Alan Edwards had provided comments relative to the leasing process and to the DEIS. The comments and questions address basic issues that the BLM should consider as part of the final EIS. You should know that as it relates to the State position and Alan Edwards' comments, they should not be taken as contrary to the opening of a new mine. Personally and as a representative of the State, I would encourage the opening of a new mine to enhance economic activity, state revenues and western coal competition. I am mindful, however, that we have an obligation to assure a credible and defensible leasing system and that leasing decisions must be addressed on their individual merits and overall impacts on the leasing system to assure the ongoing integrity of that system. It is primarily these matters which Alan's memo highlights.

Mr. James W. Monroe
March 24, 1992
Page Two

The State of Wyoming appreciates this opportunity to provide comments on this DEIS. Please continue to keep this office informed as to further developments.

With best regards, I am

Very truly yours,

Mike Sullivan

MS/rms

cc: State Review Agencies
Ray Brubaker, BLM State Director

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

3



STATE OF WYOMING
OFFICE OF THE GOVERNOR
CHEYENNE 82002

MIKE SULLIVAN
GOVERNOR

MEMORANDUM

TO: Governor Sullivan
FROM: G. Alan Edwards, Natural Resource Analyst
DATE: March 24, 1992
SUBJECT: West Rocky Butte Coal Lease - EIS Review Comments

The Environmental Impact Statement for the West Rocky Butte coal lease application has been circulated for state agency review. The state agencies have provided their comments as relating to their statutory authority. The proposed West Rocky Butte lease represents a new mine start. The potential impacts of a new mine start have resulted in the decision to prepare an environmental impact statement for the proposed lease. Due to the significance of the proposed action, the environmental document was also reviewed to address some of the more general issues regarding the proposed lease that were not covered as part of the state agency reviews.

My comments and questions included here are related most specifically to the leasing process itself because I am sensitive to your ongoing concerns that we have a defensible and credible leasing process. These relate to the production potential of the mine as proposed and the need to lease the coal as proposed. Since these questions affect any final decision to lease the West Rocky Butte tract as included in the application, they should be raised as part of the review of the document that presents the material. This information is presented both in the form of comments and questions regarding the proposal in general and in the form of comments relative to information specifically included in the EIS.

- 1a The EIS focuses on the need to lease the West Rocky Butte tract to open a new mine on this property. Clarification should be provided about whether this need is a result of physical factors such as the need for the additional coal or if it is solely needed to satisfy a legal requirement. It is clearly stated that the new tract is needed to satisfy a deadline which is faced by the applicant. That deadline is the need to lease additional coal and create a new logical mining unit (LMU) to preserve the existing Rocky Butte tract. That tract includes 4,910 acres and 575 million tons of coal. The coal under application, by comparison, would add 390 acres and 50 million tons of federal coal. The major reserves in question are, therefore, those in the Rocky Butte tract. The need to lease the coal is, therefore, perceived to be driven more by the need to meet only a legal requirement than an actual need for the additional coal reserves.

Governor Sullivan
March 24, 1992
Page Two

- 1b Table 6-5 highlights this point. Information in that table would indicate that the mine size and annual production rates are essentially the same. One of the major differences is in the mine life (i.e. 30 years as compared to 42 years for this proposal). It would appear, therefore, that the Rocky Butte tract is capable of satisfying the needs for a new mine.
- 1c The question that arises is whether or not the coal under application is physically required for a new mine operation. If the coal is not physically necessary to accommodate a new mine on the Rocky Butte tract, should the EIS address the relative impacts if the new mine were placed on the Rocky Butte tract only? Under this scenario (that is, if the impacts of the new mining activities occur on the Rocky Butte tract only) would the overall impacts of the new mine start be reduced from the option considered under the EIS? In any event, it should be clarified if the coal lease under application is necessary to satisfy physical or legal requirements.
- 2 Questions have been raised during the public review of the EIS about the ability to produce and sell coal at the production levels proposed for the mine. The proposal identifies a production of 8 million tons per year by 1995 and 16 million tons per year by the year 2000. The questions have been relative to the market demand for the additional coal. Some projections have been made regarding the production increases that will occur in the West. The Department of Energy has predicted that coal production will increase by 32 million tons between the years 1990 and 1995. The production increase predicted between 1995 and 2000 is 12 million tons. The 12 million tons would be for the period of time for which the mine would begin operations. The DOE projection is actually for the Northern Great Plains region which includes North Dakota, Montana, and Wyoming. By contrast, DRI/McGraw-Hill projects that coal production for the entire Powder River Basin will increase by 16.8 million tons between 1995 and 2000. In either case, the projected mine production could be difficult to achieve based upon projections for the Basin.
- 3 It could be commented that the risk of being able to find a market rests with the company that invests in the coal. This is true, of course. The question that arises, though, is the same question that was identified above. Is the additional coal covered in the application necessary to meet a market need or would the Rocky Butte tract have sufficient quantity and quality of coal to meet any conceivable market demand? This is apparently the thrust of the comment on page 2-4 that "in actuality, coal production rates would be dictated by market conditions." It is stated on page 1-4 that the proposed production from the mine "is not consistent with the published demand forecasts for the PRB." Is there a market forecast that could bring clarity to this issue?

Governor Sullivan
March 24, 1992
Page Three

Specific questions relative to the EIS are as follows:

1. The EIS identifies on page 2-1 that the second alternative which would be the rejection of the lease application is assumed to result in the expiration of the Rocky Butte lease and, therefore, no new mine start at this time. Could BLM offer the Rocky Butte lease for sale at a later date if the current Rocky Butte lease expires and if so, would it require an industry application to do so?
2. Section 2.2 states that the "mine plan is tentative and may undergo substantial revision during review of the mine permit by the Wyoming DEQ/LQD." Is there an understanding of what substantial means in this circumstance? Would substantial revisions represent a change in the impacts assessed in the EIS or would the permit review process be able to adequately address substantial revisions?
3. It is stated on page 2-4 that adding the coal in the West Rocky Butte tract "avoids bypassing this significant tonnage" of low strip ratio, high quality, compliance coal. Does a bypass potential actually exist? Would the quality and quantity of the coal make it sufficiently attractive that it would be competitive as a lease modification?
4. Equipment and employment requirements are presented in Section 2. In some categories of equipment and employment, fairly significant fluctuations occur. Are fluctuations such as presented common for coal mine operations?
5. Section 2.4 states that one alternative considered was delaying the lease sale which would result in the expiration of the Rocky Butte lease. The coal in the Rocky Butte lease and the West Rocky Butte tract could be offered for sale at a later date. It is stated that under this alternative, "other than possibly receiving an additional lease bonus if the Rocky Butte tract is leased again, there is no significant difference between this alternative and the Proposed Action." This comment does not appear to be consistent with the analysis provided in Section 4. The analysis in that Section is based upon the assumption that the no action alternative (i.e. rejection of the lease application) would result in no new mine start at this time. As stated in Section 4, there would be "negative impact" as a result of the no action alternative for the listed socioeconomic factors. This would basically be a result of the lost production revenues. If, however, the Rocky Butte tract can be offered for sale at a later date (if the current lease expires), there could still be a new mine on the property. The information in Section 2.4 would indicate that a new mine start could occur in either case. If this is so, is it correct to note in Section 4 that the no action alternative results in a negative socioeconomic impact?

Governor Sullivan
March 24, 1992
Page Four

6. Information is provided in Section 6.12 that cumulative air "impacts tend to occur only when the actual mine activities are within about 10 miles of each other." How does this comment relate to the information provided in Section 4.1.10 on air quality where the impacts of the Proposed Action and the adjacent Caballo Mine are considered?
7. Section 6.17.2 states that the expansion of the Black Hills Power and Light generating station will begin in 1994. This is identified as the final year of construction for the new mine under the Proposed Action. Will there be cumulative construction impacts?

The above comments and questions are not intended to be critical of the proposed new mine. They are simply intended to help identify issues that should be addressed as part of the review process to determine if the Proposed Action is clearly identified and potential impacts, both negative and positive, addressed.

aes

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

4

DIVISION OF PARKS
& CULTURAL RESOURCES

Wyoming
Department of Commerce

State Historic Preservation Office
1825 Carey Avenue
Cheyenne, Wyoming 82002-0240
1307 777-2697
FAX 1307 632-2748
March 5, 1992

MAR 13 1992

Wyoming State Clearinghouse
ATTN: Rich Lindsay
State Planning Coordinator's Office
Herschler Building, 4th Floor East
Cheyenne, Wyoming 82002

RE: Rocky Butte Mine Draft Environmental Impact Statement, SHPO #01901AK017

Dear Mr. Lindsay:

Richard Bryant of our staff has received information concerning the aforementioned project. Thank you for giving us the opportunity to comment.

The Draft Environmental Impact Statement (DEIS) adequately describes the activities conducted to identify and protect cultural resources. Although several surveys have been conducted in the mine area, it is not clear if the entire area has been covered. This should be clarified in the final Environmental Impact Statement (EIS). The level of documentation of cultural resources in this EIS is beyond the usual and we appreciate the effort expended. Although the documentation meets the requirements of the National Environmental Protection Act, we still need to review the original survey and site evaluation reports for the mine area before we can determine if that documentation meets the requirements of Section 106 of the National Historic Preservation Act and 36CFR800.

Other than the clarification of the area surveyed, we have no recommendations for changes or additions to the DEIS.

Please refer to SHPO project control number #01901AK017 on any future correspondence dealing with this project. If you have any questions contact Mr. Bryant at 777-6292.

Sincerely,

Gary Stephenson
Director
Administrative Services

FOR:
Dave Kalkka, Ph.D.
State Historic Preservation Officer

cc: Bureau of Land Management, Casper District

Mike Sullivan
Governor

A.D. "Max" Maxfield
Director
Department of Commerce



APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

5



March 2, 1992

EIS 6608
U.S. Department of the Interior
Bureau of Land Management
Casper District Office
Draft West Rocky Butte Coal
Lease Application
Environmental Impact Statement
SIN: 91-089
Campbell County

ROD MILLER
STATE PLANNING COORDINATOR'S OFFICE
HERSCHLER BUILDING, 4TH FLOOR EAST
CHEYENNE, WY 82002

Dear Mr. Miller:

The staff of the Wyoming Game and Fish Department has reviewed the draft environmental impact statement for West Rocky Butte. We offer the following comments for your consideration.

Terrestrial Considerations:

The preferred alternative is to lease the West Tract (393.0 acres) along with an additional isolated tract (Option A -- 70.4 acres) to facilitate maximum economic recovery of the coal deposit. The tracts will be added to the existing Rocky Butte Lease (4910.0 acres) to create a "logical mining unit." The total permit area for this mine will be 9647 acres and the affected area will be 7333 acres, thus becoming one of the larger operations in the Powder River Basin. Mining will commence in 1993 and terminate in 2034. The lease will be treated as a coal maintenance tract in accordance with "lease by application" procedures, pursuant to de-certification of the Powder River Basin Coal Production Region. We previously commented on a BLM scoping statement (October 30, 1991) and a "preliminary" DEIS (December 13, 1991).

We are disappointed that this DEIS concentrates more on discounting the significance of impacts than in presenting an objective analysis. There are serious problems with reclamation technology in the Powder River Basin that need to be resolved. This document should spell out trade-offs - loss of habitat for big game and sage grouse for many years, and changes in habitat diversity. After reviewing this DEIS and our comments from previous correspondence, we have identified the following concerns:

Wyoming Game and Fish Department
1100 State Capitol Building
Cheyenne, WY 82002
303 733 7200

Mr. Rod Miller
March 2, 1992
Page 2 - EIS 6608

- 1) RE: Protection of Riparian Vegetation (Page 3-4). While it may be true that riparian vegetation associated with livestock reservoirs is a jurisdictional wetland type, such areas are protected under the surface coal mining regulations [See 30 CFR 816.97(f)]. This distinction should be made in the text.
- 2) RE: Topographic Moderation (Page 4-5). The preparer attempts to dismiss the impact of topographic moderation by suggesting increased infiltration and decreased erosion will be benefits. Perhaps, but adverse impacts should also be summarized. These include loss of wildlife habitat and reduction of vegetation diversity.
- 3) RE: Vegetation Impacts (Page 4-8). The preparer suggests that long term vegetation impacts will be negligible because the operator will be required to meet State revegetation standards. This conclusion is incorrect because: a) The state has no mandatory shrub standard -- only a goal; meeting the goal will restore only 6 percent of the pre-mine shrub density on native surfaces and the species composition will be altered. This is a major, long term impact; and b) Reduction in topographic diversity and mixing of soil types and horizons will result in a long-term reduction in plant community diversity. These effects should be discussed in the DEIS.
- 4) RE: Habitat Diversity (Page 4-16). The statement, "Additionally, topographic moderation may reduce habitat diversity should be changed to "...will reduce habitat diversity."
- 5) RE: Impacts to Antelope (Page 4-16). Virtually the entire surface to be affected by this operation is winter/yearlong antelope range. Reduction in topographic diversity and loss of the shrub (sagebrush) component will permanently convert this to summer range. This impact is considered major, long term -- not minor as suggested by the preparer.
- 6) RE: Impacts to Sage Grouse (Page 4-17). The preparer insists lek disturbance is the most serious impact to sage grouse. While this is a concern, the more serious impact will be long term removal of sagebrush cover and riparian brood rearing habitats. The reader suggests impacts attributed to sagebrush removal will only be "moderate" and persist until sagebrush is reestablished. The amount of sagebrush that will be restored under the current shrub standard is only a small fraction of the cover and density necessary to support sage grouse. Use of reclaimed surfaces by sage grouse will be completely eliminated for a very long period of time. The preparer should acknowledge this impact and provide an estimate of the time likely to elapse until adequate sagebrush densities develop from the initial colonization at the time of bond release. Considering the allowance for substitution of other shrub species under the current shrub standard, it is likely that initial

Mr. Rod Miller
March 2, 1992
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sagebrush densities will be on the order of 0.5 to 2 percent of premine densities. This is consistent with what has been observed on current mine reclamation.

- 7) RE: Restoration of Pre-Mine Habitat Value (Page 4-19). In the Recreation section, the preparer dismisses potential impacts to recreational use on the basis that, "postmining reclamation would restore wildlife habitat to premining conditions." While this is an objective stated in the IQD regulations, it is not achievable at this time. Reduction in topographic diversity and loss of the shrub component preclude restoration of commensurate habitat conditions. In addition, technologies for restoring various wetland types such as playans and subirrigated riparian zones are untested. The reader should not be misled by suggestions that commensurate habitat restoration is possible under current technologies and legal constraints.
- 8) RE: Cumulative Wildlife Impacts (Section 6.9). The preparer attempts to dismiss the significance of cumulative impacts using the "incremental approach." In other words, the preparer expresses losses as minor percentages of the overall availability of the resource. This approach is flawed, because it does not include the incremental contributions of all impact sources in the present and foreseeable future. This would include industrial, urban, transportation, agricultural, and any other cultural activities. Downplaying the significance of small incremental fractions chips away at resources in unnoticeable fragments, ultimately resulting in a serious compromise of the resource while avoiding opposition. It is not a true cumulative analysis.
- 9) RE: Cumulative Impacts to Antelope (Tables 4-2 and 6-8, Section 6.9). Aside from the problem stated above, the applicant's analysis of cumulative impacts to antelope is misleading. Tables 4-2 and 6-8 suggest only 6.6 percent of occupied pronghorn habitat will be affected by mining in the Highlight Herd Unit. Mines in this herd unit tend to be situated proportionately more within winter/yearlong habitat than other types. Virtually all disturbances associated with Rocky Butte Mine will be within winter/yearlong range. Extensive winter/yearlong habitat alterations can have a far greater impact on carrying capacity than disturbances within yearlong habitat. In 1986, we determined approved mine permits would collectively affect 22 percent of the available winter/yearlong habitat within the Highlight Herd Unit. If the Rocky Butte affected area is added to this figure the proportion increases to 25 percent. The potential consequences of converting this much winter/yearlong habitat to summer range should be discussed.
- 10) RE: Hunting Access (Sections 4.1.7 and 4.1.9). In our comments on both the scoping statement and the preliminary DEIS, we discussed concerns with eliminating big game harvest on the permit area. This has not been addressed in the DEIS. Consequently, the comment is repeated below:

Mr. Rod Miller
March 2, 1992
Page 4 - EIS 6608

The Rocky Butte Coal Lease is situated within the Highlight Antelope Unit, which has been chronically under harvested. Only 3 percent of the occupied habitat is accessible public land. High trespass fees and hunting closures on mine lands make it difficult to maintain herd population objectives through sport hunting. The 1991 post season population estimate of 12,000 antelope places the herd 1,000 animals over objective. Continued inability to control growth of this attraction will eventually result in a large winter die-off, similar to that which occurred in winter of 1983 - 1984. This problem will be aggravated as mining converts available winter habitat to summer range and as additional fencing is constructed. From a management standpoint, this is highly undesirable.

There are currently eight coal mines operating within the Highlight Herd Unit which account for 12 percent of the occupied habitat. Ten additional sections of land associated with the Rocky Butte Mine could potentially be withdrawn from rifle hunting. Closed surfaces become refuges which draw additional animals from surrounding areas where they might otherwise be accessible to hunters. Lardoner coupon redemptions indicate past hunting on the Rocky Butte Tract has accounted for 6 percent of the annual harvest in Herd Unit 24. To alleviate the cumulative impact of hunting closures, we recommend the following mitigation procedures:

- a) Hunting should be allowed within the Rocky Butte permit area throughout the life of the operation. Only the minimum area necessary for safety considerations should be closed.
 - b) The coal company, in cooperation with the BLM, USFS, and WGF, should lease additional lands within Hunt Area 24 to facilitate public access. Easements across private surfaces to previously inaccessible public lands should be given priority.
- 11) RE: Effect of Topographic Moderation (Sections 4.1.2, 4.1.4, 4.1.7, 6.4, 6.6, and 6.9). In our comments on the preliminary DEIS, we requested the preparers to discuss local and cumulative effects of topographic moderation on bio-diversity and big game carrying capacity. This has not been addressed in the DEIS. Consequently, the comment is repeated below:

Because of the unconsolidated nature of replaced overburden material and thin overburden conditions, it will not be possible to restore topographic diversity on reclaimed surfaces. Steep regraded slopes are not erosionally stable. Furthermore, topography must be flattened considerably to conserve enough material that through drainage may be restored. The net result is reduction of habitat diversity leading to loss of biological diversity. Big game winter range is also converted to summer range because exposed slopes which support accessible forage are permanently removed. This is one of the permanent, adverse impacts of mining that has been never been adequately acknowledged or addressed

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

Mr. Rod Miller
March 2, 1992
Page 5 - EIS 6608

in previous EIS's, yet the effect is visibly apparent on existing mines. The local and cumulative effects topographic moderation will have on biological diversity and big game carrying capacity should be discussed.

- 12) RE: Feasibility of Shrub Reclamation (Sections 4.1.4, 4.1.7, 6.6, and 6.9). In our comments on the preliminary DEIS, we requested the preparers to discuss feasibility of shrub reclamation along with effects on bio-diversity and big game carrying capacity. This has not been addressed in the DEIS. Consequently, the comment is repeated below:

The document dismisses the impact of shrub removal, suggesting it will be temporary and only persist for the duration of mining and the bond period. To date, no one has developed reliable technologies for reclaiming native shrub species. Furthermore, neither the existing nor proposed State shrub standards are adequate to restore sage grouse habitat or forage requirements of wintering big game. This is another serious, negative impact of mining that has been never been adequately acknowledged or addressed in previous EIS's, yet the effect is visibly apparent on existing mines. At best, the impact of shrub removal will be very long term, perhaps considered permanent within the regulatory framework. The local and cumulative effects sagebrush elimination will have on sage grouse habitat, wintering big game, and overall biological diversity should be discussed. Also, the likelihood shrub reclamation methods and regulatory performance standards will evolve expeditiously, to correct this problem before substantial areas are reclaimed to unsuitable conditions should be discussed.

Aquatic Considerations:

Several of our recommendations that were offered on the preliminary draft were either ignored or not addressed. Specifically there is still no documentation of existing fisheries in any of the ponds presently found within the project area (comment 3). Likewise, the draft does not address the potential importance of recreation in the future and the role that the project could play in addressing this issue (comment 2). We are also concerned that the draft EIS has not addressed potential water management options that we discussed in comments 4 and 5 in terms of wetlands mitigation.

These are important issues that should be addressed by the final EIS in order to provide an objective analysis of all potential impacts and mitigation strategies. Identification of real issues and solutions at the present stage of the project could not only increase the project's feasibility, but could result in significant public benefits in the future.

Mr. Rod Miller
March 2, 1992
Page 6 - EIS 6608

Thank you for the opportunity to comment.

Sincerely,


JOE WHITE
DEPUTY DIRECTOR

JW:TC:as
cc: Game Division
Fish Division
RUIS Division
USFWS

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

6



FEB 28 1992

MIKE SULLIVAN
GOVERNOR

1ST FLOOR EAST HERSCHLER BUILDING CHEYENNE, WYOMING 82002 TELEPHONE: 307-777-1368
FAX: 307-777-6937

Office of Industrial Piling Administration

MEMORANDUM

TO: Rod Miller, Federal Lands Management Coordinator

FROM: Jay A. Meyer, Senior Economist *JAM*

DATE: February 27, 1992

SUBJECT: Draft EIS for West Rocky Butte Coal Lease Application (SIN 91-089)

I have reviewed the Draft EIS for the West Rocky Butte Coal Lease Application. I am somewhat concerned that the potential for adverse impacts to the Gillette housing market is significantly understated in the Draft EIS. The vacancy rate in the City of Gillette in September 1991 was only 6%. According to the Draft EIS, the potential number of households which may migrate into Gillette resulting directly and indirectly from the Rocky Butte project alone is 446 in 1994. This number of households would fill every vacant mobile home (not vacant spaces), single and multi-family dwelling in Gillette (in the September 1991 housing survey). When the estimated population impacts of the new BHP&L Power Plant and the Dry Fork Mine expansion are added to the estimated Rocky Butte population impacts, the only reasonable conclusion is that a shortage of housing in the Gillette area is quite likely.

The conclusion on page 4-29 that almost all operations workers would be hired from among existing residents in the Gillette area seems to be overly optimistic. Also, the projected residence patterns for Rocky Butte Mine are not consistent with those of the nearby Rawhide, Caballo, and Belle Ayr Mines. I would anticipate the percentage of Rocky Butte employees who would choose to locate in Gillette to be slightly higher than the average of 81% for the other three mines but probably not as high as 90%. Overall, I would expect the residence patterns of Rocky Butte employees to more closely resemble those of Rawhide, Caballo, and Belle Ayr. It might be reasonable to include the town of Moorcroft in the area of socioeconomic influence.

I would agree that the population projections presented on page 4-30 indicate a worst-case scenario for the Rocky Butte Mine. However, when the cumulative impacts of all three potential projects are considered, they may be relatively close or even low in the early years.

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Recycled Paper

The cumulative population and employment projections presented in Section 6.17.5 appear to be quite high. While the projects referred to in this section are likely to have an impact on the baseline population and employment projections of the Wyoming Department of Administration, I question the magnitude of the difference. Also, on page 6-23 of the Draft EIS, it is estimated that about 195 housing units should be added annually through the year 2000 to maintain an adequate housing stock. No mention is made regarding how this is to be accomplished. I would agree that the local housing industry will have to respond to projected shortages with sufficient lead time. The question of how this can be accomplished should be addressed in the EIS.

JAM

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

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FEB 06 1992

MIKE SULLIVAN
GOVERNOR

Public Service Commission

700 W. 21ST STREET CHEYENNE, WYOMING 82002
(307) 777-7427
FAX (307) 777-5700

BIL TUCKER
CHAIRMAN
JOHN R. "DICK" SMYTH
DEPUTY CHAIRMAN
STEVE ELLENBECKER
COMMISSIONER

ALEX J. ELIOPULOS
CHIEF COUNSEL AND
COMMISSION SECRETARY
STEPHEN G. OXLEY
ADMINISTRATOR

MEMORANDUM

TO: MR. ROD MILLER
FEDERAL LANDS COORDINATOR
STATE PLANNING COORDINATOR'S OFFICE

FROM: JON F. JACQUOT
CHIEF ENGINEER
PUBLIC SERVICE COMMISSION *J.F. Jacquot*

DATE: FEBRUARY 6, 1992

RE: ENVIRONMENTAL IMPACT STATEMENT FOR THE WEST
ROCKY BUTTE COAL LEASE APPLICATION, STATE IDENTIFIER
NO. 91-089

Thank you for the opportunity to comment on this matter. The Commission requests that, when coal leasing is being done, the costs of relocating any utility and pipeline facilities to accommodate coal production be borne by the lessee. If these costs are not borne by the lessee, those costs would fall unfairly on the general rate paying public.

The Commission requests that, when coal leasing is being done, the costs of relocating any utility and pipeline facilities to accommodate coal production be borne by the lessee. If these costs are not borne by the lessee, those costs would fall unfairly on the general rate paying public.

If you should have any questions regarding this matter, please let me know.
mj

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

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FEB 27 1992



THE STATE OF WYOMING

MIKE SULLIVAN
GOVERNOR

GORDON W. FASSETT
STATE ENGINEER

State Engineer's Office

HERSCHLER BUILDING 4-E
13071 777-7354

CHEYENNE WYOMING 82002-0370
FAX (307) 777-5451

MEMORANDUM

TO: Rod Miller, SPC
FROM: Sue Lowry, Interstate Streams Engineer *SL*
DATE: February 27, 1992
RE: draft West Rocky Butte Coal Lease Application
Environmental Assessment SPC ID# 91-089

No further permit activity regarding this proposed mine has been received by this office beyond those described in an October 16, 1991 letter from Phil Velez to you. I am attaching a copy of that letter for your reference.

The EA describes the surface and groundwater resources of the area, and on page 4-9 makes reference to a 1963 Board of Control tabulation of adjudicated rights. The published tabulation of adjudicated rights in each of our 4 water divisions is updated approximately every 5 years. I would suggest that the authors of the EA should obtain a more current listing of the adjudicated water rights for the tributaries of concern.

Please contact me if you have any questions.

cc: John Barnes
Phil Velez

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THE STATE OF WYOMING

MIKE SULLIVAN
GOVERNOR

GORDON W. FASSETT
STATE ENGINEER

State Engineer's Office

HERSCHLER BUILDING 4-E
13071 777-7354

CHEYENNE WYOMING 82002-0370
FAX (307) 777-5451

MEMORANDUM

TO: Rod S. Miller, Federal Lands Planning Coordinator
FROM: Phillip A. Velez, Senior Analyst *Pav*
DATE: October 16, 1991
SUBJECT: Western Energy/Rocky Butte Mine

As of this date, we have received no new applications for permits for any facilities associated with the referenced project. As you may be aware, in 1982, we did authorize several reservoir permits associated with Texas Energy Services, Inc. for a new mine in this area. On March 11, 1987, those permits were canceled per Statute since we received no response to our expiration notice. According to our records, on February 19, 1988, Mr. Dee Williamson of Kaneb Services, Inc., Houston, Texas, telephoned this office and advised us that new permits would be obtained in the future.

For future contact in this regard, our contact person for ground water (wells) matters is Mike Penz. For surface water matters, please contact me.

Thank you.

cc: John R. Barnes
Administrator, Surface Water and Engineering
Mike Penz
Ground Water Analyst

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

10



OFFICE OF
CAMPBELL COUNTY COMMISSIONERS
500 S. Gillette Avenue, Suite 212
Gillette, Wyoming 82716
(307) 682-7283
(307) 687-6325 FAX



March 9, 1992

CAMPBELL COUNTY	
MAR 11 1992	
ADM.	PL
SA	SA
AD	GRA
GR	NRA
LHR	PRA
GR	Lead Prep

Bureau of Land Management
Casper District Office
1701 East "E" Street
Casper, Wyoming 82601

ATTENTION: Jim Melton, EIS Coordinator

Dear Mr. Melton:

In review of the Draft Environmental Impact Statement for the West Rocky Butte Coal Lease Application, the Campbell County Board of Commissioners is in support of the Northwestern Resources Company efforts to develop this project.

The Board has received comments regarding water usage and development in conjunction with this application and existing mining activity in the Power River Basin, the Board believes that the EIS for the West Rocky Butte application adequately addresses these issues.

The continued growth of the mineral and mining industry is extremely important to the sustenance of Campbell County and the State of Wyoming. The impact of the mining industry on Campbell County has been quite beneficial and positive to our citizens. We look forward to a similar relationship with Northwestern Resources Company.

On behalf of the Board of Commissioners, I encourage the Bureau of Land Management to approve the West Rocky Butte Coal Lease Application WY 122586.

Sincerely,
CAMPBELL COUNTY BOARD OF COMMISSIONERS

Stanley S. Sheehan
Stanley S. Sheehan, Chairman

*The Mission Of Campbell County Is To Provide, Through Sound Decision Making, Fiscal Responsibility
And The Best Quality Of Basic Services For All Campbell County Residents.*

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

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CITY OF GILLETTE
P. O. BOX 3003 - GILLETTE, WYOMING 82717-3003
PHONE (307) 686-5200

March 5, 1992

Mr. Jim Melton
EIS Coordinator
1701 East E Street
Casper, WY 82601

Dear Mr. Melton:

The purpose of this letter is to respond to the Draft Environmental Impact Statement for the West Rocky Butte Coal Lease Application proposed near Gillette.

Let me say first that the City of Gillette generally supports this project and we feel that an additional large mine in the area would enhance our economic future. We realize that this is the first step in a lengthy permitting process and many of the potential opportunities and issues raised by the project will be more thoroughly analyzed as the project proceeds.

We feel that continued coal leasing within the Powder River Basin is important to our future.

Our staff has reviewed the EIS and we have a number of specific comments and questions regarding the Socio-Economic impacts of the project. These specific questions and comments will be transmitted directly in writing prior to the March 16th deadline and should be considered in the Final EIS as well as future permitting applications.

We look forward to working in cooperation with Northwestern Resources as well as the permitting agencies in making this project a reality. Thank you for the opportunity to comment.

Sincerely,

E. J. Collins
Mayor

DS/EJC/b

ds:92.029

12



CITY OF GILLETTE
P. O. BOX 3003 - GILLETTE, WYOMING 82717-3003
PHONE (307) 686-5200

March 6, 1992

Mr. Jim Melton
EIS Coordinator
1701 East E. Street
Casper, WY 82601

Dear Mr. Melton:

Attached to this letter is a detailed compilation of comments received from various City departments on the West Rocky Butte Coal Lease (Draft) EIS.

Based on these staff comments there are a number of areas which need further analysis in order to allow the City to plan for and react to the impacts of this project.

The general staff reaction is that given this adequate information and lead time the community can accommodate this project without severely impacting the quality of life for our citizens.

We feel that the leasing process should move forward and that these questions and comments can be addressed in the further permitting of the mine especially the Industrial Siting Application.

Please incorporate our questions and concerns into the process. If you have any questions you may contact myself or any of the contact people listed in the comment section and we would be happy to provide further clarification.

Thank you for the opportunity to comment.

Sincerely,

John C. Darrington
City Administrator

DS/JCD/b

ds:92.039

Summary of Staff Comments

West Rocky Butte Coal Lease Application
Environmental Impact Statement

by: David Spencer, Director
Department of Community Development

City of Gillette, Wyoming
P. O. Box 3003
Gillette, Wyoming 82717

Introduction

The following is a compilation of City staff comments received regarding the draft EIS for the Rocky Butte Mine. The comments are divided into four categories which include Public Works/Utilities; Police; Finance; and Planning. At the end of each section, a contact person (or persons) are listed who can provide more information on the comment.

At the end of the compilation is a summary of staff perceptions of the project which will be useful in determining how the comments should be incorporated into the final EIS.

Public Works/Utilities

1) Section 3.5.2 - Groundwater

a) Page 3-1 paragraph 8

A number of large outlying subdivisions containing several hundred lots, such as Sleepy Hollow, Antelope Valley, Crestview Estates, etc., rely on wells in the Fort Union aquifer which could be affected by this project.

2) 3.15.2 - Economic Characteristics

Page 3-42 Table 3-2

Comment on large change in Services and Public Administration sectors from 1985 to 1989. Is this an error in the table?

3) 3.15.3 - Overview of Infrastructure and Public Sector Fiscal Conditions

Page 3-45 paragraph 2

Sewer, electric, solid waste and water service is provided by the Department of Utilities not Public Works.

Summary of Staff Comments
West Rocky Butte EIS
Page 2

The characterization of a "limited" number of Gillette households served by domestic water associations is incorrect. The number is somewhere between 1500 and 2000 of a total of 7300.

There also are several thousand more households right outside the City limits. Upon meeting policy guidelines, these areas would receive priority in hooking up to City water in the future.

Page 3-45 paragraph 3

Gillette has 13 wells in the Fort Union and Fox Hills formations rather than eight (8). Gillette is obligated to deliver up to 700 GPM to Moorcroft, up to 150 GPM to Rozet, and up to 1000 GPM to the Wyodak Power Plant.

Page 3-46 paragraph 1

The City of Gillette water system could serve an additional 10 to 15,000 users however it would require additional investment in "peaking" storage as well as significant policy changes to encourage conservation, especially in regard to irrigation use. Also we have established a priority of service to existing water districts within the City Limits first which amounts to over a thousand potential users.

Page 3-46 paragraph 3

The Wastewater Treatment Plant is designed to treat 3.85 million gallons per day not 4.0 Mgd. The system was designed to serve 40,000 people by adding specific treatment units at the plant. There would be costs associated with this upgrade due to population expansion.

4.0 Analysis of Proposed Actions and Alternatives

Page 4-3 Table 4-1

Socio Economics Section -

Increased need for public facilities and services - impact would be moderate to significant for water service when viewed as a cumulative effect. Sewer could also represent at least a moderate impact.

Page 4-31 paragraph 8

Burden to the water and sewer system of additional growth may require some mitigation in order to accommodate pace of projected growth especially in regard to "peaking" water storage.

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

Summary of Staff Comments
West Rocky Butte EIS
Page 3

Page 4-23 paragraph 4

Impact on Highway 59 South will be significant since this area is congested already. Additional shift traffic will worsen the situation unless alternate routes such as the proposed "Beltline" are completed.

6.17.7 Cumulative Infrastructure and Public Sector Impacts

Page 6-24 paragraph 1

An increase of average daily water usage from 6 Mgd to 7.2 Mgd is a 20% increase not 2% and would be a significant increase in usage since it would also presumably increase peak usage beyond our current capability. Storage needs to be increased.

Page 6-24 paragraph 3

Wastewater plant capacity is 3.85 Mgd. We cannot serve 40,000 people without further investment in our plant.

Contact persons on Utilities and Public Works comments:

Bill Carson
Public Works Director/City Engineer
307-686-5265

Jon Young
Director of Utilities
307-686-5262

Finance Comments

Page 6-2 paragraph 4

Comment on oil production is correct. This has resulted in declining revenues for the City and other governments dependent on mineral royalties and severance tax. The City of Gillette has experienced a drop of approximately 20% in budget revenues this Fiscal Year for these funds.

Page 5-25 paragraph 3

Related to the above comment, the City of Gillette's share of mineral royalty and severance taxes have been fixed by the 1990 Census figures and will not be adjusted again until the year 2000. The total mineral royalties and severance taxes accruing to the State will increase however the effect will be greatly diluted by the time this revenue trickles back to the City. Increased sales and use tax is based on County totals. However, again the City

Summary of Staff Comments
West Rocky Butte EIS
Page 4

will only benefit under the same fixed population ratio. This lag of revenues when population increases faster than revenue is a chronic problem which can only be partially addressed by income from impact assistance payments.

Contact person on Finance comments:

David Layden
Director of Finance
307-686-5209

Police Department

Page 5-24 paragraph 5

The growth of approximately 10,000 people in the immediate vicinity of Gillette would necessitate an increase of 15 to 20 sworn officers to the current sworn officer count. Additional support staff and equipment costs as well as necessary expansion of the existing police facility to accommodate the larger department could easily cost several million dollars over the 10 year forecast period.

Understaffing coupled with stable to decreasing City revenue during the next three years will make it very difficult to remedy the current understaffing and add staff to meet the potential peak construction impact in 1995 or 1996. This is aggravated by an 8 to 15 month lead time necessary to fully train new officers including academy work.

Contact person for Police Comments:

Jeff Pfau
Chief of Police
307-686-5232

Planning Department

3. 15. 1 Demographic Characteristics

Page 3-39 Table 3-14

What is the source of the County population data shown in this table? The County does not estimate population between censuses. This data could be very unreliable depending on its source.

Summary of Staff Comments
West Rocky Butte EIS
Page 5

Page 3-39 paragraph 5

The analysis of population is inconsistent throughout due to the "benchmarking" of some data to Census figures and then utilizing local data in a raw form to fill in periods in between. Also growth rates, housing projections and household sizes, etc., are "off" for the same reason. In many cases the conclusions are based on "apples and oranges" mixed together. No attempt was made by the consultant to really establish which data is more reliable.

4. 1. 15 Socio Economic

Page 4-25 paragraph 3

This paragraph epitomizes the problem cited above where the "low base" Census figure of 17,635 is quoted for the City and the higher local estimate, based on a different set of data is used for the "Gillette Urban Area".

Page 4-26 and Page 4-29

The analysis of employment and hiring and the conclusion that creation of employment in high paying jobs will result in minimal in-migration is simplistic. Local workers will undoubtedly be hired for a good portion of the operations jobs however they will leave other lower paying jobs to be filled by in-migrants. This "hiring up" scenario will result in the same, if not more impact since the in-migrants will require housing and services and probably be less able to afford them. It also says nothing about the "excess" labor force attracted to the community by the lure of job potential which also produces secondary impacts. These effects have been experienced by Gillette in the past and can result in moderate to severe impacts which are not measured in this analysis.

Page 4-31 paragraphs 1 and 2

Ability of the housing market to respond on the short term needs to be carefully monitored and further analyzed. The current tight housing market and current production level of housing could cause conflicts during the early construction phases especially in view of other potential projects and events occurring at the same time. Latter cumulative analysis contradicts this assessment of potential impact.

Pages 4-31 paragraphs 7 and 8

The incremental revenues spoken of in this section are large on paper but their actual availability to the community when needed may be questionable. In addition the impacts on law enforcement and utilities may be understated.

Summary of Staff Comments
West Rocky Butte EIS
Page 6

Page 4-33 paragraph 3

The conclusion reached in this section is that Gillette will bear the major responsibility for servicing the impact of the project with only \$200,000 in additional revenues annually. No analysis was done to see if in fact this is reasonable or realistic given a detailed analysis of the City's finances. This amount is less than 1/2 of 1% of the current City budget of 30 million dollars.

6. 17. 3 Baseline Employment Projections

Pages 6-20 and 6-21

More detailed information needs to be supplied as to how these employment projections were arrived at. They are very aggressive in relation to anything which has been seen recently.

The general employment growth in Campbell County in the past three years has averaged 2%, however sustained growth in employment at the level portrayed lasting ten years would be unusual and highly unlikely.

Page 6-22 Table 6-12

The baseline population figures for the City of Gillette we feel are low because of the use of census data. The base difference of 1,650 people in 1990 between local estimates and census figures is a significant issue which needs to be resolved since it materially affects the base line growth rate portrayed. The City estimates show an average annual growth rate of 3% from 1987 to 1991.

No data or information is supplied as to the source of the growth rate used in the baseline projections.

Another underlying issue in regard to baseline City population increase is the allocation of population which is made between the City of Gillette and Campbell County. There is no data to suggest that the population growth rate is the same for the City and county. In 1990 the ratio of population between the City and County was 55%. In 1990 it was 58%. However on page 6-21 it is projected that the majority of mine workers will reside in the vicinity of Gillette. In Table 4-6 this estimate is placed at 90%. Due to new annexation and utility policies of the City it is very plausible and likely that most of the "County" population increase will also be in reality part of the population increase which should be shown in the City of Gillette column. For example it is unlikely new large urban type subdivisions would be approved within the 201 plan area that weren't connected to City sewer. This would necessitate annexation or an agreement to annex.

This table needs to be re-analyzed.

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

Summary of Staff Comments
West Rocky Butte EIS
Page 7

Page 6-22 Table 6-13

See comments on employment projections above.

Page 6-23 Table 6-14

The base line and urban/County ratio concerns carry over into this projection table.

Page 6-23 paragraphs 4-6

The analysis of potential housing demand is based on the population projections cited above. Again the analysis is very simplistic with no attempt to relate the projected demand to the specific structure of the housing market. This makes it difficult to assess the true impact.

The statement is made that cumulative impacts on the housing market could be a concern. However in the Table on 4-3, housing is not even mentioned as a separate impact issue.

The cumulative addition of 185 to 250 housing units per year to the local market is much higher than any recent production level since the early 1980's and needs more detailed analysis.

Page 6-25 paragraph 7

The reference to the National High School Rodeo should not be addressed under cumulative portion of the EIS but under the construction and short term impacts of the project.

Contact person for Planning comments:

Tom Langston
Director of Community Development
307-686-5281

Summary of Recommendations

In analyzing the detailed staff comments on the EIS, no insurmountable problems were identified in accommodating the growth related to this project. In general, the staff recommends that the following areas be given more attention in subsequent permitting analysis for the project:

- 1) The ability of water and sewer to expand and meet projected demand, needs more detailed analysis especially in regard to how it fits with current City fiscal conditions.
 - a) Areas of concern are costs of increasing peak storage and adding increments of treatment in the case of wastewater treatment.

Summary of Staff Comments
West Rocky Butte EIS
Page 8

- 2) More detailed financial analysis is needed to determine the specific impacts and timing of projected revenue increases versus when increases in services have to be delivered.
- 3) The issue of potential impacts to law enforcement is directly related to #2 and needs to be assessed in detail.
- 4) The analysis of baseline and project population projections and assessment of growth potential needs more analysis. This also affects the outcome of housing projections.
 - a) Some attempt needs to be made to incorporate more detailed and accurate local data versus sketchy census data to fine tune the population impact analysis.
- 5) More detailed analysis and monitoring of housing conditions both prior to and during the project needs to be carried on to prevent housing impacts. This includes analysis and data designed to minimize under-building and over-building which could later result in long term hardship due to future downturns.

If these items are addressed in further development of the Rocky Butte permitting process, then the community will be able to respond in a smoother manner in accommodating the project.

None of the concerns should hamper the continued progress in making the project a reality.

ds:92.032

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

13

BELLE FOURCHE PIPELINE COMPANY

LAW DEPARTMENT
 8 State, Lower Canyon
 Edward A. Lajoie, Attorney
 John J. Boudreau, Attorney
 Donald W. Morris, Attorney
 David W. Tisdale, Attorney

RIVER CROSS ROAD

PHONE 237-9301
 P. O. DRAWER 2360
 CASPER WYOMING
 82602

March 13, 1992

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Casper District Manager
 Bureau of Land Management
 c/o Jim Melton, EIS Coordinator
 1701 East "E" Street
 Casper, WY 82601

Re: Request for Comments on Draft EIS,
 West Rocky Butte Coal Lease Application

Dear Sir:

In response to the above-captioned request, Belle Fourche Pipeline Company (Belle Fourche) must point out that the Draft EIS both contains some misinformation and lacks other data which are necessary to accurately assess the impacts of granting the sought coal lease.

- In the first instance, on p.3-34 (3.14.2) the monthly production of Rourke Gap Field is given as 9,500 BPM (Barrels of oil Per Month) whereas actual production varies from its usual monthly level of more than 19,000 BPM to well over three times that (30,000 BPM).
- Secondly, the DRAFT EIS off-handedly describes Belle Fourche as having special use permits and states that "pipelines...exist within permitted rights of way (ROWS) in the permit area." In fact, however, much of Belle Fourche's affected pipeline mileage is on permanent easements "warranted and conveyed" to Belle Fourche as far back as 1962.
- Moreover, the location and extent of Belle Fourche's pipelines are not such that they can be treated in an off-handed manner. Enclosed is a copy of Figure 3-12 from the Draft EIS on which has been drawn the approximate locations of Belle Fourche's existing lines. It is obvious that there are approximately 10 miles of pipelines which extend throughout the very heart of the application area.
- While that might be of limited interest if the Draft's implication that these lines will soon be unnecessary (since the well production will be ending starting in 1995) were accurate, that implication is not correct.
- It must be kept in mind that Belle Fourche is a common carrier pipeline which provides service throughout the Powder River Basin, and its pipelines in the application area are part of a

CASPER #1144
 APR 16 1992
 MAIL ROOM

DATE	FILE
ADM	FR
MA	SE
AG	TRA
OPR	MA
LAB	PRA
SCR	Land Rep

Jim Melton, EIS Coordinator
 Bureau of Land Management
 March 13, 1992
 Page 2

single system providing the most economical, least environmentally-harmful method of getting Wyoming's Powder River crude oil to market.

- As can be seen from the attached map, the direction of flow is from the west and northwest through the application area to the northeast to Belle Fourche's Donkey Creek Station. In view of this, it should be no surprise that the pipelines in the application area transport in excess of 120,000 BPM in behalf of several major shippers. At Donkey Creek these 120,000 BPM continue on either to the south or farther east on other of Belle Fourche's lines.
- There can be no question that the granting of the sought application and the ensuing surface mining would be inimicable to the continued existence of an important part of Belle Fourche's Powder River system. In turn, the destruction of these pipelines would necessitate substituted transportation for the 120,000 BPM now moving through them. This translates into more than 1300 truckloads (at 90 Barrels each) every month which would move over the mostly two-lane roads of the Northeast quarter of Wyoming.
- Alternatively, the cost of building new pipelines around the application area would entail an expenditure of approximately \$300,000.00. However, the existing shippers' payment for transporting their crude oil already includes the costs of building the present pipelines. Requiring additional payments from these shippers for the new lines, even if the Wyoming Public Utilities Commission would approve higher charges for this purpose, is obviously unfair. Further, this added burden might cause producing wells outside of the application to become uneconomical and require their being shut in.
- In summary, then, the proposed lease, if allowed to come in existence, gives rise to substantial negative impacts --- environmental, safety, and economic --- and the Draft EIS displays clear and important deficiencies by failing to address these impacts. Accordingly, the Draft EIS cannot be approved in its current form.

Very truly,

BELLE FOURCHE PIPELINE COMPANY

Manuel K. Lajoie
 Manuel K. Lajoie, Attorney

MAL-jan
 Attachment

3.0 AFFECTED ENVIRONMENT

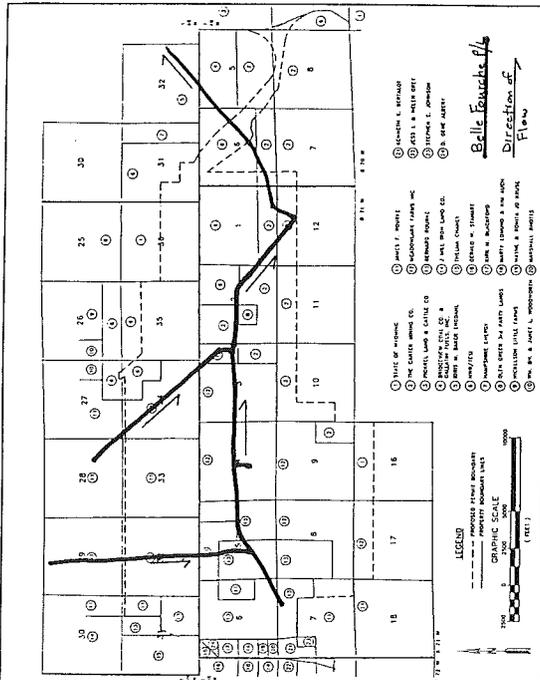


Figure 3-12. Surface Ownership On and Near the Proposed Rocky Butte Mine

3-35

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

14



Northwestern Resources Co.

16 EAST GRANITE, BUTTE, MONTANA 59701 (406) 723 5441

92 MAR 16 11:12 AM '92

March 12, 1992

Mr. Jim Melton
EIS Coordinator
Bureau of Land Management
1701 East "E" Street
Casper, WY 82601

Dear Mr. Melton:

It was a pleasure to meet you at the BLM Draft Environmental Impact hearing for Rocky Butte on February 26th. We were pleased with the meeting, and the manner in which it was conducted. For your records, I have included with this letter, a written copy of the statement I gave at the hearing.

Please let me or Northey Tretheway know if you need any further information from us.

Sincerely,
Bruce

Bruce S. Graving
President
Horizon Coal Services, Inc.

BSG:sh
Enclosure

15

92 MAR 31 10:12 AM '92

ENTECH

MINING • OIL • TECHNOLOGY • WASTE MANAGEMENT



March 26, 1992

Mr. Jim Melton
EIS Coordinator
Bureau of Land Management
Casper District Office
1701 East "E" Street
Casper, WY 82601

RE: Draft Environmental Impact Statement
Rocky Butte Coal Lease

Dear Mr. Melton:

In my oral comments at the public hearing on February 26, 1992, I indicated that Horizon Coal Services, Inc., a sister corporation to Northwestern Resources Co., will be assuming the responsibility to administer Northwestern Resources' coal interests in Wyoming. My staff and I reviewed the Draft Environmental Impact Statement (DEIS) and believe it is thorough and complete. It is our opinion that the DEIS identifies and properly analyzes all relevant environmental aspects of the alternative governmental decisions.

We appreciate the efforts of all agency representatives from the Bureau of Land Management and the Office of Surface Mining who have been involved in the NEPA process. We also thank you for the opportunities the Government provided for community and public involvement. The content of the DEIS reflects that the Bureau of Land Management and the Office of Surface Mining are proceeding with NEPA compliance in a responsive and responsible manner.

We look forward to providing additional information and working with the Federal and State agencies, the community and the public as the process continues.

Sincerely,

Bruce S. Graving

Bruce S. Graving
President
Horizon Coal Services, Inc.

BSG:sh

16 EAST GRANITE, BUTTE, MONTANA 59701 • (406) 782-4233

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

16



SIERRA CLUB
NORTHERN GREAT PLAINS REGION
COLUMBUS BUILDING
13 NORTH ST. #200
HERIDAN, WYOMING 82501

0071672-0125

March 2, 1992

Casper District Manager
Bureau of Land Management
c/o Jim Melton, EIS Coordinator
1701 East E Street
Casper, Wyoming 82601

Dear District Manager:

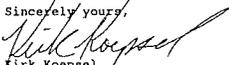
We are extremely concerned with the Draft West Rocky Butte Coal Lease Application Environmental Impact Statement.

1 The Sierra Club opposes the BLM's obvious evasion and manipulation of diligence requirements. We cannot believe that the BLM is willing to circumvent diligence in this case. Diligence requirements were developed to prevent speculation in coal leases. If diligence is ignored here, the BLM is opening a Pandora's box which will allow unwanted and unwarranted speculation in coal leasing.

2 The BLM has also failed to follow its regional activity planning process on this proposed lease as required by federal law and has instead chosen to issue this lease under a lease by application process. A regional coal leasing EIS would address the cumulative impacts of all leasing proposed in the Powder River Basin Coal region, which this EIS has failed to do.

Frankly, we are astounded the BLM would blatantly violate federal law as it is proposing to do in this EIS. This EIS should be abandoned immediately and the West Rocky Butte coal lease should expire as required under federal law. If the lessee is interested in mining coal at West Rocky Butte than it should be required to bid on the expired lease in a competitive lease sale.

Sincerely yours,


Kirk Koepsel
Associate Representative

"Not blind opposition to progress, but opposition to blind progress."

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

17



March 16, 1992

Casper District Office
Bureau of Land Management
c/o Jim Melton, EIS Coordinator
1701 East E. Street
Casper, Wyoming 82601

RE: Draft Environmental Impact Statement for the West
Rocky Butte Coal Lease Application

Dear District Manager:

Thank you for inviting the Wyoming Outdoor Council (WOC) to participate in the environmental review process for the above captioned coal lease application.

WOC is a non-profit conservation organization dedicated to the protection and enhancement of Wyoming's environment. WOC achieves its mission by educating and involving its members and the public in decisionmaking, and by advocating environmentally responsible public policies. Established in 1967, the organization presently has over 1000 members.

The following comments are based upon WOC's review of the Draft environmental impact statement (DEIS) for Northwestern Resources Company's (NWR) coal lease by application. Our comments address issues involving the lessee's failure to comply with the BLM's diligent development requirements, the adequacy of proposed mitigation measures, and the adequacy of the environmental analysis under NEPA.

1 Diligent Development Requirements.

NWR proposes to acquire a coal lease (West Rocky Butte Tract) containing approximately 50 million tons of coal. The West Rocky Butte Tract is adjacent to NWR's Rocky Butte tract, which contains approximately 575 million tons of federal coal. In combining the two tracts, NWR hopes to preserve the existing coal lease, which is scheduled to expire in February 1993, by forming a logical mining unit (LMU). On its face, NWR's proposal to form a LMU by combining the tracts appears to be an attempt to avoid congressionally mandated diligent development requirements.

The Federal Coal Leasing Amendments Act of 1976 (FCLAA) was enacted, in part, to discourage the rampant speculation that then characterized the federal coal leasing program. FCLAA requires, among other things, coal production in "commercial quantities" to be demonstrated at the end of ten years. See 30 U.S.C. Section 207(a). Commercial quantities "means 1 percent of the

201 Main Lander, Wyoming 82520 (307) 332-7031



recoverable coal reserves or LMU recoverable coal reserves." See 43 CFR 3480.0-5(a)(6). Under the BLM's federal coal management regulations, "any Federal coal lease or LMU which has not achieved diligent development shall be terminated by DOI." See 43 CFR 3483.2. Diligent development "means the production of recoverable coal reserves in commercial quantities prior to the end of the diligent development period." See 43 CFR 3480.0-5(a)(12). NWR has failed to achieve diligent development. It now attempts, through sleight of hand, to extend for another 10 years the period during which diligent development must occur. The BLM's own regulations expressly provide that "no lease shall be issued and no existing lease shall be transferred, to any entity, that holds and has held for 10 years any lease from which the entity is not producing the coal deposits in commercial quantities . . ." See 43 CFR 3472.1-2(e)(1)(i).

While the rules do provide a limited exception to the due diligence requirements, WOC nonetheless believes that the BLM should carefully consider on the record the environmental, economic, and policy consequences of endorsing such tactics. The purpose of diligent development requirements is, of course, to discourage the acquisition and holding of public resources for speculative purposes, and to penalize, through the mechanism of lease forfeiture, lessees who attempt to profit at the public's expense. Allowing mine lessees to avoid diligence requirements by combining leases into LMUs circumvents - administratively - the diligence requirement imposed by Congress and invites similar specious requests in the future.

2 Potential Adverse Impacts to Nearby Residents.

The Nickelson Little Farms and Robbins Valley Estates subdivisions are both situated within one half mile of the proposed LMU permit boundary. See Draft West Rocky Butte Coal Lease Application EIS, page 3-38. Mining activity will doubtless have an adverse affect on these residences, particularly on air quality and water resources. But the DEIS suggests that any potential adverse impacts can be mitigated: "It is concluded that impacts from mining-induced drawdowns are minor since they must be mitigated by the operator if a water user is injured." See DEIS, page 4-15. Citing Wyoming law, the DEIS indicates that NWR will be required . . . to replace the water supply of an owner of interest in real property who obtains all or part of his supply of water for domestic, agricultural, industrial, or other legitimate use from an underground or surface source where the supply has been affected by contamination, diminution or interruption proximately resulting from the surface coal mine operation." See DEIS page D-3. These comments ignore the difficulties associated with recovery under Wyoming law.

WOC envisions two potential problems that could thwart attempts by residents impacted by mining activities to obtain relief. Both relate directly to the shortcomings associated with relying solely upon state law for recovery of damages. First, the burden of proof under the relevant section is on the injured party. Under the Wyoming law cited by the BLM, a property owner claiming an injury must prove by a "preponderance of evidence" that the mine caused the injury for which relief is sought. In WOC's opinion, placing the burden of proof on a private citizen who has arguably suffered an injury from mining operations is not fair. The difficulty of proving causation can be a substantial barrier to recovery. Often, information needed to show causation is, at best, difficult and costly to obtain. To stand any chance of winning his or her claim, an injured person would probably have to hire a lawyer to initiate a claim and technical consultants to refute all of the evidence the company would no doubt offer to vindicate itself.

Second, the law cited in the DEIS protects only "owners in interest in real property." See Wyo. Stat. 35-11-415(b)(xii). A lessee or renter injured by mining activities would have no direct cause of action against the mine operator under this section. Any attempted recovery would have to be made by and through the owner of the property, who may for any number of reasons be less inclined to zealously pursue a claim against the operator.

To ensure that nearby residents are adequately protected against adverse impacts, WOC recommends that the terms of the lease form be modified under 43 CFR 3475.1. In WOC's opinion, the issuance of the lease should be conditioned upon the operator agreeing to replace any source of water adversely affected absent the requirement that a claimant 1) be "an owner of interest in real property" and 2) prove that his injury was caused by mining operations. Removing the burden of proof, causation, and ownership requirements for claimants alleging injuries to water wells would provide the residents with the possibility of some measure of relief unavailable under the current proposal.

3 Wetlands and Riparian Areas.

Four intermittent streams are present in the proposed mine permit area: Tisdale Creek, North Tisdale Creek, Gold Mine Draw, and Donkey Creek. See DEIS at 3-6. In addition, the DEIS states that "[p]luyas, which are shallow closed drainages that pond water during wet seasons, are common [in the proposed Rocky Butte permit area]." See DEIS at 3-1. The DEIS also indicates that "[t]here are 39 riparian zones that support wetland plant species within the permit area (Reed, 1988). Twenty-eight riparian areas are within the proposed disturbed area." See DEIS at 3-4.

Finally, the statement indicates that "[r]iparian vegetation also occurs adjacent to springs or hollows in ephemeral channels and in one basin where there is a locally high water table." Id.

The DEIS fails to discuss in sufficient detail the potential adverse impacts to wetlands within the project area. The discussion of how impacts to wetlands will be mitigated seems to imply that man-made wetlands provide the same functions and values as the natural ones destroyed by draining and filling. See DEIS 5-1, D-1 to D-4. Please describe in greater detail how natural wetlands damaged or destroyed by mining will be replaced during reclamation.

Cooperating Agencies.

1) Corps of Engineers. The U.S. Army Corps of Engineers (COE) regulates the discharge of dredged or fill material into Wyoming water bodies and wetlands through Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). This section requires the issuance of a permit from the COE before dredged or fill materials can be placed into "waters of the United States."

The COE is not listed as a cooperating or consulting agency in the Draft EIS. Further, the COE is not included in the list of agencies and interested groups to whom copies of the draft statement have been sent. See DEIS at 8-1 to 8-7. Because jurisdictional wetlands may occur within the project area, shouldn't the Corps of Engineers be a "cooperating agency" under the CEQ's regulations implementing NEPA. See 40 CFR 1508.5 ("Cooperating agency means any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for . . . (a) major Federal action significantly affecting the quality of the human environment"). Such agencies have a duty to "comment on statements within their jurisdiction, expertise, or authority." Id. at 1503.2. Does the BLM intend to consult with the COE on this proposal or does it view as adequate the terse reference in the DEIS to a COE survey in 1989. See DEIS 3-4.

2) Environmental Protection Agency. The U.S. Environmental Protection Agency (EPA) has an obligation under Section 309 of the Clean Air Act (42 U.S.C. 7609) to review and comment in writing on the environmental impact of the proposed action. This obligation is independent of its role as a cooperating agency under the NEPA regulations. See 40 CFR 1504.1(b).

Like the COE, the EPA is not included in the list of agencies and interested groups to whom copies of the draft statement have been sent. In addition, the EPA is not listed as

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

a cooperating or consulting agency in the Draft EIS. Does the BLM intend to consult with the EPA on this proposal? As you know, the BLM, as the lead agency, has a duty to "obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved or which is authorized to develop and enforce environmental standards." Id. at 1503.1(a)(1).

6 Contractors' Disclosure Statement.

The cover sheet for the draft EIS indicates that it was prepared with the assistance of consulting firms. Under such circumstances, the firms must execute and include in the draft EIS a disclosure statement prepared by the lead agency "specifying that they have no financial or other interest in the outcome of the project." See 40 CFR 1506.5(c) and Forty Questions Memorandum, 46 Fed. Reg. 18026 (March 23, 1981), as amended, 51 Fed. Reg. 15618 (April 25, 1986), Answer to question 17a.

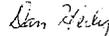
7 The "Preferred Alternative."

40 CFR 1502.14(e) requires the section of the EIS on alternatives to "identify the agency's preferred alternative if one or more exists, in the draft statement, and identify such alternative in the final statement." The agency's preferred alternative "is the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors." See CEQ's Forty Questions Memorandum, Answer to question 4a.

The DEIS did not identify the BLM's preferred alternative. Is the "proposed action" described in the DEIS the BLM's preferred alternative?

WOC appreciates having this opportunity to comment on the proposed coal sale to Northwestern Resources Company. Please do not hesitate to call our office at (307) 332-7031 if you have any questions concerning our comments.

Sincerely,


Dan Helling
Associate Director

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

18



POWDER RIVER BASIN RESOURCE COUNCIL

23 North Scott • Sheridan WY 82801 • (307) 672-5809

APR 07 1992	
ADM	NM
ADM	FE
FA	CC SA
AO	GRA
OPR	NRA
LRR	TRA
RGR	TRP

April 1, 1992

James W. Monroe
BLM Casper District Office
1701 East E Street
Casper, WY 82601

RE: Draft Environmental Impact Statement for the West Rocky Butte Coal Lease Application (DES-92-1)

Dear Mr. Monroe:

The following written comments are respectfully submitted on behalf of the Powder River Basin Resource Council. These comments reiterate and follow up on the oral comments I made at the February 26th hearing in Gillette. PRBRC is a grassroots organization dedicated to good stewardship of Wyoming's natural resources. We stand for the responsible development of our natural resources.

1 NEED AND ALTERNATIVES

The existing Rocky Butte lease will expire in February 1993 under federal due diligence requirements. Because Northwestern Resources is unable to produce commercial quantities of coal to meet these due diligence requirements before the lease expires they have apparently applied for this 50 million ton coal lease simply to avoid the expiration of the lease and extend their diligence requirement by creating a logical mining unit. We question whether this action is truly in the best interest of the public and whether it actually meets the intent of federal due diligence requirements. Other than to extend the diligence requirements, is this lease tract critical to the existing Rocky Butte lease? Does this action contradict with BLM regulations that require no lease to be issued or an existing lease to be transferred that has been held for ten years without producing the coal in commercial quantities? See 43 CFR 3472.1-2(e) (1). If not, why not?

Why didn't the BLM consider as an alternative leasing the coal tract at a later date? If the lease expired under due diligence the company could apply for the lease again and the state and federal government would receive an additional bonus bid for re-leasing the tract.

5 IMPACT TO FORT UNION FORMATION

On page 4-11, the draft EIS states that NWR does not plan to complete a well in these sands unless mine water requirements cannot be met by near-surface sources, therefore under this plan no impacts would result. Why is the BLM assuming that this will be the case for the proposed Rocky Butte Mine? To our knowledge nearly every mine in the Powder River Basin has a well in the Fort Union Formation. Why doesn't the Draft EIS at least discuss the potential impacts if the Rocky Butte mine does need to use water from the Fort Union formation?

6 REGIONAL DRAWDOWN ON OVERBURDEN AND COAL WELLS

On page 4-11 the draft EIS states that no regional drawdown data is available for the overburden. Why? Specifically in light of the fact that 114 wells are completed in the overburden. The document also states that coal wells within one mile would undergo significant drawdowns possibly to the point of complete dewatering near the pit limits. It also states that overburden aquifer would experience significant drawdowns within one mile due west and northwest of the permit area. According to SMCR, mining operations must be designed so that they do not cause material damage to the hydrologic balance outside the permit area. How will this be accomplished given these circumstances?

Also, the Draft EIS should correctly state on page 4-15 that Section 717 of SMCR requires replacement of the water supply of an owner of a well that is proximately caused by contamination, diminution or interruption resulting from the mining operation.

The Draft EIS states that drawdowns will be significant yet impacts will be minor since they must be mitigated. Mitigation does not erase impacts. How can the BLM conclude that impacts are minor which result in significant aquifer drawdowns and wells going dry? This also applies to the impacts from degraded water quality in spoil aquifers which can render these wells unsuitable for livestock or domestic use for many, many years. The BLM also concludes that this will be a moderate impact because alternative sources of water are available but also notes the impacts are significant and can last for tens to hundreds of years. Since subdivisions in the Gillette area have experienced repeated problems with water wells how does the BLM know that water supplies can be reliably replaced?

Finally the cumulative impacts section on Water Resources seems to be a duplication of what has been published in the other EA's for proposed LRA's. Why doesn't the Draft EIS look more independently at the overlapping impacts of the adjacent mines? Additionally, you need to correct your statement on page 6-14 since cumulative impacts on surface water have been mentioned as a source of concern during scoping for the proposed coal leasing.

ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

2 GAS VENTING

The Draft EIS provides very little discussion, investigation or explanation of the possibility of a Rawhide Village type situation. The EIS devotes one paragraph to the issue and states that the compaction structures in the coal bearing formations in the Rocky Butte area have not been identified. Has any study been conducted to investigate whether there are either compaction structures or gas vents in the area?

WATER RESOURCES

3 On page 4-9 the document states that, "Data collected thus far from Powder River Basin area mines show that once saturated with ground water, mine spoils are usually able to provide small yields of groundwater of a quality suitable for stock water purposes." However, this is not what the USGS study recently released indicates. The USGS study, "Geohydrology and Potential effects of coal mining in 12 coal-lease areas, Powder River Structural Basin, Northeastern Wyoming," notes that large selenium and nitrate concentrations measured in the spoil aquifers in the Caballo mine (adjacent to the proposed Rocky Butte mine) could render water unsuitable for livestock or domestic use. Why is there no discussion of potential selenium or nitrate levels in spoil aquifers? Particularly, in light of the fact that samples of overburden noted higher than recommended levels of nitrate, molybdenum and selenium.

Additionally the document on page 4-10 states that most spoil wells exhibit TDS values between 3,000 and 6,000 mg/L, and that this is similar to the premining Wasatch aquifer and meets Class III standards for use as stock water. How many wells are most? How much data has been collected on spoil aquifers? Additionally, the maximum level for stock water is 5,000 mg/L of TDS. How long does it take for one pore volume of water to leach through the spoils and return water to a pre-mining quality?

4 BLASTING

The draft EIS discusses blasting and notes 53 private wells within 5,000 feet of the boundary within which blasting will occur. The draft EIS then relies upon a study of the effects of blasting on private wells in Appalachia. The Draft EIS presumes that the geology of the Powder River Basin is the same as that of Appalachia when in fact it is totally different from Appalachia. How does this study pertain to the geology and subsequent blast effects and impacts on wells in the Powder River Basin? Geology dictates that this study does not apply to the Powder River Basin. Without a direct study on the impacts of blasting in the Powder River Basin there is no basis for concluding that the 53 private wells in close proximity to the Rocky Butte Mine will not be impacted.

10 AIR QUALITY & NOISE

Regarding the discussion on air quality page 4-21, the document states that impacts would be moderate within the Boundary except for areas in close proximity to operations which may be heavily impacted. What is close proximity and how heavily will they be impacted? How many people will be impacted? How can those impacts be mitigated? What can be done to also minimize noise pollution for those residents living near the proposed lease area?

11 SOCIOECONOMICS

The Draft EIS states on page 4-34 that the no action alternative would result in negative socioeconomic impacts because job opportunities, etc. would not occur. However, it also states that certain "minor" negative impacts would also not occur and these relate to a burden upon the housing market and eventual loss of jobs and revenue when the mine closes. Why does the BLM classify these negative impacts as "minor"? Is this a view held by the community as a whole? Additionally, the negative impacts go beyond just the housing market by placing a burden on the whole infrastructure of Gillette as indicated on page 4-31. The quality of life for those residents near the mine is significantly degraded and the quality of life for the rest of the Gillette residents is lowered. How are these impacts measured against any perceived gains in revenue and employment? Do the gains outweigh the losses in the longterm and how is this measured? If this is simply a value judgement shouldn't the document make that clear?

12 CONCLUSION

Under Section 43 of the Code of Federal Regulations subpart 3475.1 the Director has the ability to add additional stipulations and conditions he/she deems appropriate. We suggest additional stipulations need to be added to ensure the replacement of wells and water systems that will be impacted by this action. We also suggest that the BLM investigate what stipulation or condition may minimize the impacts of noise. We would be happy to discuss these possibilities further.

Thank you for the opportunity to submit comments.

Sincerely,

Dave Stueck
Dave Stueck
Chair
Powder River Basin Resource Council

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

19

Wayne & Ronita Kruse
10318 S. Highway 59
Gillette WY. 82716

Casper District Office
Bureau of Land Management
c/o Jim Melton, EIS Coordinator
1701 East "E" Street
Casper, WY 82601

Dear Jim Melton,

We are Wayne and Ronita Kruse, living at 10318 S. Hwy. 59. Being within 600 feet of the west boundary of the West Rocky Butte Coal lease application, we are very concerned about the following effects that the mining operation could have on us: Air and noise pollution; blasting damage to our home foundation, water well and windows; and the lowering of our property value.

We feel it is reasonable to require Northwestern Resources Co. sign a commitment stating that they will monetarily reimburse us for any damage or loss caused by their mining activity.

Please consider these concerns in the final EIS.

Sincerely,
Ronita Jo Kruse

Wayne Kruse
Ronita Jo Kruse

CASPER ELM	
MAR 09 1992	
ELM	MIN
LA	FL
PA	SL
AD	SRA
DY	NRA
VER	PRA
REG	Lead Resp

MELTON

20

March 6, 1992

WE AD OF
92 MAR 11 10:15

Casper District Manager
Bureau of Land Management
c/o Jim Melton, EIS Coordinator
1701 East "E" St.
Casper, WY 82601

Our residence is on the west edge of the proposed Rocky Butte lease. We are concerned that if mining activities begin as proposed they will have many devastating affects upon us.

The dust & noise generated from activities within such close proximity of our home will make outside activities very annoying if not impossible to enjoy. The blasting & strip mining is sure to cause damage to our home and buildings as well as disrupt our water table. Our ranch animals will not tolerate the constant disturbances and therefore will not produce in a feasible and economical capacity.

Also the value of our properties have already depreciated with talk of the mine going in. If the mine is actually started, our properties will have little value for many years and be difficult to regain our investments from, when we are forced to move out. Which is exactly what will happen as we could not put up with the every day hassles and/or have our home life and business subjected to the effects of a mining operation at such close proximity.

Steven E. Johnson

Debra R. Johnson
Steven E. & Debra R. Johnson
2868 Bishop Road
Gillette, Wyoming 82716

21

March 6, 1992

Casper District Manager
Bureau of Land Management
Jim Melton, EIS Coordinator
1701 East E Street
Casper, Wyoming 82601

Mr. Melton,

This letter is to comment on the Northwestern Resources Company application for the West Rocky Butte tract. I urge you to deny this lease application.

The original Rocky Butte tract should be able to stand on its own without the addition of the West Rocky Butte tract or the lease should be dropped.

The addition of the West Rocky Butte tract brings the open pit mining and blasting activities within one half mile of the residences along Highway 59. The last time mining activity was this close to a residential subdivision in Campbell County was when the Rawhide Village subdivision had to be evacuated and condemned. I see nothing in the Draft EIS for West Rocky Butte that

2

protects me or my fellow landowners in this valley from the same sort of problems.

We bred and raise quarter horses on our place. Blasting activity taking place less than 1 mile from our corals will be very hazardous to my family when handling horses. We had a very close call recently thanks to Carter Minings blasting 3 1/2 miles away. Blasting at less than 1 mile will be intolerable and dangerous.

There is such an over supply of 8200-8600 BTU coal in the Barber River Basin at this time that Clovis Point and Coal Creek Mines are idle. What is the logic in opening another mine with the market this soft. The compliance coal that goes to power plants in the East will come from the southern end of the basin. Utilities can not afford to transport the quarter of coal found in the Rocky Butte tract to their plants in the eastern and deep south market areas.

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

3

Combining the West Rocky Butte and Rocky Butte tracts to get a restart on the diligence clock appears to be an abuse of the whole LBA process and should not be condoned. If the original Rocky Butte lease cannot be mined economically, the 50 million tons of coal contained in the West Rocky Butte tract will not make or break the project.

Please reject the lease application for the West Rocky Butte tract.

Jonny Stanant

10389 Hwy 59
Tackla Route
Gillette, Wyoming 82716

Phone 686-0386

22

March 7, 1992

Casper District Manager
Bureau of Land Management
Jim Nelson, EIS Coordinator
1701 East E Street
Casper, Wyo. 82601

-N. Nelson,

This letter is to comment on the Northwestern Resources Company application for the West Rocky Butte tract. please, deny this lease!!

We breed and raise quarter horses on our place. Blasting activity taking place less than 1/2 mile from our parcels will be very dangerous to me and my family when handling horses. I had a very close call only 6 weeks ago thanks to Carter Mining blasting 3 1/2 miles away. Blasting a less than 1 mile away from us could get someone hurt or even killed!!

So I urge you to deny this lease application, as the Rocky Butte tract has

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March 10, 1992
92 MAR 13 PM 12:17

Casper District Manager
Bureau of Land Management
% Jim Nelson, EIS Coordinator
1701 East E Street
Casper, Wyo. 82601

Re: Draft EIS West Rocky Butte
Coal Lease Application
(Federal Coal Lease Application
WY 6122586)

Dear Mr. Nelson,

As land owners on the West boundary of the proposed lease application, we have some real concerns regarding noise, air pollution, water quality, and real estate value. We are already affected by the mining of Carter to the Southeast of us. We can hear the haul trucks and the blasting has been shaking our dwellings. We can only imagine what the noise and blasting will be like if West Rocky Butte starts mining 1300 feet from our dwellings. There is already air pollution in the valley of the subdivision of Robbins Valley Estates. Some days it is real "foggy" - what will it look like when another mine

enough coal in it, without the West Rocky Butte tract--

please deny the lease application for the West Rocky Butte tract.

Mark L. Stanant
10389 Hwy #59
Tackla RT.
Gillette - Wyo
82716

phone 686-0386

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

page 2

adds to that "smog." In the Spring and through the fall the majority of our words are from the East and Southeast. We will not be able to have a single window or door open because of the noise and dust. We did not purchase this property to live caged in a house and not be able to enjoy the outdoors because of pollution from air quality and noise. Western Resources has already admitted that some water supplies will be disturbed. Ten years ago it cost over \$10,000⁰⁰ to drill our water well. How many water wells are Western Resources willing to drill at today's prices before they say it is our problem? The market value of our property has already dropped to an extreme low just because of the speculation of a coal mine 1400 feet from the property line. No body wants to live that close to a mine therefore it will be impossible for us to sell to a private party and start over. We also raise Registered Suffolk sheep that will be greatly affected. They become very nervous and are very

page 3

poor mothers when the noise level they are used to is disturbed. For the reasons stated above, we are requesting that the SLM "DENY" the West Rocky Butte Coal Lease Application WgW 122586.

If the SLM approves the above application we are requesting that an air quality monitor and a ground disturbance monitor be set up and operated 24 hours a day continuously for the life of the coal mine. These monitors will be next to our home. At such time that the air quality, and or noise, and or ground disturbance reach nonliveable conditions, Western Resources will be obligated to purchase our property at a price agreed to by both parties concerned.

Kirk & Leesa Blackford
P.O. Box 1543
10358 S. Hwy. 59
Gillette, Wyo. 82717

24

March 12, 1992

Casper District Manager
Bureau of Land Management
c/o Jim Melton, EIS Coordinator
1701 East E Street
Casper, WY 82601

92MAR 16 11:23

Dear Mr. Melton,

We request that a coal lease for the West Rocky Butte tract not be issued to Northwestern Resources Company. We respectfully base our request on the following concerns:

1. The additional 390 acres included in the West Rocky Butte tract brings the proposed mine to an unreasonable distance from our existing home. According to p. 3-31, section 3.12 Noise, "dwelling #2, the closest occupied dwelling to the mine area, will be 500 feet from the nearest disturbance and 125 feet from the permit boundary." We live in dwelling #2 and believe that our lives will be impacted by the construction and operation of the mine.
2. Blasting at the mine will damage our water well. Northwestern Resources Company officials have acknowledged the probability of damage to wells in the area and have stated that the well will be repaired or replaced as often as necessary. We believe that it will be a continuous problem, for the majority of the life of the mine, and constant water problems is not an acceptable situation for us.
3. Air quality can not be controlled, mainly due to the winds. The dust during construction and mining will affect every living thing in the area, from our children, to our animals, to our trees and gardens.
4. Constant noise and vibration from equipment, trucks, and blasting less than 1/4 mile from our home will, in all probability, make it impossible to live there. Mines operate 24 hours per day, 7 days per week.

We truly believe that the granting of this lease, the subsequent construction and mining operation will impact the people living on the west edge of the lease area. We have already felt the impact in the form of decreased property values, and our childrens concerns about what it will be like to live next door to a producing coal mine.

Please understand that as permanent residents of Campbell County we have to be supportive of positive economic development and the potential for hundreds of jobs. However, we believe that the acres contained in the West Rocky Butte tract will not mean the success or failure of the proposed coal mine.

Sincerely,

Lee & Lori Edwards
10392 S. Hwy 59
Gillette, WY 82716

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

25

CASPER BLM	
MAR 09 1992	
ADM	FL
PA	SL
AD	GRA
OPR	NRA
LRR	PRA
RRG	Lead Resp

"MELTON"

Casper District Manager
Bureau of Land Management
c/o Jim Melton, EIS Coordinator
1701 East E. street
Casper, WY 82601

March 5, 1992

Dear Sir;

We are writing to protest the Northwestern Resources Company getting the lease and developing the coal mine at the West Rocky Butte Tract. in Campbell County, Wyoming.

We live at 63 Nathan Hale in Nickelsons Little Farms. We moved here in August of 1991, and at the time that we purchased the property we had no idea that a mine was proposing to start up practically on our doorstep. If we had we would not have bought this property.

We used to live inside the city limits of Gillette, and we were a few miles from several coal mines. We regularly felt the blasting from the mines, and several times we had

things knocked from the walls because of the blasts. This mine is going to be even closer, and we are very concerned about property damage, dust pollution, and noise pollution. What are our rights, and who is going to protect us from all this. We have read your EIS book, and quite frankly we have no faith in it. We feel that the government and this coal company are not sufficiently concerned about the people who are going to be most affected by all this, namely, those whose land borders the proposed coal mine.

There are too many unanswered questions, questions that have been avoided by the coal company and the BLM. Will we be guaranteed restitution for any property damage?, Will we be bought out at a fair price if our property values drop and living becomes unbearable out here. These type of questions should be answered now before any coal lease is granted.

We would like to go on record as objecting to this proposed lease and any coal mine this close to living quarters.

Sincerely,

Sidney J. Sharp
Susan J. Sharp

Sidney J. and Susan J. Sharp P.O. Box 4121 Gillette WY 82717

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CASPER BLM	
MAR 11 1992	
ADM	FL
PA	SL
AD	GRA
OPR	NRA
LRR	PRA
RRG	Lead Resp

Mr. & Mrs. Mikel R. Manley
114 Patrick Henry Road
Gillette, Wyoming 82716

March 9, 1992

Mr. Jim Melton
Powder River Coal Team Leader
Bureau of Land Management
1701 East E Street
Casper, Wyoming 82601

Re: West Rocky Butte Coal Lease Application
Rocky Butte Mine

Dear Sir:

We would like to express our concerns about the above coal lease application and coal mine that is proposed for leasing by the BLM. We are located in the extreme southwestern corner of Nickelson Little Farms. The Rocky Butte Mine permit boundary will be less than 2,000 feet from our home and the silos, railroad loop and crushing facilities will be less than 3,000 feet from our home.

We are concerned about the air quality as a result of the mining operation so close to our home with the south and southwest winds. We do not feel this is a healthful atmosphere as two of our family members have respiratory problems. We may not medically be able to cope with the continual dust and dirt from the mine and crushing facilities. We would like dust monitors on our south fence line if the lease is approved. The law requires 2 days per week of dust monitoring. We would like to see a continuous air-monitoring system installed on the Nickelson Little Farms south boundary.

Another concern is the continual blasting and what impact this will be on our water supply, our water distribution system and our home. If the permit is granted, we request a pre-blasting survey of our home and water system.

Noise pollution is another concern. We moved to the extreme southwestern corner of Nickelson Little Farms for peace and quiet, which we now enjoy. However, with the proposed location of the crushing facilities, railroad loop and silos our peace and quiet will be gone. We will be hearing back up alarms, trains, trucks and traffic for the next 30+ years. This is a grim thought. If the permit is granted, please request that Northwestern Resources move the proposed silos, crushing facilities and railroad loop to another location preferably to the east and south of the planned location. We feel it will be more than a nuisance noise. Since this will be a 24 hour, 7 day a week operation for the next 30+ years, we do not feel that we should have to put up with the noise level of an operating coal mine 1/2 mile from our home.

Another concern is the Four Corners Road relocation. This road will be constructed close to our property. If this permit is granted, we request that this road be paved from the mine-entrance east to Fairview Road. This request is due to the heavy road usage by the oilfield traffic southeast of Nickelson Little Farms and also truck traffic dodging the port of entry due to the straightening of Four Corners Road.

Last but not least, a great concern is our property value. We have made improvements and invested many dollars and time each year for the past 12 years. If we cannot live here due to health problems arising from the location of the Rocky Butte Coal Mine, we are concerned about a fair market value for our property.

Since the existing Rocky Butte lease tract comprises approximately 575 million tons of coal, we do not think that the additional 50 million ton in the West Rocky Butte Tract is necessary for the mining of the Rocky Butte Tract. We feel that this is a ploy by the Montana Power Co. to get an additional 10 years before coal has to be mined. Therefore, we do not want the West Rocky Butte Coal Lease permitted.

Thank you for your time and consideration of this matter.

Sincerely yours,

Mr. & Mrs. Mikel R. Manley
Mr. & Mrs. Mikel R. Manley

cc: DEQ

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

27

March 11, 1992

HEADQUARTERS ENVIRONMENTAL
92 MAR 13 AM 11:51 *gm*

ELN
James W. Monroe
1701 East E Street
Casper, WY 82601

RE: the Rocky Butte mining lease.

Dear Mr. Monroe:

As a certified water operator for Nickelson Little Farms as well as a resident of Nickelson Little Farms I am concerned that the mining operation will have a detrimental effect on the Fort Union aquifer.

Although the environmental impact statement said there would be no detrimental effect I feel sure that the mine will have to have a source of water other than ground water and that the draw down on the aquifer will cause us to run out of water.

I think that North Western Resources should guarantee in writing that should Nickelson Little Farms lose its water supply that North Western Resources would be financially responsible for drilling new wells.

Sincerely yours,

David VanDams
David VanDams
Certified Operator #195 905-20
92 Patrick Henry
Gillette, WY 82716

28

March 12, 1992

Casper District Manager
Bureau of Land Management
c/o Jim Melton, GIS Coordinator
1701 East E Street
Casper, Wyoming

Dear Mr. Melton,

We, the residents of Nickelson Little Farms, have cause for concern and believe that the operation of a coal mine to be known as the Rocky Butte Mine will adversely affect our way of life as we now know it.

We find it difficult, if not impossible, to believe that the mine operation as set forth in the Draft Environmental Impact Statement DES-92-1 of January, 1992, will not impact our community beyond limits commensurate with our current standards. The tangibles we fear are subject to deterioration include water quality and quantity, air quality, noise levels and property values among others. Each of these factors is addressed individually in the following commentary.

WATER:

Our water is of excellent quality and adequate quantity. Our pumping station and distribution system have been continually upgraded through out the approximate 15-year history of our existence. The impact statement avers that water for the mine operation will be primarily derived from accumulations released as the result of excavation with a contingency plan to drill deep wells in the event water released by excavation does not fulfill projected needs of 150 to 200 gallons per minute. Our computers compute to between 216,000 and 268,000 gallons per 24-hour day. That's a lot of water. We have established outside watering restrictions in our community in order to preserve the water table. Should the mining operation find it necessary to drill wells into the same aquifer from which we draw our water, we fear that the amount of water available for our residents will be substantially curtailed. With water as precious a commodity as it is and the below-normal amounts of precipitation we have experienced in recent years this is surely an area of deep concern for all of us. Along with an adequate water supply we also question the effect blasting at the mine will have on our physical wells and the piping distributing water to our residents. Our water mains are approximately 6 to 7 feet below the land surface. We question very strongly the effect continual earth shock waves resulting from blasting would have on the joints in this piping and/or the piping itself. Maintenance costs on the distribution system have been minimal in the past allowing us to supply water to our residents at a reasonable rate. Should maintenance costs rise due to repairing leaks in the system we may find ourselves in a position of not being able to foot the bill. The impact statement does not address avenues of recourse in a situation of this nature. We need some assurance (other than oral) that maintenance costs relating to blasting or other mining functions will be compensatable in one form or another. We also request a pre-blasting survey be made at the expense of an entity other than Nickelson Little Farms prior to the approval of the mining permit.

AIR QUALITY:

ating coal mine? Would you?

The impact statement goes to great lengths to spell out the favorable financial impacts of a new mine to the State of Wyoming, Campbell County and the city of Gillette. There is not one word about favorable financial impact to our community per se, which is understandable since no such gain is within the realm of contemplation. Quite to the contrary we, as residents and landowners in Nickelson Little Farms, are put in a potential position of sacrificing our water supply, air quality and our peace and quiet for the financial benefit of everyone else (including Northwestern Resources Company) without any avenue to recourse for ourselves.

We hold that the investments we have made in our properties and our community will be nullified by the proposed mining operation. Those who find they cannot continue to live in our community for reasons relative to threats to health and welfare have no alternative but to relocate without financial or physical assistance from any entity. Some of us are not financially or physically able to bear the burden of relocating and starting out anew.

What will our properties be worth on the open market if we choose or are forced to sell out? Wyoming has long prided itself in being known as the "Equality State". Where is the equality in this scenario? It is, at best, a very lopsided picture and we believe our community has been totally ignored. We do exist and stand to be recognized.

The environmental impact statement addresses the interval of a half-mile to a mile and one-half between our community and the proposed mine as though it were sufficient to overcome any and all adversities. We doubt this evaluation is accurate.

We ask, therefore, that some consideration be given to the provision for monetary compensation or services in kind to those residents and landowners who will not be able to adjust to the impact of the mining operation.

ACCESS ROADS:

We note that an access road to the mining operation from Highway 59 has been proposed, said road to continue on to the existing Fairview Road. It is anticipated that both these roadways will be heavily traveled. For safety and maintenance reasons we recommend that the roadways be paved, including the portion of Fairview that remains unpaved at this time.

SUMMATION:

The environmental impact statement speaks of short-term and long-term impacts with short-term defined as the 42-year life of the proposed mine, and long-term as anything beyond 42 years. For many of us the short-term is our remaining lifetimes and beyond. Many of our younger residents will be senior citizens before the short-term expires. The short-term is here and now. Any decisions made now will affect our residents for many years to come.

We at Nickelson Little Farms are as much pro-America as anyone else. We try to keep ourselves informed of national, state and local issues. That having been said, we are sympathetic with our nation's needs for low sulphur coal and the energy it produces. A number of our resi-

There are adults and children among our residents who are subject to respiratory ailments. Air pollution is, therefore, a major concern for these people in particular as it is for all our residents in general. A portion of our operating budget is earmarked for road maintenance and dust control within our community in order to alleviate this problem. While we may not have any sophisticated equipment or experts capable of analyzing air quality within our community, we can interpret what we can see: When the wind blows the dust flows! We find it disturbing to note in the map of the proposed layout of the mining unit that the proposed loadout facility is a scant mile from our community. While it may be true that prevailing winds in our area are from the north or northwest, we do have substantial periods of southerly winds. The addition of airborne pollution from the loadout facility to the dust already created by blasting and excavating procedures may well be beyond the limits of tolerance. During the course of a meeting with representatives from Northwestern Resources Company on February 8, 1992, it was established that the reasons for locating the loadout as indicated were purely economic in nature. We submit that economic factors in determining the location of the loadout facility be superseded by concerns for health factors and that the loadout facility be located as far from our community as is feasibly possible. Additionally, we request that an air monitoring station be installed and maintained within our community sufficiently in advance of any activity initiated at the proposed mine in order to establish a basis for comparison in the event the mining operation is approved and actual construction commences.

NOISE POLLUTION:

Our community is blessed with a serenity second to none. Aside from the noises created by normal use of motorized equipment for mowing, gardening, construction and the like we have little to disturb our peace and quiet. It's one of the reasons many of our residents have opted to live here. We value the country life. Now we are to be subjected to the clanging, banging and loud engine noises that are part and parcel of a major mining operation as well as the intrusion of railroad trains shuttling back and forth within a mile of our homes any hour of the day or night. We did not bargain for this kind of racket when we established here years before any thought was given to a coal mining operation in our back yards. While the impact statement does not seem to address this problem with any specific limitations in mind, we strongly urge that any and all approaches to noise mitigation be stipulated as being mandatory and binding on the part of Northwestern Resources Company prior to the approval of the mining permit.

PROPERTY VALUES:

Granted, Nickelson Little Farms is not Beverly Hills, but for most of its residents it represents the fruits of incessant labor, blood, sweat and tears. This community was carved out of a piece of Wyoming prairie and was brought to its present state of fruition by honest, hard-working people striving to attain a way of life suited to their needs. For many it is the realization of the American dream — a place we call home and where we toiled to put down roots for ourselves and oncoming generations. Suddenly we are to be thrust into a situation not of our making which threatens not only our way of life but our pocketbooks as well. Let's face it! Who, in his right mind, would choose to live within a proverbial stone's throw of an oper-

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

cents are faithfully employed in existing coal mines and are grateful for the jobs they hold. We are not against progress, the advancement of industry or coal mining as long as these activities are conducted responsibly.

We are proud to be Wyomingites entrenched in the principles of equality which our great state has purported to uphold since its conception. All we ask is some consideration as Americans attempting to live the American way with equality for all.

Respectfully submitted,

Signed by members of the Nickelson Little Farms Board of Directors and the Committee for Concerned Nickelson Residents

John B Wold
Sola W E
Larry a Sature
Brian Walter
Thomas Sule
Thomas Sule
Curtis K. Stanley
Judith Van Damme
Don Johnson
Stacy Johnson
Paul T. Waldman
Robert H. Huger

29

March 12, 1992

BUREAU OF LAND MANAGEMENT
 CASPER DISTRICT OFFICE
 92 MAR 16 PM 12:06

Casper District Manager
 Bureau of Land Management
 c/o Jim Melton, EIS Coordinator
 1701 East E Street
 Casper, Wyoming

Subject: Draft Environmental Impact Statement for the West Rocky Butte Coal Lease Application

Dear Mr. Melton,

In accordance with instructions contained in the subject DEIS this commentary is submitted for consideration.

1. Executive Summary, paragraph 2: It is unfair that a new diligence period would be established since it essentially allows Northwestern Resources Company to be a holding company similar to the former lease holder.
2. Executive Summary, paragraph 5: Beyond the two alternatives analyzed, more exist. For example, opening Rocky Butte and bidding West Rocky Butte at a later date when coal prices may be better.
3. Page 1-4, paragraph 5: The governor of Wyoming has been quoted as being strongly in favor of this development and it seems his leadership could slant actions of state agencies.
4. Page 3-29, paragraph 1: Total suspended particulates averaged 30.8 micrograms per meter cubed in 1980, and this seems to be an average of all collection points whether upwind or downwind. The Nickelson Little Farms area is already having air quality problems when a slight south breeze exists.
5. Page 331, section 312: This section seems inaccurate and skirts the noise issue. Paragraph 2 indicates the probable noise level in the eastern part of the mine area as being from 40 to 50 decibels. This seems untrue since, on a calm evening, the heavy industry at the Caballo Mine, which is three miles away, is the dominating background noise. Paragraph 3 indicates Nickelson Little Farms would be a mile from the nearest disturbance. We would like to ask that the dump and preparation areas also be located at a distance greater than one mile from Nickelson Little Farms since these are dusty and noisy operations.
6. Page 3-33, section 3.13.2 Roads: Northwestern Resources has proposed a reroute of the Four Corners Road (figure 3-11). We find this favorable and ask that it be paved from Highway 59 to the intersection at Fairview Road and that Fairview Road be paved from the intersection of Four Corners Road north 1/3 mile to existing pavement. We also ask that the county road be widened and turnouts established at the southerly entrance to Nickelson Little Farms since this entrance is on a hilltop and Fairview Road is likely to have greatly increased traffic. Northey Tretheway of Northwestern Resources Company has implied it may be possible to help Nickelson Little Farms with dust control on its five miles of roadways to aid in off-setting dust Nickelson Little Farms will receive from the proposed

mine.

7. Page 3-39, section 3.14.2 Land Use: Paragraph 3 acknowledges the existence of Nickelson Little Farms and other dwellings but seems to draw no conclusions concerning their close proximity to the proposed mine.

8. Page 4-3, table 4-1: Indicates a negative socioeconomic impact for the "no action alternative". This is not justified.

9. Page 4-19, section 4.1.10 Air quality: This section has not addressed particulate emissions from the dump and preparation plant area. Since it is expected that this area would remain near Nickelson Little Farms for nearly 40 years, this needs to be studied. Paragraph 2 indicates particulate levels have a significant radius of approximately 10 kilometers (6.25 miles). With southerly winds this would have a cumulative effect on Nickelson Little Farms from the Rocky Butte Mine, Caballo Mine, Amex Mine, Caballo Rojo Mine and Cordero Mine. Paragraph 4 indicates a probable cumulative dust problem. Paragraph 2 on page 421 indicates particulate emissions would have a moderate impact on the Caballo Mine and, therefore, would also have a moderate impact on Nickelson Little Farms.

10. Page 4-21, section 4.1.12 Noise: Paragraph 2 indicates sound intensity levels are proportionate to distance. At least several sources of noise from the mining operation would produce noise levels upwards of 100 decibels including but not limited to haul trucks, crushers, drag lines and shovels. At a distance of one mile each of these would still be 50 decibels loud. This is too much for a residential neighborhood. Since no noise standards are in effect, we are asking that the Environmental Protection Agency study this situation and we also ask that Northwestern Resources erect a large sound baffle directly north of the dump.

11. Page 6-25, section 6.17.12 Cumulative impacts on social well-being: Indicates the social well-being of Campbell County residents could be considered "good". Contrary to this claim, Campbell County residents have abnormally high teen pregnancy rates and high suicide rates for both teens and adults. Campbell County is saturated with a heavy industrial environment and needs no more employers providing shift work and high stress.

12. Appendix D-5, Noise mitigation: Proposals are such that tree lines and hedges should be applied where the duration of impact will be five years or more. Establishing the production plant in its proximity to Nickelson Little Farms makes this area suitable for extensive planting for mitigation. Since Northwestern Resources Company wants to be a good neighbor, we would appreciate a presuaranteed decibel level that we may expect from the mining operation.

Respectfully submitted,

John B Wold
 John B. Wold
 Resident

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

MARCH 9, 1992

CASPER DISTRICT OFFICE
BUREAU OF LAND MANAGEMENT
% JIM MELTON, EIS COORDINATOR
1701 EAST "E" STREET
CASPER, WYOMING 82601

DEAR MR. MELTON:

REFERENCE THE DIRECT WEST ROCKY BUTTE COAL LEASE APPLICATION,
ENVIRONMENTAL IMPACT STATEMENT OF JANUARY 1992.

PAGE 2-4, THE HIGHEST QUALITY COAL WITH THE RESULTING PRICE PREMIUM
IS ADDRESSED AS JUSTIFICATION FOR MINING THE WESTERN (HIGHEST QUALITY)
PORTION OF THE MINE FIRST. IN THE EVENT THAT THE MAJORITY OF THE
FIRST YEARS OF PRODUCTION IS TO BE SOLD IN FOREIGN MARKETS, THE
MINING PLAN SHOULD BE REVERSED AND THE EASTERN (LOWER QUALITY) COAL
MINED FIRST. SINCE THE WESTERN (HIGHEST QUALITY) COAL PER A PROBABLE
INCREASE IN THE FUTURE USA MARKET, THIS GIVING OUR OWN INDUSTRIES
THE COMPETITIVE EDGE.

PAGES 3-34 TO 3-37, PRESENT AND PROJECTED OIL AND GAS PRODUCTION
IS DISCUSSED BASED ONLY ON EXISTING FIELDS AND PRESENTLY PRODUCING
WELLS WITHIN EACH FIELD. THE IMPACT ON EXPLORATION WITHIN THE
PRESENT FIELDS AND THE POSSIBILITY OF OTHER FIELDS NEEDS TO BE
PROPERLY ADDRESSED. PAST EXPERIENCE HAS SHOWN THAT NEW WELLS

ARE OFTEN DISCOVERED IN SANDS WHERE NO FURTHER DISCOVERIES
WERE ANTICIPATED (I.E. THE MUDDY AND MANUELSA SANDSTONES,
PAGE 4-4, ITEM 4.1.1.D) AND IN FORMATIONS BELOW THE MINNECUSA.
MINERAL AND ROYALTY OWNERS, WHETHER OR NOT THEY OWN COAL
RIGHTS OR COAL PRODUCTION OVERLIES, HAVE A RIGHT TO EXPECT
MAXIMUM BENEFITS FROM THEIR HOLDINGS. ANY BUYOUT OF OIL AND/OR
GAS PRODUCERS (OIL COMPANIES, ETC.) SHOULD INCLUDE COMPENSATION TO
MINERAL AND ROYALTY OWNERS AS WELL.

PAGE 4-4, THE STATEMENT INDICATES THAT STILL PRODUCING OIL
WELLS, WHEN ENCOUNTERED BY THE MINE, WILL BE CAPPED BELOW THE
LOWEST COAL SEAM AND MINED THROUGH. MINERAL AND ROYALTY OWNERS
SHOULD BE COMPENSATED FOR LOSS OF INCOME DURING DISRUPTION OF
PRODUCTION. AFTER THE MINE THROUGH, CAPPED WELLS SHOULD BE RESTORED
TO PRODUCING CAPABILITY AT NO COST TO THE OIL PRODUCERS.

THE UNDERSIGNED OWN SEPARATE MINERAL AND ROYALTY INTERESTS IN
THE PROPOSED ROCKY BUTTE MINE PERMIT AREA.

SINCERELY YOURS,

Louretta A. Wolff
LOURETTA A. WOLFF
2687 S. 2445E
SALT LAKE CITY, UT 84109

Louis F. Wolff
LOUIS F. WOLFF
P.O. Box 11835
SALT LAKE CITY, UT 84147-0835

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

31

JOHN C. CORKERY
910 Woodland Avenue
Gillette, WY 82716

February 27, 1992

Jim Melton
Bureau of Land Management
1701 East "E" Street
Casper, WY 82601

RE: Written comments supporting Rocky Butte Mine

Dear Sir:

I am a partner in Earthwork, Inc., which owns undeveloped land in the southwestern portion of Gillette. I very much support the development of the Rocky Butte Coal Mine. With its development and the development of other projects proposed in the area, our company will be more readily able to develop this land into tracts for home building.

However, while my motives for supporting the development of this mine are clear, the motives of the Sierra Club and its affiliated organizations are not.

As reported in the Casper Star Tribune, February 26, 1992, the Sierra Club wants to block Northwestern Resources' efforts to extend their large federal coal lease by forming a logical mining unit. The Sierra Club and their associates would rather let Northwestern's large coal lease expire so that the BLM could re-lease the coal tract and get, as the paper quoted, "tens of millions of dollars in new bonus bids".

Is this the purpose of the Sierra Club and their affiliated sister groups: to look after BLM's best interests? If it were, then these groups would concede that while an LMU can hold a coal lease for another 10 years, it is being employed in this case to give the company time to build its mine facilities and gain its permitting. This being the case, the actual development of the lease (BLM's ultimate goal) is more likely to progress in the near future if the mine is allowed to proceed on schedule. Taking back the lease, putting it out for bid, awarding it and then having another company progress to Northwestern's current status would only delay the development of the lease and the royalties to be had from it. This

Jim Melton
February 27, 1992
Page Two

re-leasing would assume, of course, that there is another company that will want the lease when it is made available. The market for low sulfur coal could remain soft or only improve slightly during the interim. If this happened, the current euphoria for low sulfur coal properties could quickly disappear. Thus, the re-leased tract could bring little or no bonus whatsoever. Even if the bidding process is successful and the tract is re-leased, there is a very real possibility that the new Lessee will postpone any development of the lease until coal prices increase, perhaps the entire ten years.

It is obvious that the protests of these groups are for no other reason than to stop this project and, as in the case of Kerr McGee's by-pass lease, any other coal development in the Basin.

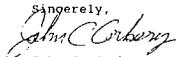
But why? They insist that they are not anti-coal, nor are they anti-development. Still, anyone has yet to see these groups support any project that has to do with the development of natural resources.

Is it because there are serious environmental problems associated with these projects or with surface mining in general? If so, why are these problems not being brought to light? Why are their resources being wasted on administrative maneuvering when they could be spent on research and making a bonafide case for the major environmental hazards of coal mining in the Powder River Basin?

The reason, I suspect, is that after 15 years of intense mining in the basin and after all the environmental impact statements, monitoring and reporting done by state and federal agencies, no viable case can be made to support a stance that says surface mining in the basin causes any major environmental hazards. Since these groups invariably equate the development of natural resources with environmental degradation, they use every means at their disposal to stop it.

This is a clear case of a special interest group pursuing an agenda rather than having a specific objection to a particular project.

Please see this play for what it is and allow Northwestern Resources to continue its way through your process.

Sincerely,

John C. Corkery

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

32

BUREAU OF LAND MANAGEMENT
 CASPER DISTRICT OFFICE
 92 MAR 12 PM 12:17
 Gillette, Wyoming
 March 9, 1992

Bureau of Land Management
 Casper, Wyoming

Gentlemen:

At the recent public hearing on the Environmental Impact Statement on the West Rocky Butte coal lease application, the representative of the Powder River Resource Council proposed that the application be denied. They contend that coal mining operators should not be exposed to further competition at this time and that the U.S. Treasury would be better served if the Rocky Butte lease be allowed to expire and offered for rebidding at some time in the future.

This scenario presumes that the present surface ownership and lease structure would remain intact. Because of the multiple and involved surface situations and possible surface lease defaults, future offering of the tract would be difficult if not impossible.

Rather than a probable substantial loss of return, the present application if approved would return to the federal government millions in royalty payments and similar amounts in state and county taxes. The proposed mine would also provide a tremendous economic spinoff, all of which are important to the present economy.

Sincerely,
 Paul D. Rourke

Paul Rourke
 Box 578
 Gillette, Wyo
 82717

33

Chuck Rourke
 116A Four Corners Rd
 Gillette, Wyoming
 82716

Casper District Manager
 Bureau of Land Management
 c/o Jim Melton, EIS Coordinator
 1701 East E Street
 Casper, Wyoming 82601

To whom it may concern,

This letter is in regard to the West Rocky Butte Coal Lease Application. I am the agricultural producer on the land which the West Rocky Butte Coal Lease is being applied for. The primary land uses in this lease application tract are livestock grazing and wildlife on native rangeland and improved pasture land.

I have been working with other coal mines in the Powder River Basin on reclamation and livestock grazing practices. I see many benefits from the reclaimed land after being mined for coal. There is a substantial increase in livestock and wildlife carry capacity. With an improved landscape and increased forage production there is less soil erosion. I see the opportunity for more trees to be established for wildlife habitat and livestock protection as well as the aesthetics value.

I strongly support the leasing of the West Rocky Butte Coal Lease Application Tract. It will improve my ranch and farm operation with a higher livestock carrying capacity, farming with less top soil loss and improved wildlife habitat.

There would be a boost in the economy for our country from this mining activity. The tax base increase for our County and State would be very beneficial. The royalties and taxes going to the Federal Government would help the people of the United State as a whole.

Respectfully Submitted,
 Chuck Rourke
 Chuck Rourke
 116A Four Corners Rd
 Gillette, Wyo
 82716

34

Gillette, Wyo.
 March 14, 1992

To Whom It May Concern:

In regard to West Rocky Butte Coal Lease application by Northwestern Resource Co. In 1976 the Rourke family leased the surface of their ranch, plus their private coal for mining purposes. Commenting on Chapter 3:14, Land Use and Ownership page 3-34: The Rourke family owns 160 acres of private coal in sec. 7 and sec. 8-48-71, which is adjacent to the above lease. Since the family has granted BLM surface owner consent to lease and mine federal coal on their ranch, I believe BLM should give

serious consideration to leasing the West Rocky Butte tract so that our private coal will be mined, thus relieving some financial pressure put on our ranching operation, through the total mining process. The West Rocky Butte tract and private coal acreage contains high quality coal and should not be bypassed.

Sincerely,
 James F. Rourke
 Box 339
 Gillette, Wyo
 82717

Stamp: MAR 14 1992
 C/26114 DFM

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

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Kittoe Wyo.
March 16, 1992

Dear Mr. Nelson,

In regard to the Shoshone
Cattle Coal Lease, I am totally
in favor of it. I have an interest
in the Bouske coal fee and
would like to have it mined.

If this area were mined, many
people would benefit from it
including the City of Kittoe and
county.

Sincerely,
Lorraine Jackson

Kathryn P. Jackson
706 Warren Ave.
Kittoe, Wyo. 82716

MCB	MBV
TRB	MBV
CRB	MBV
YD	MBV
LD	MBV
VDH	LF
DB	MBV

MBB 1 5 25
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36

Kittoe Wyo.
March

To Whom It May Concern
I am in favor of coal mining
on the Rocky Butte Coal Lease
as I own 1/2 interest of the
Bouske fee coal, which is
included in the projected
Coal Lease.

Respectfully,
Mary Evangelina Lake



MCB	MBV
TRB	MBV
CRB	MBV
YD	MBV
LD	MBV
VDH	LF
DB	MBV

MBB 1 5 25
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RESPONSES TO COMMENTS ON THE DRAFT EIS

Response to Letter 1 from the Environmental Protection Agency

The participation of the EPA in reviewing the West Rocky Butte Environmental Impact Statement provides an important perspective to the BLM on the adequacy of the document. Revisions have been made to the document in order to address EPA's comments. EPA should also be aware that some of these issues are the responsibility of other state and federal agencies during future stages of permitting. They are not specifically addressed in the EIS because the proposed mine plan is speculative at this stage, and mitigation will need to be designed according to the approved mine plan.

Responses to detailed comments by the EPA:

1. The FEIS text has been revised as recommended (see end of Section 3.10.2).
2. The description of the Tullock Member is found in Chapter 3.0, Affected Environment, in Section 3.5.2. The description of the Fort Union Formation, of which the Tullock is the lowermost member, has been expanded in response to this comment.
- 3,4,5 & 6. The discussion of these topics has been expanded in Section 4.1.5 in response to the comments from the EPA.
7. There is a discussion of the potential for water trapped within the spoil aquifer to re-enter the regional flow pattern in Section 4.1.5 and Section 6.7.1. This discussion has been expanded in response to this comment from the EPA.
- 8 & 9. The Lebo Shale Member of the Fort Union Formation, which lies between the coal being mined and the Tullock Member of the Fort Union Formation, has a mean thickness of 711 feet for the Powder River Basin, and a thickness of about 400 feet near Gillette. This member is not disturbed by mining. Therefore, no breaching of the Tullock Member or water quality impacts to the Tullock Member as a result of vertical leakage are anticipated during mining or after reclamation. Recharge to the Tullock Member is not affected by mining. These topics are discussed in Section 3.5.2 and Section 4.1.5 of the EIS.

Response to Letter 2 from the Governor of Wyoming

The BLM appreciates the involvement and support of the State of Wyoming in the current coal leasing effort. Parts of the West Rocky Butte FEIS have been revised in response to comments received from the Governor and State Agencies. If there are further concerns or comments on the part of the State of Wyoming with regard to this lease or any of the others currently under consideration, the BLM will attempt to answer them to the state's satisfaction.

Response to Letter 3, from G. Alan Edwards, Wyoming Governor's Office.

The numbers in the response to Alan Edwards comments correspond to numbered sections in the comment letter. The replies are divided into two sections, responses to general comments and responses to specific comments.

General Comments

- 1a. The West Rocky Butte tract is needed to satisfy a deadline faced by the applicant, however it also has value to the applicant as a source of higher quality coal. As discussed in Section 2.2 of the EIS, the coal

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

underlying the West Rocky Butte tract is higher Btu coal than much of the coal in the existing lease, and is therefore more competitive with the coal currently being mined and sold in the Powder River Basin at this time. Also, the coal underlying the West Rocky Butte tract is present as one thick seam, but it is split across much of the existing lease (see Figure 3-1). According to the company, during the early years of mining the addition of this coal to the existing Rocky Butte coal will extend the period of time the mine will be able to mine and sell thicker, higher Btu coal, and thus make the mine more competitive.

From the BLM's standpoint, the West Rocky Butte tract would be most logically mined at the same time as the existing Rocky Butte lease for maximum economic recovery. The possibility exists that the coal on the West Rocky Butte tract might never be recovered if it is not mined at the same time the existing lease is mined.

- 1b. There is a sufficient quantity of coal on the existing Rocky Butte lease to open a new mine, however the quality of the coal underlying much of the existing lease is not competitive with coal currently being produced and sold in the basin. The coal on the West Rocky Butte Tract is higher Btu coal, and is therefore more salable at this time. It is the applicant's position that the higher Btu coal from the West Rocky Butte tract results in a total mine property that can better compete in the current marketplace.
- 1c. The impacts of mining only the existing lease were specifically included in the regional EIS prepared for the 1982 sale and were cumulatively considered in the EIS prepared but not finalized in 1984. Also, the impacts of a scenario based on mining the existing lease alone would not be greater in magnitude than the impacts of mining the existing lease and the proposed lease together, so mining only the existing lease would not result in additional impacts to the environment which are greater than those considered under the proposed action. The mining of the existing lease only was not included in the EIS as an alternative because it is not feasible for a mine to start up and meet diligence requirements (i.e., mine 1 percent of the coal underlying the existing lease) prior to the diligence date of February 1, 1993.
2. The discussion of the coal demand forecasts has been expanded in the FEIS in response to comments on this topic. This discussion can be found in Section 1.4 of the FEIS.
3. As stated above, the existing Rocky Butte lease contains a sufficient quantity of coal to meet market demand, but much of that coal is of a quality which is not competitively salable at this time but may be in the future. The acquisition of the West Rocky Butte tract will allow the company to produce currently competitive coal for a longer period of time. In the future, after the higher quality coal has been mined off the existing lease and the LBA, the lower quality coal on the existing lease may be more competitive. There is an expanded discussion on the market forecast in the FEIS, as mentioned above.

Specific Comments:

1. The No Action Alternative assumes for the purposes of this analysis that the coal would never be mined in order to allow a comparison of the impacts of the proposed mine versus no development in the area. Section 2.3, The No Action Alternative, has been revised to clarify this. The BLM could offer the lease for sale at a later date, which would require a lease by application or an expression of interest in leasing the coal on the part of industry. A discussion of the impacts of leasing the coal at a later date is included in Section 2.4, Alternatives Considered But Not Analyzed In Detail.
2. There is not a definition of substantial in this case. In response to this comment, clarification has been added in Section 2.2 of the FEIS. Substantial revisions could represent a change in the impacts assessed in the EIS, however, it is anticipated that these changes would result from a lower production rate in response to market conditions, and therefore would result in smaller impacts to the environment

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

than are analyzed in the FEIS (see discussion under section 2.4). In any event, prior to mining, the OSM will evaluate the environmental impacts of the approved mine plan in an additional NEPA document.

3. The coal in the West Rocky Butte lease would be logically mined with the Rocky Butte tract, and might not be mined if it were not mined along with the Rocky Butte tract. The tract is too large to be added to the lease as a lease modification as there is a 160 acre limit to lease modifications over the life of the lease. Lease modifications are not issued on a competitive basis. Nonetheless, if West Rocky Butte were not leased now, it would make a logical addition to the Rocky Butte reserves, if and when they are mined in the future.
4. Section 2 has been revised.
5. As discussed above, for the purposes of this analysis, the No Action Alternative assumes that the coal will never be mined for the purposes of comparison with the Proposed Action. The possibility that the tracts could be mined in the future is discussed under Section 2.4, but is not analyzed in detail because the environmental and socioeconomic impacts would not be greater than those which are analyzed in the Proposed Action. If the Rocky Butte lease is not mined at this time as proposed by Northwestern Resources, the lease will expire next year. Based on the quality of the coal underlying much of the lease and market forecasts at this time, BLM predicts that interest in this lease would not exist until sometime between 2010 and 2020, so any analysis of the benefits of the sale in the future based on current information would be purely speculative. The No Action Alternative in Section 4 has been modified.
6. The statement in Section 6.12 is a general statement about regional impacts to air quality in the Powder River Basin as a result of surface coal mining. Since the Rocky Butte lease is closer than ten miles to the existing Caballo Mine, the discussion of air quality impacts in Section 4.1.10 was based on modeling which included the adjacent mines as well as the Rocky Butte Mine.
7. The Black Hills Power and Light generating station and the Dry Fork Mine expansion were considered in the socioeconomic and cumulative impact analyses. Section 6.17.2 provides the baseline information which was used in the analyses in the following sections.

Response to Letter 4, Wyoming State Historic Preservation Office

The entire proposed permit area has been the subject of a Class III cultural resource inventory. This has been clarified in the text of the FEIS. Additional coordination on this subject will take place between DEQ and OSM during actual permitting activities.

Response to Letter 5, Wyoming Game and Fish Department

Terrestrial Considerations:

For leasing purposes, the BLM must determine whether or not the impacts of an action can be mitigated. The BLM does not regulate what the reclamation standards are or what they should be. If there are serious problems with reclamation technology in the Powder River Basin, as stated by the Wyoming Game and Fish Department, then those problems should be pursued with the Office of Surface Mining and with the Wyoming DEQ.

The Wyoming Game and Fish Department is correct in stating that impacts should be clearly stated in the document. The BLM appreciates the input and data provided by the Game and Fish Department. Revisions have been made to the FEIS which take the information provided by the Game and Fish Department into account.

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

Response to Letter 6, Office of Industrial Siting Administration

Revisions to the housing availability discussions have been made in response to these comments.

Response to Letter 7, Public Service Commission

Utility and pipeline facilities will be relocated by the coal lessee except in areas where pre-existing easements and rights-of-way or other legal obligations state otherwise.

Response to Letters 8 and 9, State Engineers Office.

The Board of Control tabulation of adjudicated rights has been updated, per your comment. Water well and reservoir permits will be filed in accordance with State requirements when more final mining plans indicate what the requirements are going to be.

Response to Letter 10, Campbell County Commissioners

The BLM appreciates the support, cooperation and input of the Campbell County Commissioners during the current leasing effort. We would like to continue working with you on leasing proposals, and request that you continue to advise us of any concerns that the county has regarding this project, or any other coal-related project involving Federal coal.

Response to Letters 11 and 12, City of Gillette

The comments offered on the DEIS by the City of Gillette have been taken into account, and revisions have been made in the FEIS accordingly. The BLM would like to thank the City of Gillette for their input into the leasing process and the West Rocky Butte EIS, and to request that the city continue to contact us with regard to their comments and concerns on the leasing process.

Response to Letter 13, Belle Fourche Pipeline Company

(Numbers refer to numbered paragraphs in the comment letter)

General response:

BLM is required to manage Federal lands on the basis of multiple use. 33 CFR 3400.1 provides that "the presence of deposits of other minerals...or production of other minerals shall not preclude...the development or production of coal deposits...". When conflicts arise between natural resource uses, BLM policy is to encourage negotiation and resolution of those conflicts between the conflicting parties.

Northwestern Resources Company has expressed their intention to the BLM to relocate pipelines to the extent that the pipeline owner does not have the legal obligation to relocate those lines. BLM would suggest that resolution of this issue would best be handled by negotiation between Northwestern Resources and Belle Fourche Pipeline.

The purpose of this EIS is to state the impacts of leasing the West Rocky Butte tract. A valuable part of the EIS process is that misinformation and data deficiencies be identified in the comment process and corrected. It must

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

also be pointed out, however, that most of the impacts discussed in the comment letter from Belle Fourche would have occurred if the existing lease had been mined, and are not significantly increased by the addition of the West Rocky Butte tract.

1. The monthly production reported in the DEIS was based on outdated production data. This has been corrected in the FEIS.
2. The FEIS has been revised to reflect this.
3. The location of Belle Fourche's pipelines has been added to the FEIS (see Figure 3-13). To be accurate, the majority of the 10 miles of Belle Fourche's pipeline system referred to in the comment letter are located on the existing lease, not on the application area as stated in the comment letter, and would have required relocation if the existing lease had been mined.
4. The EIS does not intend to imply that the lines will soon be unnecessary, however their existence on the existing lease and the lease application area does not preclude issuance of a lease or a mining permit.
5. Even though the location of the pipeline may change, its function will not.
6. Again, it should be pointed out that the majority of the Belle Fourche pipeline is located on the existing lease, and would have been affected by development of that lease at any point since its issuance in 1983.
7. Trucking can be useful for resolving short-distance or short time disruptions in pipelines, but it is not necessarily viable as a long-term transportation solution. Whether trucking or rebuilding of the pipeline is the best solution will require studies and negotiations by the companies involved.
8. The disruption of existing pipelines, power lines and telephone lines is an impact resulting from coal mining, and therefore must be identified in the impact analysis. There are other rights of way in the Rocky Butte area which will likely have to be relocated in the course of coal mining activities, including at least one county road, powerlines and telephone facilities. Ideally, these could all be relocated along common right-of-way corridors, which will be created for other needs. Northwestern Resources Co. has indicated that they are prepared to relocate those lines, at their expense, to the extent that Belle Fourche and other pipeline owners do not have the legal obligation to relocate those lines.
9. The Final EIS identifies wells and pipelines which will be impacted by coal mining. The existence of these impacts does not preclude the issuance of the lease, however.

Response to Letters 14 and 15, Northwestern Resources Co. and Entech

The BLM appreciates the willingness of the company to provide information necessary for the preparation of the EIS in a timely fashion when it is needed.

Response to Letter 16, Sierra Club

(Numbered responses refer to numbered paragraphs in comment letter)

1. Diligence requirements are not being evaded by this action. The proposal by the applicant to form a logical mining unit, and thus extend diligence, is allowed under the applicable regulations. It is also

APPENDIX E. COMMENT LETTERS AND RESPONSES ON THE DEIS

unlikely that this action will lead to "unwanted and unwarranted speculation". The most recent lease sale was held in 1982, and the leases sold in that lease sale are all reaching the point of being subject to diligence requirements in 1992 or 1993. There is only one other existing undeveloped lease in the Powder River Basin which is not adjacent to an existing mine, and for which an LMU could be formed under these circumstances. That is the Keeline lease, and it will expire this year if diligence requirements are not met.

2. The regional activity planning process is required prior to leasing in Federal coal production regions. The director of the BLM accepted the recommendation to the Powder River Regional Coal Team to decertify the Powder River Federal Coal Production Region as a Federal coal production region in January, 1990. This action allowed coal leasing to be done on a lease by application basis as described in the Federal Regulations (43 CFR 3425), which does not require regional activity planning. The cumulative impacts of all the proposed leasing have been addressed in this EIS in a similar manner to the way they would be addressed in a regional EIS.

The BLM has proceeded with the processing of the West Rocky Butte lease by application and preparation of an EIS at the direction of the Powder River Regional Coal Team, in accordance with the regulations on coal leasing (43 CFR 3425) and the regulations implementing NEPA (40 CFR 1500).

Response to Letter 17, Wyoming Outdoor Council

(Numbers in response correspond to numbered sections in the comment letter.)

1. Diligent Development Requirements.

As Wyoming Outdoor Council points out, the existing lease is scheduled to expire in February, 1993. Northwestern Resources Co.(NWR) has not failed to achieve diligent development until that date. Likewise, the regulations at 43 CFR 3472.1-2(e)(1)(i) cited by Wyoming Outdoor Council can not be applied until that date. The BLM has reviewed the status of other federal leases held by NWR in other states and determined that they are not in violation of this regulation at this time. It also should be pointed out that NWR has not held the lease for 10 years, they acquired it recently. (That does not impact diligence requirements, of course, however, the company has not been holding the lease for 10 years for speculative purposes.)

Combining leases into LMU's is a valid mechanism for promoting reasonable, logical, and more environmentally responsible development of coal leases, and not a means of allowing lessees to avoid diligence requirements. As discussed in the response to Letter 16, there is currently only one other existing lease in the Powder River Basin in the same category as the Rocky Butte lease regarding diligence, and it will expire in 1992 if diligence requirements are not met. Therefore, the opportunity for the BLM receiving similar requests in the future is quite limited.

2. Potential Adverse Impacts to Nearby Residents.

There are a number of mechanisms in place to protect the water supplies of nearby residents to mines. These include:

1. A pre-mining blasting survey will be conducted at the expense of the company upon request for all residents within a half-mile of the permit boundary. A copy of this report is provided to the mine and to the resident as a means of establishing pre-mining conditions in the area.
2. An Environmental Quality Council hearing will be held prior to permit approval if requested. At such a hearing, all residents in the vicinity of the proposed operation are notified through the public media and invited to attend and present testimony concerning the status of their wells. All wells

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within three miles of the mine permit boundary must be shown in the permit document which is on public display prior to issuance of a permit.

3. As part of the permitting process, the lessee is required to do groundwater impact analyses (which take into account the existence of contiguous mines) to determine the expected extent of impacts to the overlying and underlying aquifer, and to the coal aquifer. DEQ then uses these analyses to identify in advance which wells are likely to be impacted as a result of coal mining. The analyses are then checked with results of monitoring to determine the extent of groundwater impacts on a yearly basis, and how well the analyses are predicting these impacts. If the analyses are not adequately predicting the impacts, DEQ can and has required additional analyses. The wells identified in this process will be replaced according to Wyoming law and SMCRA.

These actions are all part of the permitting process.

BLM does not agree that the lease terms should be modified as recommended. There are several reasons for this decision. First, as the discussion above indicates, there are several remedies in place for residents near coal mines. Secondly, based on discussions with the State Engineer's Office and the DEQ, there have been very few complaints to either agency concerning loss of water supplies as a result of coal mining. And, finally, there are a number of reasons for well failures, with or without coal mining, and it would not be reasonable to require replacement of wells because they fail and are located near a coal mine, without some evidence that the coal mine was responsible.

Wetlands and Riparian Areas.

3. As stated in the EIS, most of the riparian areas are associated with stockponds or reservoirs where levees have been constructed to hold water, and are thus already man-made wetlands. The detailed reclamation practices will be described in the permitting process. During the leasing process, a determination must be made as to what the existing situation is, and whether there are any lands which should be declared unsuitable (such as alluvial valleys floors which are significant to farming), and whether or not mitigation is possible according to regulatory requirements. Based on the existing operations in the Powder River Basin, the BLM has determined that such mitigation is possible for a surface coal mining operation. Specifics as to how mitigation will be accomplished will be included in the permit process.
4. The Army Corps of Engineers is not involved in the leasing process. They do become involved where appropriate in the permitting process.
5. The Environmental Protection Agency was inadvertently left off the list of agencies and interested groups who were sent copies of the draft. The EPA in Washington, D.C. received the first five copies of the draft as required for their Federal Register Notice on the availability of the DEIS, which appeared on Friday, January 17, 1992, p. 2093. The Region VIII office in Denver was also sent copies. Letter 1 of the comment letters is from the Region VIII office of the EPA.
6. The DEIS and FEIS were prepared by a contractor, Western Water Consultants, who has signed a disclosure statement as specified in the regulations. This statement of disclosure is available for viewing in the EIS file. 40 CFR 1506.5(c) does not state that such a statement must or even should be included in the draft EIS.
7. The BLM's preferred alternative has been identified as required in the FEIS. As quoted by the Wyoming Outdoor Council, the agency's preferred alternative should be identified in the draft, if it exists. The BLM had not made a decision on the preferred alternative when the draft was issued, and therefore it was not included in the DEIS.

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Response to Letter 18, Powder River Basin Resource Council

(Numbered responses refer to numbered sections in comment letter)

1. Need and Alternatives

Much of the coal on eastern half of the existing lease is of lower quality than the coal currently being mined and marketed in the Powder River Basin, and is therefore not competitive at this time. The coal on the western part of the lease and underlying the LBA is of higher quality and more competitive than much of the coal on the eastern half of the existing lease, although the overburden is thicker in the west than the east. The company plans to start mining in the area containing the higher quality coal with the least overburden in the western part of the lease, in order to be more competitive with the current market. The addition of the LBA tract will allow them to mine this higher quality coal for a longer time. When the higher quality coal in the west has been mined, the remaining lower quality coal may be more salable. Therefore, the West Rocky Butte Tract has value beyond the need to form an LMU for diligence reasons.

The regulation cited is not in effect until the ten year period has elapsed, which will not be until February, 1993 (see response 1 to Wyoming Outdoor Council). At that point, the lease would be terminated anyway if diligence had not been met.

Leasing the coal tract at a later time was considered and is discussed in Section 2, Alternatives Considered But Not Analyzed in Detail. That alternative was not analyzed in detail because the environmental impacts of such an alternative would be expected to be within the range of those analyzed for the two principal alternatives, but an evaluation of the socioeconomic impacts would be very speculative.

Based on the quality of coal in this area and current market projections, BLM projects that it would be sometime between 2010 and 2020 before there would be interest in leasing the tract. The environmental impacts of mining the coal at that time would presumably be similar to or less than the impacts of mining the coal as described under the proposed action. (The impacts could be less, depending on advancements in technology and the level of activity at other mine sites in the basin at that time). Another lessee would develop their own mine plan which would not necessarily correspond to the mine plan developed by the applicant in terms of order of mining and rate of production. Evaluating the socioeconomic impacts of events that far in the future would be highly speculative. There would be a bonus bid if the lease were reissued, which is a positive consideration, however, the income from the mine would be delayed, which is a negative in an economic sense. Most of the income to the Federal and State governments accrues in the form of royalty income based on the price of coal, and that income would be delayed and could change favorably or unfavorably, depending on the price of coal at that point in the future.

Under the No Action Alternative, the West Rocky Butte lease would not be issued and the Rocky Butte lease would be terminated on February 1, 1993. While the EIS assumes that the coal would never be developed under the No Action Alternative for purposes of analysis, in reality, selection of that alternative would allow development of the lease in the future.

2. Gas Venting

There is not a history of gas accumulation in this area based on published reports, and compaction structures are not expressed in the rocks at the surface near the Rocky Butte Mine, as they are in the Rawhide Village area. Nor has extensive drilling revealed the presence of no-coal channels and/or compaction structures similar to those near Rawhide Village.

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The BLM is aware of two proposed coal bed methane drilling projects in this area (northwest and west of the lease, one involves federal oil and gas leases, one is on privately-owned oil and gas leases). Commercial production has not been established in either one of these projects at this time.

3. Water Resources

Naturally high levels of selenium and other undesirable chemical constituents occur locally in the Powder River Basin. Overburden is analyzed during mining. When high levels of chemically undesirable overburden material are encountered, this material is handled and placed so as to avoid adversely affecting water quality. All mine permit applications submitted to WDEQ/LQD must include baseline data on overburden geochemistry and special handling plans for unsuitable spoil materials. This information is included under Mitigation (Appendix D) in the EIS.

Based on the backfill wells reported in the 1991 Annual GAGMO report, 55 percent were within the 3,000 to 6,000 mg/L range for TDS, 33 percent were below that range, and 12 percent were above. As discussed in Section 6.7.1, under cumulative water resources impacts, 56 monitor wells have been completed in the backfill areas in the Powder River Basin. According to the CHIA, the time it takes for one pore volume to leach through a spoils pile could be from 10s to 100s of years, the time it would take for the water to return to pre-mining quality would be longer than that.

4. Blasting

The EIS relies on the study of effects on blasting on private wells in Appalachia because that is the available documented data on the relationship between well damage and near-by blasting, not because it presumes that the geology of the Powder River Basin is the same as that in Appalachia. The study has validity in this case because it is a similar situation, namely water wells in close proximity to operating strip mines, and because maximum ground vibration level at the wells tested in Appalachia were significantly higher than will be allowed for ground vibration near the proposed Rocky Butte Mine. This discussion has been expanded in the Final EIS.

Another pertinent fact is that Northwest Resources operates the Colstrip Mine, which is in operation in close proximity to the town of Colstrip, Montana. In response to their proximity to the town of Colstrip, they have developed blasting practices which minimize impacts to nearby residences.

Finally, as pointed out in the EIS, nearby residents are entitled to a pre-blasting survey at the cost of the company in order to establish the performance and condition of water wells and other facilities. Copies are provided to the residents. These reports provide data concerning the condition of facilities prior to mining which can be used to verify the existence of blasting damage after the development of the mine.

5. Lower Fort Union Well

NWR does not plan to complete a well in the sands in the lower Fort Union based on the existence of good thick water-productive sands in the overburden in this area. If a well is completed by the mine in the Fort Union, the impacts of that well would not be expected to extend beyond a radius of a mile around such wells, as discussed in the CHIA.

6. Drawdowns

No regional drawdown information is available for the overburden (i.e., the Wasatch) because it is not a regional aquifer. The sandstone aquifers in the Wasatch are lenticular, and thus of limited regional extent. Additional discussion was added to the Final EIS to clarify this.

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SMCRA recognizes that drawdowns occur outside the permit area, which is why SMCRA specifies compensation for wells damaged as a result of mining operations.

7. Statute

A direct quote from the pertinent statute can be found in Appendix D.

8. Ground-water Quality Impacts

Mitigation does not erase impacts, it reduces them. Therefore a significant short or moderate term impact can be reduced to a minor long-term impact. The BLM concludes that the impacts from degraded water quality in spoils will be moderate because the data we are relying on (primarily the CHIA and the results of monitoring wells during the last 10 years of monitoring) indicate that the water quality in spoils is suitable for stock use upon recharge, and that recharge is already occurring in most monitored spoils wells. Since the water in the aquifers being replaced by the spoils was suitable for stock use (not domestic use) prior to mining, and will be available for stock use after mining, this is considered to be a moderate impact. It may be tens to hundreds of years before the aquifer is returned to a postmining equilibrium condition, but that doesn't translate directly into a requirement of tens to hundreds of years before the water can be used for its premining use.

Communication with the State Engineer's Office, the City of Gillette, and Campbell County indicates that problems with wells in the Gillette area can be related to age of the wells, and proximity of wells completed in the same zone, as much as to depletion of the reservoirs. At this point in time, the BLM has no documented instances of an inability to replace water wells.

9. Cumulative Impacts

The cumulative impacts section on Water Resources does include much of the same information as has been published in the EA's for the proposed LBA's because cumulatively, these documents are looking at the same area and each document is addressing the cumulative impacts of all the proposed leasing to the region. The EIS includes the overlapping impacts of the mines adjacent to the proposed Rocky Butte Mine on water resources in the Environmental Consequences section of the EIS (Chapter 4). The predictive model discussed in that section simulates the impacts as a result of mining at the six closest surrounding mine sites. This is also stated in the DEIS, on page 6-13 ("The results of ground-water modeling of the Rocky Butte mine is described in Section 4 of this EIS and includes cumulative impact analyses"). The statement on page 6-14 of the DEIS has been revised.

10. Air Quality and Noise

The statement on page 4-21 of the DEIS is as follows: "PM₁₀ impacts would be moderate within the Boundary during the mine operations. Exceptions would be areas in close proximity to operations." On page 4-19 of the DEIS, Boundary is defined as "the Boundary of the Lands That are Necessary to Conduct Mining Operations,...and coincident with the proposed Rocky Butte Mine permit boundary." Therefore, the area which may be heavily impacted is within the permit boundary, in close proximity to the mining operations.

11. Socioeconomics

There have been revision to the FEIS based on this and other comments. Comments were also received from the City of Gillette, and revisions have been made based on those comments. The BLM has contacted

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and relied on the City of Gillette and Campbell County to help evaluate the positive and negative impacts of this action on the residents. Comments from the city and county can be found in letters 10, 11, and 12.

12. Conclusion

There are several mechanisms available during the permitting process which enable the replacement of wells and water systems which will be impacted by this action (See reply No. 2, letter 17, from the Wyoming Outdoor Council). Stipulations and conditions for minimizing noise should be explored during the permitting stage.

Response to Letters 19 through 24 from the following landowners who live west of the proposed lease by application area:

Wayne and Ronita Jo Kruse
Steven E. and Debora Jo Johnson
Jerry Stanart
Mara L. Stanart
Kirk and Teresa Blackford
Lee and Lori Edwards

The residents who live along Highway 59 west of the proposed lease area will be negatively impacted by the addition of the proposed lease by application area because it will result in mining activities which are located closer to their residences than the existing lease. The major concerns expressed by these landowners include noise, deterioration of air quality, impacts to water wells, houses and livestock as a result of blasting, and deteriorating property values.

There are standards for public nuisance, air quality, water well replacement, and blasting which must be met in order to be in compliance with federal regulations and/or permit requirements for mining. These standards will be enforced, however, the BLM recognizes that there may still be impacts to residents west of the mine due to the proximity of the mine to the residences. The concerns and requests not to lease expressed in the letters from these residents will be considered in the Record of Decision.

In the event that the Record of Decision is to lease the acreage to Northwestern Resources Co., as proposed, there are a number of opportunities for public involvement during the mine permitting process. These opportunities include (but are not limited to):

1. Pre-blasting surveys for houses and water wells;
2. A hearing before the Environmental Quality Council can be requested, at which time, water well conditions can be verified for residents in the vicinity of the proposed mine operation (see response 2 to the Wyoming Outdoor Council (letter 17)).
3. Water wells will be replaced by the mine operator if they are damaged by mining operations.

Residents who are concerned should contact the OSM and DEQ regarding their opportunities to be involved in the permitting process. The permitting period is also the appropriate time for the addition of specific stipulations such as continuous air quality and ground disturbance monitors to be requested.

The BLM does not participate in negotiations between landowners and federal lessees regarding property values and compensation. The regulations and permit do require replacement of water wells and repairs to structures damaged by mining. The pre-blasting survey establishes the pre-mining conditions, and therefore facilitates identification of damage caused by mining operations.

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Finally, Northwestern Resources Co. operates the Colstrip Mines very close to the town of Colstrip, Montana. As a result of the mine's proximity to the town, the company has developed blasting procedures designed to minimize impacts off-lease.

Response to letters 25 through 29, from the following residents of the Nickelson Little Farms subdivision, located north of the existing Rocky Butte lease:

Sidney J. and Susan J. Sharp
Mr. and Mrs. Mikel R. Manley
David VanDamme
Nickelson Little Farms Board of Directors and The Committee for Concerned Nickelson Residents
John B. Wold

The residents of Nickelson Little Farms will be negatively impacted by mining activity on the existing Rocky Butte lease, but the impacts to those residents will not be increased by the addition of the proposed West Rocky Butte lease area. The Rocky Butte lease was issued in 1983, and a mine could have been opened on that lease subsequent to that time.

The concerns expressed by the Nickelson Little Farms residents are similar to those of residents west of the proposed West Rocky Butte tract: noise, deterioration of air quality, impacts to water wells, water systems, and houses as a result of blasting, and deteriorating property values. Several residents also requested road improvements when the road is relocated.

As stated in the previous response, there are standards which must be met in order to be in compliance with federal regulations and/or permit requirements for mining. These standards will be enforced, however the BLM realizes that there may still be impacts to residents in Nickelson Little Farms due to the proximity of the mine to the residences. The concerns and requests not to lease from these residents will be considered in the Record of Decision.

In the event that the Record of Decision is to lease the acreage to Northwestern Resources Co., as proposed, there are a number of opportunities for public involvement during the permitting process. Some of these opportunities are noted in the previous response. Residents who are concerned should contact OSM and DEQ regarding their opportunities to be involved in the permitting process. That is the appropriate point in the process to address many of the requests mentioned in these comment letters.

As stated above, the BLM does not participate in negotiations between landowners and federal lessees regarding property values and compensation. The regulations and permits do require replacement of water wells and repairs to structures damaged by mining. The pre-blasting survey establishes the pre-mining conditions, and therefore facilitates identification of damage caused by mining operations.

Finally, Northwestern Resources Co. operates the Colstrip Mine very close to the town of Colstrip, Montana. As a result of the mine's proximity to the town, the company has developed blasting procedures to minimize impacts off-lease.

The final letter in this group, from Mr. John B. Wold, included some specific comments. The following numbered responses correspond to the numbered comments in Mr. Wold's letter.

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1. The proposal by Northwestern Resources Co. is in accordance with the regulations concerning diligence and Logical Mining Units (See responses to the Sierra Club, the Wyoming Outdoor Council, and the Powder River Basin Resource Council for further discussion of this issue).
2. That alternative has been included in section 2.4, Alternatives Considered But Not Analyzed in Detail. The discussion of that alternative has been expanded in the final EIS.
3. Please see comments from the Governor and other state agencies for their views and concerns.
4. Standards required by the permit and by regulations will not be exceeded. There may be impacts to nearby residents as a result of the proximity of the mine. The impacts to residents will be considered in the Record of Decision.
- 5 and 6. These issues should be addressed during the permitting stage.
7. There may be impacts to residents as a result of their proximity to the mine.
8. The table has been revised.
9. The air quality model does include all known emission sources. The cumulative effects of the adjacent mines were included in the air quality modeling which was done for the proposed mine. Standards would be met at the permit boundary, however, there could be impacts to nearby residents due to their proximity to the mine.
10. This issue should be addressed during the permitting stage.
11. The City of Gillette and Campbell County have not expressed these concerns to the BLM.
12. This should be addressed during the permitting stage.

Response to Letter 30, from Louis F. and Loverretta A. Wolff

The location of the market for the coal has not been established, however, the quality of the coal in the eastern portion of the existing lease does not make it competitive with other coal being sold in the Powder River Basin at this time. The existence of a coal mine could negatively impact oil and gas mineral and royalty owners, and this is stated in the Final EIS. The BLM policy at this time is to encourage negotiations between competing mineral lessees when conflicts arise. The BLM does not participate in these discussions. The BLM does require maximum economic recovery of federal coal during a mining operation.

Response to Letter 31, from John C. Corkery

There are certainly unknowns associated with allowing the lease to expire and attempting to release it in the future, as you have pointed out. The BLM estimates that the Rocky Butte lease would not be competitive for releasing until some time between 2010 and 2020. This is discussed in Section 2.4 of the Final EIS, under Alternatives Considered But Not Analyzed In Detail.

Response to Letters 32 through 36, from Paul Rourke, Chuck Rourke, James F. Rourke, Kathryn Jackson, and Vione Lane

Thank you for your letter. The BLM agrees that there would be benefits to the area as a result of leasing and mining the West Rocky Butte tract, and this will be taken into account in the Record of Decision.



