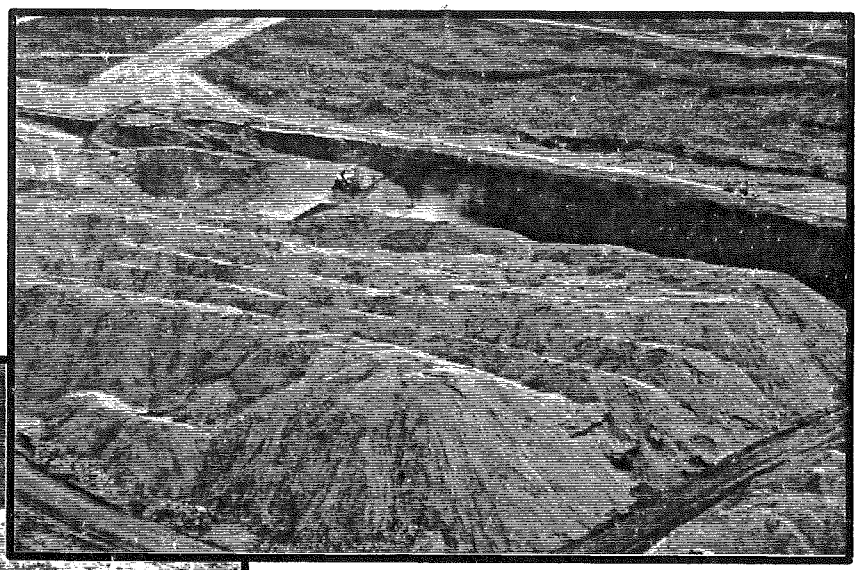
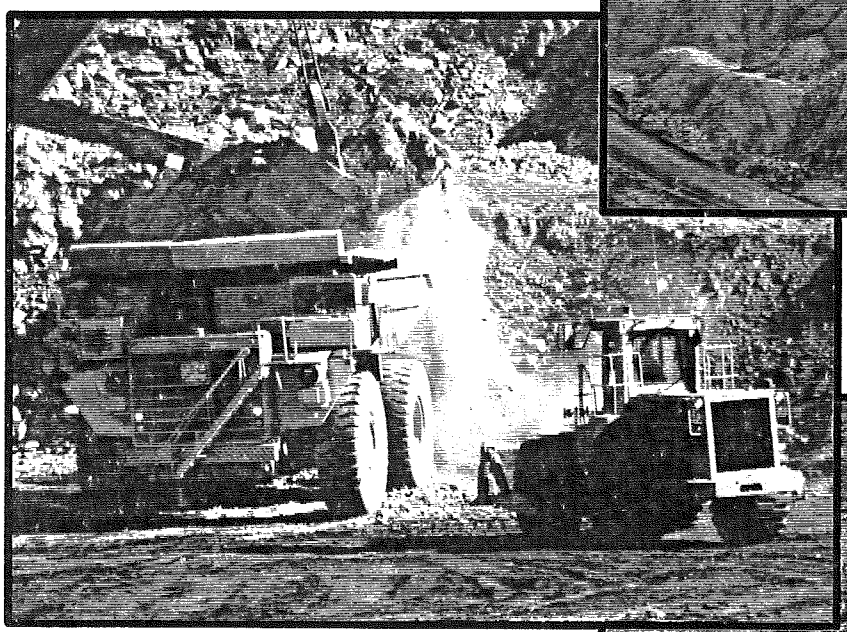
U.S. Department of the Interior
Bureau of Land Management
Wyoming State Office

Casper District Office

April 1997

FINAL
Environmental Impact Statement for the North Rochelle Coal Lease Application as applied for by Bluegrass Coal Development Company (Federal Coal Lease Application WYW127221)





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.

BLM/WY/PL-97/001-1320

FES 97-13

ERRATA

Final Environmental Impact Statement
for the North Rochelle Coal Lease Application
as applied for by Bluegrass Development Company
(Federal Coal Lease Application WYW177221

Appendix D, Page D-4 should read as follows:

operations under this lease, and shall leave such discoveries intact until directed to proceed by FS and BLM.

FOREST SERVICE REGION 2 SENSITIVE SPECIES - The FS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species listed as sensitive by the Regional Forester. The findings of this examination may result in some restrictions to the operator's plan or even disallow use and occupancy that would lead to the listing of a sensitive species under the Endangered Species Act of 1973.

ENDANGERED OR THREATENED SPECIES - The FS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determined effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. The findings of this examination may result in some restrictions to the operator's plans or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats.

The lessee/operator may, unless notified by the FS that the above examinations are not necessary, conduct the examinations on the leased lands at his discretion and cost. These examinations must be done by or under the supervision of a qualified resource specialist approved by the FS. Acceptable reports must be provided to the FS identifying the anticipated effects of a proposed action on endangered or threatened species or their habitats, and the anticipated effects and impacts to Forest Service Region 2 Sensitive species that may occur or have habitat in the area.

United States Department of the Interior

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

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WYW127221
N. Rochelle

APR 0 3 1997

Dear Reader:

This Final Environmental Impact Statement (FEIS) has been prepared pursuant to 40 CFR 1500-1508 for the North Rochelle Coal Lease Application (WYW127221), located in Campbell County, Wyoming. This copy of the FEIS is provided for your review and comments. This FEIS has been revised in response to the comments that were received on the Draft Environmental Impact Statement.

The Draft Environmental Impact Statement was mailed to the public in early November 1996. The comment period extended through January 10, 1997. Eleven written comment letters were received on the draft document, and they are included with responses, as Appendix G of this FEIS.

A formal public hearing on the proposed North Rochelle Coal Lease Application was held at 7 p.m. on December 12, 1996, at the Holiday Inn, 2009 S. Douglas Highway, Gillette, Wyoming. The purpose of the hearing was to receive comments on the proposed coal lease sale, on the fair market value and maximum economic recovery of the coal resources in the proposed North Rochelle tract (originally called the North Roundup tract), and on the Draft Environmental Impact Statement. A transcript of the hearing proceedings is available for review at the Bureau of Land Management office in Casper. An open house was held prior to the hearing, from 4 p.m. to 6 p.m. on December 12, 1996, at the Gillette Holiday Inn to answer questions regarding the North Rochelle coal lease application, as well as other pending Federal coal lease applications, other mineral development issues in the Powder River Basin, the coal leasing process, and the coal unsuitability screening process.

Comments will be accepted on the FEIS, as well as on the issues of Fair Market Value of the tract, and Maximum Economic Recovery of coal on the tract through May 19, 1997. Please address written comments to Bureau of Land Management, Casper District Office, Attn: Nancy Doelger, 1701 East "E" Street, Casper, WY 82601. Written comments may also be faxed to 307-234-1525. If you have any questions, please contact Nancy Doelger at 307-261-7627.

Sincerely,

Alan R. Pierson
State Director

FINAL

ENVIRONMENTAL IMPACT STATEMENT FOR THE NORTH ROCHELLE COAL LEASE APPLICATION AS APPLIED FOR BY BLUEGRASS COAL DEVELOPMENT COMPANY (FEDERAL COAL LEASE APPLICATION WYW127221)

FES 97-13

Prepared by

TRC Mariah Associates Inc.
Laramie, Wyoming

and

U.S. Department of the Interior
Bureau of Land Management
Casper District Office

Cooperating Agencies

U.S. Office of Surface Mining Reclamation and Enforcement

and

U.S. Forest Service

April 1997

NORTH ROCHELLE COAL LEASE APPLICATION
AS APPLIED FOR BY BLUEGRASS COAL DEVELOPMENT COMPANY
(FEDERAL COAL LEASE APPLICATION WYW127221)

ENVIRONMENTAL IMPACT STATEMENT
ABSTRACT

[ ] Draft [X] Final

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

Cooperating Agencies:
U.S. Office of Surface Mining Reclamation and Enforcement
U.S. Forest Service

Counties That Could Be Directly Affected:
Campbell County, Wyoming

Abstract:
This Final Environment Impact Statement (FEIS) assesses the environmental consequences of a federal decision to offer 1,440 acres containing approximately 144 million tons of federal coal for lease at a competitive sale, subject to standard and special lease stipulations. The tract was applied for by Shell Mining Company, which is now Bluegrass Coal Development Company (a wholly-owned subsidiary of Zeigler Coal Holding Company) and whose subsidiary operating unit, Triton Coal Company, operates the adjacent North Rochelle Mine. This FEIS describes the physical, biological, cultural, historic, and socioeconomic resources in and surrounding the project area. The focus for impact analysis was based upon resource issues and concerns identified during public scoping. Potential concerns related to development include impacts to soils, groundwater, and wildlife and cumulative impacts.

Other Environmental Review or Consultation Requirements:
This FEIS, in compliance with Section 7(c) of the Endangered Species Act (as amended), identifies any endangered or threatened species which are likely to be affected by the Proposed Action.

Lead Agency Contact:
For further information contact Nancy Doelger at the Bureau of Land Management, Casper District Office, (307) 261-7627. Comments on this FEIS should be submitted in writing to:

Bureau of Land Management
Casper District Office
Attn: Ms. Nancy Doelger, Environmental Protection Specialist
1701 East E Street
Casper, WY 82601

Date FEIS Made Available to EPA and Public: April 18, 1997

Date By Which Comments Must Be Received: May 19, 1997

EXECUTIVE SUMMARY

Bluegrass Coal Development Company (Bluegrass) operates the North Rochelle Mine through its wholly owned subsidiary, Triton Coal Company, in southeastern Campbell County, Wyoming. Bluegrass has existing contract customers that require low sulfur coal to comply with the Clean Air Act amendments. Bluegrass currently has 186 million tons of federal coal leased at the North Rochelle Mine, which was permitted by the State of Wyoming in 1983. The North Rochelle reserves will be mined out by approximately 2010 under current mining plans. Without supplemental reserves, no additional coal will be available for new or existing contracts. Therefore, Bluegrass is proposing to lease additional federal coal reserves located adjacent to their permitted North Rochelle Mine (Figure ES.1). The lease application was initially reviewed by the Bureau of Land Management (BLM), Wyoming State Office, Division of Mineral and Lands Authorization, on November 17, 1992. The BLM ruled that the application and lands involved met the requirements of regulations governing coal leasing on application (43 CFR 3425). The North Rochelle coal lease application was also reviewed by the Powder River Regional Coal Team (PRRCT) at their June 16, 1993, meeting in Billings, Montana. At that time, the PRRCT recommended that the BLM process the North Rochelle coal lease application as a lease-by-application (LBA).

According to the PRRCT operational guidelines for coal LBAs, the BLM must prepare either an environmental assessment (EA) or an environmental impact statement (EIS) to address the site-specific and cumulative environmental impacts of leasing and developing the federal coal in the application area. For this lease application, the decision was made to prepare an EIS.

The BLM will use this analysis to make a decision whether or not to hold a competitive, sealed-bid lease sale and issue a federal coal lease. If a lease sale is held, the lease will be issued to the highest bidder if a federal sale panel determines that the high bid meets or exceeds the fair market value as determined by BLM's economic evaluation and if the U.S. Department of Justice determines that there are no antitrust violations if the lease is issued to the high bidder.

Other agencies, including cooperating agencies on this EIS (the U.S. Forest Service [USFS] and the Office of Surface Mining Reclamation and Enforcement [OSM]) will also use this analysis to make decisions related to leasing and mining the federal coal in this tract.

All of the lands in the North Rochelle coal lease application have been subjected to the four coal planning screens and determined acceptable for further lease consideration. The Proposed Action to lease and mine the federal coal lands in this application is in conformance with both the BLM Buffalo Resource Area Resource Management Plan and the USFS Thunder Basin National Grassland Land and Resource Management Plan.

The Proposed Action is to hold a competitive lease sale for the federal coal lands as applied for (approximately 1,440 acres of federal coal reserves containing an estimated 144 million tons of coal), subject to the standard coal lease stipulations and to special coal lease stipulations developed for the Wyoming Powder River Basin (PRB). The LBA process is, by law and regulation, an open, public, competitive sealed-bid process. Thus, if the decision reached as a result of this analysis is to hold a lease sale, Bluegrass may not be the high bidder. Nonetheless, the analysis presented in this

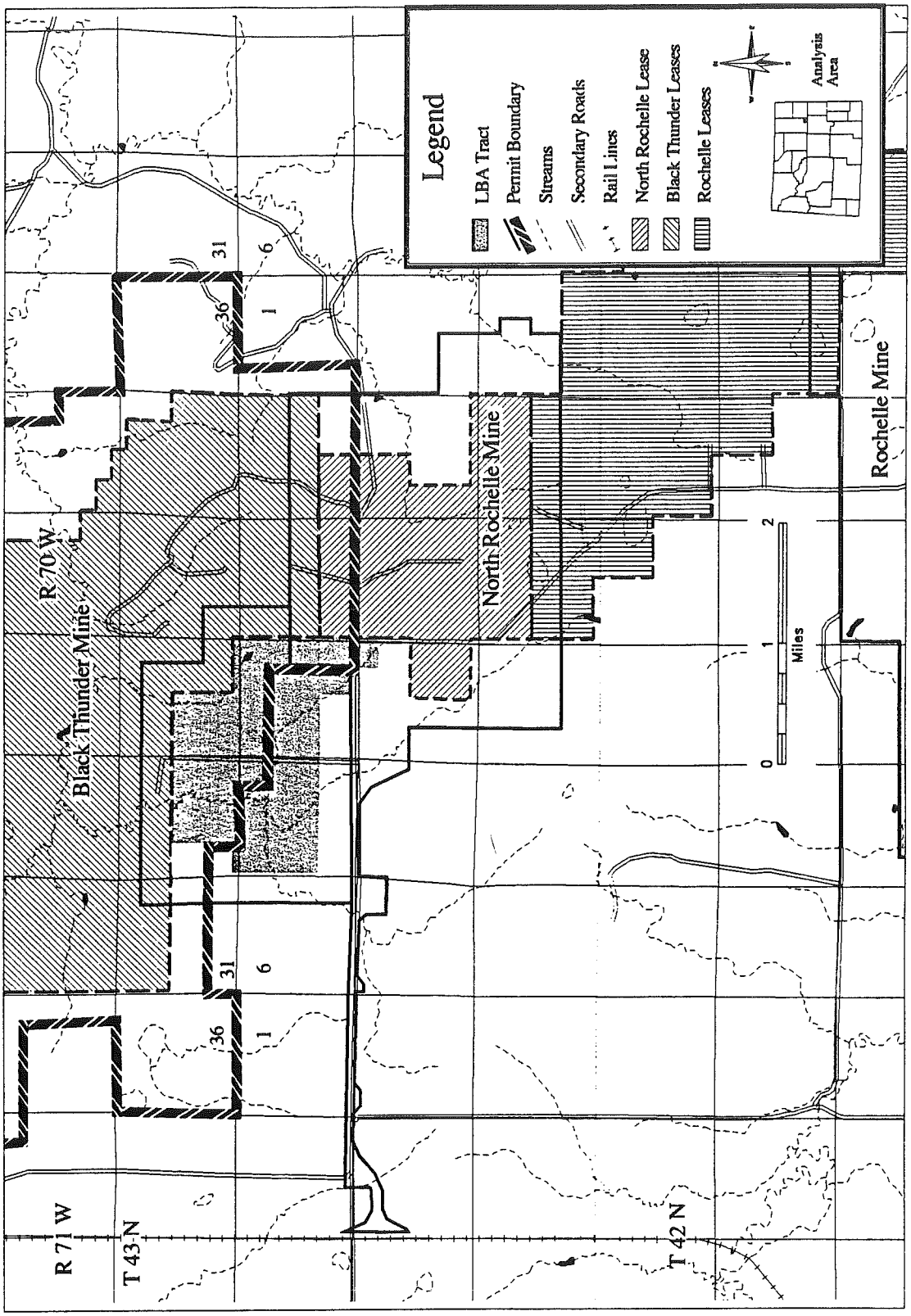

Figure ES.1 Proposed Action LBA Tract.

EIS assumes that the applicant (Bluegrass) would be the successful bidder and that they would mine the lands as a maintenance tract with their permitted North Rochelle Mine[1], and no new facilities, equipment, or personnel would be needed to mine the LBA tract. The overburden and coal thickness on the LBA tract is similar to North Rochelle's existing lease, and Bluegrass does not propose to increase production above the currently permitted maximum rate; acquisition of the LBA tract would simply allow production to be extended for 11 years.

The analyzed lease lands are also adjacent to the Black Thunder Mine, operated by the Thunder Basin Coal Company (TBCC), a subsidiary of ARCO. TBCC is also in a position to mine the tract as a maintenance lease. If TBCC acquires the lease, the rate of coal production, mining sequence, equipment, and facilities may be slightly different than Bluegrass's. However, the impacts of TBCC mining the tract would be similar to the impacts of Bluegrass mining the tract, and company-specific mining and reclamation plans would not significantly alter the disturbed acreage and, thus, would not substantially alter the environmental analysis conducted in this EIS.

Several possible tract configurations were considered by the BLM with the goal of making the LBA tract attractive to other potential bidders, minimizing the risk of bypassing federal coal that would then become economically unrecoverable and enhancing the fair market value of remaining unleased federal coal in the area. After considering specific coal reserve data, overburden thickness, and other site constraints, the BLM developed an alternative tract configuration (Alternative A, which is BLM's preferred alternative). Under this alternative, approximately 80 acres with about 9 million tons of federal coal would be added to the northwestern corner of the tract to prevent a potential bypass situation, and approximately 40 acres with about 4 million tons of federal coal would be removed from the southeast corner of the tract to enhance the value of adjacent, unleased coal. The revised tract contains approximately 149 million tons of federal reserves covering approximately 1,482 acres (Figure ES.2).

The No Action Alternative analyzed in this EIS is to reject this coal lease application, and the area contained in the application would not be offered for competitive sale at this time. However, rejection of this application will not affect the previously permitted coal mining at the North Rochelle Mine.

Figure ES.3 presents the three alternative lease configurations analyzed in detail in this EIS, and Table ES.1 presents a summary comparison of coal production, surface disturbance, mine life, and projected state revenue for the three alternatives.

Critical elements of the human environment that could be affected by the proposed project include air quality, cultural resources, floodplains, Native American religious concerns, threatened and endangered (T&E) species, hazardous or solid wastes, water quality, and wetlands/riparian zones. Four critical elements (areas of critical environmental concern, prime and unique farmland, wild and scenic rivers, and wilderness) are not present in the project area and are not addressed further. In addition to the critical elements that are potentially present in the project area, this EIS discusses the status and potential effects of the project on topography and

[1] The North Rochelle Mine has an approved 20 million ton per year surface mining permit and air permit. There are currently no support or rail facilities at the North Rochelle Mine; however, Triton Coal Company will initiate construction of these facilities in 1997. Triton Coal Company had a contract mining company, Fuller Construction Company, mining North Rochelle through November 1996, when the federal diligent development requirements were satisfied for the federal coal lease.

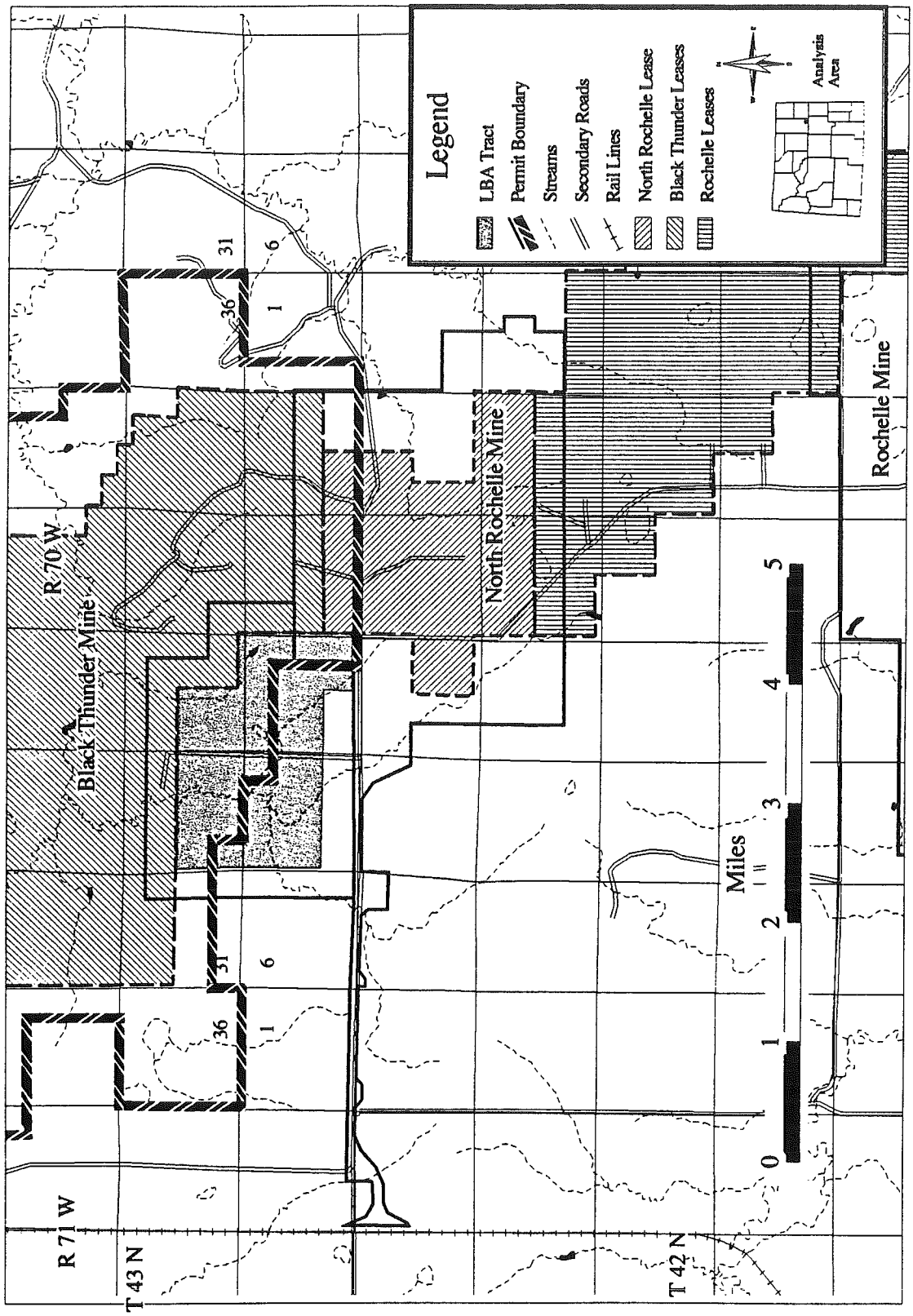

Figure ES.2 Alternative A LBA Tract.

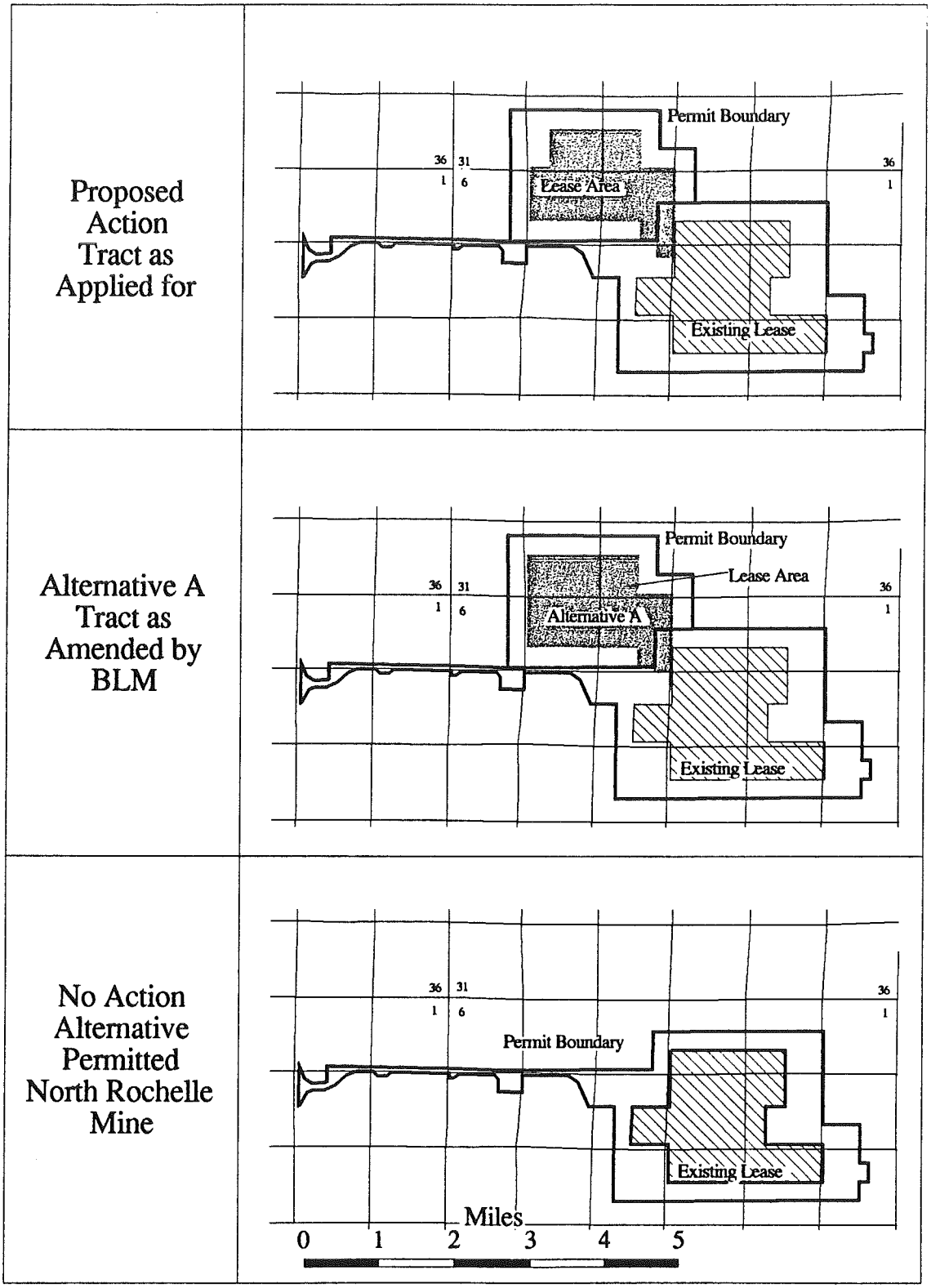

Figure ES.3 Alternative Tract Configurations Analyzed.

Table ES.1 Summary Comparison of Coal Production, Surface Disturbance, and Mine Life.

	Existing North Rochelle Mine	Existing Mine + LBA Tract	
Item	No Action Alternative	Proposed Action	Alternative A
Recoverable coal[1]	173 million tons	304 million tons	312 million tons
Total area to be disturbed[2]	3,193 acres	5,080 acres	5,160 acres
Average annual coal production	15 million tons	15 million tons	15 million tons
Life of mine	15 years	25 years	25 years
Average no. of employees	139	139	139
Total projected state revenue[3]	$190 million	$334 million	$343 million

[1] Assumes 93% recovery of in-place coal reserves.
[2] Includes acreage affected by railroad corridor--258 acres in 1996.
[3] Projected revenue to the State of Wyoming assumes the state will receive $1.10 per ton of coal sold (University of Wyoming 1994).

physiography, geology and mineral resources, soils, water availability or quantity, alluvial valley floors, vegetation, wildlife, land use and recreation, paleontological resources, visual resources, noise, transportation resources, and socioeconomics.

The project area is located in the PRB, a part of the Northern Great Plains, which includes most of northeastern Wyoming. The LBA tract is located in the south-central part of the PRB at an elevation of about 4,500 ft in an area of low rolling topography. The applicant's main mining objective is a lower Wyodak coal seam. The Upper Wyodak coal seam is present locally and will also be mined where it can be economically recovered. The main coal seam on the LBA tract is approximately 60 ft thick and the overburden ranges from about 150 ft to 250 ft thick.

The existing topography on the LBA tract would be substantially changed during mining. A 150- to 250-ft highwall would exist in the active pit, with large volumes of spoil and topsoil stockpiled for later reclamation. Trussler Creek would be diverted into a temporary channel. The reclaimed land surface would contain fewer topographic features, but the basic drainage network would be retained. Both mining alternatives would lower the existing elevation by about 10 ft, due to removal of the coal. Even though the reclaimed land would be at a lower elevation, it would approximate premining contours, but lack some premining terrain diversity. This could contribute to reduced wildlife carrying capacity on the LBA tract. These topographic changes would not conflict with regional land use, and the postmining topography would adequately support anticipated land use.

The geology from the base of the coal to the land surface would be subject to considerable long-term change on the LBA tract under either action alternative. Mining would permanently remove 144 million tons of coal (Proposed Action) or 148 million tons (Alternative A).

Consequences to soils from mining the LBA tract would include changes in the physical, biological, and chemical properties. Following reclamation, the soils would be unlike premining soils in texture, structure, color, accumulation of clays, organic matter, and chemical composition. The soils would be much more uniform in type, thickness, and texture. However, the replaced topsoil would support a stable and productive vegetation community adequate in quantity and quality to support planned postmining land uses (i.e., wildlife habitat and rangeland).

Moderately adverse short-term impacts to air quality would occur as a result of mining the LBA tract. Visibility would continue to be slightly reduced due to blowing dust. Total suspended particulates (TSP) concentrations would continue to be elevated near the mine site, but would not violate federal or Wyoming primary and secondary standards, even when combined with emissions from adjacent mines. Concentrations of gaseous emissions would continue to remain within acceptable federal and state standards. Federal and state air quality standards have not been exceeded by all existing industrial development in the southeastern PRB, including the existing mines. This is not predicted to change as a result of mining the LBA tract.

Based on modeling conducted for the North Rochelle and Black Thunder Mines, dewatering of the coal seam by adjacent mines has and will lower the water level in the coal aquifer as much as 5 ft for a distance of approximately 5 to 8 mi from the mines. Mining of the LBA tract should not extend the distance of this drawdown, but it would extend the duration of the drawdown. Drawdowns in the coal aquifer will extend much further beyond the mine's boundaries than those in the overburden. About 305 acre-ft of groundwater would be used on the LBA tract each year. After mining, a period of approximately 100 to 200 years would be required for groundwater levels in the restored coal overburden (spoil) aquifer to reach equilibrium premining levels. Postmining water quality would be lower due primarily to increased total dissolved solids (TDS) levels, but it would remain acceptable for anticipated postmining grazing and wildlife use. Surface water quality would remain about the same as at present. Total surface water discharge and sediment yield would also remain about the same following mining, but, because of the relocation of the Trussler Creek drainage, the timing and quantity of streamflow would be distributed differently.

Mining of the LBA tract would progressively remove the native vegetation on 1,440 acres (Proposed Action) or 1,482 acres (Alternative A). Reclamation and revegetation of this land would occur concurrently with mining. Initially, the reclaimed land would be dominated by grassland vegetation which would be less diverse than the premining vegetation. Estimates for the time it would take to restore sagebrush to premining density levels range from 20 to 100 years. An indirect impact of decreased big game habitat carrying capacity would be associated with this vegetative change. However, a diverse, productive, and permanent vegetative cover would be established on the LBA tract within about 10 years following reclamation. The decrease in plant diversity would not seriously affect the potential productivity of the reclaimed areas, and the proposed postmining land use (wildlife habitat and rangeland) should be achieved even with the changes in vegetation composition and diversity.

Mining of the LBA tract would reduce the acreage of habitat available for wildlife populations; however, the LBA tract does not contain any unique or crucial habitat, and habitat would be disturbed in parcels, with reclamation progressing as new disturbance occurs. Wildlife habitat quality has declined in the PRB due to a continuing trend of landscape fragmentation from roads, rail lines, oil and gas wells, coal mines, and fences. Mining of the LBA tract would add to this habitat fragmentation. However, since no defined crucial habitat occurs on the LBA tract and very little crucial habitat occurs in the highly developed corridor involving area coal mines, these consequences are not expected to cause significant impacts.

Mining the LBA tract would not be expected to jeopardize the existence of any T&E species, and no known critical habitat for T&E species exists on the LBA tract.

Active mining would preclude other land uses. Recreational use of the LBA tract would be severely limited during mining. Within 10 years after initiation of each reclamation phase, rangeland and wildlife use would return to near premining levels. The mine would also impact potential oil and gas development on the leased lands during active mining. The cumulative impacts of energy development (coal mining, oil and gas) in the PRB are and will continue to contribute to a reduction in hunting opportunities for some animals (pronghorn, mule deer, and sage grouse).

There are currently no oil and gas wells on the LBA tract; however, oil and gas exploration may occur on existing oil and gas leases on the LBA tract. Potential for development of coal bed methane resources on the tract would be lost with removal of the coal. Following reclamation, the land would be suitable for grazing and wildlife use, which are the historic land uses. Following reclamation bond release, management of the privately owned surface (80% of the LBA tract) would revert to the private surface owner.

Cultural resources will be impacted by mining, but adverse impacts will be mitigated through data recovery and/or avoidance of significant properties. A total of five prehistoric, historic, and multicomponent (consisting of both prehistoric and historic components) sites has been recorded within the LBA tract. All of the currently recorded sites are not presently considered eligible for inclusion on the National Register of Historic Places (NRHP); however, formal Wyoming State Historic Preservation Office (SHPO) consultation is required for concurrence with this evaluation. Class III surveys would be required for the uninventoried lands prior to mining; Class I reconnaissance to confirm the evaluation of unconcurred sites would also be required to comply with legislation. If eligible cultural properties are found within the LBA tract and they cannot be avoided, a data recovery program would be implemented.

No sites of Native American religious or cultural importance are known to occur on the LBA tract; if such sites or localities are identified, they will be taken into consideration.

No unique or significant paleontological resources have been identified on the LBA tract, and the likelihood of encountering significant paleontological resources is small.

Mining activity on the LBA tract would not be visible from any major travel routes and would be partly concealed by surrounding terrain. Mining would affect landscapes classified by USFS as "common," and the landscape character would not be significantly changed following reclamation.

Impacts from noise generated by mining activities on the LBA tract are not expected to be significant due to the remote nature of the site.

No impacts to transportation facilities from leasing and subsequent mining of the LBA tract are anticipated.

Leasing and subsequent mining of the LBA tract would not create additional jobs if mined as a maintenance tract, but would extend the life of an already permitted operation by 11 years. The sale of coal under the Proposed Action is expected to generate over $147 million to the state or almost $153 million under Alternative A.

Cumulative Impacts

Cumulative impacts 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 occurring over time.

Wyoming coal production has increased 2.5 times in the last 15 years, from 94.0 million tons in 1980 to 236.9 million tons in 1994, according to records of the Wyoming State Inspector of Mines. 1995 coal production from Campbell and Converse Counties was approximately 246.5 million tons, according to the Wyoming State Geological Survey. Campbell and Converse Counties produce 85-95% of Wyoming coal each year. The increasing state production is primarily due to increasing sales of inexpensive low-sulfur PRB coal to electric utilities who must comply with requirements of the 1990 Clean Air Act Amendments. Increases in demand for electricity will probably result in a continuing demand for federal coal from Wyoming's PRB.

In 1996, the BLM completed a report titled *Coal Development Status Check Powder River Federal Coal Region Montana & Wyoming*. This report documents actual cumulative mineral development impacts in the PRB during the last 15 years and compares them with the cumulative mineral development impacts predicted in previously prepared regional EISs. A primary conclusion reached in the status check was that regional coal production levels are within predicted coal production levels, except for the southern group of mines, where production has exceeded predictions (The North Rochelle LBA tract is in this southern group of mines). The Wyoming status check also considers predictions that were made in *Cumulative Potential Hydrologic Impacts of Surface Coal Mining in the Eastern Powder River Structural Basin* (CHIA) (Martin et al. 1988).

There are currently 17 active surface coal mines and two inactive mines in Campbell and northern Converse Counties, Wyoming (Figure ES.4). The inactive mines are the Clovis Point/East Gillette Mine and the Rocky Butte Mine. The Clovis Point/East Gillette Mine was active from October 1986 through February 1988 and July 1994 through June 1996, to produce coal to meet federal diligent development requirements, which have been met at this time. The Rocky Butte Mine is still in the developmental stage. These mines lie along a north/south line paralleling Highway 59 from just north of Gillette, Wyoming, south for about 75 mi. The mines are located just west of the outcrop of the thick Fort Union coal beds, where the coal is at the shallowest depth. The proposed North Rochelle LBA tract is situated in the middle of a nearly continuous corridor of six coal mines in southern Campbell and northern Converse Counties, Wyoming. This southern corridor is approximately 24 mi long and 8 mi wide. Four maintenance leases including about 8,900 acres of federal coal (Jacobs Ranch, West Black Thunder, North Antelope/Rochelle, and Antelope) have been issued to mines in this southern group since decertification, which has resulted in a 33% increase in the acres of leased federal coal in this group of mines since 1990 (see Figure ES.4). BLM is currently processing three maintenance leases including approximately 9,500 acres of federal coal in this group of mines (North Rochelle, Thundercloud, and Powder River). If these three maintenance leases are issued, the increase since 1990 in acres of leased federal coal in the southern group of mines would be 68%. Issuance of the 1,440-acre North Rochelle LBA tract under the Proposed Action (approximately 1,482 acres under Alternative A) would represent an increase of about 4% in acreage of leased federal coal in the southern group of mines. In May 1996, Evergreen Enterprises submitted a lease application for federal coal located north of the Jacobs Ranch Mine (Figure ES.4). This lease application is for a new mine start, not for maintenance of an existing mine. Kennecott also submitted an application in February 1997 for federal coal adjacent to their existing operations at the Antelope Mine. BLM has not yet started processing either of these new lease applications, which must still be reviewed by the PRRCT. There is also a potential for development of coal bed methane resources in a large area west of the coal mines (Figure ES.5). An EIS for coal bed methane development south of Gillette is in preparation and an EA for coal bed methane development north of Gillette was mailed to the public in December.

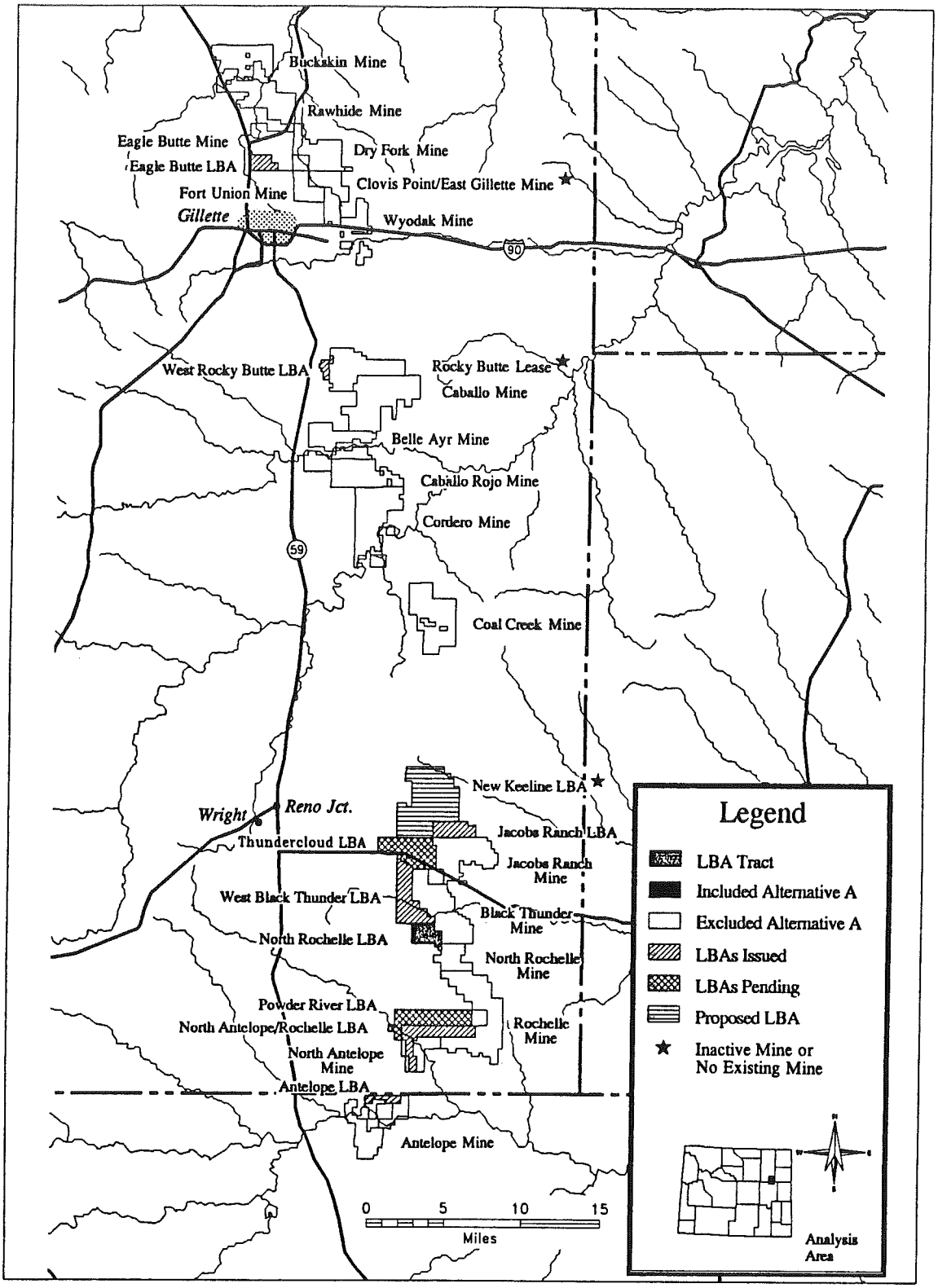

Figure ES.4 Existing and Proposed Federal Coal Leases.

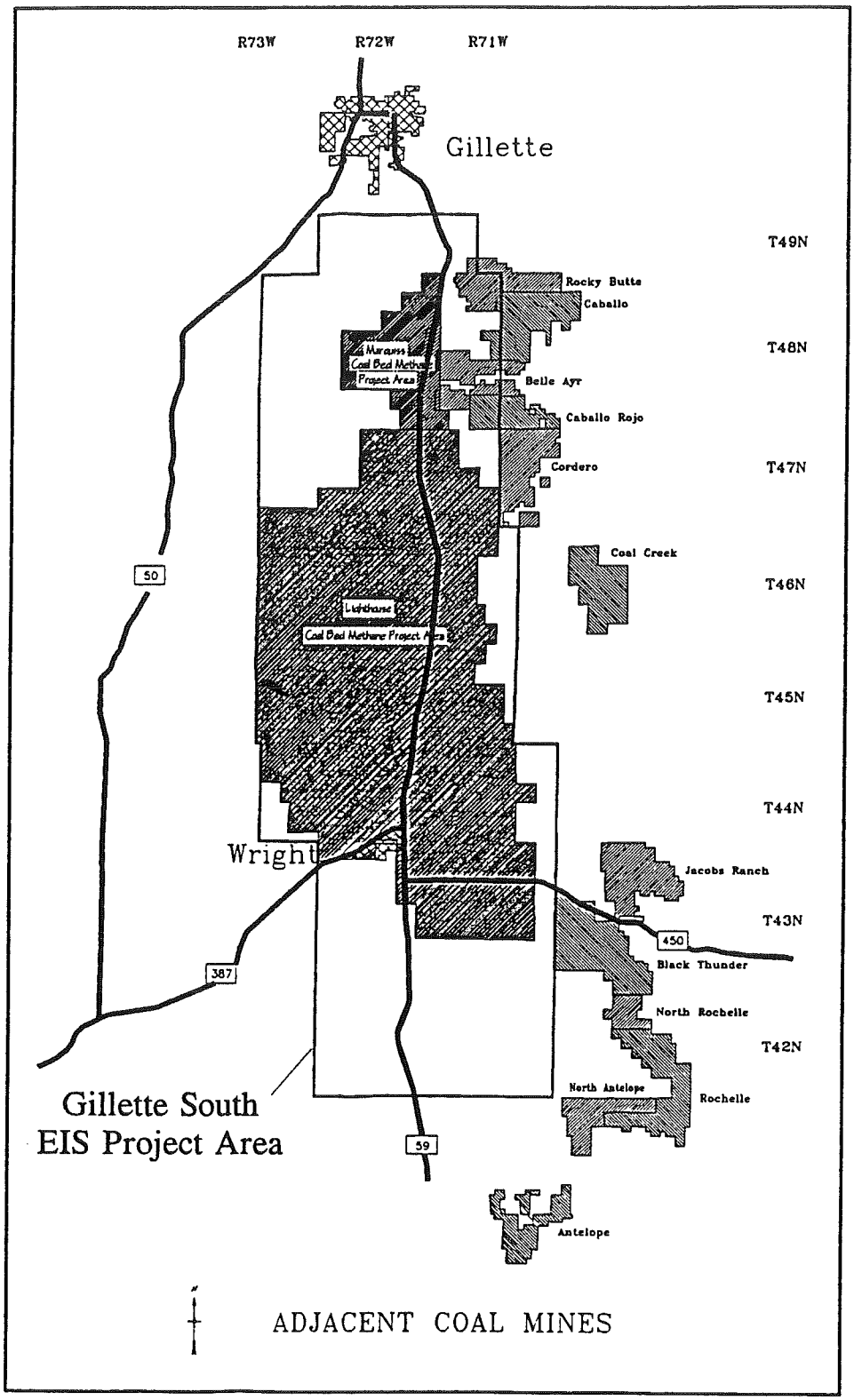

Figure ES.5 Coal Bed Methane Development Area (Taken from BLM 1996).

It is possible that construction may commence in 1997 on three projects in the vicinity of the North Rochelle LBA: 1) North Rochelle Mine facilities and rail loop (see Section 2.1.2); the ENCOAL Plant, which will be located within the rail loop at the North Rochelle Mine; and the Two Elk power plant, which will be located east of the Black Thunder Mine.

The PRB coal region encompasses an area of about 20,000 mi^2 and contains nearly 240 billion tons of sub-bituminous coal resources. Campbell County has a total surface area of about 4,760 mi^2, of which approximately 4% is within current mine permit boundaries. Coal mining in this area disturbs about 2,000 acres annually with about 1,850 acres reclaimed annually. Mining and reclamation rates are expected to continue to increase through the year 2015, but the balance between reclamation and mining should remain about the same. Production of coal in the southern mine group began in 1977 at the Black Thunder Mine. The current maximum permitted production rate is 152 million tons per year from the six mines. An estimated 3 billion tons of leased coal underlies these six mines, and additional unleased deeper coal reserves are present adjacent to these mines. Approximately 52,000 acres are contained in the existing permit boundaries and will be disturbed--42,000 acres by mining and 10,000 acres by roads, railroads, facilities, temporary stockpiles, and other mine-related activities and structures.

The existing and proposed development in the PRB has and will continue to result in the introduction of additional roads, railroads, power lines, fences, mine structures, and oil and gas production equipment. This area has already undergone change from a semi-agriculturally based economy to a coal mining and oil and gas economy. Environmentally, the open, basically treeless landscape has been visibly altered by construction, equipment, and human activities. Part of this intrusion will be in evidence long after coal mining and oil and gas production have ceased. Cumulative impacts vary by resource and range from being almost undetectable to being substantial. Cumulative impacts such as groundwater quantity and wildlife habitat (particularly antelope) have created the greatest concern. Monitoring of backfill areas indicates that reclaimed areas are being recharged with water generally suitable for livestock use (the premining use). Wildlife monitoring indicates that wildlife are using reclaimed areas.

This EIS presents the BLM's analysis of environmental impacts under authority of the National Environmental Policy Act (NEPA) and associated rules and guidelines. The BLM will use this analysis to make a leasing decision. If a lease sale is held, it will be based on a competitive, sealed bid. The successful bidder must not only submit the highest bid but the bid must equal or exceed an undisclosed amount determined by the BLM as the fair market value. The decision to lease these lands is a necessary requisite for mining, but is not in itself the enabling action that will allow mining. The most detailed analysis prior to mine development would occur after the lease is issued, when the lessee files an application for a surface mining permit and mining plan approval, supported by extensive proposed mining and reclamation plans, to the Wyoming Department of Environmental Quality (WDEQ).

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1.0 INTRODUCTION

On July 22, 1992, Shell Mining Company filed an application with the Bureau of Land Management (BLM) for a coal lease for federal coal reserves located northwest of and adjacent to Shell Mining Company's North Rochelle Mine. This application was made pursuant to provisions of the leasing on application regulations at 43 Code of Federal Regulations (CFR) 3425.1. Shell Mining Company has subsequently been acquired by Zeigler Coal Holding Company (Zeigler) and renamed SMC Mining Company, which is a wholly-owned subsidiary of Zeigler. SMC Mining Company has five subsidiary operating units, one of which is Triton Coal Company of Gillette, Wyoming. The North Rochelle Mine is operated by Triton Coal Company. SMC Mining Company changed its name to Bluegrass Coal Development Company in 1996. Bluegrass Coal Development Company is now the applicant of record for this application and is hereafter referred to as Bluegrass.

The subject lands in the application are located in southeastern Campbell County approximately 50 mi south of Gillette, Wyoming (Figure 1.1), contain an estimated 144 million tons total coal, and cover approximately 1,440 acres. These lands are located along a north/south corridor of 17 active coal mines (Figure 1.2) (The Clovis Point/East Gillette Mine is inactive, there is no mine on the Rocky Butte leases, and New Keeline is a lease application for a proposed new mine). If the decision reached as a result of this analysis is to hold a sale, any of these existing mines, as well as any other qualified party, could potentially submit a bid on this coal lease sale. If Bluegrass acquires the federal coal lease for these lands, the coal would be mined, processed, and distributed as part of their permitted North Rochelle Mine, which contains 186 million tons of minable coal and covers 1,961 acres. These proposed lease lands are hereafter referred to as the LBA tract. (LBA stands for lease-by-application.)

The lease application was initially reviewed by the BLM, Wyoming State Office, Division of Mineral and Lands Authorization, on November 17, 1992. The BLM ruled that the application and lands involved met the requirements of regulations governing coal leasing on application (43 CFR 3425).

Since these federal coal lands are within the decertified Powder River Basin Federal Coal Production Region, the application was also reviewed by the Powder River Regional Coal Team (PRRCT), a federal/state advisory body established to develop recommendations concerning management of federal coal in the region. Although the Powder River Basin Federal Coal Region was decertified in January 1990, the PRRCT has retained oversight of the administrative functions of its charge. The North Rochelle coal lease application was reviewed by the PRRCT at their June 16, 1993, meeting in Billings, Montana. At that time, the PRRCT recommended that the BLM process the North Rochelle coal lease application as a lease-by-application (Appendix A). In order to process a lease-by-application, BLM must complete:

- a geologic and engineering report on the quantity, quality, and maximum economic recovery of coal in the tract;
- a fair market value analysis; and
- an environmental analysis.

According to the PRRCT operational guidelines for coal lease-by-applications (BLM 1991), the BLM must prepare either an environmental assessment (EA) or an environmental impact statement (EIS) to address the site-specific and cumulative environmental impacts of leasing and developing the federal coal in the application area. For this lease application, the decision was made to prepare an EIS.

The BLM will use this analysis to make a decision whether or not to hold a competitive, sealed bid lease sale and issue a federal coal lease. If a lease sale is held, a lease will be issued to the highest bidder if a federal sale panel determines that the high bid meets or exceeds the fair market value as

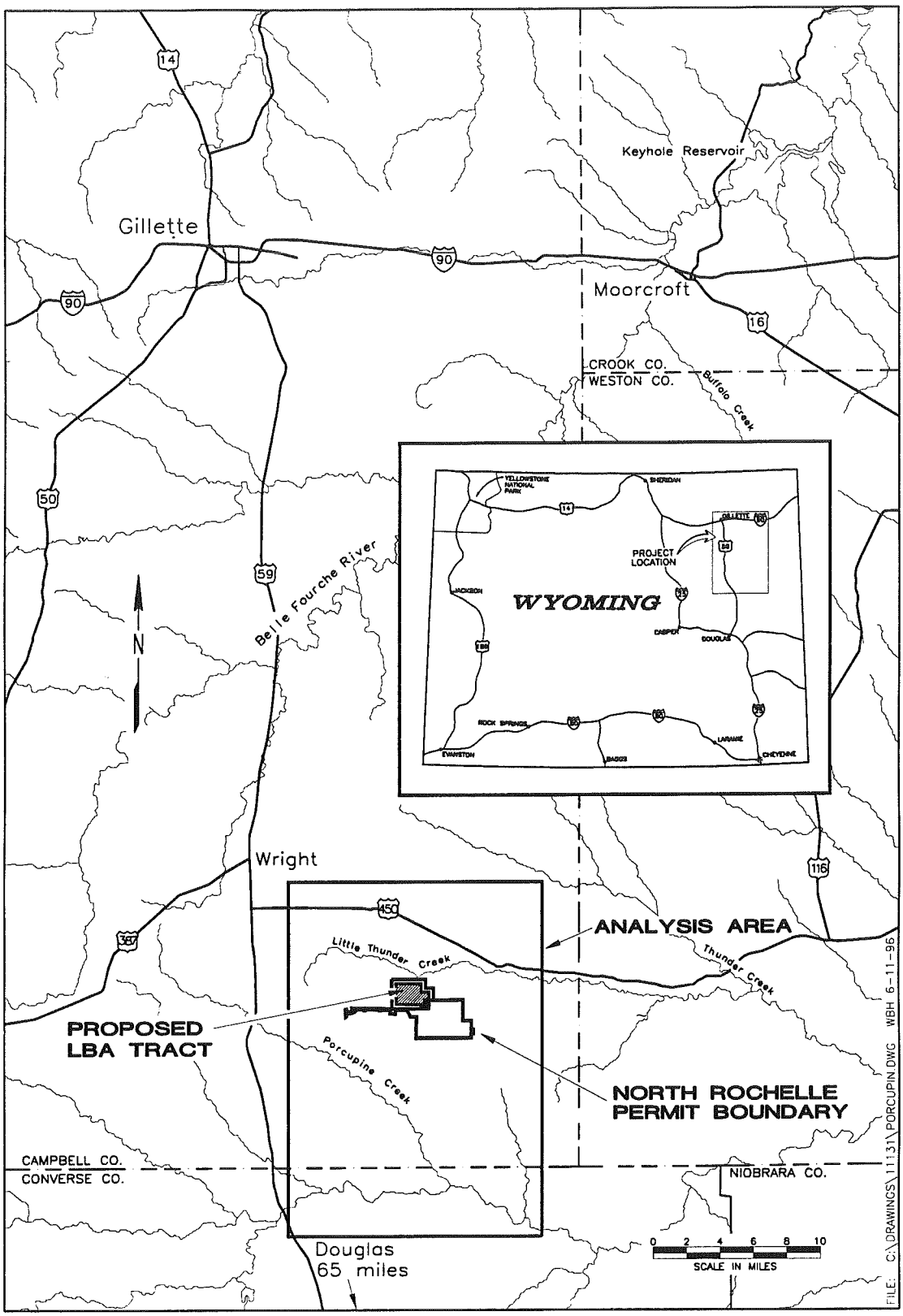


Figure 1.1 General Location of the North Rochelle Lease Application Tract.

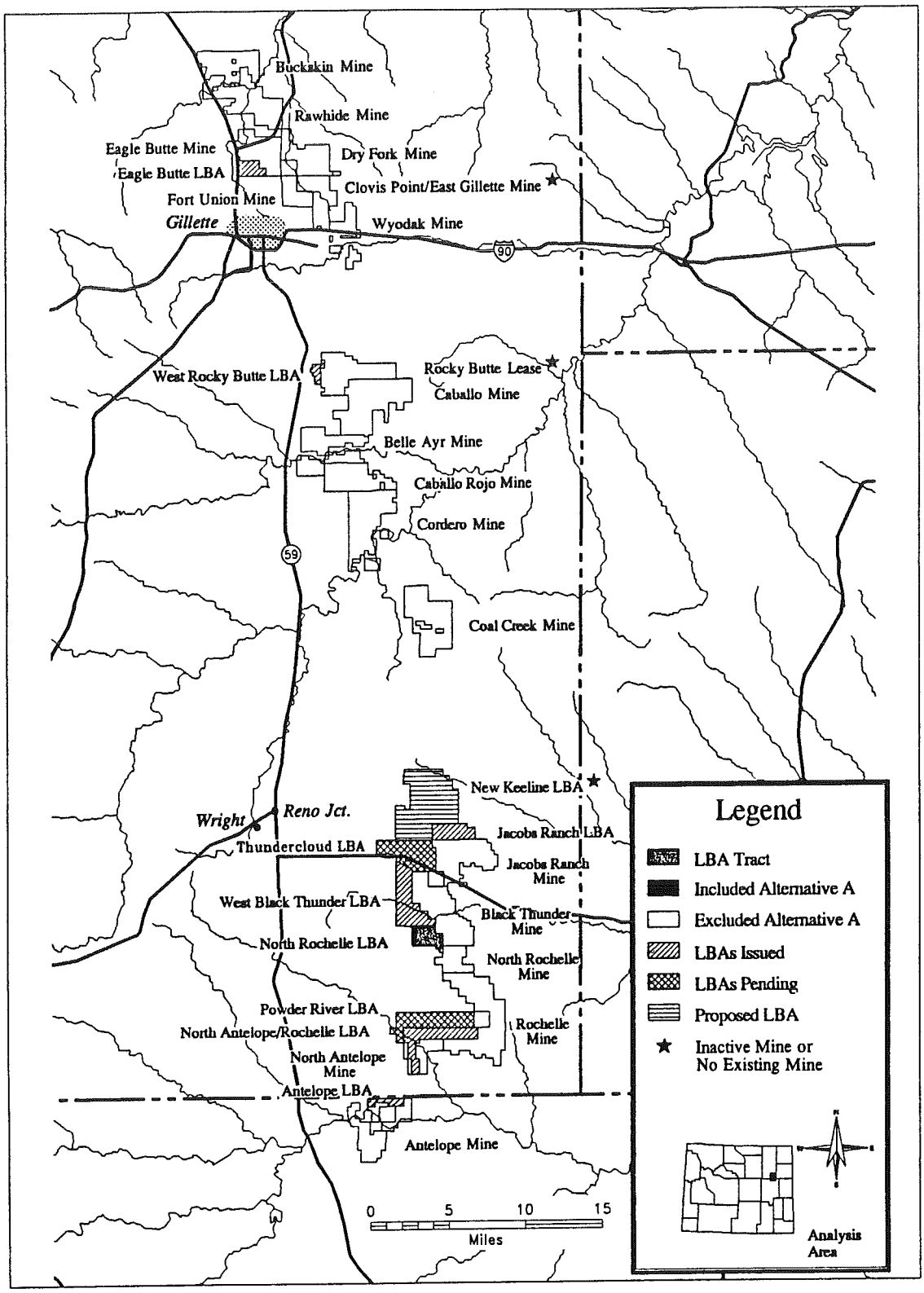


Figure 1.2 Coal Mines in Campbell and Northern Converse Counties.

determined by BLM's economic evaluation and if the U.S. Department of Justice determines that there are no antitrust violations if the lease is issued to the high bidder.

Other agencies, including cooperating agencies on this EIS (the U.S. Forest Service [USFS] and the Office of Surface Mining Reclamation and Enforcement [OSM]), will also use this analysis to make decisions related to leasing and mining the federal coal in this tract.

1.1 PURPOSE AND NEED FOR ACTION

Under the original homestead laws, ranchers and farmers were granted both the surface and mineral rights to their land. The homestead laws were amended in the early 1900s to allow the federal government to retain the subsurface mineral rights. Since the passage of the Mineral Leasing Act in 1920, the U.S. Department of the Interior (USDI), through its implementing agency, the BLM, has been charged with administering a leasing program that would allow the private sector to mine federally owned coal reserves. A federal coal lease grants the lessee the exclusive right to obtain a mining permit for, and to mine coal on, the leased tract subject to the terms of the lease, the mining permit, and applicable state and federal laws. In return for receiving a lease, a lessee must make payments to the federal government.

The leasing program allows for the designation of new production tracts (a lease to open a new mine), bypass tracts (a lease needed to prevent leaving "islands" of unmined coal), and maintenance tracts (a lease needed to continue operations at an existing mine). The leasing program provides for competitive leasing of federal coal to ensure that adequate coal supplies are available to meet national long-term energy requirements and that sufficient reserves are available to continue existing production. Bluegrass has existing contract customers that require a low sulfur coal to comply with the Clean Air Act amendments. Bluegrass currently has 186 million tons of federal coal leased at the North Rochelle Mine, which is directly adjacent to the lands evaluated in this proposal. The North Rochelle reserves will be mined out by approximately 2010 under current mining plans. Without supplemental reserves, no additional coal will be available for new contracts. Coal reserves are needed now so that new coal contracts can be secured to replace existing contracts.

The BLM is currently leasing coal to ensure that coal companies can acquire adequate reserves for long-term commitments. It has been projected that the passage of the 1990 Clean Air Act, with its incentives for use of low sulfur coal, will lead to increased demand for Powder River Basin (PRB) coal. Coal is not available for market for several years following the issuance of a lease because of the time required to prepare and submit a mine permit application, review and issue the permit, and provide public hearings and appeal periods.

This EIS analyzes the environmental impacts of issuing a federal coal lease and mining the federal coal in the North Rochelle lease application as required by the National Environmental Policy Act of 1969 (NEPA) and associated rules and guidelines. The decision to hold a competitive sale and issue a lease for the lands in this application is a prerequisite for mining the LBA tract, but is not in itself the enabling action that will allow mining. The most detailed analysis occurs after a lease has been issued, but prior to mine development when the lessee files a permit application package with the Wyoming Department of Environmental Quality (WDEQ) and OSM for a surface mining permit and mining plan approval. Authorities and responsibilities of the BLM and other concerned regulatory agencies are described in the following sections.

1.2 REGULATORY AUTHORITY AND RESPONSIBILITY

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

- the Mineral Leasing Act of 1920, as amended;

- the Multiple Use Sustained Yield Act of 1960;
- the National Environmental Policy Act of 1969;
- the Federal Coal Leasing Amendments Act of 1976;
- the Federal Land Policy and Management Act of 1976; and
- the Surface Mining Control and Reclamation Act (SMCRA) of 1977.

The BLM is the lead agency responsible for leasing federal coal lands under the Federal Coal Leasing Amendments Act of 1976 and is also responsible for preparation of this EIS to evaluate the potential impacts of issuing a lease. The BLM must decide whether to hold a competitive, sealed-bid lease sale for the tract as applied for, hold a competitive lease sale for a modified tract, or not offer the tract for sale.

The USFS is a cooperating agency on this EIS because they manage the federal surface lands in the Thunder Basin National Grasslands, and this lease application includes some of those lands. Prior to the BLM making a decision to hold a competitive scale, the USFS must consent to holding the lease sale.

OSM is also a cooperating agency. After a coal lease is issued, SMCRA gives the OSM primary responsibility to administer programs that regulate surface coal mining operations and the surface effects of underground coal mining operations. Pursuant to Section 503 of SMCRA, the WDEQ developed, and in November 1980 the Secretary of the Interior approved, a permanent program authorizing WDEQ to regulate surface coal mining operations and surface effects of underground mining on nonfederal lands within the state of Wyoming. In January 1987, pursuant to Section 523(c) of SMCRA, WDEQ entered into a cooperative agreement with the Secretary of the Interior authorizing WDEQ to regulate surface coal mining operations and the surface effects of underground mining on federal lands within the state.

Pursuant to the cooperative agreement, a federal coal lease holder in Wyoming must submit a permit application package to OSM and WDEQ/Land Quality Division (LQD) for any proposed coal mining and reclamation operations on federal lands in the state. WDEQ/LQD reviews the permit application package to ensure that the permit application complies with the permitting requirements and that the coal mining operation will meet the performance standards of the approved Wyoming program. OSM, BLM, USFS, and other federal agencies review the permit application package to ensure that it complies with the terms of the coal lease, the Mineral Leasing Act of 1920, NEPA, and other federal laws and their attendant regulations. If the permit application package does comply, WDEQ issues the applicant a permit to conduct coal mining operations. OSM recommends approval, approval with conditions, or disapproval of the mining plan to the Assistant Secretary of the Interior, Land and Minerals Management. Before the mining plan can be approved, the BLM and the USFS must concur with this recommendation.

If the proposed LBA tract is leased to an existing mine, the lessee would be required to revise its coal mining permit prior to mining the coal, following the processes outlined above. As a part of that process, a new mining and reclamation plan would be developed showing how the lands in the LBA tract would be mined and reclaimed. Specific impacts which would occur during the mining and reclamation of the LBA tract would be addressed in that mining and reclamation plan, and specific mitigation measures for anticipated impacts would be described in detail at that time.

WDEQ enforces the performance standards and permit requirements for reclamation during the mine's operation and has primary authority in environmental emergencies. OSM retains oversight responsibility for this enforcement. BLM has authority in those emergency situations where WDEQ or OSM cannot act before significant environmental harm and damage occurs.

BLM also has the responsibility to consult with and obtain the comments of other state or federal agencies which have jurisdiction by law or special expertise with respect to potential environmental impacts. Appendix B presents other federal and state permitting requirements that would be required to mine this LBA tract.

1.3 RELATIONSHIP TO BLM POLICIES, PLANS, AND REGULATIONS

In addition to the federal acts listed under Section 1.2, guidance and regulations for managing and administering public lands, including the federal coal lands in the North Rochelle application, are set forth in 40 CFR 1500 regulations (Protection of Environment), 43 CFR 1601 (Planning, Programming, Budgeting), and 43 CFR 3400 (Coal Management).

Specific guidance for processing this application follows BLM Manual 3420 (Competitive Coal Leasing) (BLM 1989) and the 1991 *Powder River Regional Coal Team Operational Guidelines For Coal Lease-By-Applications* (BLM 1991). The *National Environmental Policy Act Handbook* (BLM 1988) has been followed in developing this EIS.

1.4 CONFORMANCE WITH EXISTING LAND USE PLANS

The Federal Coal Leasing Amendments Act of 1976 requires that lands considered for leasing be included in a comprehensive land use plan and that leases be compatible with that plan.

The resource management plan (RMP) for the BLM Buffalo Resource Area (BLM 1984a), governs and addresses the leasing of federal coal in this area. *The Medicine Bow National Forest and Thunder Basin National Grassland Land and Resource Management Plan* (LRMP) (USFS 1985) governs and addresses the management of USFS (public) lands in the area. All management decisions concerning these respective lands must comply with these plans.

Coal land use planning involves four planning screens to determine whether the coal is acceptable for further lease consideration. The four coal screens are:

- development potential of the coal lands,
- surface owner consultation,
- unsuitability criteria application, and
- multiple land use decisions that eliminate federal coal deposits.

Only those federal coal lands that pass these screens are addressed and given further consideration for leasing.

For the RMPs, only in-place coal with beds at least 5 ft thick, stripping ratios of 15:1 or less, and less than 500 ft of overburden were addressed and carried forward. The lands in this coal lease application pass this test and were addressed in the Thunder Basin National Grassland LRMP.

The coal leasing unsuitability criteria listed in the federal coal management regulations (43 CFR 3461) have been applied to high to moderate coal potential lands in the Thunder Basin National Grassland. This analysis is contained in Appendix F of the LRMP Final EIS (FEIS) (USFS 1985). The multiple use conflict evaluation concluded that there were no serious surface resource use conflicts on Thunder Basin National Grassland and that any conflicts which do arise could be mitigated on a case-by-case basis. Appendix C of this EIS summarizes the unsuitability criteria, describes the findings for the Thunder Basin National Grassland, and presents a validation of these findings for the North Rochelle application. None of the lands located in the application were found unsuitable for leasing; therefore, the tract is available for further lease consideration.

Surface owner consultation was completed during preparation of the 1985 LRMP, and qualified private surface owners[1] with land over federal coal were provided the opportunity to have their views considered by the USFS during land use planning. The lands in this application were addressed in the LRMP and carried forward as acceptable for further lease consideration based on satisfactory surface owner consultations at that time. Based on updated surface ownership provided by Bluegrass, Atlantic Richfield Co. (ARCO), and Powder River Coal Company are the current private surface owners. All federal coal lands in the application were determined acceptable for further lease consideration based on the absence of qualified surface owners.

As part of the coal planning for the Thunder Basin National Grassland LRMP and Buffalo Resource Area RMP, a multiple land use conflict analysis was completed to identify and "eliminate additional coal deposits from further consideration for leasing to protect resource values of a locally important or unique nature not included in the unsuitability criteria," in accordance with 43 CFR 3420.1-4e(3). All of the lands in the application were subjected to this multiple use conflict analysis and determined to be acceptable for further lease consideration (USFS 1985).

In summary, all of the lands in the North Rochelle coal lease application have been subjected to the four coal planning screens and determined acceptable for further lease consideration. Thus, a decision to lease and mine the federal coal lands in this application are in conformance with both the BLM Buffalo Resource Area RMP and USFS Thunder Basin National Grassland LRMP.

1.5 PUBLIC PARTICIPATION AND CONSULTATION

In addition to this EIS, other factors and consultations are considered and play a major role in determining the decision on this proposed lease application. These include the following.

Regional Coal Team Consultation. The North Rochelle lease application was reviewed and discussed at the June 16, 1993, PRRCT meeting in Billings, Montana. The PRRCT determined that the tract applied for qualified as a production maintenance tract and recommended processing the application as a lease-by-application.

Governor's Consultation. The BLM Wyoming State Director notified the Governor of Wyoming on November 17, 1992, that a lease application had been filed with the BLM.

Public Notice. The BLM filed a public notice on November 17, 1992, announcing that this coal lease application had been received and requested public comment.

Attorney General Consultation. After a competitive coal lease sale, but prior to issuance of a lease, the BLM will solicit the opinion of the Attorney General on whether the planned lease issuance creates a situation inconsistent with federal anti-trust laws. The Attorney General is allowed 30 days to make this determination. If the Attorney General has not responded in writing within the 30 days, the BLM can proceed with issuance of the lease.

Other Consultations. Chapter 5.0 provides a list of other federal, state, and local governmental

[1] The natural person or persons (or corporation, the majority stock of which is held by a person or persons) who 1) hold legal or equitable title to the land surface; 2) have their principal place of residence on the land, or personally conduct farming or ranching operations upon a farm or ranch unit to be affected by surface mining operations, or receive directly a significant portion of their income, if any, from such farming or ranching operations; and 3) have met the conditions of 1 and 2 for a period at least 3 years prior to granting of any consent to mining of their lands.

agencies that were consulted in preparation of this EIS.

1.5.1 Initial Involvement

A notice announcing the receipt of the coal lease application was published in the Federal Register on November 23, 1992. Copies were sent to voting and nonvoting members of the PRRCT, including the governors of Wyoming and Montana, the Northern Cheyenne and Crow Tribes, the USFS, OSM, U.S. Fish and Wildlife Service (USFWS), National Park Service, and U.S. Geological Survey (USGS).

After the PRRCT recommended processing the North Rochelle application, BLM made a decision to prepare a more comprehensive EIS rather than an EA. A Federal Register notice announcing this intent was published on November 24, 1995, and copies were sent to parties on the project mailing list.

Project scoping to determine issues and concerns to be addressed in the EIS commenced in late November 1995 and ended on December 31, 1995. A public meeting was held in Gillette, Wyoming, on December 5, 1995. A scoping statement was mailed to 246 state, federal, and local government offices; elected officials; public land users and groups; Native American tribal governments; newspapers; and radio and TV stations describing the project and requesting comments on issues and concerns that should be considered in the EIS and requesting data that should be included in the EIS. Six comment letters were received.

1.5.2 Issues and Concerns

Issues and concerns expressed by the public and government agencies relating to this and previous coal lease applications included:

- protection of the area's groundwater resources;
- concerns with the leasing process;
- alternative tract configurations;
- loss of habitat diversity from topographic moderation;
- loss of pronghorn antelope and sage grouse habitat;
- cumulative wildlife impacts;
- cumulative groundwater impacts;
- cumulative air quality impacts;
- hunting access;
- feasibility of shrub reclamation;
- aquatic and fishery considerations;
- impacts to the Gillette and Wright housing markets;
- utility and pipeline relocation;
- beneficial economic impact to Campbell County;
- impacts on oil and gas production and development; and
- wetlands and riparian areas.

1.5.3 Draft EIS

Parties on the mailing list were sent copies of the draft EIS (DEIS) on October 31, 1996. Copies were available for viewing at BLM offices in Cheyenne, Casper, and Buffalo. A 60-day public comment period began on November 8, 1996, and ended on January 10, 1997, for receiving comments on the DEIS. A formal public hearing was held on December 12, 1996, in Gillette, Wyoming. All comments that were received are addressed in Appendix G of this FEIS. Federal Register Notices announcing the availability of the DEIS for public review were published on November 8, 1996, by the Environmental Protection Agency (EPA), and on November 14, 1996, by the BLM. The USFS published a Request for Comments on the DEIS in the Rocky Mountain News and Denver Post on November 15, 1996.

1.5.4 Final EIS

Parties on the mailing list and others who commented on the DEIS have been sent copies of this FEIS. Copies are also available at the BLM offices in Cheyenne and Casper. An announcement of availability of the FEIS has been

published in the Federal Register by the both BLM and the EPA. There is a 30-day review period for this FEIS.

1.5.5 Future Involvement and Record of Decision

A public Record of Decision (ROD) to hold or not hold a competitive sale for the federal coal in the LBA tract will be signed following the 30-day review period. The USFS must consent or not consent to the surface use of USFS lands for coal mining before BLM can sign the ROD. BLM and USFS will consider comments received on this FEIS during the 30-day review period prior to signing the ROD. Both the public and the applicant can protest the USFS decision to consent or not to consent and the BLM decision to hold a competitive sale and issue a lease or not hold a competitive sale and issue a lease.

The decision to consent or not to consent must be appealed within 45 days after the USFS decision is signed, and can be implemented 5 days following the appeal period if no appeal is received. If an appeal of the USFS decision is received, 45 days are afforded to resolve the appeal; and 15 days following the resolution, the decision can be implemented.

The BLM decision to hold a competitive sale and issue a lease or not hold a competitive sale and issue a lease must be appealed within 30 days after the BLM decision is signed, and can be implemented at that time if no appeal is received. If a competitive lease sale is held, the lease sale will follow the procedures set forth in 43 CFR 3422, 43 CFR 3425, and BLM Handbook H-3420-1 (Competitive Coal Leasing).

2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the Proposed Action and alternatives to this action. The Proposed Action is to hold a competitive lease sale for the federal coal lands as applied for by Bluegrass. The No Action Alternative is to reject the application and not hold a lease sale for these federal coal lands. Additional alternatives considered include:

- holding a competitive lease sale of federal coal lands, as amended by BLM (Alternative A);
- holding a competitive lease sale of federal coal lands which would maximize the potential for a new stand-alone mine (Alternative B); and
- postponing the competitive lease sale (Alternative C).

Alternative A is preferred alternative of the BLM and the USFS.

LBA tracts are nominated for leasing by companies with an interest in acquiring them, but as discussed in Chapter 1.0, the lease-by-application process is, by law and regulation, an open, public, competitive sealed-bid process. Thus, if the decision reached as a result of this analysis is to hold a lease sale, the applicant (Bluegrass) may not be the high bidder. Nonetheless, the analysis presented in this EIS assumes that the applicant (Bluegrass) would be the successful bidder if a competitive sale is held and that they would mine the lands as a maintenance tract with their permitted North Rochelle Mine.[1] However, the LBA tract is also adjacent to the Black Thunder Mine, operated by the Thunder Basin Coal Company (TBCC), a subsidiary of ARCO (see Figure 1.2). TBCC is also in a position to mine the tract as a maintenance lease. If TBCC acquires the tract, the rate of coal production, mining sequence, equipment, and facilities may be slightly different than Bluegrass's. However, the impacts of TBCC mining the tract would be similar to the impacts of Bluegrass mining the tract, and company-specific mining and reclamation plans would not significantly alter the disturbed acreage and, thus, would not substantially alter the environmental analysis conducted in this EIS.

If a decision is made to hold a competitive lease sale and there is a successful bidder, a final mining and reclamation plan must be developed by the successful bidder and be approved before mining can begin on the tract. As part of the approval process, the final mining and reclamation plan undergoes detailed review by federal and state agencies. This final plan may differ from the plan summarized here, but changes to the mining plan used for this analysis would not be expected to significantly change the impacts described in this EIS because those changes would typically be related to the details of mining and reclaiming the tract.

2.1 THE PROPOSED ACTION

Under the Proposed Action, the LBA tract would be offered for lease at a competitive sale, subject to the standard coal lease stipulations and to special coal lease stipulations developed for the Wyoming PRB (Appendix D). The lands included in the tract would be the lands that were applied

[1] The North Rochelle Mine has an approved 20 million ton per year surface mining permit and air permit. There are currently no support or rail facilities at the North Rochelle Mine; however, Triton Coal Company will initiate construction of these facilities in 1997. Triton Coal Company had a contract mining company, Fuller Construction Company, mining North Rochelle through November 1996, when the federal diligent development requirements were satisfied for the federal coal lease.

for: approximately 1,440 acres of federal coal reserves containing an estimated 144 million tons of coal. This is a preliminary estimate of the tons of minable coal in the tract. A more accurate estimate of recoverable reserves in the tract, based on the geological and engineering evaluation of the tract, will be included in the tract sale notice, if a competitive sale is held. The Proposed Action assumes that the applicant is the successful bidder if a competitive sale is held (Figure 2.1).

The legal description of the coal lease lands in the Proposed Action are as follows.

T42N, R70W, 6th Principal Meridian (P.M.), Campbell County, Wyoming

Section 4, Lots 5-16, 19, and 20	529.87 acres
Section 5, Lots 5-16	468.39 acres
Section 9, Lot 1	39.15 acres

T43N, R70W, 6th P.M., Campbell County, Wyoming

Section 32, Lots 9-11 and 14-16	241.63 acres
Section 33, Lots 11-14	160.88 acres
Total surface area	1,439.92 acres

If Bluegrass acquires a federal coal lease for these lands, the coal would be mined, processed, and sold by Bluegrass's North Rochelle Mine, which has approximately 186 million tons of coal reserves covering a 1,961 acre federal lease.

As discussed in Section 1.2, after a coal lease is issued, the lessee must submit a permit application package to WDEQ and OSM. This plan generally covers a permit area substantially larger than the area leased to allow for support facilities, roads, rail spur, topsoil storage, etc. The tonnage of coal produced may also be somewhat smaller than the total reserves that are leased, because not all of the coal may be recoverable. The applicant estimates that about 93% of the coal resources in the tract will be recoverable. This EIS will analyze a projected permit disturbance area for the LBA tract which is adjacent to the permitted North Rochelle Mine (see Figure 2.1). The proposed mine layout and proposed pit progression are illustrated in Figure 2.2. Table 2.1 summarizes the projected coal production, surface disturbance, and employment for the life of the mine under the Proposed Action.

The mining production sequence would be similar to other operating coal mines in Campbell County. Topsoil would be removed and stockpiled prior to initial overburden drilling and blasting. Overburden removed from the initial pit would be stockpiled as well. As mining proceeds, the sequence would become a continuous operation with topsoil being stripped in advance of the pit and hauled directly to graded spoils behind the pit. Following blasting, overburden would be removed from the advancing face and replaced directly behind the pit. While some stockpiling is necessary due to pit turns, variations in overburden thickness, and other factors, it would be minimized to avoid the added expense of moving the material more than once. The replaced overburden would be graded and the area reclaimed in accordance with an approved reclamation plan.

Specific mining proposed for the LBA tract would be done by a combination of dozer, truck-shovel, and dragline excavation. Mining would begin with a boxcut along the eastern portion of the tract, after which successive mining passes would be made parallel to the boxcut as mining advances in a westerly direction (Figure 2.2).

Topsoil would be salvaged by rubber-tired scrapers prior to overburden removal and immediately replaced on recontoured spoil backfill or stored in topsoil stockpiles for later distribution. Salvage depths would vary from 2 to 60 inches; the average replaced depth would be approximately 29 inches.

The overburden in each pass would then be drilled and blasted, and large dozers would push the blasted overburden and build a dragline bench. The dragline would remove the remaining overburden located immediately above the coal; mobile diesel equipment would assist the dragline

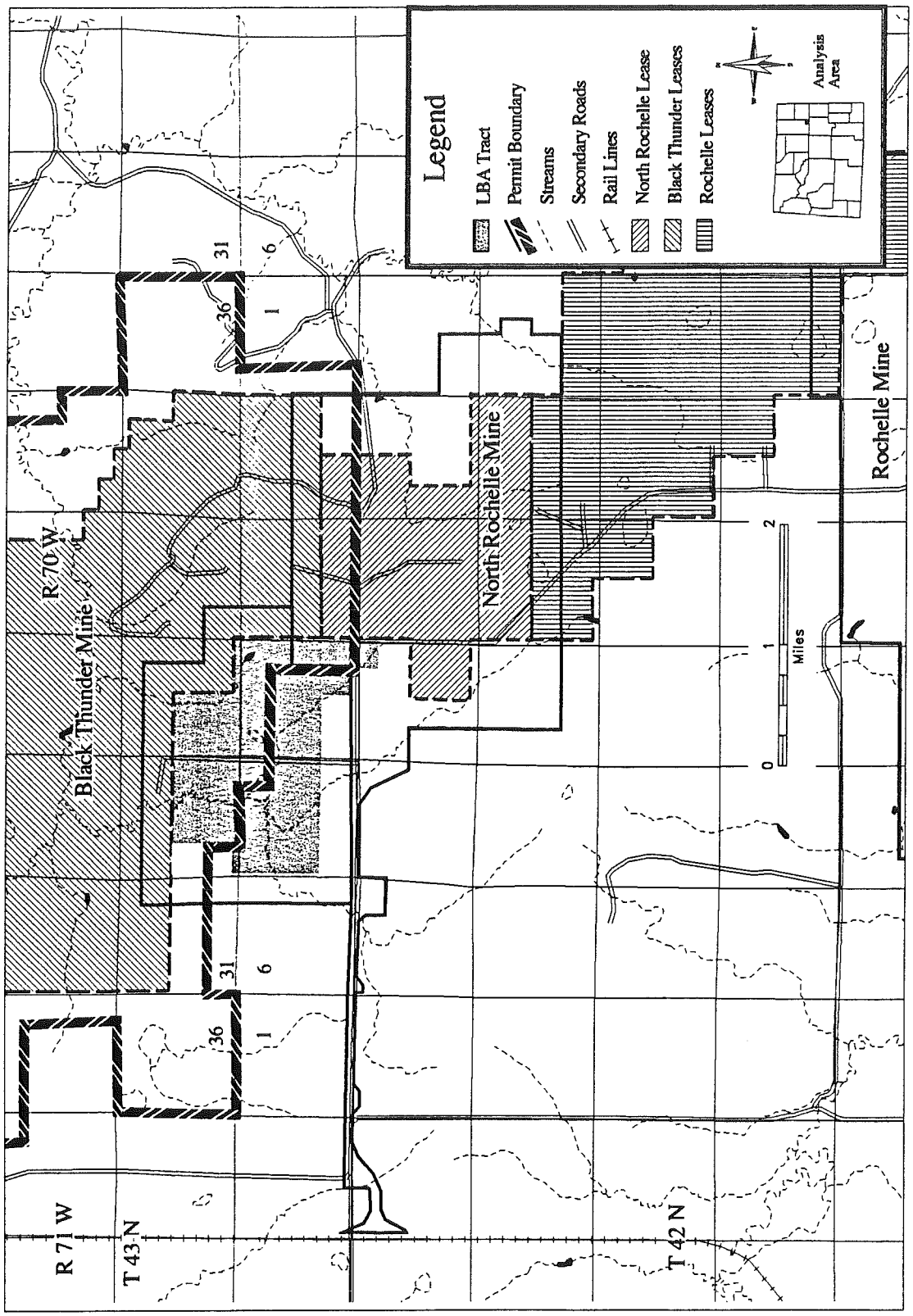


Figure 2.1 Proposed Action LBA Tract.

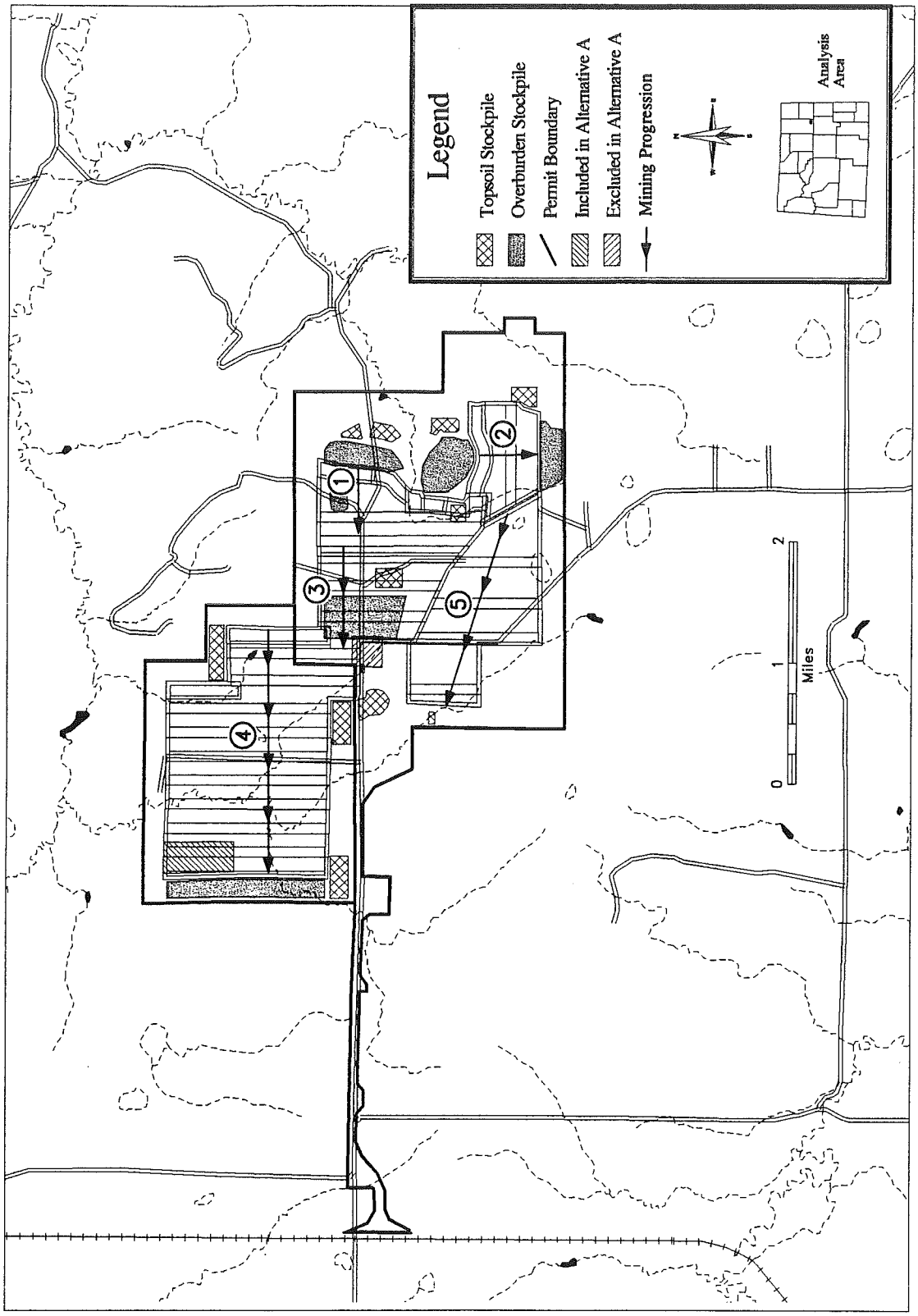


Figure 2.2 Proposed Action Mine Layout and Pit Progression.

Table 2.1 Projected Coal Production, Surface Disturbance, and Employment for the Proposed Action.[1]

Year	Coal Production[2]	Overburden Removal (MBCY)[3]	Area Affected[4] (acres)	Area Reclaimed[5] (acres)	Average No. Unit Trains/Week[6]	Total Employees (Salaried and Operations)[7]
Pre-1996	988,000	5,803	193	48	--	32
1996	860,000	3,501	1,089	0	--	233
1997	1,793,000	8,122	146	0	--	278
1998	9,000,000	42,995	166	0	16	68
1999	12,500,000	49,376	189	63	22	72
2000	15,000,000	46,820	131	97	26	103
2001	15,000,000	45,812	168	175	26	109
2002	15,000,000	50,037	307	168	26	139
2003	15,000,000	65,023	282	182	26	139
2004	15,000,000	63,191	159	228	26	139
2005	15,000,000	46,382	176	209	26	139
2006	15,000,000	48,919	173	206	26	139
2007	15,000,000	46,968	174	181	26	139
2008	15,000,000	46,723	172	183	26	139
2009	15,000,000	44,022	173	173	26	139
2010	15,000,000	44,223	175	170	26	139
2011	15,000,000	46,767	174	173	26	139
2012	15,000,000	51,354	170	175	26	139
2013	15,000,000	60,721	167	174	26	139
2014	15,000,000	58,424	183	139	26	139
2015	15,000,000	68,840	242	192	26	139
2016	15,000,000	74,476	215	429	26	139
2017	15,000,000	66,213	56	222	26	139
2018	8,990,000	0	0	218	16	139
2019	0	0	0	515	0	106
2020	0	0	0	760	0	47
Total	304,131,000	1,084,712	5,080	5,080	--	--

1 LBA tract mined with North Rochelle Mine.
2 Assumes a 93% recovery of in-place resources.
3 MBCY = thousand bank cubic yards.
4 Includes railroad corridor affected acreage of 258 acres in the year 1996.
5 Includes railroad corridor reclaimed acreage of 258 acres in the year 2020.
6 Assumes a total of 110 car unit trains and truck deliveries in the years pre-1996 through 1997.
7 Includes 30 contract mining workers in pre-1996 and 1996; 195 construction workers in 1996; and 226 construction workers in 1997.

as needed. Overburden stripping would be accomplished using an area strip mining method in which the overburden in the active pass is cast into the mined out pit created by the preceding pass.

As the dragline exposes the upper and lower Wyodak seams, the coal would be drilled and blasted. Front-end loaders and/or electric shovels would load blasted coal into 240-ton end-dump trucks, and the coal would be hauled to a near-pit hopper and crusher station. The crushed coal would be loaded onto a covered overland conveyor for transport to the coal storage facilities and rail loadout, from which it would be loaded into coal trains for transport to market. Bluegrass would recover as much of the coal as possible under prevailing pit conditions.

There are currently no producing oil and gas wells or rights-of-way (ROWs) for oil and gas pipelines on the LBA tract. If any productive oil and gas wells are drilled on the LBA tract prior to mining, an agreement would be needed between the oil and gas operator and the coal operator before the coal could be mined. For mining to proceed, it would be necessary to plug the oil and gas wells beneath the coal and cut off the casing. After the coal is removed and backfilling is completed, the wells could be restored to production or redrilled if it is economically feasible. If not, the wells would be abandoned. Oil and gas pipelines related to these wells or other oil and gas pipelines could be relocated or otherwise protected to prevent damage during mining operations.

Surface water control structures would be built in accordance with WDEQ requirements. Trussler Creek, which flows only part of the year, would be temporarily diverted to avoid the mine pit and overstrip benches. The temporary channel would be designed to carry the 100-year peak discharge of Trussler Creek, as approved by the WDEQ. The Trussler Creek channel would be restored following mining to its approximate contour but the drainage divide would be slightly relocated.

The coal seam would be dewatered by pumping from pit sumps. Some of the water would be used for dust control, and excess water would be routed to WDEQ-approved sedimentation reservoirs.

Spoil piles left by the dragline would be graded with dozers to approximate the original contour, with slopes not exceeding 5:1, and prepared for topsoil distribution. Topsoil would be distributed to an estimated average depth of 29 inches. Soil amendments would be added as necessary to optimize growing conditions.

When the final pit limit is reached, the final highwall would be reduced with dozers and scrapers. The spoil piles adjacent to this final pit would be reduced to a 5:1 slope, and previously stockpiled topsoil would be distributed on these slopes. The final topography would be similar to the present topography, but with lower gradient slopes (3.1%) than now present (4.1%) and without the widely distributed network of small drainages that is present in the landscape.

Following topsoil placement, the seedbed would be prepared and seeded with drill and hydromulch equipment. Three seed mixtures palatable to both livestock and wildlife would be utilized, including: 1) a mixed-grass prairie mixture for exposed upland regions; 2) a big sagebrush/shrubland mixture for mesic (moderate moisture regime) uplands and downslope from the mixed-grass prairie; and 3) a streamside/meadow mixture for final reclamation along drainages. In addition, cottonwood and willow saplings would be planted along select permanent impoundments

A cover crop of barley, wheat, or millet would be used to stabilize disturbed areas subject to erosion. All newly seeded areas would be mulched and crimp-anchored. Fertilization and noxious weed control would occur as needed. Reseeded areas would be protected from livestock by a five-strand sheep-tight fence.

2.1.1 Annual Production Rate

The North Rochelle Mine is permitted to mine 20 million tons of coal per year, and the average annual coal production from the North Rochelle Mine is anticipated to be approximately 15 million tons per year, with or without the LBA tract.

2.1.2 Location and Description of Facilities

As stated previously, there are currently no support or rail facilities at the North Rochelle Mine. The company currently plans to start construction of those facilities in 1997. Those facilities were considered in previous environmental analyses, and are included in the currently approved mining and reclamation plan. Under that plan, support facilities would be constructed in the northwestern portion of the current North Rochelle Mine permit area. These facilities would consist of a combination administrative building, change house, and service building; an equipment ready area, water pump house, fuel station, and storage yard; conveying and loadout facilities; a rail loop; a parking lot; and electric power substations.

The service building would contain storage tanks for lubricating oil, antifreeze, hydraulic oil, transmission fluid, and solvents. An explosives storage area would be isolated 0.25 mi from the nearest building and shielded from the facilities area by earth berms.

Coal handling and storage facilities would consist of a hopper, primary crusher, secondary crusher, covered conveyors, and a 50,000-ton coal slot storage from which coal would be loaded onto unit trains at the constructed 5-mi rail spur. This spur would connect to the existing Gillette-Orin main line of the Burlington Northern, Santa Fe, and Union Pacific line.

Power would be delivered by a 69-kV line that terminates at the main substation near the northwestern corner of the existing North Rochelle permit area.

The proposed ENCOAL® Commercial LFC™ Plant (ENCOAL Plant) would be located within the rail loop at the North Rochelle Mine, and the proposed North American Power Group Two Elk (Two Elk) coal-fired power plant would be located about 3 mi northeast of the North Rochelle LBA; however, niether of these facilities is part of this Proposed Action, and both facilities are addressed in Section 4.5, Cumulative Impacts.

2.1.3 Hazardous and Solid Waste

Solid waste which may be produced by mining the LBA tract consists of floor sweepings, shop rags, lubricant containers, welding rod ends, metal shavings, worn tires, packaging material, used filters, and office and food wastes. These wastes would be disposed of within the permit boundary in accordance with a WDEQ-approved solid waste disposal plan. A WDEQ-permitted sewer system consisting of a septic tank(s) and leach field(s) would be utilized to dispose of sewage. Major lubrication, oil changes, etc., of most equipment would be performed inside the service building lube bay, where waste oil would be contained and deposited in a storage tank. The collected waste oil would then be sold for reuse.

Bluegrass has reviewed the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act* (SARA) *of 1986* (as amended) and EPA's list, *List of Extremely Hazardous Substances* as defined in 40 CFR 355 (as amended), for hazardous substances proposed for use in this project. Bluegrass maintains a file containing Material Safety Data Sheets for all chemicals, compounds, and/or substances which are or would be used during the course of mining at North Rochelle.

Bluegrass is and would be responsible for ensuring that all production, use, storage, transport, and disposal of hazardous and extremely hazardous materials as a result of the proposed project would be in accordance with all applicable existing or hereafter promulgated federal, state, and local

government rules, regulations, and guidelines. All mining activities involving the production, use, and/or disposal of hazardous or extremely hazardous materials are and would continue to be conducted so as to minimize potential environmental impacts.

Bluegrass is and would continue to be expected to comply with emergency reporting requirements for releases of hazardous materials. Any release of hazardous or extremely hazardous substances in excess of the reportable quantity, as established in 40 CFR 117, must legally be reported as required by the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), as amended. The materials for which such notification must be given are the extremely hazardous substances listed in Section 302 of the *Emergency Planning and Community Right to Know Act* and the hazardous substances designated under Section 102 of CERCLA, as amended. If a reportable quantity of a hazardous or extremely hazardous substance is released, immediate notice must be given to the WDEQ Hazardous Waste Division and all other appropriate federal and state agencies.

Each mining company is also expected to prepare and implement several plans and/or policies to ensure environmental protection from hazardous and extremely hazardous materials. These plans/ policies include:

- Spill Prevention Control and Countermeasure Plans;
- Spill Response Plans;
- inventories of hazardous chemical categories pursuant to Section 312 of the SARA, as amended; and
- Emergency Response Plans.

These plans are in place for the North Rochelle Mine.

All mining operations are also required to be in compliance with regulations promulgated under the Resource Conservation and Recovery Act, Federal Water Pollution Control Act (Clean Water Act), Safe Drinking Water Act, Toxic Substances Control Act, Occupational Safety and Health Act, and the Federal Clean Air Act. In addition, mining operations must comply with all attendant state rules and regulations relating to hazardous material reporting, transportation, management, and disposal.

2.2 THE NO ACTION ALTERNATIVE

Under the No Action Alternative, this coal lease application would be rejected and the federal coal contained in the application would not be offered for competitive sale at this time, and the environmental impacts associated with mining the coal in the LBA tract would not occur. Selection of this alternative would not affect the already permitted mining activity at the adjacent North Rochelle and Black Thunder mines. A portion of the surface of the LBA tract would probably be disturbed due to overstripping to allow coal to be recovered from the existing, contiguous North Rochelle and Black Thunder coal leases. Table 2.2 presents Bluegrass's projected coal production, surface disturbance, and employment without the LBA tract.

For the purposes of this analysis, the No Action Alternative assumes that the LBA tract would never be mined. This assumption is highly speculative since these lands are within the previously delineated Roundup tract, which was previously identified as an economical mining unit, and the lands are suitable for further consideration for leasing under the current BLM and USFS land management plans (BLM 1983). However, this assumption will allow a comparison of the economic and environmental consequences of mining these lands versus not mining them.

Not leasing this land could result in a bypass of federal coal which may not be in the general public's best interest. However, the selection of the No Action Alternative in this EIS would not preclude a subsequent lease application for these lands.

Table 2.2 Projected Coal Production, Surface Disturbance, and Employment for the No Action Alternative.

Year	Coal Production[1]	Overburden Removal (MBCY)[2]	Area Affected[3] (acres)	Area Reclaimed[4] (acres)	Average No. Unit Trains/Week[5]	Total Employees (Salaried and Operations)[6]
Pre-1996	988,000	5,803	193	0	--	32
1996	860,000	3,501	1,089	48	--	233
1997	1,793,000	8,122	146	0	--	278
1998	9,000,000	42,995	166	0	16	68
1999	12,500,000	49,376	189	63	22	72
2000	15,000,000	46,820	131	97	26	103
2001	15,000,000	45,812	168	175	26	109
2002	15,000,000	50,037	168	228	26	139
2003	15,000,000	58,112	148	262	26	139
2004	15,000,000	63,129	190	139	26	139
2005	15,000,000	62,315	213	192	26	139
2006	15,000,000	72,648	239	429	26	139
2007	15,000,000	74,468	137	222	26	139
2008	15,000,000	60,050	16	218	26	139
2009	12,563,000	0	0	360	22	106
2010	0	0	0	760	0	47
2011	0	0	0	0	0	0
2012	0	0	0	0	0	0
2013	0	0	0	0	0	0
2014	0	0	0	0	0	0
2015	0	0	0	0	0	0
2016	0	0	0	0	0	0
2017	0	0	0	0	0	0
2018	0	0	0	0	0	0
2019	0	0	0	0	0	0
2020	0	0	0	0	0	0
Total	172,704,000	643,187	3,193	3,193	--	--

1 Assumes a 93% recovery of in-place reserves.
2 MBCY = thousand bank cubic yards.
3 Includes railroad corridor affected acreage of 258 acres in the year 1996.
4 Includes railroad corridor reclaimed acreage of 258 acres in the year 2020.
5 Assumes a total of 110 car unit trains and truck deliveries in the years pre-1996 through 1997.
6 Includes 30 contract mining workers in pre-1996 and 1996; 195 construction workers in 1996; and 226 construction workers in 1997.

2.3 ALTERNATIVE A - HOLD A COMPETITIVE LEASE SALE OF FEDERAL COAL LANDS, AS AMENDED BY BLM (PREFERRED ALTERNATIVE)

Several possible tract configurations were considered by the BLM with the goal of making the LBA tract attractive to other potential bidders, minimizing the risk of bypassing federal coal that would then become economically unrecoverable, and enhancing the fair market value of remaining unleased federal coal in the area. After considering specific coal reserve data, overburden thickness, and other site constraints, the BLM developed an alternative tract configuration (Alternative A - preferred alternative). Under this alternative, approximately 80 acres with about 9 million tons of federal coal would be added to the northwestern corner of the tract to prevent a potential bypass situation, and approximately 40 acres with about 4 million tons of federal coal would be removed from the southeast corner of the tract to enhance the value of adjacent, unleased coal. Coal reserves for the amended tract are preliminarily estimated at 149 million tons covering approximately 1,482 acres (Figure 2.3).

Legal descriptions of Alternative A lands are as follows.

T42N, R70W, 6th P.M., Campbell County, Wyoming

Section 4, Lots 5-16, 19, 20	529.87 acres
Section 5, Lots 5-16	468.39 acres

T43N, R70W, 6th P.M., Campbell County, Wyoming

Section 32, Lots 9-16	322.79 acres
Section 33, Lots 11-14	160.88 acres
Total surface area	1,481.93 acres

Under this alternative, the federal coal tract with amended boundaries would be offered for competitive sale subject to the standard coal lease stipulations and to special coal lease stipulations developed for the Wyoming PRB (Appendix D).

Alternative A also assumes that Bluegrass is the successful bidder on the tract and the coal would be mined as previously described in Section 2.1. Estimated annual production of 15 million tons over 24 years of mining is assumed (Table 2.3). As with the Proposed Action, if another mine acquires the amended tract as a maintenance tract, the mining rate and/or sequence may differ from the mining plan used in this analysis; however, the impacts of mining the coal would not be expected to be significantly different.

2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

There were several other alternatives considered but not analyzed in detail because they were considered unreasonable, impractical, or outside the scope of this EIS. These alternatives, together with the rationale for dismissal, are discussed below.

2.4.1 Alternative B - Hold a Competitive Sale of Federal Coal Lands Which Would Maximize the Potential for a New Stand-alone Mine

If the LBA tract is leased as applied for or as amended in Alternative A, there would not be sufficient coal included in the tract to justify the expense of opening a new separate surface coal mine. This alternative assumes that the BLM would enlarge the tract in order to make it more attractive for a new company to lease the tract and open a new mine. The enlarged tract would be offered for competitive sale, subject to standard and special lease stipulations.

A new stand-alone mine would require considerable initial capital expenses, including the construction of new surface facilities (offices, shop, warehouse, coal processing, coal loadout, and a rail spur), extensive baseline data collection, and development and permitting of a mining and reclamation plan. The majority of the coal that would be available to be included in the enlarged tract has a relatively high overburden to coal ratio.

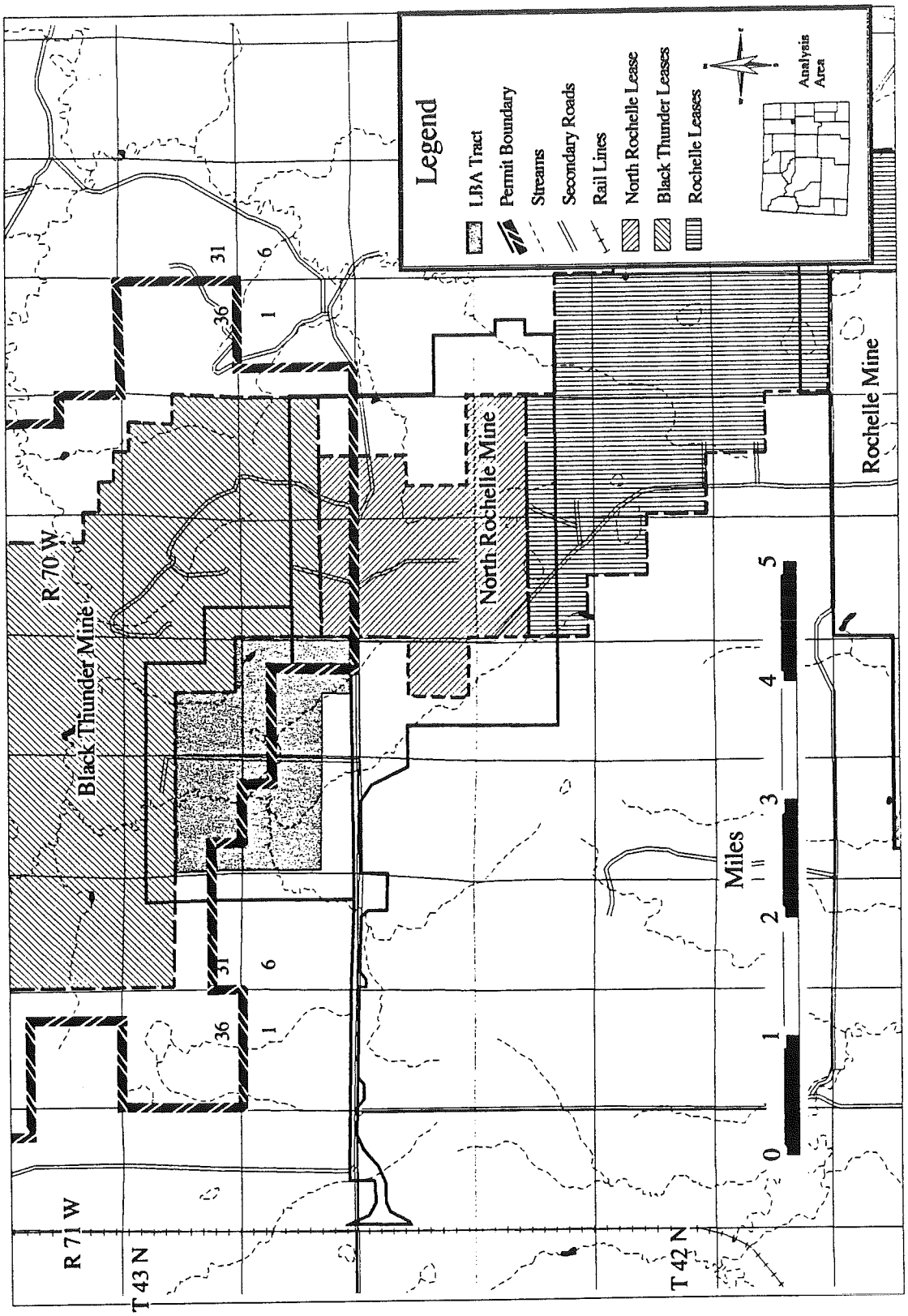


Figure 2.3 Alternative A LBA Tract.

Table 2.3 Projected Coal Production, Surface Disturbance, and Employment for Alternative A.

Year	Coal Production[1]	Overburden Removal (MBCY)[2]	Area Affected[3] (acres)	Area Reclaimed[4] (acres)	Average No. Unit Trains/Week[5]	Total Employees (Salaried and Operations)[6]
Pre-1996	988,000	5,803	193	48	--	32
1996	860,000	3,501	1,089	0	--	233
1997	1,793,000	8,122	146	0	--	278
1998	9,000,000	42,995	166	0	16	68
1999	12,500,000	49,376	189	63	22	72
2000	15,000,000	46,820	131	97	26	103
2001	15,000,000	45,812	168	175	26	109
2002	15,000,000	50,037	307	168	26	139
2003	15,000,000	65,023	282	182	26	139
2004	15,000,000	63,191	159	228	26	139
2005	15,000,000	46,382	176	209	26	139
2006	15,000,000	48,919	173	206	26	139
2007	15,000,000	46,968	174	181	26	139
2008	15,000,000	46,723	172	183	26	139
2009	15,000,000	44,022	173	173	26	139
2010	15,000,000	44,223	175	170	26	139
2011	15,000,000	46,767	174	173	26	139
2012	15,000,000	51,354	170	175	26	139
2013	15,000,000	60,721	167	174	26	139
2014	15,000,000	58,424	183	139	26	139
2015	15,000,000	68,840	242	192	26	139
2016	15,000,000	74,476	215	429	26	139
2017	15,000,000	73,011	86	222	26	139
2018	15,000,000	22,182	50	218	26	139
2019	2,270,000	0	0	596	4	106
2020	0	0	0	760	0	47
Total	312,411,000	1,113,691	5,160	5,160	--	--

1 Assumes a 93% recovery of in-place reserves.
2 MBCY = thousand bank cubic yards.
3 Includes railroad corridor affected acreage of 258 acres in the year 1996.
4 Includes railroad corridor reclaimed acreage of 258 acres in the year 2020.
5 Assumes a total of 110 car unit trains and truck deliveries in the years pre-1996 through 1997.
6 Includes 30 contract mining workers in pre-1996 and 1996; 195 construction workers in 1996; and 226 construction workers in 1997.

A company acquiring this coal would have to compete for customers with established mines in a competitive market that is currently characterized by low prices. For these reasons, it is unlikely that an enlarged tract would attract additional bidders interested in starting a new mine. Furthermore, enlarging the tract enough to make it attractive for a new mine start could lower the fair market value of the coal per ton and would potentially discourage bidding on the tract as a maintenance lease. Therefore, this alternative is not analyzed in detail in this EIS.

2.4.2 Alternative C - Postpone Competitive Lease Sale

Under this alternative, the sale of the LBA tract would be postponed on the assumption that coal prices would rise in the future, which could increase the fair market value of the tract and result in a higher bonus bid when the coal is sold.

The Clean Air Act of 1990 includes provisions that encourage the use of low sulfur coal, and PRB coal production has increased by more than 10% annually since 1992. However, prices have not increased along with production. In fact, with the expiration of older contracts having guaranteed prices and the market shift to spot sales of coal, the average price paid for coal from northeastern Wyoming has decreased by more than $1.00 per ton since 1992 (Wyoming State Geological Survey 1996). However, this trend may be slowing down, as much of the 1995 production has again involved contract sales rather than spot sales (Wyoming State Geological Survey 1996).

There are two sources of revenue to federal and state governments from the leasing and mining of federal coal: a bonus bid paid at the time the coal is leased and a 12.5% royalty collected when the coal is sold. The royalty payment is the larger of the two income sources, and since it is collected when the coal is sold, the mechanism is already in place for government revenues to increase if prices rise. Although postponement of the lease sale until prices rise could conceivably result in a higher bonus payment for the tract, it would not necessarily result in higher royalty payments. It takes several years to lease and permit a coal tract, and coal prices would not necessarily remain high until the coal is actually mined if a sale is postponed until the price increases. If the coal is already leased when prices increase, the company might be able to negotiate longer term contracts at the higher prices.

This alternative was not analyzed further because the potential impacts to economic benefits are not predictable, and the impacts of mining coal at a later time would not be expected to be significantly different from the Proposed Action or Alternative A.

2.4.3 Additional Alternatives

Additional alternatives that have been suggested in the past but dismissed because they were considered unreasonable, impractical, or outside the scope of this EIS include reclassifying the federal coal lands as unsuitable for lease consideration, revising the Proposed Action to bring the mine plan production rate more in line with current coal demand forecasts, and requiring a different mining method.

With regard to reclassifying the lands as unsuitable, as discussed in Section 1.4, the Proposed Action to lease and develop the federal coal lands in this application is in conformance with both the Buffalo Resource Area RMP and Thunder Basin National Grassland LRMP. Based on the coal leasing unsuitability criteria, it was concluded that there were no serious surface resource use conflicts and that any conflicts that may arise could be mitigated on a case-by-case basis. None of the lands located in the lease application were found unsuitable for leasing; therefore, the tract is available for further consideration for leasing.

Another potential alternative was to revise the Proposed Action to bring the mine plan production rate more in line with coal demand forecasts. Past

leasing comments have questioned whether current market conditions justify the leasing of federal coal. Depressed coal prices and excess production capacity have resulted in a relative lack of interest in coal leasing for new mine starts in the PRB, but the interest in leasing maintenance tracts by existing operations has remained fairly constant since the federal coal region was decertified in 1990. If a lease sale is held for the LBA tract, it would be conducted by a competitive, sealed bid, and 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 BLM as fair market value based on both an economic and geologic evaluation of the coal reserve. In making this determination, BLM would prepare an independent analysis of production costs, perform a market analysis for the coal, and assume a reasonable rate of return to derive a value for the in-place coal reserve. The hypothetical mine plan and production rate that BLM uses in this analysis are designed to maximize the value of the coal and are not necessarily the same as presented in the Proposed Action or alternatives. The BLM will thus analyze the maximum economic return to the federal government from the lease sale, regardless of the proposed production rate. Once a company has acquired the tract, the specific mining and reclamation plans, including the maximum permitted production rate, would be evaluated by the WDEQ and other federal and state agencies as described in Section 1.2. Additionally, minor revisions to the production rate would not appreciably alter the overall mining impacts for this project.

Another alternative considered was to require a different mining method. Bluegrass proposes to use a mining method that has proven successful and profitable in the PRB since the early 1980s. This basic open-pit mining technology is widely utilized and accepted as an economically and environmentally sound method to recover low overburden coal; therefore, this alternative was considered unreasonable and was dismissed.

2.5 COMPARISON OF ALTERNATIVES

Figure 2.4 presents the three alternative mine configurations analyzed in this EIS, and Table 2.4 presents a summary comparison of coal production, surface disturbance, mine life, and projected state revenue for the three alternatives. The environmental consequences of the Proposed Action, Alternative A, and the No Action Alternative are analyzed in Chapter 4.0. Table 2.5 presents a comparative summary of the projected magnitude of the environmental impacts of implementing each alternative.

These summary impact tables are derived from the following explanation of impacts and magnitude. NEPA requires all agencies of the federal government to include in every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment, a detailed statement by the responsible official on—

(i) the environmental impact of the proposed action,

(ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,

(iii) alternatives to the proposed action,

(iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and

(v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented (42 USC § 4332[C]).

Impacts can be beneficial or adverse, can be a primary result of an action (direct) or a secondary result (indirect), and can be permanent or long-lasting (long-term, lasting years following mining and reclamation) or temporary and of short duration (short-term, lasting only a few years following mining and reclamation). Impacts can vary in degree from a slightly discernable change

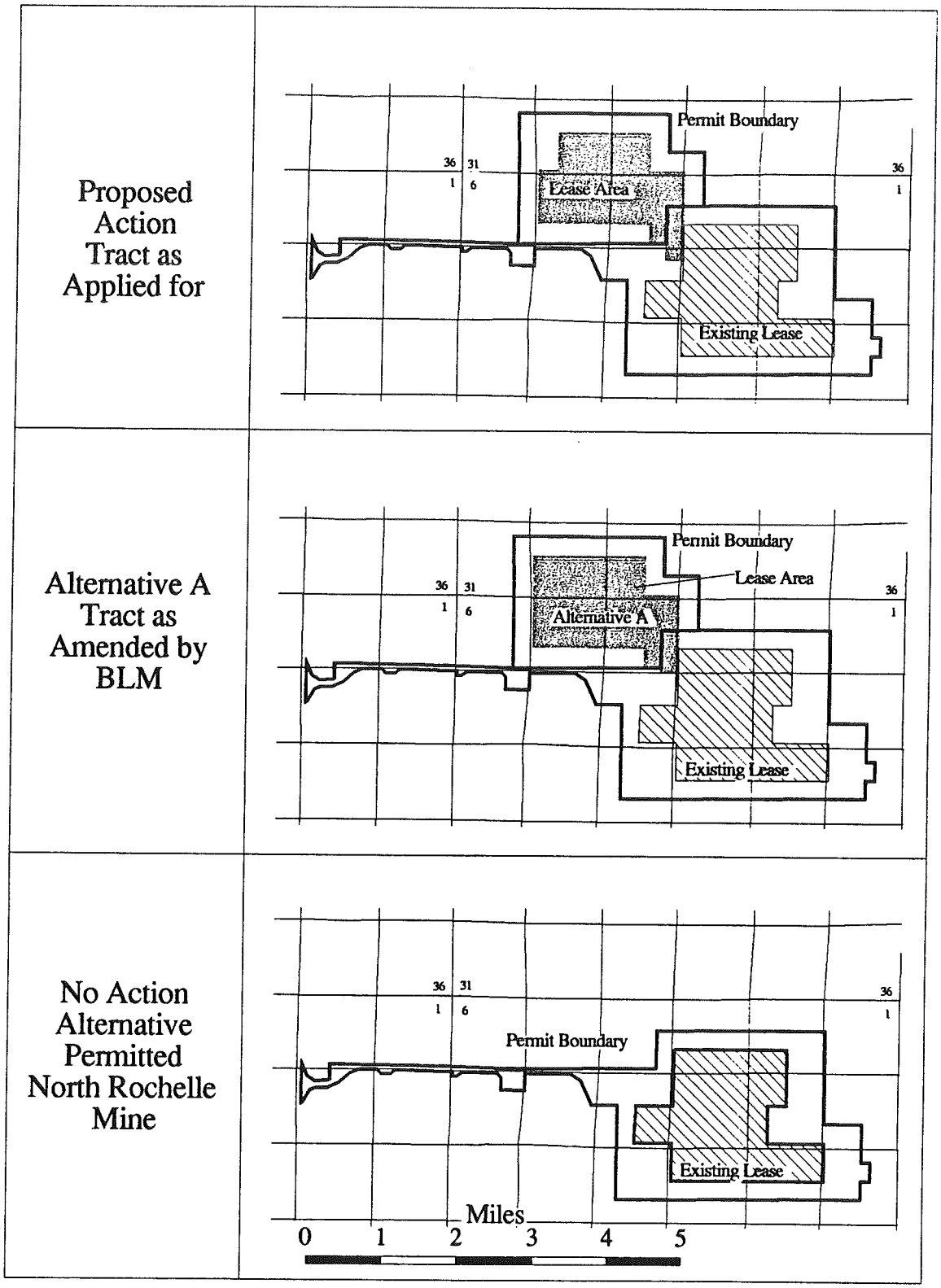


Figure 2.4 Alternative Mine Configurations Analyzed.

Table 2.4 Summary Comparison of Coal Production, Surface Disturbance, and Mine Life.

	Existing North Rochelle Mine	Existing Mine + LBA Tract	
Item	No Action Alternative	Proposed Action	Alternative A
Recoverable coal[1]	173 million tons	304 million tons	312 million tons
Total area to be disturbed[2]	3,193 acres	5,080 acres	5,160 acres
Average annual coal production	15 million tons	15 million tons	15 million tons
Life of mine	15 years	25 years	25 years
Average no. of employees	139	139	139
Total projected state revenue[3]	$190 million	$334 million	$343 million

[1] Assumes 93% recovery of in-place coal reserves.
[2] Includes acreage affected by railroad corridor--258 acres in 1996.
[3] Projected revenue to the State of Wyoming assumes the state will receive $1.10 per ton of coal sold (University of Wyoming 1994).

to a total change in the quality of the human environment. A negligible impact is an impact that may produce a change in the environment--this change may even be substantial--but would not necessarily be considered beneficial or adverse. For instance, surface mining will cause a very substantial change to the soils in the mined area, however, this change would not necessarily cause an impact on the quality of the human environment. A moderate impact would produce a modest change to the quality of the human environment, and a significant impact would result in substantial change in the quality of the human environment.

Table 2.5 Summary of Major Impacts as a Result of the Proposed Action, Alternative A, and the No Action Alternative.

	Impact Summary	
Resource	Proposed Action and Alternative A[1]	No Action Alternative[2]
Topography and physiography	Permanent topographic alteration by lowering the land surface and decreasing the average slope on both North Rochelle federal leases.	Same as for Proposed Action, but not occurring on LBA tract.
Geology and minerals	Permanent removal of coal from both North Rochelle federal leases; permanent change in composition of overburden soils due to mixing; delay in development of other minerals until mining completed.	Same as for Proposed Action, but not occurring on LBA tract.
Soils	Changes in physical, biological, and chemical properties of overburden soils due to mixing on both North Rochelle federal leases.	Same as for Proposed Action, but not occurring on LBA tract.
Air quality	Elevated TSP levels near mining operations; elevated gaseous emissions due to fuel combustion.	Same as for Proposed Action, but not occurring on LBA tract.
Water resources	Increased runoff and sediment yields as mining progresses; lower water levels adjacent to mine due to removal of coal aquifer from both North Rochelle federal leases during life of mine and for next 100 years; no impact to Fort Union aquifers below the coal directly due to mining; increased calcium, sulfate, magnesium, manganese, and TDS in postmining groundwater in spoils.	Same as for Proposed Action, but not occurring on LBA tract.
Alluvial valley floors	No impacts.	No impacts.
Wetlands	All existing wetlands on both North Rochelle federal leases would be destroyed during mining, but would be replaced as required by Section 404 of the Clean Water Act.	Same as for Proposed Action, but not occurring on LBA tract.
Vegetation	Native vegetation would be removed from both North Rochelle federal leases and adjacent areas; initially, reclaimed lands would by dominated by grassland vegetation, with sagebrush requiring 20-100 years to reach premining densities; landowners may manipulate vegetation on their private lands to discourage shrubs; no permanent reduction in vegetative productivity.	Same as for Proposed Action, but not occurring on LBA tract.

Table 2.5 (Continued)

Resource	Impact Summary	
	Proposed Action and Alternative A[1]	No Action Alternative[2]
Wildlife	Progressive loss of wildlife habitat from both North Rochelle federal leases due to mining operations until reclamation is completed; displacement of animals to adjacent habitats due to surface disturbance, noise, dust, and human activity; possible blockage of antelope movements; increased road kills; elimination of potential sage grouse habitat; some destruction of raptor nests which have not been used for several years; long-term reduction in carrying capacity for shrub-dependent species; reduction in habitat diversity and microhabitats due to topographic alterations.	Same as for Proposed Action, but not occurring on LBA tract.
USFS Region 2 sensitive species	Surveys for these species would be necessary as part of a Biological Evaluation prior to surface disturbance. Definitive determinations regarding potential impacts to these species and their viability on the Planning Area and rangewide would be reflected in the Biological Evaluation.	No significant effect on these species within the LBA tract.
Threatened, endangered, and candidate species	No adverse impacts. Surveys for Ute lady's tresses would be required on suitable habitat on both North Rochelle federal leases, and surveys for mountain plover would be conducted on both North Rochelle federal leases if the species is found in the area. No potential black-footed ferret habitat identified on LBA tract.	No adverse impacts, except possibly to black-footed ferrets, for which surveys would be required. Existing lease has been surveyed for Ute lady's tresses and is monitored annually for mountain plover.
Land use and recreation	Loss of livestock grazing, wildlife habitat, and land available for recreation on both North Rochelle federal leases during mining operations; delays in oil and gas production or other mineral development until mining is completed.	Same as for Proposed Action, but not occurring on LBA tract.
Cultural resources	Sites eligible for the NRHP on both North Rochelle federal leases would be mitigated; some unknown sites could be destroyed.	Same as for Proposed Action, but not occurring on LBA tract.

Table 2.5 (Continued)

Resource	Impact Summary	
	Proposed Action and Alternative A[1]	No Action Alternative[2]
Native American concerns and trust resource issues	No concerns identified to date. Any concerns identified on either North Rochelle federal lease would be mitigated in consultation with appropriate tribes.	Same as for Proposed Action, but not occurring on LBA tract.
Paleontological resources	No unique or significant paleontological resources known to occur in the area.	Same as for Proposed Action, but not occurring on LBA tract.
Visual resources	Mine-related activities would extend onto LBA tract, but development not visible from major travel routes, and use compatible with USFS classifications. No residual impacts.	Intrusion of mine-related activities and buildings would create high contrast with existing landscape.
Noise	Increased noise levels in immediate area of active mining on both North Rochelle federal leases, but in area remote from residences. No residual impacts.	Same as for Proposed Action, but not occurring on LBA tract.
Transportation	No new transportation facilities; increased levels in local highway traffic and unit coal train traffic would be extended for 10 additional years.	Increased levels in local traffic and increases in round trips per week by unit coal trains.
Socioeconomics	Extend life of North Rochelle mine by 10 years; extend increased population and demand for public services; generate $147 million (Proposed Action) or $153 million (Alternative A) to state; generate $804 million (Proposed Action) or $834 million (Alternative A) in total economic impacts.	Increased population and demand for public services.

1 The environmental consequences of implementing the Proposed Action and Alternative A are generally the same. For more detail, see the discussion in Section 4.0, Environmental Consequences.

2 From OSM (1982).

3.0 AFFECTED ENVIRONMENT

This chapter describes the existing conditions of the physical, biological, cultural, and socioeconomic resources in the study area. The resources that are addressed here were identified during the scoping process or interdisciplinary team review as having the potential to be affected. Figure 3.1 shows the general analysis area for most environmental resources.

Critical elements of the human environment (BLM 1988) that could be affected by the proposed project include air quality, cultural resources, floodplains, Native American religious concerns, threatened or endangered (T&E) species, hazardous or solid wastes, water quality, and wetlands/riparian zones. USFS Region 2 Sensitive Species could also be affected by the proposed project. Four critical elements (areas of critical environmental concern, prime and unique farmland, wild and scenic rivers, and wilderness) are not present in the project area and are not addressed further. Hazardous and solid wastes (a critical element) are addressed in Section 2.1.3. In addition to the critical elements that are potentially present in the project area, this EIS discusses the status and potential effects of the project on topography and physiography, geology and mineral resources, soils, water availability or quantity, alluvial valley floors, vegetation, wildlife, land use and recreation, paleontological resources, visual resources, noise, transportation resources, and socioeconomics.

3.1 GENERAL SETTING

The project area is located in the PRB, a part of the Northern Great Plains, which includes most of northeastern Wyoming. Vegetation is primarily sagebrush and mixed grass prairie. The climate is semi-arid, with an average annual precipitation at Wright (see Figure 1.1) of just over 11 inches (Martner 1986). June (2.35 inches) and May (2.04 inches) are the wettest months, and February (0.29 inches) is the driest. Snowfall averages 25.1 inches, with most occurring in March (5.0 inches) and December (4.5 inches). Potential evapo-transpiration, at approximately 23 inches (National Oceanic and Atmospheric Administration 1969), exceeds annual precipitation. The average daily mean temperature is 44.2°F. The highest recorded temperature was 103°F and the lowest -34°F. July is the warmest month, with a mean daily temperature of 70°F, and January is the coldest (20.5°F). The frost-free period is 100-125 days.

The average annual wind speed at the adjacent Black Thunder Mine (see Figure 1.2) is 11.6 mi per hour (mph), with winter gusts often reaching 30-40 mph. Wind speeds are highest in the winter and spring and are predominantly from the southwest and northwest (Figure 3.2). The absence of locally elevated terrain limits the formation and duration of temperature inversions, resulting in an average of 15 air-stagnation events annually in the PRB with an average duration of 2 days each (BLM 1974). General information describing the area's resources were gathered from draft BLM Buffalo Resource Area planning documents (BLM 1996a, 1996b, 1996c, 1996d, 1996g) and a BLM coal leasing study (BLM 1996e).

3.2 TOPOGRAPHY AND PHYSIOGRAPHY

The PRB is an elongated, asymmetrical structural downfold. The landscape consists of broad plains, low hills, and tablelands. The strata of the steep western limb and the gentle eastern limb of the PRB dip approximately 550 ft/mi and 150 ft/mi, respectively, towards the PRB axis that lies near the western margin. The area is characterized by broad plateaus dissected by incised stream valleys, which create most of the topographic relief. Generally, the topography changes from open hills with 500-1,000 ft of relief in the northern part of the PRB to plains and tablelands with 300-500 ft of relief in the southern part. Playas--shallow,

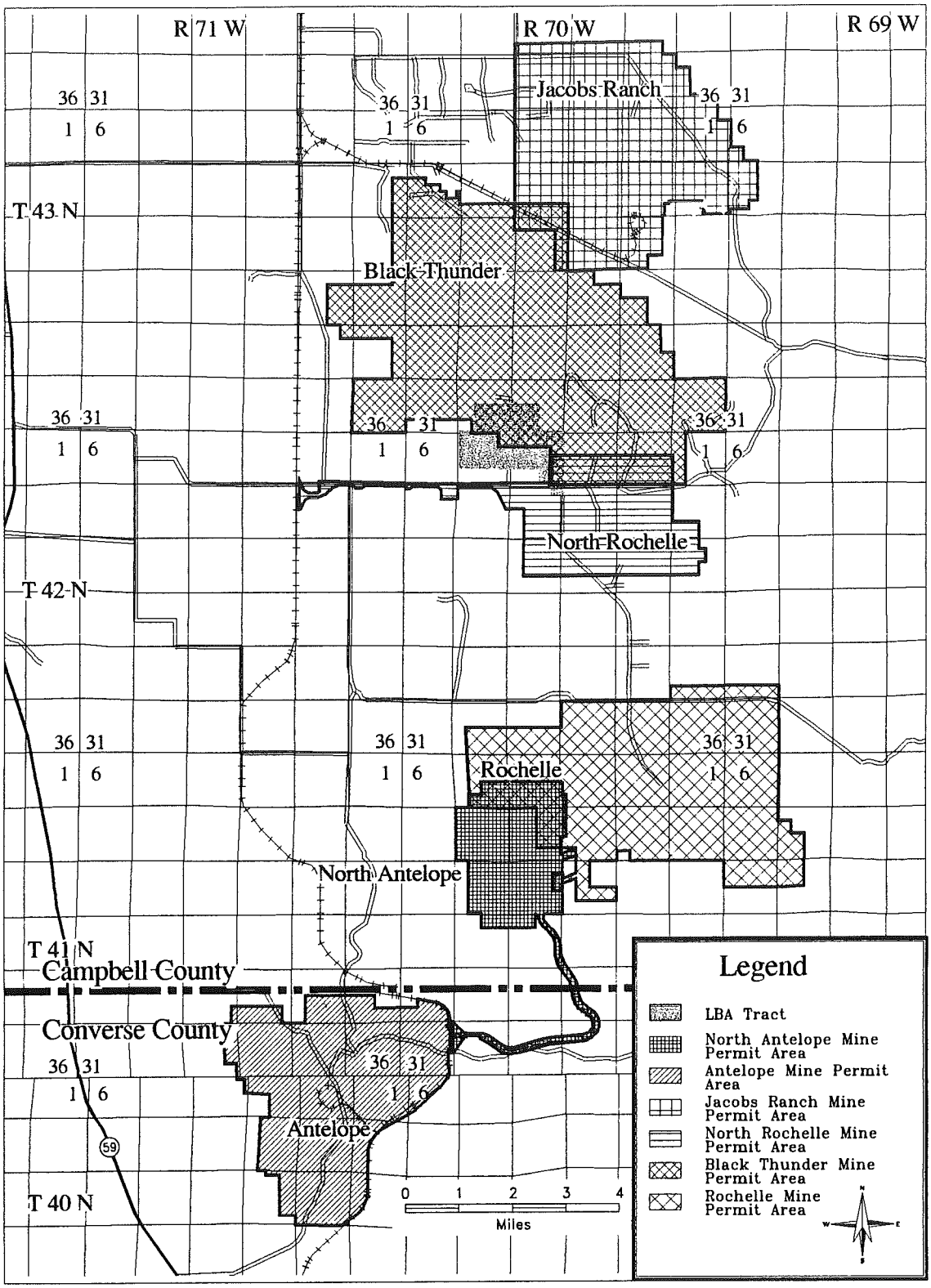


Figure 3.1 General Analysis Area.

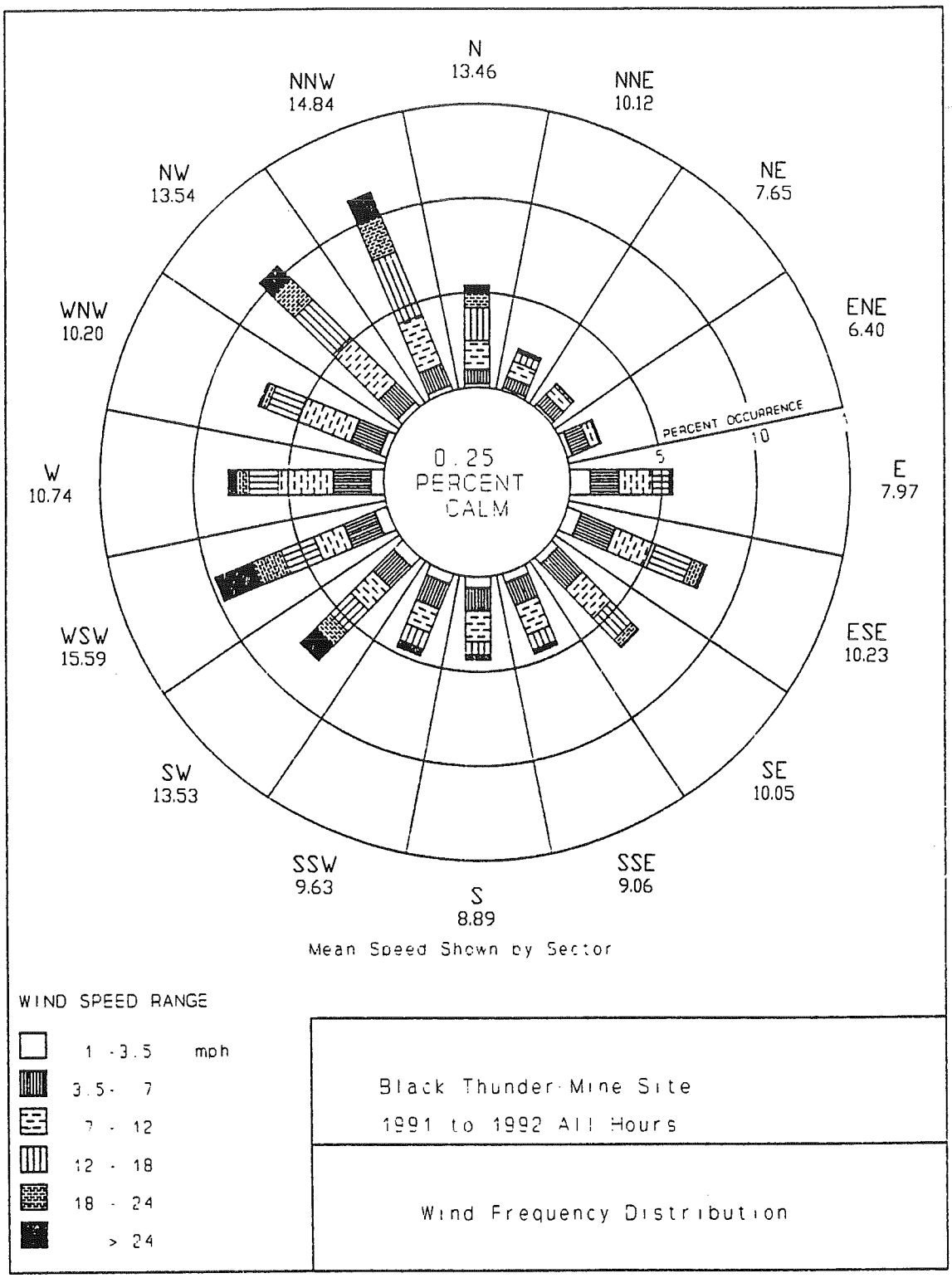


Figure 3.2 Wind Rose for Black Thunder Mine (1991-1992 Combined).

closed (internally drained) ponds that receive water during wet seasons--are common. Buttes and plateaus are also fairly common.

The PRB is bounded by the Casper Arch, Laramie Mountains, and Hartville Uplift to the south, the Miles City Arch in Montana to the north, the Big Horn Mountains on the west, and the Black Hills to the east. The LBA tract is located in the south-central part of the PRB at an elevation of about 4,500 ft in an area of low rolling topography.

3.3 GEOLOGY

The applicant's main mining objective is the lower Wyodak coal seam. An upper split of the Wyodak is present locally and will also be mined where it can be economically recovered. The rocks above the recoverable coal (overburden) are interbedded sandstones, siltstones, and shales of the Tertiary Fort Union and Wasatch formations. The lower Wyodak coal seam on the LBA tract is approximately 60 ft thick and the overburden ranges from about 150 ft thick on the eastern boundary of the tract to 250 ft on the western boundary. Figure 3.3 shows a vertically exaggerated cross section of the geology of the North Rochelle permit area. This cross section is a general representation of the geology of the LBA tract, the primary variables being the amount of sandstone in the overburden, the local presence and variable thickness of the upper split of the Wyodak coal seam, and the surface topography.

Surficial deposits in the analysis area generally include Quaternary alluvial deposits, scoria or clinker, and weathered Wasatch and Fort Union formations (Figure 3.4). Scoria forms when near-surface coal beds spontaneously burn and bake the overlying rocks. Scoria is characteristically red in color and is similar to angular porous gravel; it is resistant to erosion and forms buttes and plateaus east of the LBA tract in an area regionally known as the Rochelle Hills. No scoria is present on the LBA tract. Surface deposits on the LBA tract consist of alluvial deposits along Trussler Creek and Wasatch formation. The alluvial deposits along Trussler Creek consist primarily of poorly to well-sorted, irregularly bedded to laminated, and unconsolidated sand, silt, and clay with minor interbeds of fine gravel.

Drilling and sampling programs have been conducted throughout the PRB coal fields to identify overburden which may be unsuitable for reclamation (i.e., unsuitable for use in growing vegetation). All of the mines have identified some unsuitable overburden, which must be specifically handled in the reclamation process. A small portion of the overburden in the analysis area may be unsuitable due to high sodium adsorption ratios, potentially acid-forming materials, or unsuitable texture. All of the PRB mines have some overburden containing excessive total carbon content associated with nonminable carbonaceous zones, and several mines also have excessive selenium concentrations in near-surface material.

Mineral Resources

The PRB contains large reserves of fossil fuels including oil, natural gas or methane (from conventional reservoirs and from coal beds), and coal, all of which are currently being produced. In addition, uranium, bentonite, and scoria are mined in the PRB (BLM 1996g).

Coal. There are 17 active coal mines lying along the north/south line that parallels Highway 59 starting just north of Gillette, Wyoming, and extending south for about 75 mi, where the coal is at its shallowest depths (see Figure 1.2). An 18th active mine (Dave Johnston) is located near Glenrock, Wyoming, about 25 mi southwest of the Antelope Mine. The Wyodak coal seam--the main seam mined in the PRB--is sub-bituminous and is generally a low sulfur, low ash coal. On the LBA tract, a 60 foot thick lower seam or split of the Wyodak coal bed would be mined. Average delivered quality of coal from the existing North Rochelle lease in 1994 was 8,631 Btu/pound, 4.71% ash, and 0.24% sulfur (Wyoming State

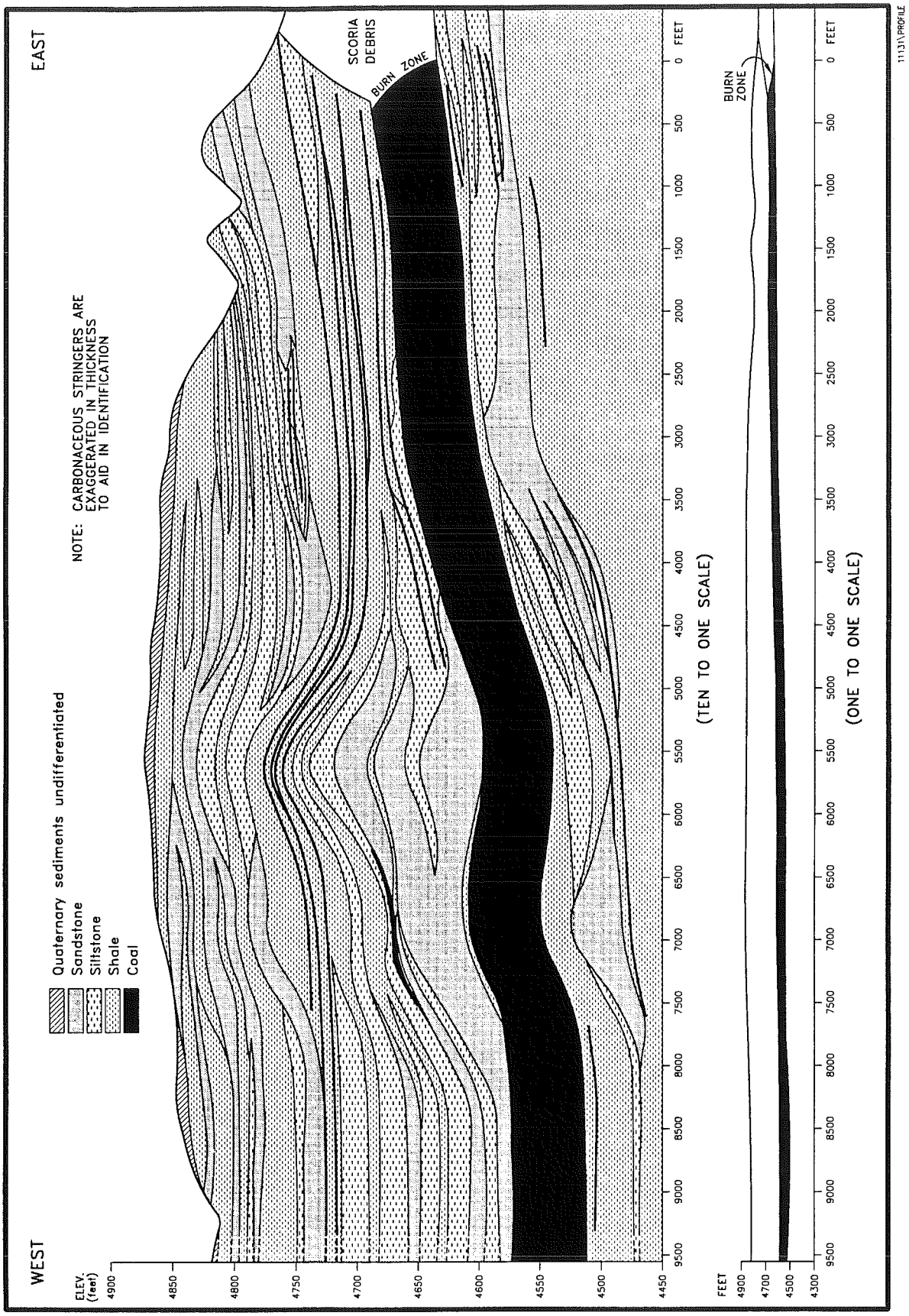


Figure 3.3 Generalized Geologic Cross Section of the North Rochelle Mine Area.

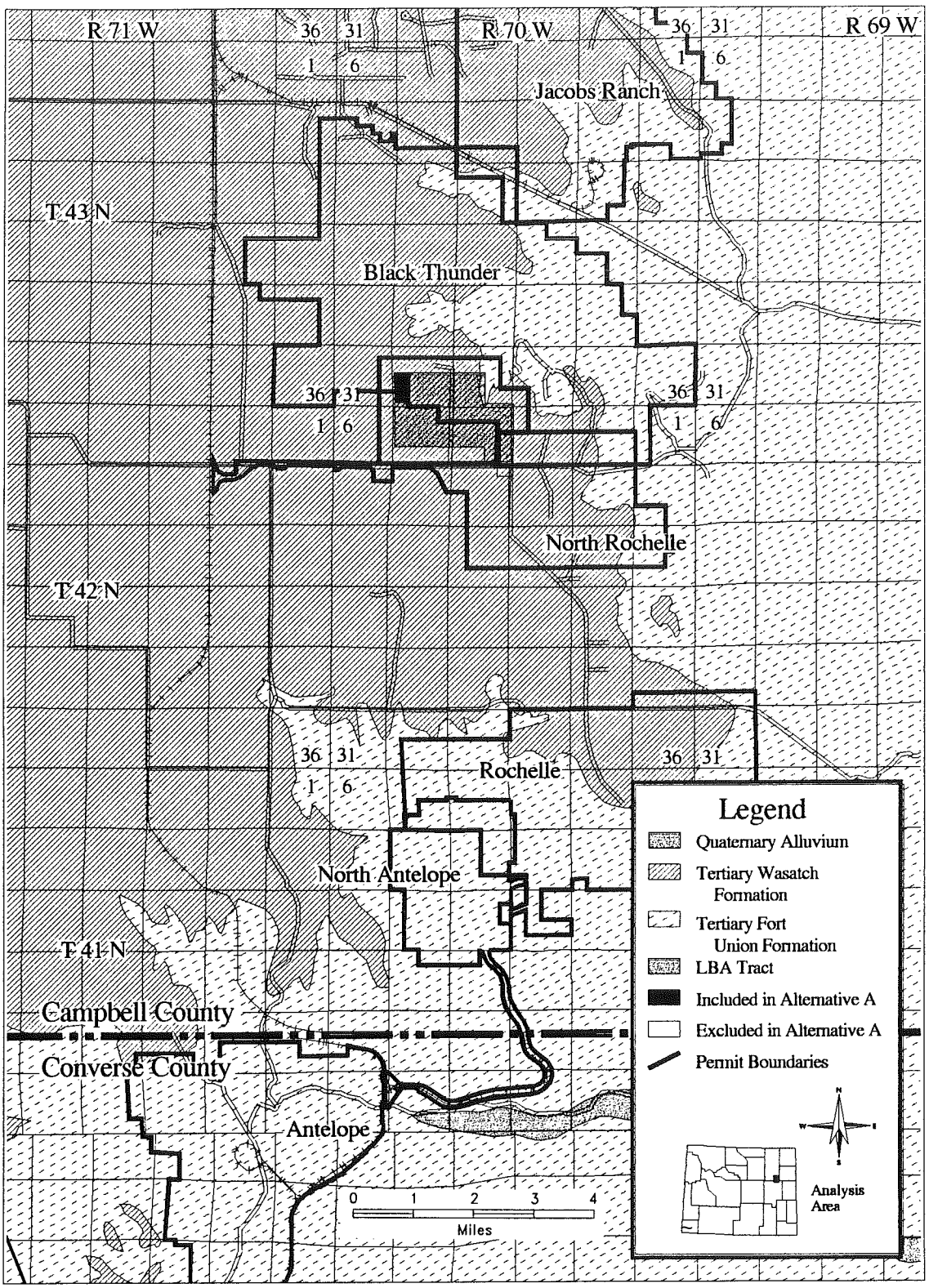


Figure 3.4 Surficial Geologic Map of the Analysis Area (Love and Christiansen 1985).

Geological Survey, 1995). An upper split of the Wyodak, varying from less than 1 ft to over 8 ft thick and discontinuous over the area, contains some recoverable coal. Other coal seams in the LBA tract are either too thin and discontinuous or too deep to be of economic value.

Oil and Gas. There are approximately 500 fields that produce oil and/or natural gas from a number of formations of varying geologic ages in the PRB. Depth to oil-bearing strata is generally between 4,000 ft and 13,500 ft, but some of the older wells are as shallow as 400 ft. The LBA tract overlies parts of two geologic structures that may contain producible quantities of oil and gas. There are currently no producing or abandoned oil or gas wells on the LBA tract (personal communication, January 1996, with Molly DeVore, Wyoming Oil and Gas Commission); however, the potential for future exploration exists. Although the coal rights on the LBA tract are all federal, only about 48% of the oil and gas rights are federal. The remaining 52% of the oil and gas rights on the LBA tract are privately owned. There are currently no applications for permit to drill on file within the LBA tract.

Coal Bed Methane. The generation of methane gas from coal beds occurs as a natural process. Methane produced by coal may be trapped in the coal by overburden pressure, by the pressure of water in the coal, or by impermeable layers immediately above the coal. The methane may also migrate upward and be trapped in shallower rocks (like sandstone), or it may disperse to the atmosphere. Deeper coal beds have higher pressures and generally trap more gas. Under certain geologic conditions, methane can be trapped at shallow depths in and above coal beds. Historically, methane has been reported flowing from shallow water wells and coal exploration wells in parts of the PRB. In the PRB, commercial production of coal bed methane began in 1989, north of Gillette. Since that time, exploration and development of coal bed methane trapped in the Wyodak coal bed west of the operating coal mines has continued. Coal bed methane development south of Gillette is currently being evaluated in the area shown on Figure 3.5. There are currently no proposals or applications to develop coal bed methane resources on or near the LBA tract; however, if coal bed methane resources can be economically developed in the Lighthouse Project Area (Figure 3.5), then exploration is likely to continue to the south. In the PRB, methane is recovered by the drilling and completion of wells, similar to, but generally shallower than, conventional natural gas development.

Bentonite. Layers of bentonite (decomposed volcanic ash) of varying thickness are present throughout the PRB. Some of the thicker layers are mined where they are near the surface, mostly around the edges of the basin. Bentonite has a large capacity to absorb water, and because of this characteristic, it is used in the processing of or directly in a number of products, including kitty litter, concrete, and drilling mud. No minable bentonite reserves have been identified on the LBA tract.

Uranium. Uranium exploration and mining was very active in the 1950s, when numerous claims were filed in the PRB. A decreased demand combined with increased foreign supply significantly decreased uranium mining activities in the early 1980s; however, substantial uranium reserves exist in southern Campbell, southern Johnson, and northern Converse Counties. There are currently two in situ leach operations in the PRB, and the recent price increase in uranium has raised interest in developing additional sites in the PRB and elsewhere in Wyoming (Wyoming State Geological Survey 1996). No known uranium reserves exist on the LBA tract.

Scoria. Scoria has been and continues to be a major source of gravel for road construction in the area. Scoria is present along the exposed outcrop of the Wyodak coal seam located just east of the mines.

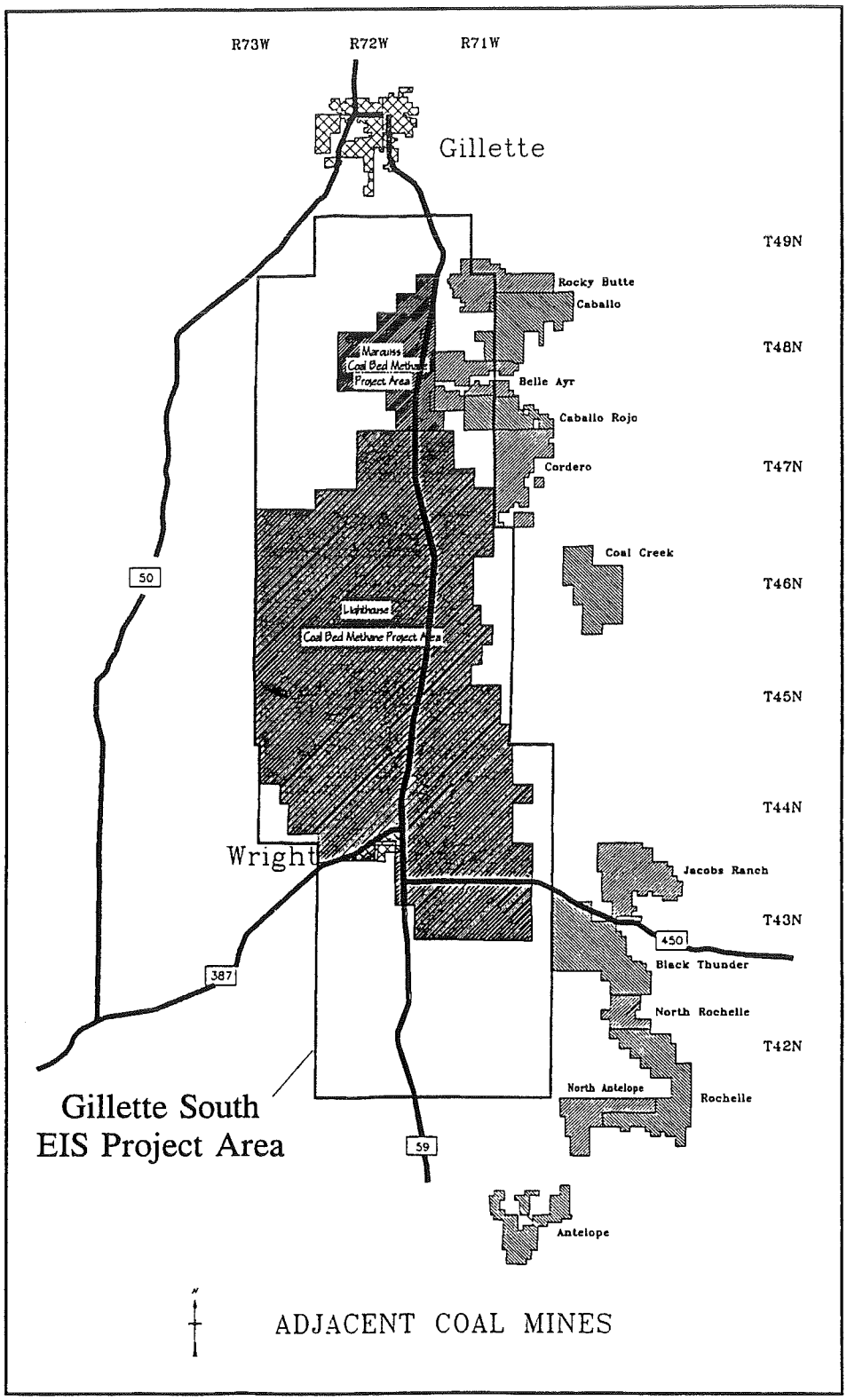


Figure 3.5 Coal Bed Methane Areas and Adjacent Coal Mines (Taken from BLM 1996).

3.4 SOILS

Soils in the region are mostly residual (developed in place) and have formed from weathered sandstones and shales. Due to the prevailing climate and vegetative conditions, organic matter accumulates slowly and the fertility of the soils is relatively low. Soils in the PRB can generally be classified into four taxonomic orders: 1) aridisols; 2) entisols; 3) vertisols; and 4) mollisols.

The aridisols cover the majority of the broad, rolling uplands and are usually dry for significant portions of the growing season. They have moderate accumulations of organic matter in the surface layers, and leaching over a long period of time has resulted in modest to strong accumulations of clay in subsoil horizons. Textures range from sand to clay and can be highly variable within a short distance.

Entisols occur in small scattered areas on upper hillsides and ridge crests, where erosion has prohibited soil horizon development, and on areas of recent alluvial (unconsolidated material deposited by streams) deposition. Textures of entisols vary from sand to clay and are strongly influenced by the parent rock, which ranges from sandstone to shale.

Vertisols occur in playas. They are clayey and typically have wide surface cracks when dry. Because these soils are associated with playas, moisture is much greater than in surrounding soils and vegetative productivity is normally higher.

Small areas of mollisols occur in the larger river bottoms. These soils exhibit a dark color and are highly productive.

The soils on the LBA tract are typical of the soils that occur on the adjoining North Rochelle and Black Thunder Mines. The Natural Resource Conservation Service (NRCS) (formerly Soil Conservation Service) has mapped (Order 3) the LBA tract soils as part of their Soil Survey of Campbell County, Southern Part, which is not yet published. A complete list of soils occurring on the LBA and their associated hydric classification is provided in Table 3.1 (NRCS 1996). Adjoining mines have also completed detailed (Order 1) soil surveys on small portions of the LBA tract that extend into their permit boundaries (Shell Oil Company Mining 1982; ARCO Coal Company 1995). These surveys are required by the WDEQ prior to issuance of a permit to mine, and if the LBA tract is leased, it would be inventoried for site-specific soil information prior to mining. Maps of Order 1 surveyed areas are available from mine permit files at WDEQ and are incorporated, by reference, into this EIS. Based on a review of the above surveys, soils on the LBA tract are similar to soils on the existing North Rochelle and Black Thunder Mines, and the tract is expected to have an adequate quantity and quality of soil for reclamation.

Inclusions of hydric soils (soils that are saturated, flooded, or ponded long enough to develop anaerobic [no oxygen] conditions) are absent to uncommon in all soils mapped within the LBA (see Table 3.1) (NRCS 1996). Site-specific soil surveys (Order 1) will be used to evaluate the presence of hydric soils and/or inclusions of hydric soils in detail, and the presence of hydric soils, as well as hydrophytic vegetation and wetland hydrology, will be determined during jurisdictional wetland determinations included in the mine permit application package (see Section 3.8).

3.5 AIR QUALITY

Ambient air quality in Wyoming, where "ambient air" is defined as air which is contiguous with publicly accessible lands, is regulated by the State of Wyoming and the EPA through the Wyoming air quality standards and regulations, which are enforced by the WDEQ, Air Quality Division (AQD) (WDEQ 1994a). Lands within an approved mine permit boundary and not accessible to the general public are not subject to state air quality standards, but are governed by the Mine Safety and Health Administration respirable dust regulations.

Table 3.1 List of Soils Occurring on the LBA Tract and Their Associated Hydric Classification.[1]

Soil Map Unit	Hydric Soils Classification[2]
Arvada, thick surface-Arvada-Slickspots complex, 0-6% slopes	2
Decolney-Hiland sandy loams, 0-6% slopes	1
Forkwood-Ulm loams, 0-6% slopes	2
Hiland-Bowbac sandy loams,0-6% slopes	1
Hiland-Vonalee sandy loams, 0-6% slopes	1
Hilight-Wags-rock outcrop complex, 3-45% slopes	4
Maysdorf fine sandy loam, 0-6% slopes	1
Maysdorf-Pugsley complex, 0-6% slopes	1
Maysdorf-Pugsley sandy loams, 6-15% slopes	1
Pits-dumps complex	1
Ulm-Renohill complex, 0-6% slopes	1

[1] Based on NRCS unpublished data (1996).

[2] 1 = No hydric soil components or inclusions occur in these units.
2 = Hydric soil inclusions consisting of intermittently ponded basins (playas) may occur in these units. Ponding may occur in these areas for more than 7 days in April, May, and June. Areas are small, typically less than 5% of the map unit, and not every delineation will have this inclusion.
4 = Hydric inclusions consisting of narrow, wet drainages have been identified in some delineations. They are not common. On-site investigation should be done to verify occurrence.

The EPA has authorized Wyoming to enforce federal ambient air quality standards as enumerated in the Clean Air Act through approval of a State Implementation Plan. The plan specifies that state air quality standards for criteria pollutants must be at least as stringent as the National Ambient Air Quality Standards (NAAQS) (Table 3.2).

The dominant air pollutants in the PRB are particulates, which are measured as total suspended particulates (TSP) and as particulate matter less than 10 microns in diameter (PM_{10}). Both are measured as $\mu g/m^3$ (micrograms per cubic meter). The largest contributor to TSP and PM_{10} in the PRB is dust resulting from surface mining, blasting, coal handling and loading, farming activities, and vehicular traffic on dirt roads (including mine haul roads). Surface winds also cause elevated levels of dust. Ambient concentrations of other air pollutants (sulfur dioxide, nitrogen oxides, carbon monoxide, and ozone) are low and cause little regulatory concern in this area.

Air quality monitoring data demonstrate that ambient concentrations of TSP (annual

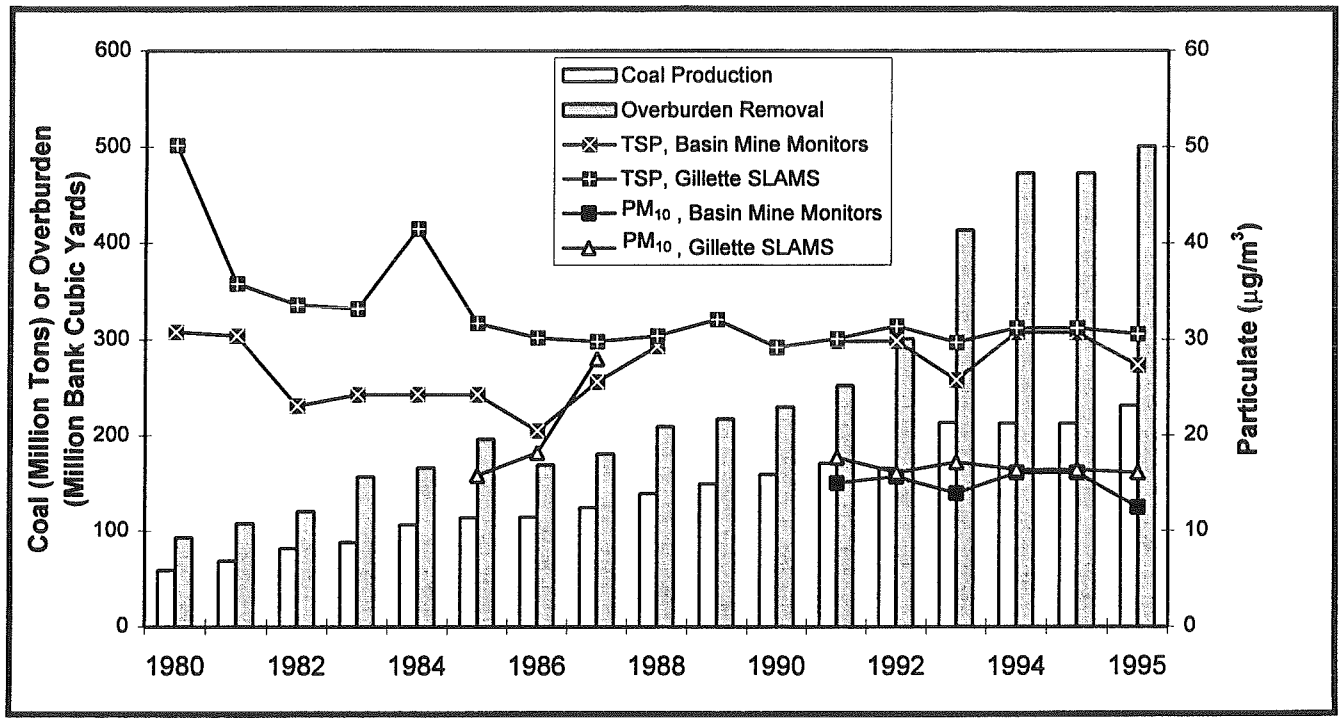
Table 3.2 National and Wyoming Air Quality Standards.

Air Pollutant	Averaging Period	Wyoming Standard ($\mu g/m^3$)[2]	NAAQS[1] ($\mu g/m^3$)[2]
Total suspended particulate (TSP)[3]	24-hr[4]	150	--
Respirable particulate matter (PM_{10})[3]	24-hr[4]	150	150
	Annual[5]	50	50
Nitrogen oxide	Annual[5]	100	100
Photochemical oxidant (ozone)	1-hr[4]	160	235
Sulfur dioxide	3-hr[4]	1,300	--
	24-hr[4]	260	365
	Annual[5]	60	80
Carbon monoxide	1-hr[4]	40,000	40,000
	8-hr[4]	10,000	10,000

1 National Ambient Air Quality Standard.
2 $\mu g/m^3$ = micrograms per cubic meter.
3 Particulates are very small-diameter solids or liquids. Materials handling processes such as crushing or grinding rock or loading dry materials in bulk can result in the creation of fine dusts. Vehicle traffic on dirt and gravel roads also generates large quantities of dust. Combustion processes can also emit small particles of noncombustible ash or incompletely burned soot. Total suspended particulates (TSP) includes all particulates suspended in the atmosphere. Respirable particulate matter is the very fine fraction (less than 10 microns in diameter) which can penetrate deep into the lungs and cause health problems.
4 May not be exceeded more than once per year.
5 Arithmetic mean may not be exceeded.

geometric-averaged 24-hour concentrations) and PM_{10} (annual arithmetic-averaged) have remained relatively constant, although mining activity has increased. Figure 3.6 compares average TSP and PM_{10} concentrations in the PRB relative to coal and overburden removal. Although the tonnages of overburden being removed and coal being mined have both been increasing, average annual TSP concentrations measured at the mines and in Gillette have remained relatively constant in the 25 to 30 $\mu g/m^3$ range. PM_{10} concentrations of 15-18 $\mu g/m^3$ are assumed to be background concentrations by the WDEQ. WDEQ estimates that PM_{10} amounts to about 30% of TSP (WDEQ 1979).

The data confirm the findings of the WDEQ/AQD that although annual tonnage of mined coal has increased, air quality has not been significantly affected. TSP and PM_{10} concentrations have remained well within NAAQS. The maintenance of air quality in the PRB is due, in large part, to the state and federal requirements for mines to actively reduce the potential for generation of particulate pollution through the use of specific control equipment and mining practices.



Data Source: WDEQ (1993) and EPA (1994).

Figure 3.6 Coal Production vs. Annual Average Particulate Concentrations, Powder River Basin.

Table 3.3 shows the allowable increment of particulate as PM_{10} which is permitted by the Clean Air Act Prevention of Significant Deterioration regulations (WDEQ 1995). PSD is designed to preserve existing air quality which meets NAAQS by limiting the increase in air pollution over current levels. Class I areas, which are allowed the smallest increment, include national parks and wilderness areas. All of Wyoming outside of national parks and wilderness areas is in the Class II area, reflecting the state's low overall pollution level. The nearest Class I area is approximately 80 mi east of the analysis area at Wind Cave National Park in southwestern South Dakota.

In order to obtain a state air quality operating permit, each mine must demonstrate, through modeling, that its activities will not increase TSP above what is allowable (WDEQ 1994a). This demonstration is required to include the estimated air pollutant emissions from other existing pollution-generating activities, including adjacent mines, so that control of overall air quality is a part of the permitting process. The historical record shows that increased mining in the PRB has not resulted in exceedances of air quality standards for TSP and PM_{10}.

3.6 WATER RESOURCES

3.6.1 Groundwater

Groundwater occurs in several geologic units of interest within and adjacent to the LBA tract. Figure 3.7 displays the relationship of stratigraphic units to hydrogeologic units. Three principle aquifers would be affected by mining the LBA tract. In descending order, these are the Wasatch Aquifer, the Wyodak Coal Aquifer, and the Fort Union Aquifers which underlie the coal (Martin et al. 1988). Detailed, site-specific groundwater

Table 3.3 Maximum Allowable Increments of Deterioration for PM_{10} (WDEQ 1995).

		Maximum Allowable Increment ($\mu g/m^3$)		
Air Pollutant	Averaging Period	Class I	Class II	Class III
Particulate matter (PM_{10})	24-hr[1]	8	30	--
	Annual arithmetic mean	4	17	--

[1] May not be exceeded more than once per year at any receptor site.

information is not currently available for aquifers within the proposed LBA tract. However, information is available for the adjacent North Rochelle, Black Thunder, and Rochelle Mines, and this information was utilized to evaluate existing groundwater resources (see Figure 3.1 for locations of adjacent mines).

Wasatch Aquifer. The Wasatch Aquifer overlies the Wyodak coal beds and is hosted by the Wasatch Formation and the overlying alluvium. The Wasatch Formation was formed by the deposition of sediments on a broad low-lying floodplain with shallow lakes and swamps. The organic material that was deposited in the swamps was subsequently buried, compacted, and heated to form the coal stringers in the Wasatch today. The thick sandstones were deposited by ancient stream channels, the interbedded fine grained sandstones, siltstones, and shales represent crevasse splay and levee deposits, and other shales and limy siltstones represent lake deposits. The alluvium and discontinuous sandstones and coal seams of the Wasatch can provide water where they are saturated, but the Wasatch Formation is not a regional aquifer.

Recharge to the aquifer is from infiltration of precipitation and lateral movement of water from adjacent clinker formations. Very dense drilling patterns are usually required to accurately delineate the discontinuous water-bearing sands. On a regional scale, the discontinuous nature of the sandstone results in low permeability and slow movement of groundwater in the overburden. Because of the varied nature of the aquifer, hydraulic characteristics also vary. Wells completed in sandstone and channel sands are considerably more productive than wells in shale and siltstone. On a regional scale, transmissivity (movement of water) of the Wasatch Aquifer is typically less than 97 gallons per day (gpd)/ft and is commonly less than 9.7 gpd/ft (Martin et al. 1988). Aquifer tests conducted at the North Rochelle Mine indicated that the mean transmissivity of the overburden is 7.0-8.0 gpd/ft, with a range of 1.3-39.0 gpd/ft (Shell Oil Company Mining 1982).

Groundwater from the Wasatch Aquifer is generally used for livestock watering. Regional data indicate median total dissolved solids (TDS) concentrations of 2,215 milligrams per liter (mg/l) with observations exceeding 9,000 mg/l (Martin et al. 1988). TDS in the immediate vicinity of the LBA tract show considerable variation. Black Thunder Mine data show TDS of 820-9,430 mg/l in the Wasatch overburden (ARCO Coal Company 1995), and data from North Rochelle are consistent with these observations (Shell Oil Company Mining 1982). Data also show that sodium and sulfate concentrations in the Wasatch Aquifer are elevated. At the Black Thunder Mine, sodium concentrations ranged from 67 to 1,020 mg/l, and sulfate concentrations ranged from 9 to 5,390 mg/l. Therefore, concentrations

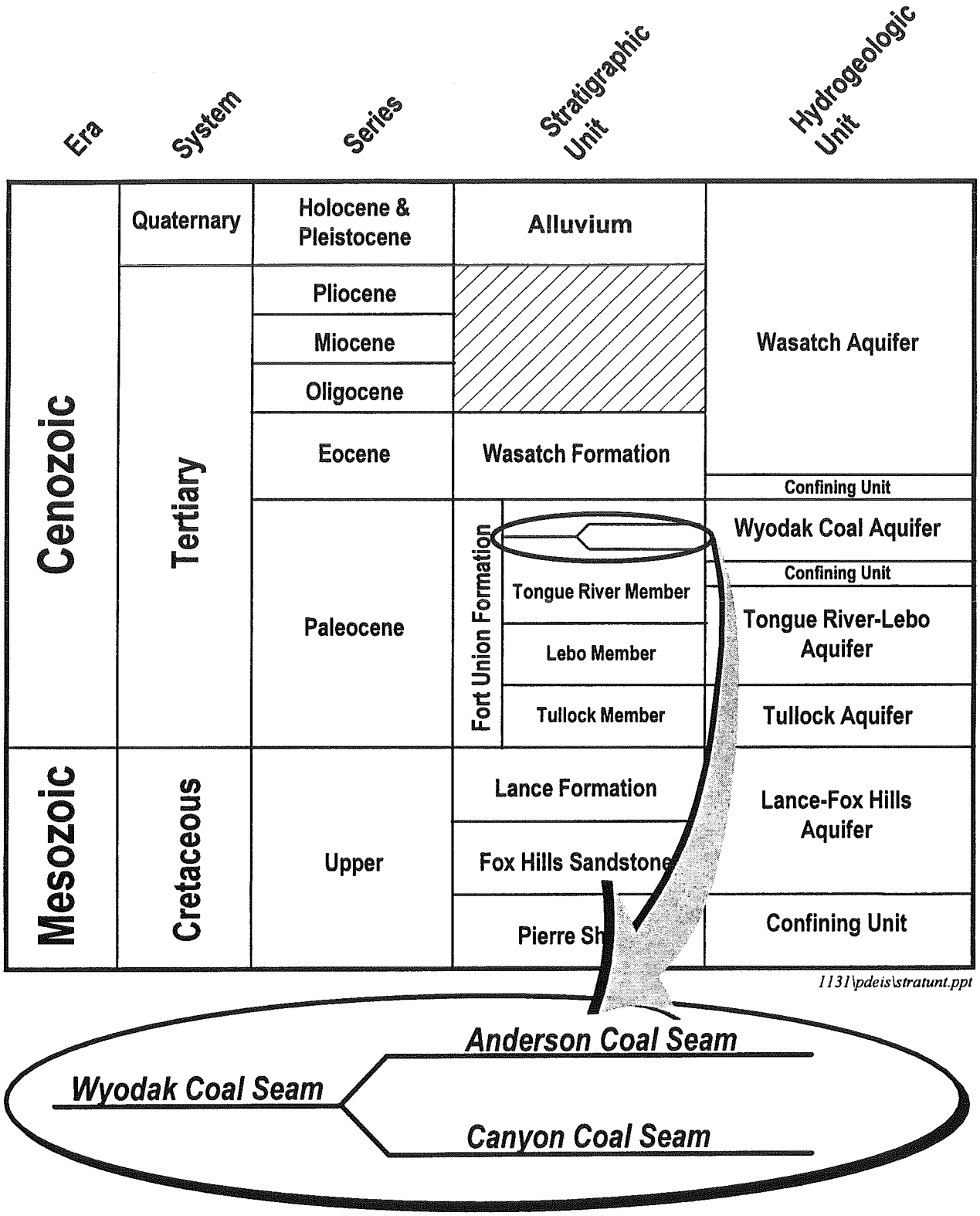


Figure 3.7 The Relationship of Stratigraphic Units to Hydrogeologic Units (Modified from Martin et al. 1988).

of TDS and sulfate generally preclude the use of the Wasatch Aquifer from uses other than livestock watering.

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. When the coal burned, 80-90% 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.

Water quality in clinker is generally better than is reported for the overburden and somewhat worse than that found in the coal. Clinker water chemistry is generally of a calcium-magnesium-sodium sulfate composition, and sulfate concentrations are often high enough to exceed Wyoming's Class II water quality standard for irrigation.

Wyodak Coal Bed Aquifer. The Wyodak coal bed is the most continuous hydrogeologic unit in the PRB and generally exists under confined conditions. Near the outcrop, the aquifer is generally unconfined (Martin et al. 1988). As the coal dips westward, it generally becomes progressively more confined between the overlying Wasatch and underlying Tongue River sediments. These sediments are comprised primarily of shale and siltstone, with occasional interbedded sandstones lenses (see Figure 3.3).

Solid, undisturbed coal is basically impermeable; therefore, the hydraulic properties of the coal are functions of the amount of fracturing which has occurred (i.e., faulting and flexing). As a result, aquifer properties are highly variable. Transmissivity in the coal formation is typically less than 1,002 gpd/ft and wells completed in the coal generally yield 10-50 gallons per minute (Martin et al. 1988).

Premining water level data from the Black Thunder and North Rochelle Mines indicate groundwater in the coal aquifer generally flows to the west. Due to current dewatering associated with the strip mining occurring at the adjacent Black Thunder Mine, a cone of depression currently exists in the LBA tract.

Water quality in the coal aquifer varies with location. In areas where the aquifer is unconfined (eastern portions of the study area), the dominant ions are calcium, magnesium, sodium, and sulfate. In the western portion of the study area where the aquifer becomes more confined, the water is a sodium-bicarbonate type (Shell Oil Company Mining 1982; ARCO Coal Company 1995). The median dissolved solids concentration reported by Martin et al. (1988) is 1,310 mg/l, with a maximum of 5,180 mg/l. Data from both the Black Thunder and North Rochelle Mine permits are within this range.

As with the Wasatch Aquifer, water quality of the coal aquifer generally does not meet WDEQ drinking water standards, but does meet livestock standards, and is also suitable for some industrial and irrigation purposes. Dissolved solids, sodium, and sulfate are the principal constituents contributing to its general unsuitability as drinking water.

Underlying Aquifers. The aquifers which underlie the Wyodak Coal Aquifer include the Tongue River-Lebo and the Tullock Aquifers, which are members of the Fort Union Formation. These aquifers generally have significantly higher quality than the Wasatch or coal aquifers. Therefore, wells completed in these aquifers are used throughout the PRB for domestic, industrial, municipal, and stock water supplies. The Fort

Union Formation below the coal is described as interbedded fine-grained sandstone, shale, carbonaceous shale, and coal. The average thickness of the Fort Union Formation, including the Wyodak coal, is 1,800 ft (Crist, 1991).

Aquifer tests conducted within the existing North Rochelle permit boundary demonstrate that the underlying Fort Union confining unit is only slightly permeable, with underburden transmissivities of 1.1-13.2 gpd/ft. The low permeability minimizes vertical communication between the coal and the underburden. Therefore, water quality of the underburden is protected.

Water quality of the underlying Tongue River-Lebo Aquifer often meets Wyoming drinking water standards, and these aquifers are typically utilized as sources of drinking water for mining operations. However, data from the North Rochelle permit indicate that the underlying aquifer exhibits highly variable water quality. Sulfate, sodium, and TDS were observed in several underburden wells at levels exceeding standards for all but livestock use. Total dissolved solids concentrations ranged from 1,700 mg/l to 3,700 mg/l.

The deeper Tullock Aquifer is of much higher quality. Limited monitoring data at the North Rochelle Mine indicate that this aquifer is a sodium bicarbonate type with a slightly alkaline pH (8.4) and TDS of 330 mg/l (Shell Oil Company Mining 1982).

North Rochelle's existing water supply well is completed in sands in the Tullock Aquifer at a depth of 1,072 ft to 1,926 ft. The total depth of this well is 1,930 ft, and it is located in the northeast corner of the proposed rail loop with a legal description of the NW¼, NW¼ of Section 9, T42N, R70W.

3.6.2 Surface Water

Surface water features in the analysis area are displayed in Figure 3.8 and on the LBA tract in Figure 3.9. The LBA tract lies almost entirely within the Trussler Creek drainage, and all of the stream channels are ephemeral, that is, they flow only in direct response to precipitation events and snowmelt. Trussler Creek flows northward through the LBA tract and joins Little Thunder Creek near the center of Thunder Basin Coal Company's Black Thunder Mine permit area. Olson Draw enters the LBA tract from the west and joins Trussler Creek near the center of the tract. A small portion of the northeastern corner of the LBA tract lies within an unnamed drainage area which is a tributary to Little Thunder Creek. Little Thunder Creek flows easterly to join Black Thunder Creek, a tributary of the Cheyenne River.

The channels of Trussler Creek, Olson Draw, and their tributaries are typically meandering, ephemeral grassed swales. As a result, the channels are dry for the majority of the year. When runoff does occur, it is typically of high intensity and short in duration. Typically, over 75% of the annual runoff occurs during May, June, and July, in response to snowmelt. Peak discharges typically occur in June; however, they may occur as early as January and as late as September (Shell Oil Company Mining 1982). Annual peak discharges are generally associated with thunderstorm activity. On the average, streams in the study area experience from three to five runoff events in a typical year. Discharge in Trussler Creek within the LBA tract is controlled to a large extent by an impoundment located immediately upstream of the site.

The drainage area of Trussler Creek is relatively small. At the upstream (southern) limit of the LBA tract, the Trussler Creek drainage area is approximately 2,507 acres (3.9 mi^2). At the downstream (northern) limit, the drainage area increases to 6,400 acres (10.0 mi^2) including the 2,755-acre (4.3-mi^2) watershed of Olson Draw. Upstream from the LBA tract, Trussler Creek will be disturbed by mining at the North Rochelle Mine, and downstream from the LBA tract, it has been disturbed by mining at the Black Thunder Mine. The drainage area of Olson Draw has not

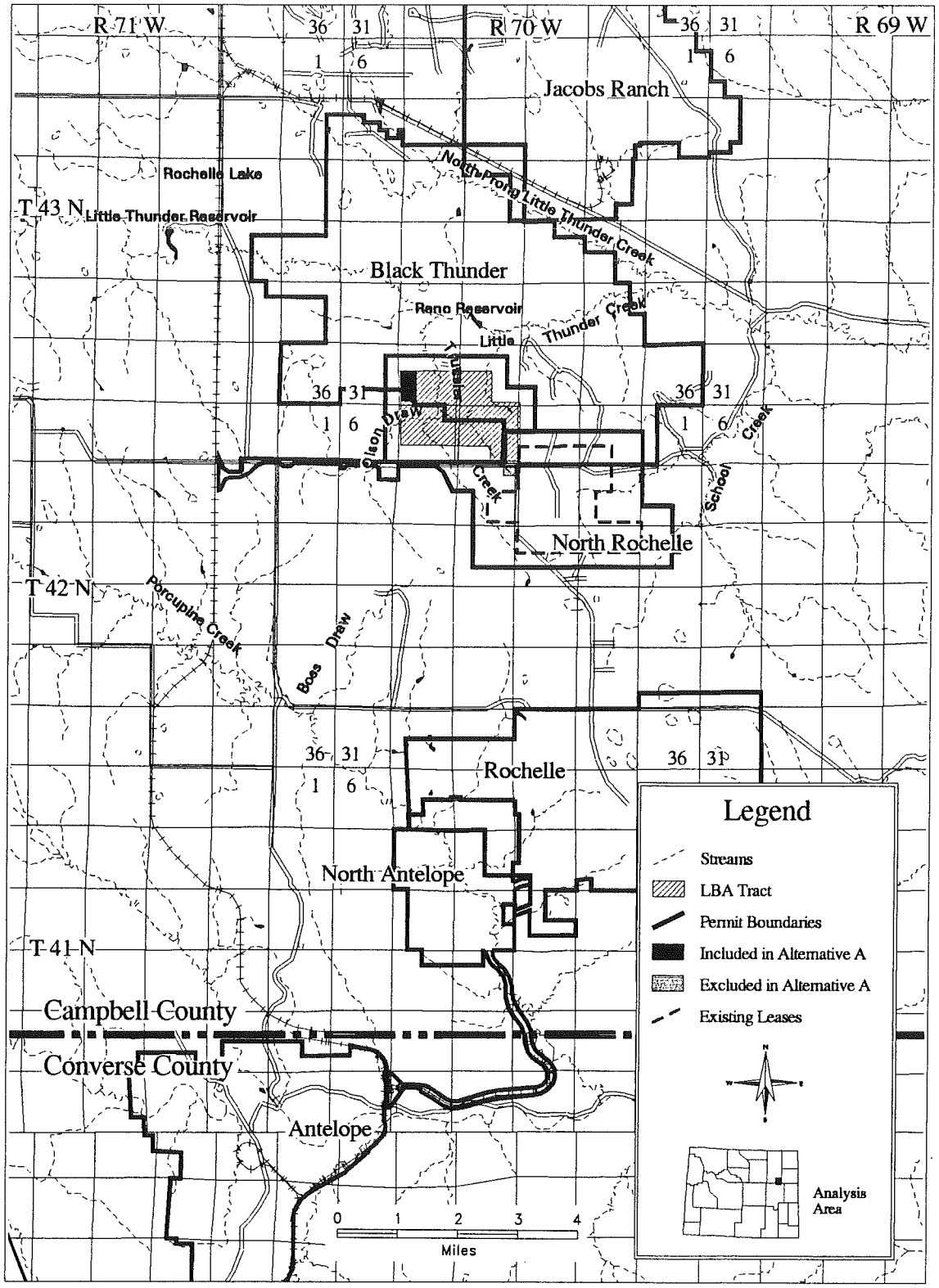


Figure 3.8 Surface Water Features in Analysis Area.

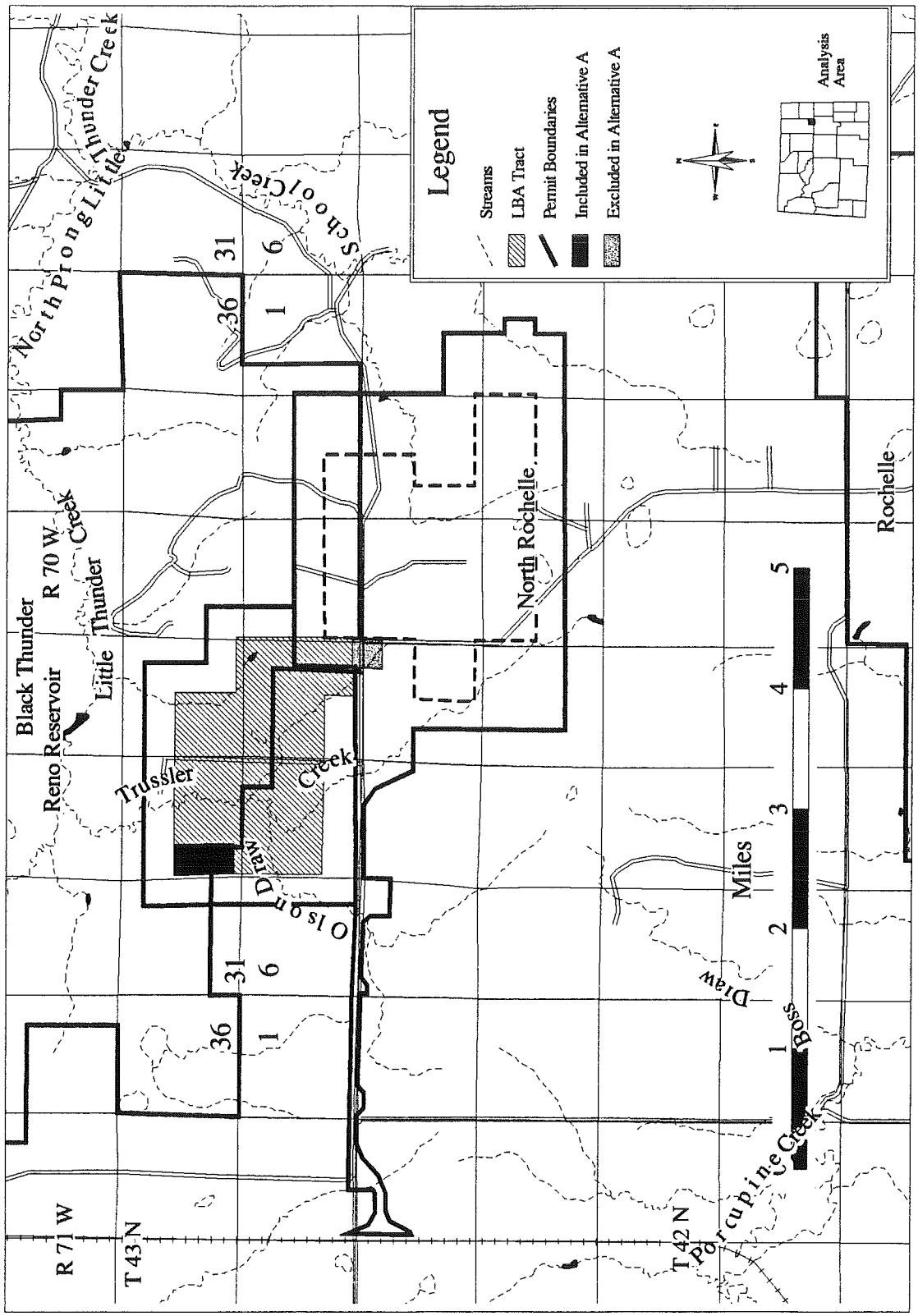


Figure 3.9 Surface Water Features on the LBA Tract.

been disturbed by mining and is currently rangeland. A series of pothole depressions in the stream channel of Trussler Creek have been created for stock watering. There is little evidence of headcutting or other geomorphic instabilities within the watershed.

Surface water quality information for Trussler Creek was obtained from the North Rochelle and Black Thunder Mine permits and indicates that the water quality is significantly higher than the shallow groundwater. Total dissolved solids concentrations are generally an order of magnitude lower than groundwater sources. The water is a calcium-bicarbonate type, and sodium is not present in detectable levels. In general, surface water in the analysis area has been determined to meet standards for livestock and is commonly used for wildlife and stock watering. No irrigation facilities exist within the LBA tract, and stock-watering ponds are limited to the several pothole depressions in Trussler Creek.

3.6.3 Water Rights

Wyoming State Engineer's Office records were searched for groundwater rights within 3 mi of the LBA tract on March 2, 1994, as required for WDEQ permitting. These data indicate that there are 282 water wells within 3 mi of the LBA tract. The majority (232) of these wells are owned by coal mining companies. Of the 50 noncoal-related wells, 15 are permitted for stock-watering purposes, and only one is permitted for domestic use. This well is shallow and completed within the Quaternary alluvium of Boss Draw approximately 3 mi south of the LBA tract. The remaining noncoal-related wells are monitoring wells owned by either the USFS or the Water Resources Research Institute of the University of Wyoming. Figure 3.10 presents the location of both North Rochelle's and Black Thunder's current monitoring wells for their existing mines.

A newer record search for all water wells registered within the general analysis area was conducted on October 14, 1996. This search area included T41N, T42N, and T43N and R69W, R70W, and R71W. A total of 1,052 wells was identified in this search, with 12 being identified for domestic use, 186 for stock use, 572 for monitoring, 40 for dewatering, 21 for reservoir supply, 54 for industrial use, 1 for irrigation, 159 for miscellaneous use, 1 temporary, and 6 unclassified. Appendix E presents the results of this search and identifies each well's location, depth, use, estimated yield, and ownership.

Wyoming State Engineer's Office records (June 17, 1994) indicate that surface water rights within the immediate vicinity of the LBA tract are predominately associated with coal mining activity at Black Thunder Mine (downstream of the LBA tract) or North Rochelle Mine (upstream of the LBA tract). These mine-related permits consist of impoundments for flood and sediment control, stream diversions, and industrial use (dust control). No surface water rights (within 3 mi) were found which were not related to the coal mining industry.

3.7 ALLUVIAL VALLEY FLOORS

Alluvial valley floors are unconsolidated stream-laid deposits where water availability is sufficient for subirrigation or flood irrigation agricultural activities. The designation of a valley as an alluvial valley floor has significant bearing on mining and reclamation plan requirements.

Two drainage valleys occur in the general area--Trussler Creek and Olson Draw. Both have been studied in detail to determine the presence or absence of alluvial valley floors (Shell Oil Company Mining 1982; ARCO Coal Company 1995). There is no evidence of flood irrigation or subirrigation activities along either of these ephemeral streams, and the stream-laid deposits along these drainages are typically too narrow (less than 50 ft) to be mapped as alluvial valley floors. Therefore, no areas within the LBA tract are expected to meet the criteria of an alluvial valley floor.

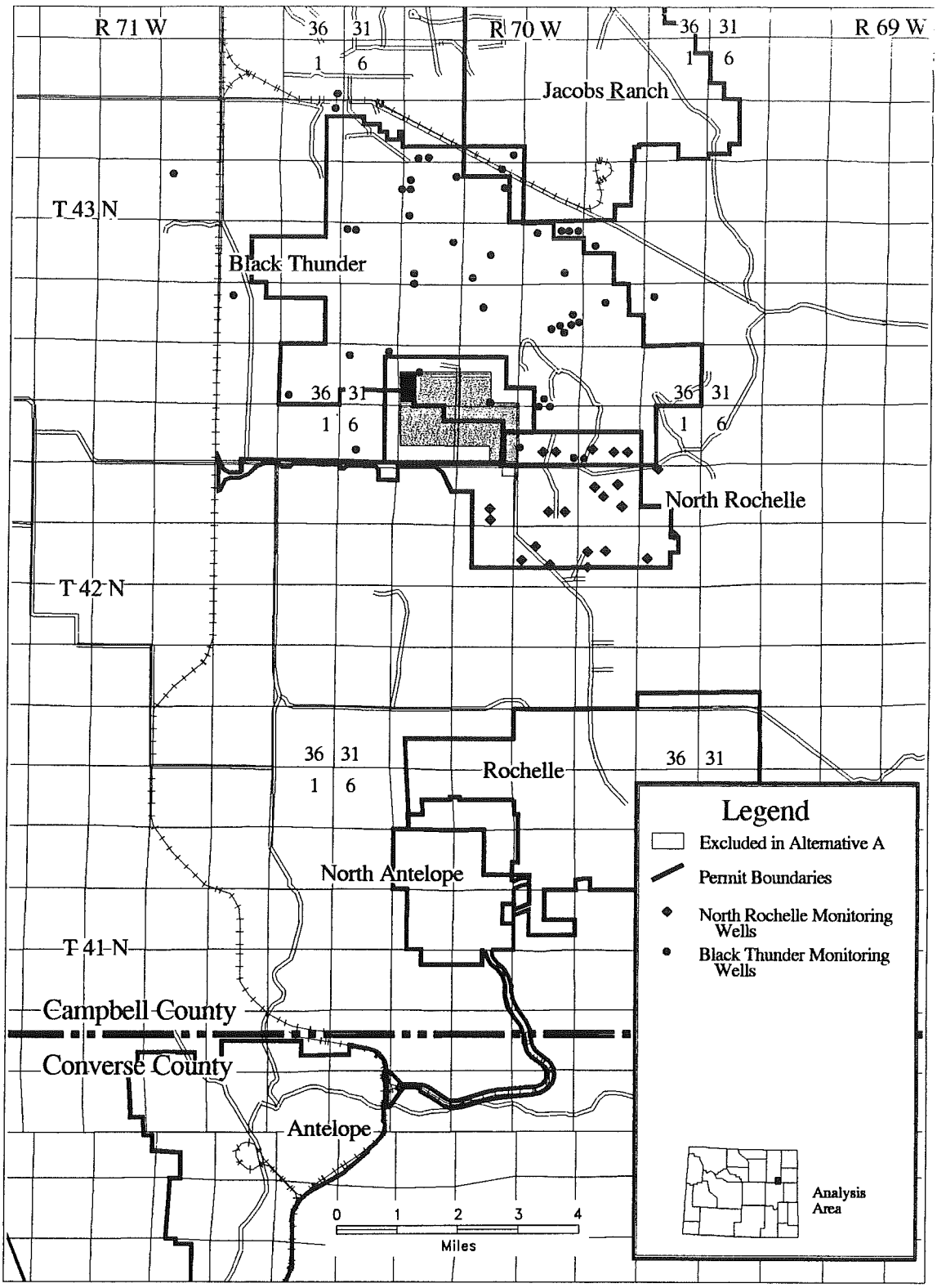


Figure 3.10 Existing Groundwater Monitoring Wells for the North Rochelle and Black Thunder Mines.

3.8 WETLANDS

Wetlands, which are protected under Section 404 of the Clean Water Act (33 CFR 1251 et seq.), are considered sensitive and valuable resources. National Wetlands Inventory (NWI) maps (USFWS 1991) were examined to identify potential wetlands in the analysis area and on the LBA tract (Figures 3.11 and 3.12). Jurisdictional wetland delineations using U.S. Army Corps of Engineers criteria would be performed during the WDEQ permitting process if a lease is issued for this tract. At that time, the U.S. Army Corps of Engineers and EPA would evaluate compliance with the Clean Water Act provisions under Section 404.

According to NWI maps, 10 wetlands totaling approximately 6 acres are scattered throughout the LBA tract (Figure 3.12). Palustrine (nontidal marshes) emergent wetlands occur along Trussler Creek, and a single palustrine, open water wetland (approximately 2 acres) occurs along an unnamed tributary to Little Thunder Creek in the eastern portion of the LBA tract. One playa (an approximately 3-acre ephemeral pond with no external drainage) located on the LBA tract is classified as an NWI wetland.

3.9 VEGETATION

The vegetation on the LBA tract is typical of that found in the southern part of the eastern PRB and is very similar to the premining vegetation on adjacent mines. Vegetation for approximately 80% of the LBA has been mapped in association with permitting the North Rochelle and Black Thunder Mines (Triton Coal Company 1980; ARCO 1995). The remainder of the LBA (approximately 292 acres), including portions of the SW¼ of Section 33, T43N, R70W, and the S½ of Section 32, T43N, R70W, have not been mapped. The following description of vegetation on the LBA is limited to the mapped area of the LBA and is based on information from the North Rochelle and Black Thunder Mine permits (Triton 1980; ARCO 1995). Table 3.4 gives the types and acreages of vegetation on the 1,440-acre LBA tract.

Of the 1,148 acres for which vegetation is mapped, the big sagebrush shrubland is most common (38.1%, or 438 acres). The primary species in this type are big sagebrush (*Artemisia tridentata*), followed by blue grama (*Bouteloua gracilis*), prickly pear cactus (*Opuntia* spp.), needle-and-thread grass (*Stipa comata*), western wheatgrass (*Elymus smithii*), and prairie Junegrass (*Koeleria cristata*). Shrubs--especially big sage--generally account for >30% of the total ground cover in this type.

Mixed grass is the second most abundant vegetation type mapped in the LBA tract, accounting for 29.8% (342 acres) of the 1,148 mapped acres. Mixed grass is common throughout upland areas but may also occur adjacent to ephemeral drainages (i.e., the southern banks of Trussler Creek). Primary species include blue grama, prickly pear cactus, needle-and-thread grass, prairie Junegrass, and western wheatgrass. Grasses account for the greatest percent of vegetative cover, followed by shrubs (<20% cover) and forbs. Big sagebrush is the most common shrub in this vegetation type.

Agricultural land is common in the southeastern portion of the LBA, accounting for 260 acres (22.6% of the mapped area). Agricultural areas consist primarily of cultivated barley fields and are probably rotated with other crops on a yearly basis. Portions of the agricultural lands were fallow at the time of the North Rochelle vegetation survey (Triton 1980).

Streamside meadows occur on the LBA primarily in association with Trussler Creek and Olson Draw. This vegetation type occurs on approximately 7.1% (82 acres) of the mapped portion of the LBA and is characterized by Kentucky bluegrass (*Poa pratensis*), western wheatgrass, field sedge (*Carex praegracilis*), common dandelion (*Taraxacum officinale*), foxtail barley (*Hordeum jubatum*), and prairie cordgrass

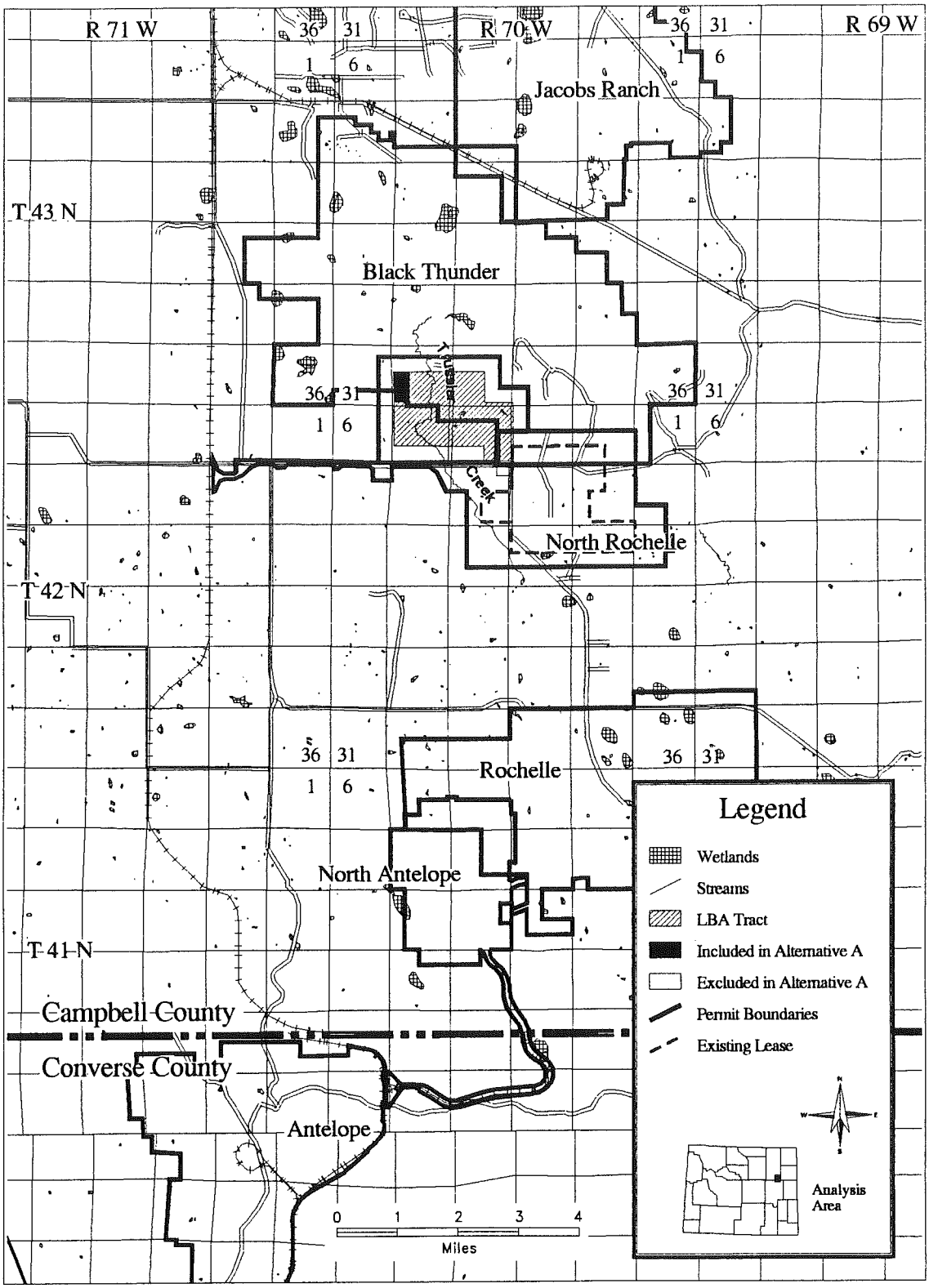


Figure 3.11 National Wetland Inventory Wetlands in the Analysis Area.

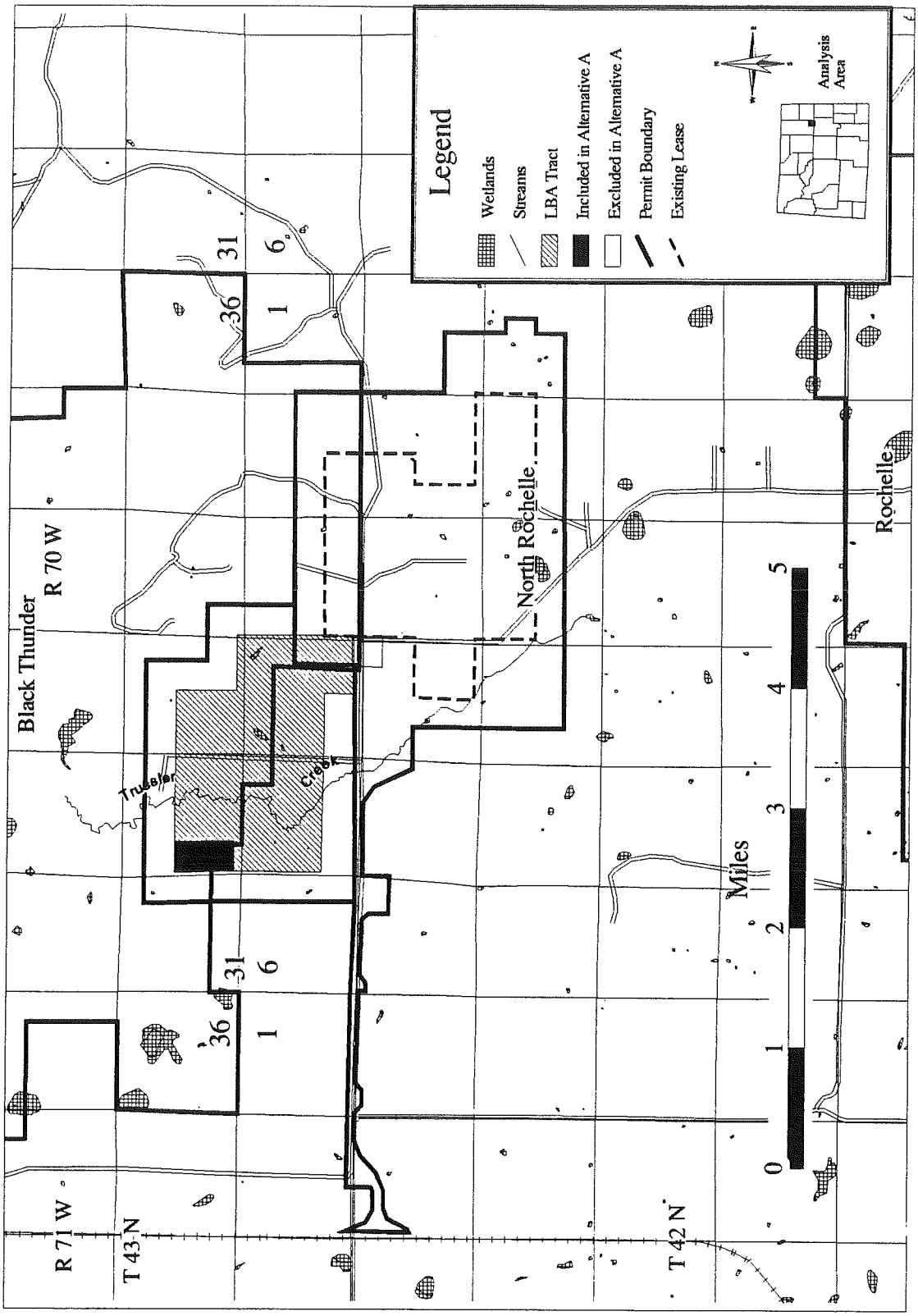


Figure 3.12 National Wetland Inventory Wetlands on the LBA Tract.

Table 3.4 Vegetation Types and Acreages for the LBA Tract.[1]

Vegetation Type	Number of Acres	Percent of LBA
Big sage shrubland	438	30.1
Mixed grass prairie	342	23.8
Agricultural land	260	18.3
Streamside meadow	82	5.7
Disturbed	9	0.6
Playa	8	0.6
Rough breaks shrublands	7	0.5
Open water/reservoir	2	0.1
Unmapped-vegetation unknown	292	20.3
Total	1,440	100.0

[1] Based on Triton (1980) and ARCO (1995).

(*Spartina pectinata*). Streamside meadows are some of the wettest areas in the LBA, receiving runoff and snowmelt. Although the streams flow only intermittently, scattered ponded areas may occur in low spots along the channel.

Two small playas occur on the mapped portion of the LBA (8 acres total, or 0.7%). These seasonal lake beds are either barren or support primarily grassland vegetation. Over time, evaporative processes have created saline soil conditions which determine the amount and type of vegetation these sites can support. Because of the range of water availability and soil salinity, playa vegetation can be quite variable; however, common species generally include western wheatgrass, common spikerush (*Eleocharis macrostachya*), needle-leaf spikerush (*E. acicularis*), and speedwell (*Veronica peregrina*). Species diversity in playa vegetation is normally substantially lower than most other vegetation types due to the more severe environmental conditions (e.g., salinity).

Rough breaks shrublands and disturbed vegetation types account for 0.6% and 0.8% of the mapped portion of the LBA, respectively; approximately 2% of the area (2 acres) is mapped as open water habitat. Rough breaks vegetation occurs on eroded uplands and is typically sparsely vegetated. Soils are generally shallow and poorly developed. Common species include western wheatgrass, big sagebrush, broom snakeweed (*Gutierrezia sarothrae*), and rubber rabbitbrush (*Chrysothamnus nauseosus*). Shrubs account for ≥30% of the cover, and total vegetative cover is typically low. Disturbed areas on the mapped portion of the LBA are limited to roads and associated ROWs.

Figure 3.13 presents a vegetation map of the analysis area obtained from satellite imagery and computer enhancement techniques using the Wyoming Gap Analysis Land Cover Map (University of Wyoming 1996). This map was created on a regional rather than a local scale;

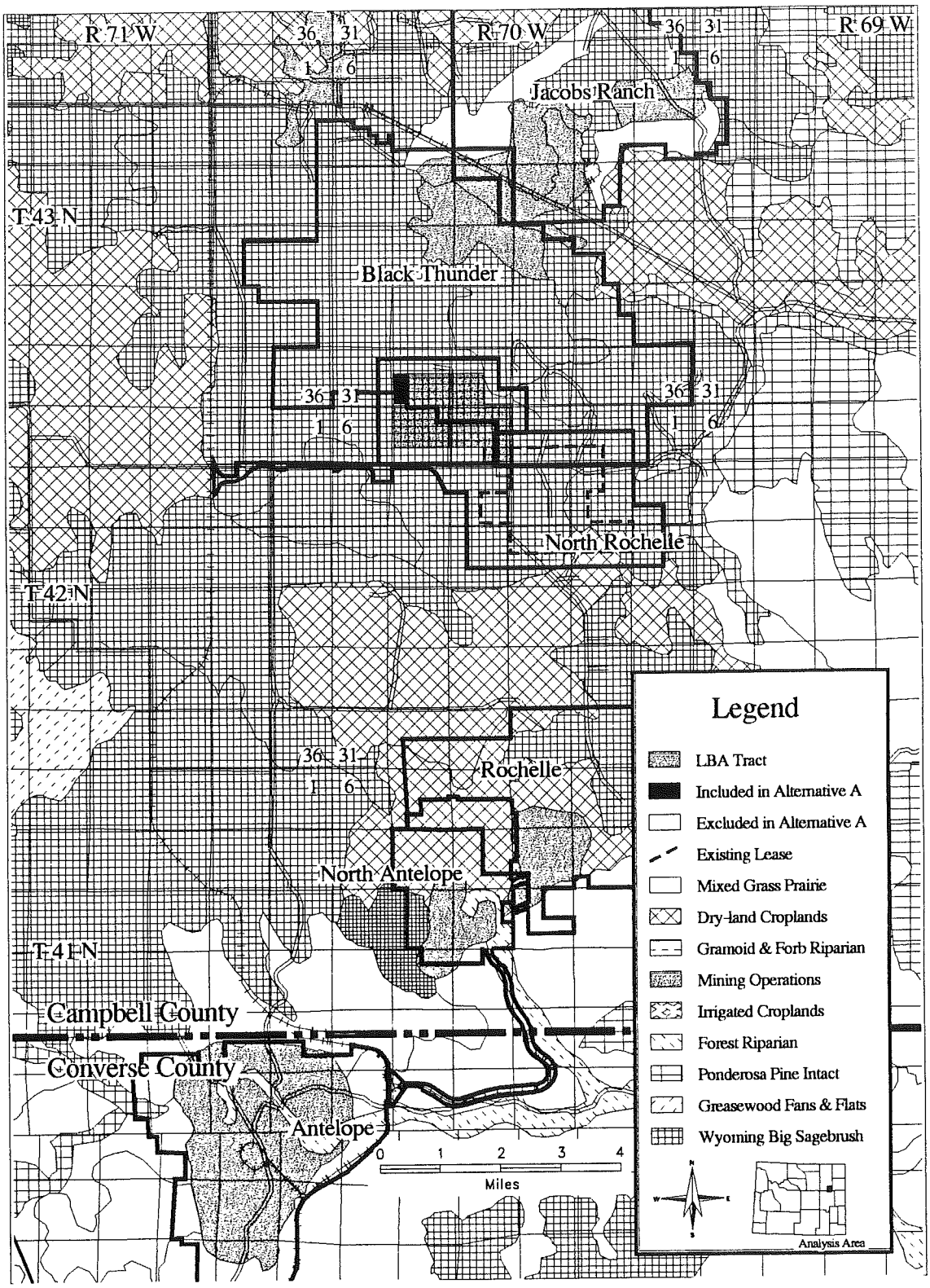


Figure 3.13 Vegetation Map of the Analysis Area (Data Source: Wyoming Gap Analysis Land Cover Map).

thus, the entire LBA tract was classified as Wyoming big sage (the most common vegetation type on the LBA). An in-depth discussion of vegetation types and distribution in the general analysis area is presented below.

Nine primary vegetation types (mixed grass prairie, greasewood fans and flats, graminoid- and forb-dominated riparian, dryland crop, irrigated crop, mining operations, ponderosa pine, forest-dominated riparian, and Wyoming big sagebrush) occur in the general analysis area. Approximately 65% of the analysis area is dominated by native big sagebrush and mixed grass prairie types (approximately 40% and 25%, respectively). Areas in or adjacent to stream channels are typically native graminoid/forb riparian or forest-dominated riparian. The ponderosa pine type typically occurs in the Rochelle Hills area on the eastern edge of the analysis area. Dryland crop and irrigated crop types occupy approximately 18% and 1% of the analysis area, whereas the mining operations type (6%) occurs on recently mined areas.

3.10 WILDLIFE

Numerous wildlife species have traditionally used the PRB for seasonal and year-round habitation. Changes in land use from native rangeland to livestock grazing, agricultural crop production, and mineral extraction have had an impact on wildlife habitat and subsequent wildlife use of the area. The Wyoming Game and Fish Department (WGFD) has summarized the history of the wildlife resources in this general area as follows.

> Wildlife habitat has generally declined since pre-Euro-American settlement. Wildlife habitat once occupied by buffalo, wolves, black-footed ferrets, and grizzly bears is now vacant of these species. Populations of antelope, elk, bighorn sheep, mountain lion, black bear, sage and sharp-tailed grouse, game fish, waterfowl, bald and golden eagles, and peregrine falcon have decreased since pre-Euro-American settlement. The decline in habitat is a result of man's developments, alteration of vegetation, and introduction of domestic livestock. The decline may be more pronounced in the plains and foothills/escarpments land type areas where greater development has occurred. Populations of mule deer, white-tailed deer, moose, turkey, and small game may be higher than pre-Euro-American settlement. Populations of predators, furbearers, and raptors appear to be relatively stable (personal communication, 1994, to Bruce Daughton, BLM, RMP Team Leader, for use in Buffalo RMP Update, from Roger Wilson, State Wildlife Biologist).

Reports and references used in this description of the area's wildlife include the WGFD Wildlife Observation System (WGFD 1994a, 1996); WGFD Job Completion Reports (WGFD 1994b), WGFD comment letters; USFWS comment letters; USFS wildlife maps and comments; The Nature Conservancy Wyoming Natural Diversity Database (WNDDB) searches (The Nature Conservancy 1994, 1996); the DEIS for North Rochelle Mining and Reclamation Plan (OSM 1982); the North Rochelle Mine Permit Application (Shell Oil Company Mining 1982); the FEA for the West Black Thunder Coal Lease Application (BLM 1992a), the Black Thunder Mine Permit Renewal/Amendment (ARCO Coal Company 1995); North Rochelle Mine 1996 Wildlife Monitoring data (Triton Coal Company 1996); and personal contacts with WGFD and BLM biologists. Site-specific wildlife surveys have not been conducted for this lease application, but will be as part of the mine permitting process if a lease sale is held. Listings of all wildlife observed or recorded in the area are available from the references listed above. General descriptions of wildlife and habitat use in the analysis area follow. Detailed analysis of big game hunting and fishing data is provided in the recreation portion of the landownership and use section on pages 3-33 and 3-35. This includes designated seasonal use areas.

The most common big game species in the area are pronghorn antelope and mule deer. Antelope are widely distributed throughout the sagebrush and grassland vegetative types. Mule deer use all habitats, although they show a marked preference for the ponderosa pine/juniper breaks habitat in the Rochelle Hills east of the mines. Elk also prefer this habitat, although they make extensive use of reclaimed coal lands north of the LBA tract on Jacobs Ranch Mine. White-tailed deer are occasionally seen in the area. No designated big game crucial habitat or migration corridors exist in the LBA tract.

Other common mammals include predators such as coyote, red fox, striped skunk, raccoon, and feral cat. Lagomorphs (jackrabbits and cottontails) are abundant and widespread throughout the PRB and, along with numerous rodents (mice, shrews, and voles) and sciurids (chipmunks, ground squirrels, and prairie dogs), are important prey items for raptors and other predators.

Sage grouse habitat occurs throughout the PRB and is typically characterized by an interspersed mixture of sagebrush and grassland. In winter, sage grouse are dependent on tall, dense stands of sagebrush that remain relatively exposed through deep snow. During spring, sage grouse gather on breeding grounds (leks), which are characterized by open areas (meadows in low sagebrush) surrounded by denser sagebrush cover. Year after year, grouse return to these leks, although the exact location of the lek may shift slightly. Sage grouse tend to nest within 2 mi of the lek, and this area is considered nesting habitat. Sage grouse have been documented to select sagebrush-grassland habitats with relatively tall sagebrush and canopy coverage ranging from approximately 10 to 40% in which to build nests. Figure 3.14 shows the location of known sage grouse leks in the analysis area. No leks have been reported on the LBA tract, and the entire tract was searched this year as part of North Rochelle's annual wildlife monitoring (Triton Coal Company 1996).

Several common species of waterfowl, shorebirds, and waders have been recorded in the analysis area. Most individuals observed were on or and around larger water bodies (Reno Reservoir, Rochelle Lake, Little Thunder Reservoir, etc.), although ephemeral streams and associated stock ponds also provide suitable habitat.

The WGFD, USFWS, and WDEQ have expressed concern for several avian species or subspecies that may occur in the PRB coal region. These species have been designated as Migratory Birds of High Federal Interest (MBHFI). Table 3.5 lists the MBHFI in the PRB and their expected occurrence on or near the LBA tract.

The most common MBHFI recorded in the analysis area are raptors (hawks, eagles, and falcons). Ferruginous hawks and golden eagles are known to nest in the PRB. Ferruginous hawks migrate out of the PRB in the winter, whereas golden eagles are year-round residents. Bald eagles are winter residents and have been observed flying over the LBA tract. No bald eagle roosts or feeding sites occur in the immediate vicinity of the LBA tract. Other raptors documented in the analysis area include prairie falcon, merlin, osprey, and peregrine falcon. The latter species are listed as uncommon to rare and were likely migrating through the area, as little suitable habitat exists for them and very few sightings have been recorded. Figure 3.15 presents known locations of all historical raptor nest sites within the vicinity of the LBA tract (however, many of these nests are no longer in existence).

Two ferruginous hawk nest sites and two golden eagle nest sites have been documented within the proposed LBA permit area, but all four of these nests are now destroyed and are no longer used (Triton Coal Company 1996). Numerous other historical raptor nest sites (the majority of which are either ferruginous hawk or golden eagle) occur in close proximity to the LBA tract (see Figure 3.15). Triton Coal Company's 1996

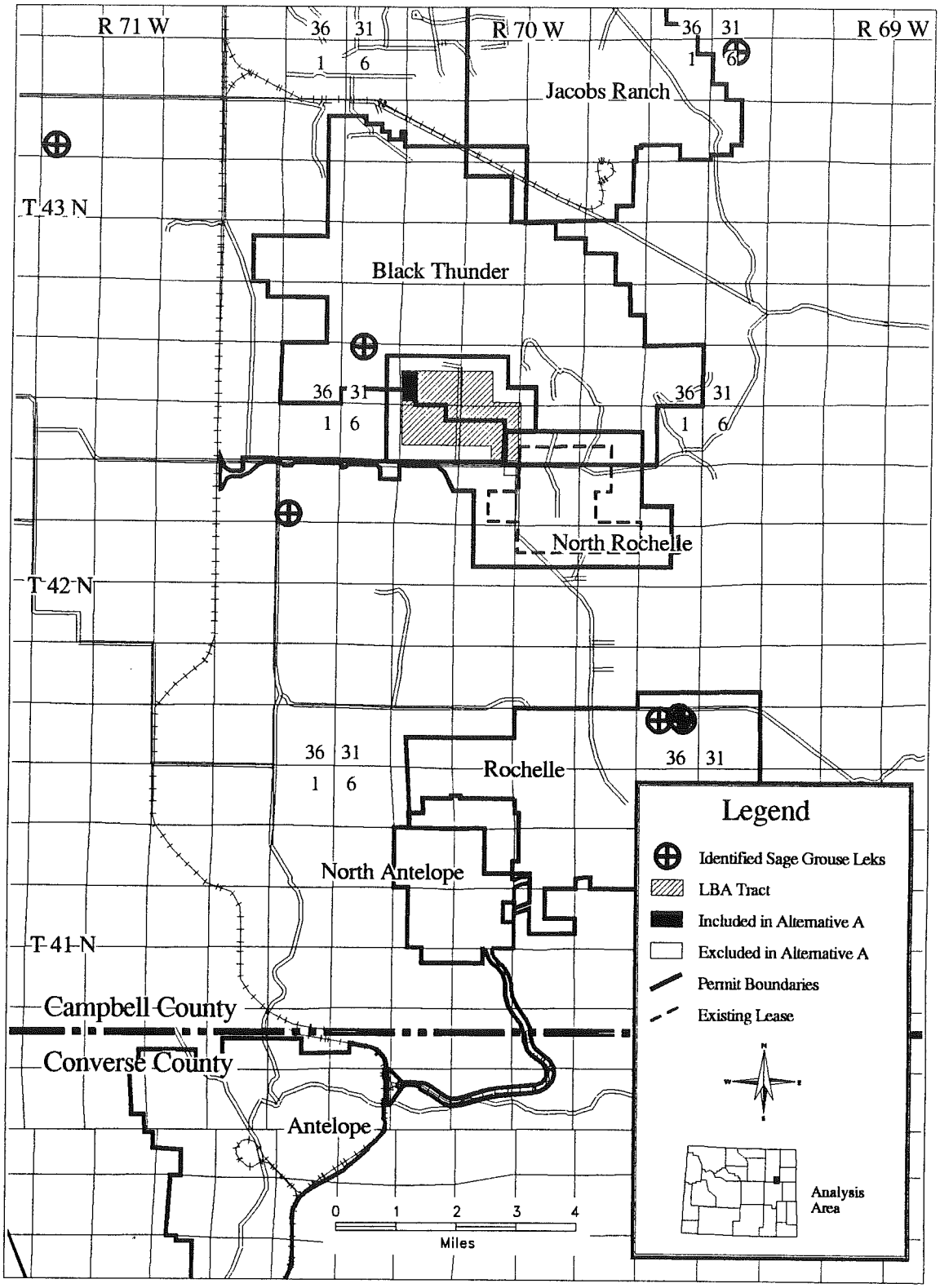


Figure 3.14 Known Sage Grouse Leks in the Analysis Area.

Table 3.5 MBHFI Status in Northeastern Wyoming and Expected Occurrence on the North Rochelle LBA Tract.

Species	Seasonal Status/Breeding Records in Northeastern Wyoming[1]	Potential Occurrence on LBA Tract	Record of Sighting Near LBA Tract
White pelican	Summer/nonbreeder	Rare/migrant	Yes
Double-crested cormorant	Summer/breeder	Rare/migrant	Yes
Canvasback	Summer/one record	Rare/migrant	No
Ferruginous hawk	Summer/breeder	Common	Yes
Golden eagle	Resident/breeder	Common	Yes
Bald eagle	Winter/nonbreeder	Common in winter	Yes
Osprey	Summer/has nested	Rare/migrant	Yes
Prairie falcon	Resident/breeder	Uncommon	Yes
American peregrine falcon	Migrant/historical	Rare	Yes
Richardson's merlin	Resident breeder	Rare	Yes
Whooping crane	Never recorded	Very rare/migrant	No
Sandhill crane	Migrant/nonbreeder	Uncommon/migrant	Yes
Mountain plover	Summer/breeder	Uncommon	Yes
Long-billed curlew	Summer/possible breeder	Rare/migrant	Yes
Burrowing owl	Summer/breeder	Uncommon	Yes
Lewis' woodpecker	Summer/breeder	Rare	No
Dickcissel	Summer/breeder	Rare	No

[1] Compiled from USFWS (1980) and Oakleaf et al. (1991) and includes Campbell County and adjacent counties.

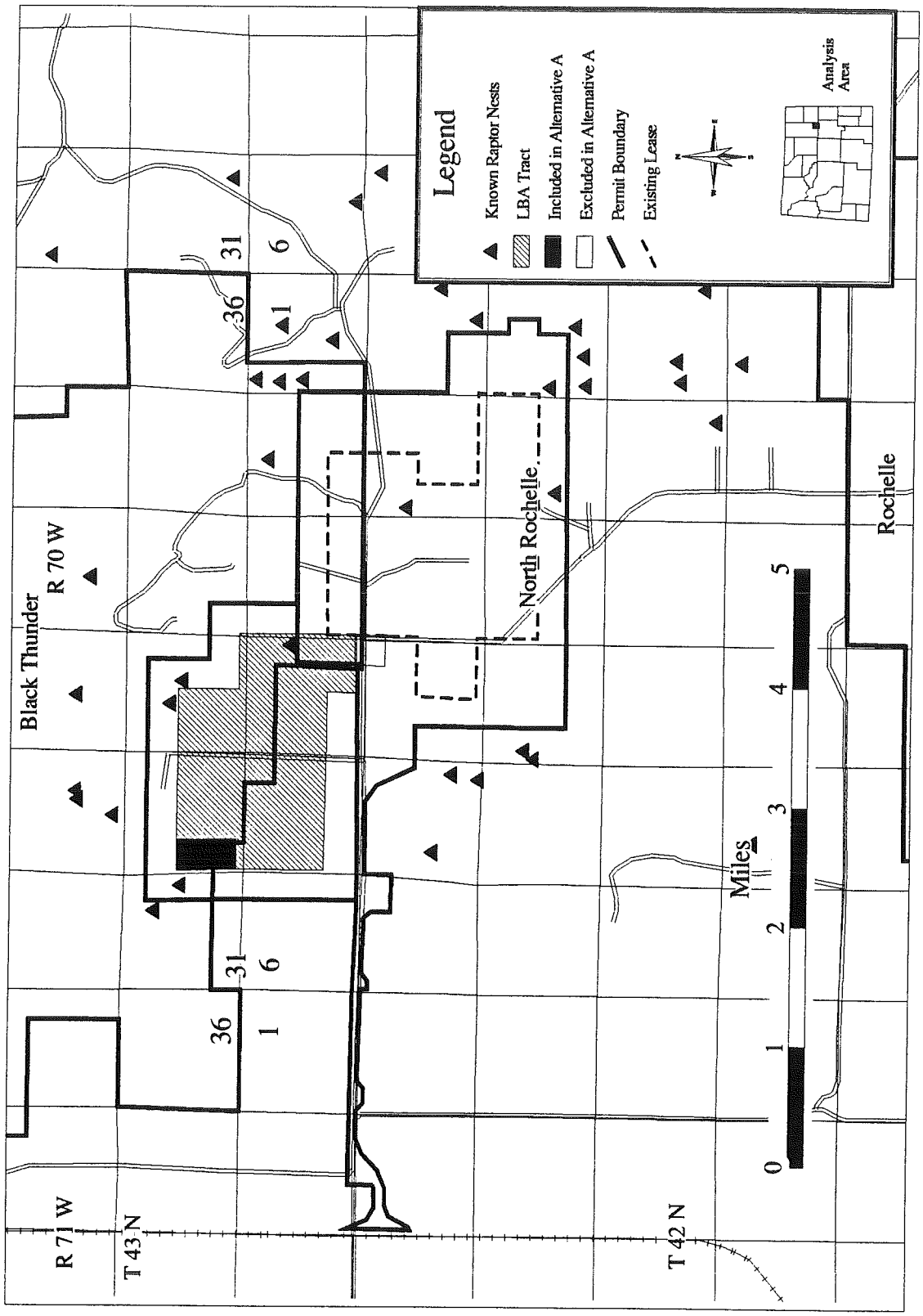


Figure 3.15 Known Historical Raptor Nest Sites on the LBA Tract.

wildlife monitoring report contains detail concerning each of these nests and is incorporated by reference into this EIS. Nesting habitat for burrowing owls (black-tailed prairie dog towns and badger burrows) is present in the PRB, and burrowing owls have been reported nesting several miles south of the LBA tract within the North Antelope Mine permit area (Oelklaus 1989) and on the eastern edge of the existing North Rochelle permit area (Triton Coal Company 1996). However, burrowing owls have not been reported nesting in the LBA tract. Mountain plover habitat does occur within the LBA tract, but no plovers have been documented during annual wildlife monitoring at the adjacent North Rochelle and Black Thunder Mines and associated 2-mi buffers, which includes the entire LBA tract. The USFS has identified certain sensitive species that they must consider in making land use decisions for lands they administer. Prior to mining, the LBA tract will have to be evaluated for habitat for these species, and the USFS will have to make a determination as to how mining could impact these species. A list of USFS Region 2 Sensitive Species that the LBA tract will have to be evaluated for prior to mining is included as Appendix F.

3.11 THREATENED, ENDANGERED, AND CANDIDATE SPECIES

The Endangered Species Act (16 U.S.C. 1531-1543) protects plant and animal species that are listed as T&E, as well as their critical habitats. Endangered species are defined as those that are in danger of extinction throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered in the foreseeable future throughout all or a significant portion of their range. An additional classification--"candidate species" (formerly Category 1 candidate species)--includes species for which the USFWS has sufficient data to list as T&E, but for which proposed rules have not yet been issued.

A list of T&E species potentially occurring in the lease area was obtained from the USFWS (Table 3.6). Observation records of T&E and candidate species in the project area were collected from WGFD (1994a, 1996), the WNDDB (The Nature Conservancy 1994, 1996), and mine permit applications and associated annual wildlife monitoring reports for the operating coal mines adjacent to the LBA tract. T&E surveys specific to this lease application have not yet been conducted.

T&E animal species potentially occurring on the LBA tract are the black-footed ferret (endangered), bald eagle (threatened), and peregrine falcon (endangered). One listed (threatened) plant, Ute lady's tresses may occur on the LBA tract. Two candidate animal species, mountain plover and swift fox, may occur on the LBA tract.

The black-footed ferret was once distributed throughout the high plains of the Rocky Mountain and western Great Plains. Prairie dogs are the main food source of black-footed ferrets, and few ferrets have historically been collected away from prairie dog colonies. No prairie dog colonies exist within the LBA tract, but several occur in the analysis area (Figure 3.16). Surveys of these colonies conducted for adjacent mine permit applications have revealed no evidence of black-footed ferrets.

Bald eagles are relatively common winter residents in the PRB. They require cliffs, large trees, or sheltered canyons associated with concentrated food sources (e.g., fish or waterfowl concentration areas) for nesting and/or roosting areas. Although bald eagles apparently do not nest within the LBA tract, it is likely that they use the area for foraging. They forage widely during the non-nesting season (i.e., fall and winter) and scavenge on animal carcasses such as deer and elk; however, no concentrated bald eagle food sources exist in the LBA tract. A communal winter bald eagle roost exists approximately 2.5 mi east of the LBA tract.

Table 3.6 Threatened, Endangered, and Candidate Animal and Plant Species and Their Potential Occurrence Within the North Rochelle Lease Area.

Common Name	Scientific Name	Status	Expected Occurrence
Mammals			
Black-footed ferret	*Mustela nigripes*	Endangered	Potential resident in prairie dog colonies
Swift fox	*Vulpes velox*	Candidate	Potential resident in grasslands of southern/eastern Wyoming
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Common winter resident
Peregrine falcon	*Falco peregrinus*	Endangered	Migrant
Mountain plover	*Charadrius montanus*	Candidate	Grasslands statewide, breeder
Plants			
Ute lady's tresses	*Spiranthes diluvialis*	Threatened	Potential occurrence along riparian edges, gravel bars, old oxbows, and moist to wet meadows

Peregrine falcons feed almost exclusively on birds, many of which are associated with riparian zones and large bodies of water (e.g., waterfowl). The PRB is occasionally used by peregrines for hunting, and several ponds and lakes in the PRB provide an abundant source of potential waterfowl and shorebird prey. Peregrines have been observed during annual wildlife monitoring surveys at the Antelope Mine approximately 10 mi south of the LBA tract, and it is likely that wintering or migrating peregrine falcons hunt over the LBA tract on occasion. Peregrine falcons nest on tall cliffs, usually within 1.0 mi of a stream or river. These habitats provide concentrated food sources and open areas to hunt. No known peregrine falcon nests have been recorded on or adjacent to the LBA tract, and neither peregrine nesting habitat nor concentrated food sources exist in the area.

Ute lady's tresses, a member of the orchid family, was first identified in Wyoming in 1993. This threatened plant has been identified in a few locations in Goshen and Converse Counties of eastern Wyoming, and its presence could be expected throughout appropriate habitats in southeastern Wyoming. The plant grows in moist soils along with grasses and sedges and may be found along streams, rivers, ponds, and reservoirs, as well as in bogs, wetlands, and riparian or seep areas. Ute lady's tresses were identified on a sandy bank of Antelope Creek near a cattail marsh approximately 10 mi southwest of the LBA tract in 1994. These particular plants were identified as being 2-8 inches tall and difficult to find beneath a moderately dense canopy of grass. They occurred on a 2-3 ft wide moist to wet meadow-like bank with sandy soils, on a 45° south-facing slope, which was located between

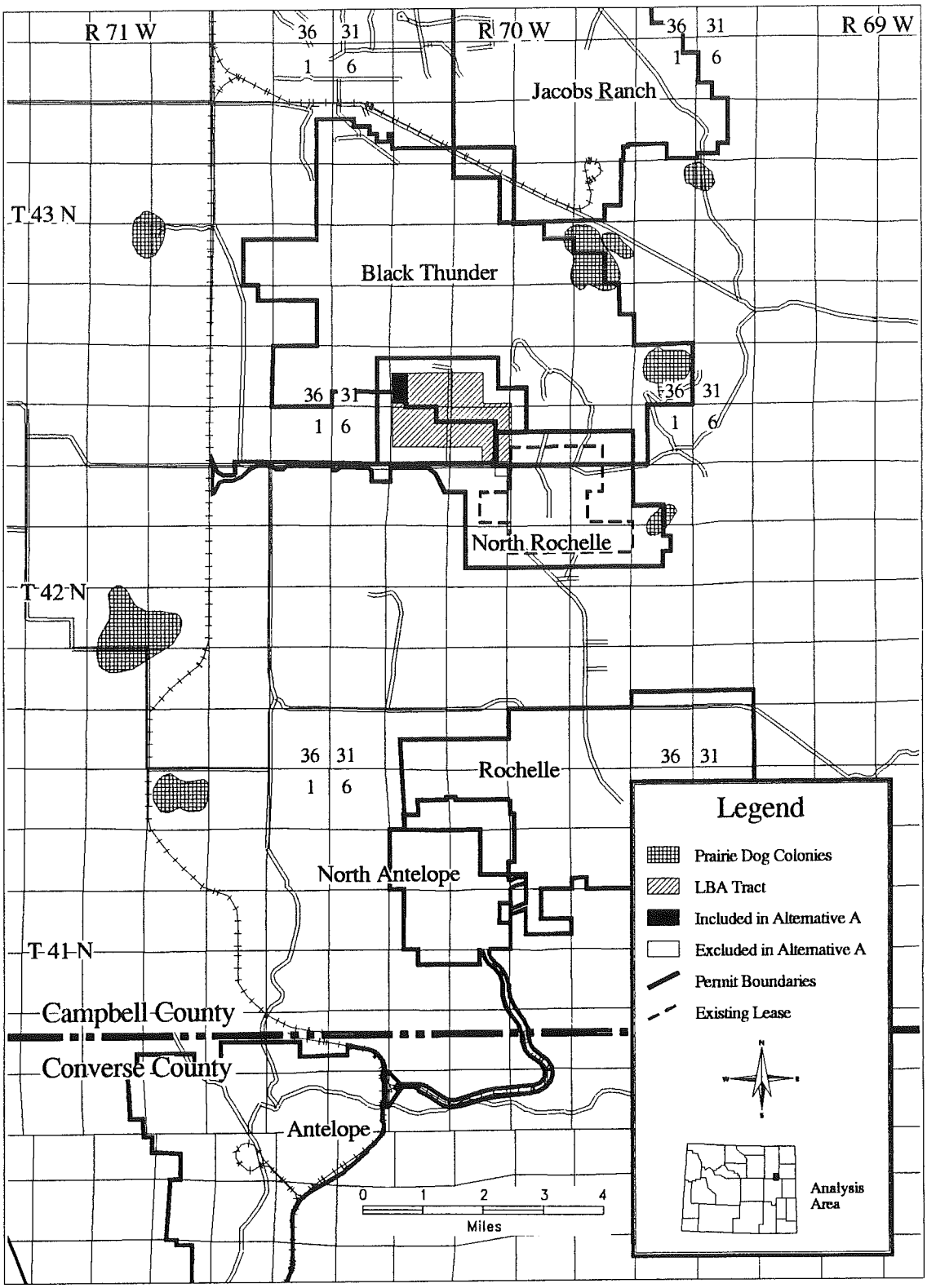


Figure 3.16 Known Prairie Dog Colonies Within the Analysis Area.

cattails and a sandy bench. Surveys of the adjacent North Rochelle Mine permit area conducted in June and August of 1995 (BKS Environmental Associates, Inc. 1995), using the USFWS interim guidelines for Ute lady's tresses surveys found no orchids, and the lack of suitable habitat was noted in the area. The LBA tract is located directly northwest of the areas surveyed in 1995, and suitable habitat for Ute lady's tresses is likely to be limited on the LBA tract. Site-specific surveys would be conducted on the LBA tract as part of the WDEQ permitting process if a lease is issued.

The mountain plover is a candidate species inhabiting the high, dry short-grass plains east of the Rocky Mountains. Breeding bird surveys have shown an overall decline in the continental population of mountain plovers. The main reason cited for this decline is degradation in the quality of wintering habitats in southern Texas and California. The loss of breeding habitat due to cultivation and land use changes, as well as prey base declines resulting from pesticide use, are also listed as threats to mountain plover survival. Cattle grazing that maintains the open short-grass habitat favored by mountain plovers may however benefit the species. Nesting mountain plovers have been documented on the Antelope Mine located approximately 10 mi south of the LBA tract. Studies conducted in this area theorized that suitable nesting habitat exists throughout the area. Parrish (1988) noted that mountain plover nests in the PRB were found in areas of short (<4 inches) vegetation on slopes of less than 3%, and any short-grass, very short shrub, or cushion plant communities could be considered potential nesting habitat. Black-tailed prairie dog colonies are reported to provide favored nesting habitat. Mountain plover habitat occurs on the LBA tract, but no plovers have been documented during annual wildlife monitoring on the adjacent North Rochelle and Black Thunder Mines and associated 2-mi buffers which includes the LBA tract. Site-specific surveys of the LBA tract will be conducted as part of the WDEQ mine permitting process if a lease is issued for this tract.

The swift fox, also a candidate species, is a resident of the northern Great Plains from the Rocky Mountain foothills to Texas. In Wyoming, this species inhabits the eastern Great Plains grasslands, occasionally utilizing agricultural lands and irrigated native meadows. Prey includes small mammals, insects, and birds. No recent sightings of swift fox have been reported on or near the LBA tract; however, much of the PRB, including the LBA tract, is potential swift fox habitat.

3.12 LANDOWNERSHIP AND USE

Surface landownership in the analysis area is both private and public (U.S. government) (Figure 3.17). The majority of the U.S. government lands are administered by the USFS as part of the Thunder Basin National Grasslands. Coal ownership on the LBA tract is entirely federal (Figure 3.18). This land and mineral ownership pattern influences land use. These lands have traditionally supported (and continue to support) numerous wildlife species. Livestock grazing became a dominant land use in the early 1900s, and approximately half of the native rangeland in the PRB has been converted to pasture and cultivated crop land. The PRB has been referred to as "The Energy Capital of the United States," with Campbell County producing about 25% of all U.S. coal and 88% of the coal mined in Wyoming (Campbell County Economic Development Corporation 1993; BLM 1996g). Campbell County is also the largest oil producer in Wyoming, and if recent plans for coal bed methane development materialize, the county may soon produce substantial quantities of methane gas.

Private surface lands within the LBA tract are owned by Atlantic Richfield Company (ARCO) and Powder River Coal Company (Figure 3.19). The public surface lands are part of the Thunder Basin National Grasslands, administered by the USFS. The coal ownership of all the lands in the LBA tract (both private and federal surfaces) is federal and administered by the BLM (see Figure 3.18).

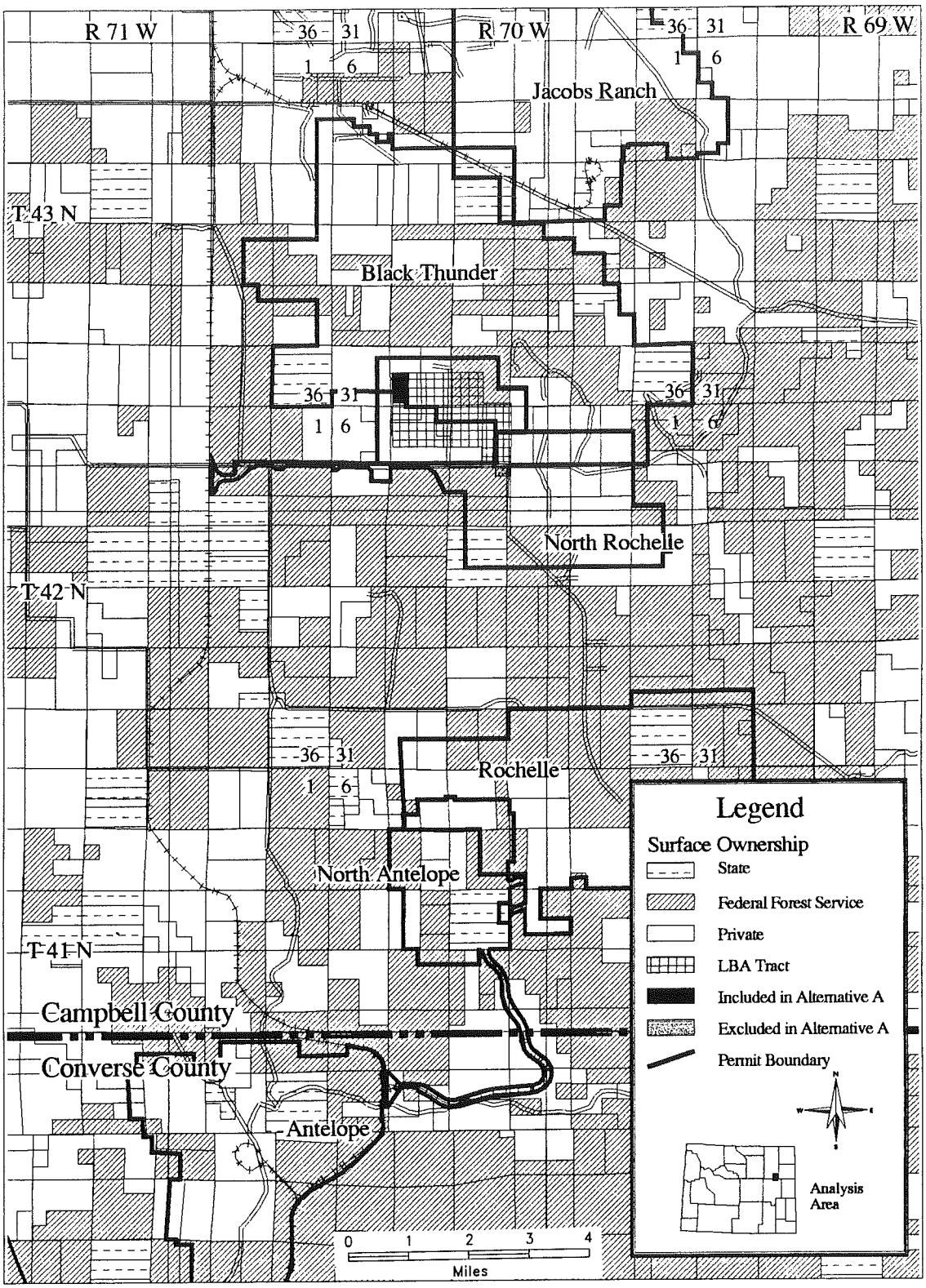


Figure 3.17 Surface Ownership in the Analysis Area.

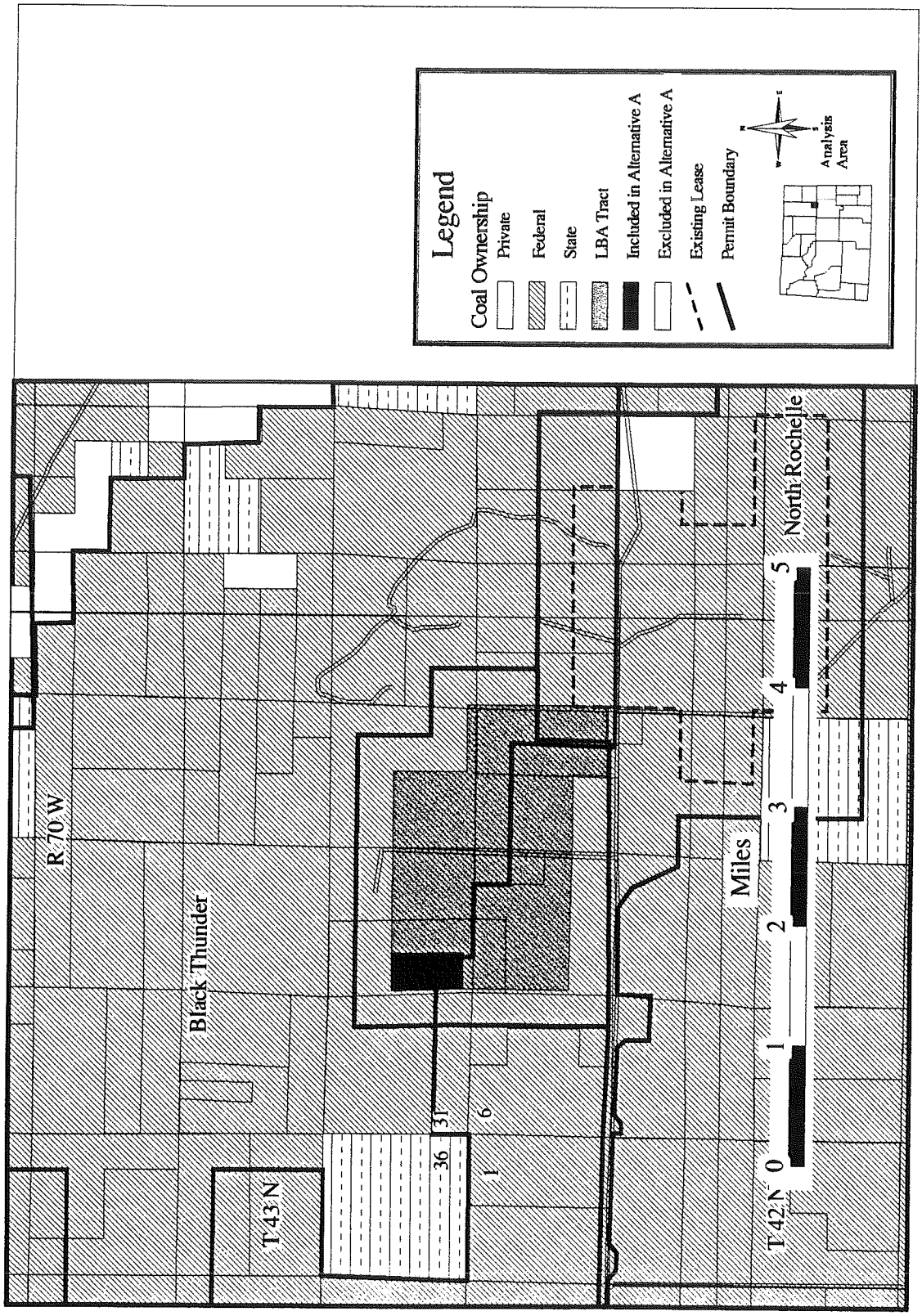


Figure 3.18 Coal Ownership in the LBA Tract Area.

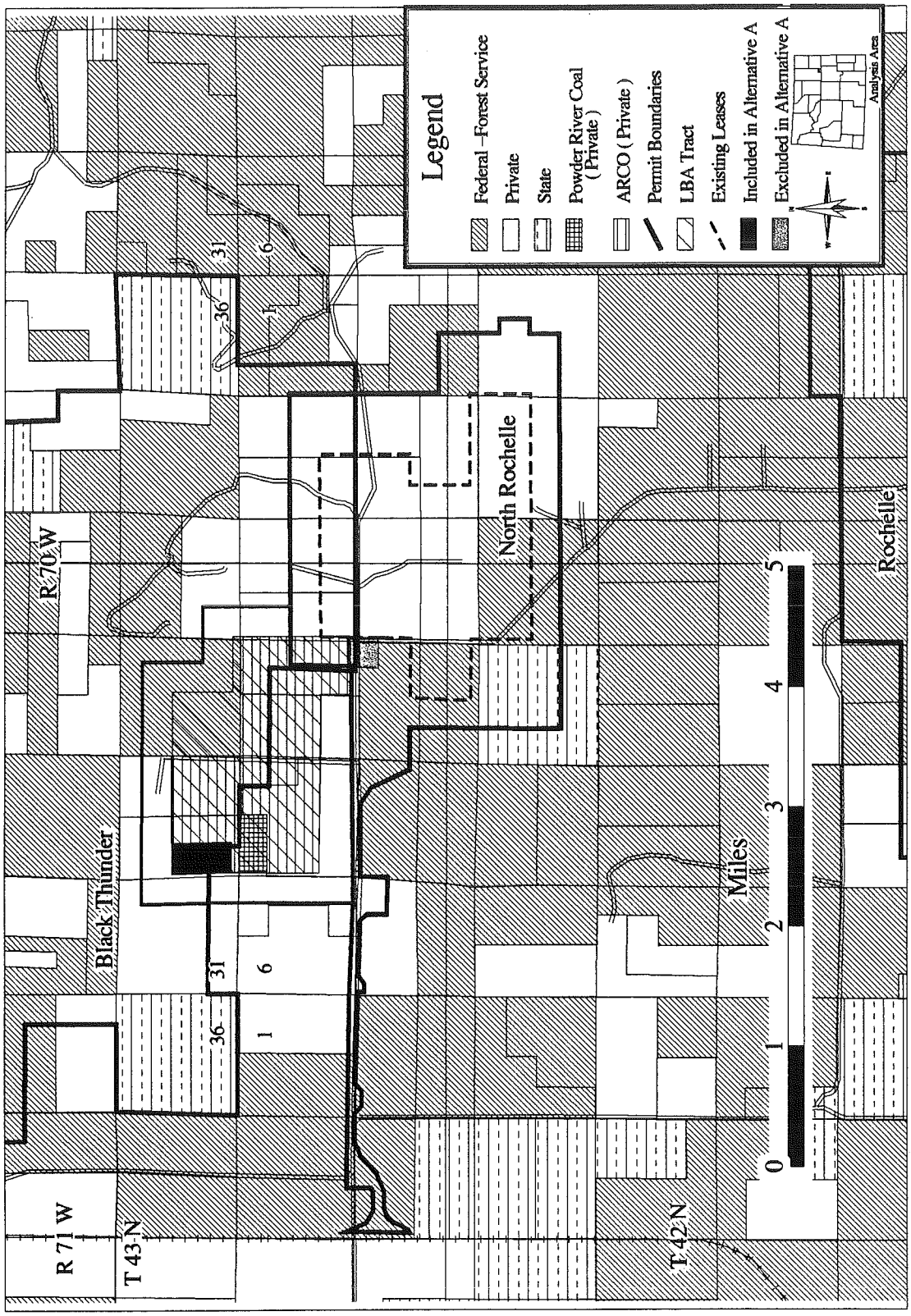


Figure 3.19 Surface Ownership in the LBA Tract Area.

The lands involved in this lease application are native rangelands currently used for wildlife habitat and livestock grazing. The typical rangeland production supports approximately 0.25 animal unit months (AUMs) per acre. Several small stock ponds have been excavated along Trussler Creek to provide water for livestock. Tom and Guy Edwards graze cattle and sheep on the LBA tract. Numerous wildlife species common to the PRB occur on the LBA tract.

Coal mining is a dominant land use in the area surrounding the LBA tract. The existing North Rochelle Mine is located in the middle of a group of six operating surface coal mines located in southern Campbell and northern Converse Counties (see Figure 3.1). Coal production at these six mines increased by 70% between 1990 and 1995 (from about 70 million tons in 1990 to almost 120 million tons in 1995). Over that same time period, four maintenance coal leases have been issued within this group, and applications have been submitted and are being processed for three more maintenance tracts in this same group of mines. (The North Rochelle coal lease application is one of these three pending applications.) BLM has received an application for a coal lease for a potential new mine (New Keeline Mine) located north of the Jacobs Ranch Mine. The PRRCT has not reviewed this lease application, and the BLM has not begun processing it (see Figure 1.2 on page 1-3). BLM has also just received an application for a second maintenance tract for the Antelope Mine. This lease application also has not been reviewed by the PRRCT, and the BLM has not begun processing it.

The potential exists for development of oil and gas resources in the area, including coal bed methane, but there are currently no oil or gas wells on the LBA tract, and none are planned.

There are no dwellings or other buildings on the LBA tract, and none of the land is cultivated. No ROW corridors for pipelines, electric power lines, or telephone cable cross the LBA tract. Reno Road traverses the southern boundary of the LBA tract; however, there are approved plans to relocate this road to allow for current mining operations.

Campbell County has no county-wide land use plan, and the LBA tract has no designated zoning classification. The *City of Gillette/Campbell County Comprehensive Planning Program* (City of Gillette 1978) provides general land use goals and policies for state and federal coal leases in the county. The long-term land use objectives established for the Thunder Basin National Grasslands include livestock grazing and wildlife habitat.

Recreation

Big game hunting is the principle recreational use in the analysis area. Landownership within the PRB is largely private (approximately 80%), with some private landowners permitting sportsmen to cross and/or hunt on their land. Others charge an access fee, and some do not allow any access. There has been a trend over the past two decades towards a substantial reduction in lands open and reasonably available for hunting. Access fees continue to rise and many resident hunters feel these access fees are unreasonable. This trend has created management problems for the WGFD in their attempt to distribute and control harvest at optimal levels, as well as to sportsmen who desire access to these animals (WGFD 1996). Due to safety concerns, public lands contained within an active mining area are often closed to the public, further limiting recreational use. In the PRB, the publicly owned Thunder Basin National Grasslands, BLM lands, and state school sections (normally Sections 16 and 36) are generally open to hunting if legal access is available.

Approximately 10% of the surface of the LBA tract is public land (Thunder Basin National Grassland), and 40 acres are publicly accessible. The remaining lands are private, and recreational use is allowed only with landowner permission.

This situation, along with a restriction of hunting activities on adjacent operating mines, currently results in minimal sport hunting on the LBA tract. Pronghorn antelope, mule deer, and white-tailed deer do, however, occur on and adjacent to the LBA tract. Sage grouse, mourning dove, waterfowl, cottontail rabbit, and coyote may also be harvested in the vicinity, and some trapping of red fox may occur.

Specific details regarding big game herd management objectives in the project area are contained in the *District 3 Annual Big Game Herd Unit Reports* (WGFD 1995). The LBA tract is within pronghorn antelope Hunt Area 27, part of the Lance Creek Herd Unit which also includes Hunt Areas 6, 8, 9, and 29. The severe winter of 1992-93 resulted in an estimated 39% mortality in this herd, and WGFD thus reduced the number of licenses in 1993 from 3,000 to 2,000. They have issued 2,750 licenses annually in the past 2 years and anticipate the pronghorn population will continue to grow to the post-hunt population objective of 27,000 (assuming normal reproduction and good weather conditions). The actual number of antelope in the herd unit has been approximately 22,500 over the past few years. Hunters annually harvest about 2,400 animals with better than 90% success and spend about 2.1 hunting days per animal harvested. The entire LBA tract is classified as winter/yearlong habitat for antelope (habitat used by a portion of the animals yearlong and into which a significant influx of animals occurs during the winter) (Figure 3.20). The Lance Creek Herd Unit does not contain any designated crucial habitat. Antelope are widely scattered throughout the herd unit, and no important microhabitats (dense stands of sagebrush, winter relief cover, etc.) are present on the LBA tract.

The LBA tract is in mule deer Hunt Area 10, part of the Thunder Basin Herd Unit, which also includes Hunt Areas 7, 8, 9, 11, and 21. This herd was above the 13,000 post-season deer population objective prior to the winter of 1992-93, which reduced the population to near objective. The current population is estimated at about 14,000. The WGFD has managed this herd for an annual harvest of approximately 1,800 deer, with hunter success running at about 71% and 3.9 days spent per deer harvested. The hunting season is designed to allow the population to grow; however, much of the preferred habitat in this herd unit occurs in drainage bottoms on private land, where grazing-related conflicts occur with landowners. The population objective may be increased in the future if landowner and public sentiment allow. The LBA tract is not within any designated mule deer habitat (Figure 3.21), and no important microhabitats (escape and winter relief cover) occur on the LBA tract.

Although white-tailed deer and elk have been seen occasionally in the area, they are not common. The Rochelle Hills Elk Herd is located a few miles to the east. Elk Hunt Area 113 extends into the LBA tract; however, very limited use of these lands by elk occurs. Elk favor the ponderosa pine/juniper woodlands, savanna, and steeper terrain habitat in the Rochelle Hills. This small herd (about 200 elk) is hunted every 2 to 3 years. Owing to their habituation to humans, these elk provide a significant amount of nonconsumptive recreational use. Landowners appear tolerant of the elk, and the WGFD will likely increase the population objective in the future. These elk are dispersing from the designated herd unit boundary, possibly due to density-dependent population factors related to limited habitat.

White-tailed deer are managed as part of the Thunder Basin Herd Unit, an area which extends from the Montana border through Gillette, Moorcroft, Newcastle, and south to Lusk and Douglas. White-tailed deer are not managed separately in this herd unit, but generally are included in the management of the corresponding mule deer herd units. White-tailed deer habitat use is concentrated in riparian areas, which are predominantly privately owned. Doe/fawn licenses are therefore allocated to reduce grazing conflicts on private land in specific areas.

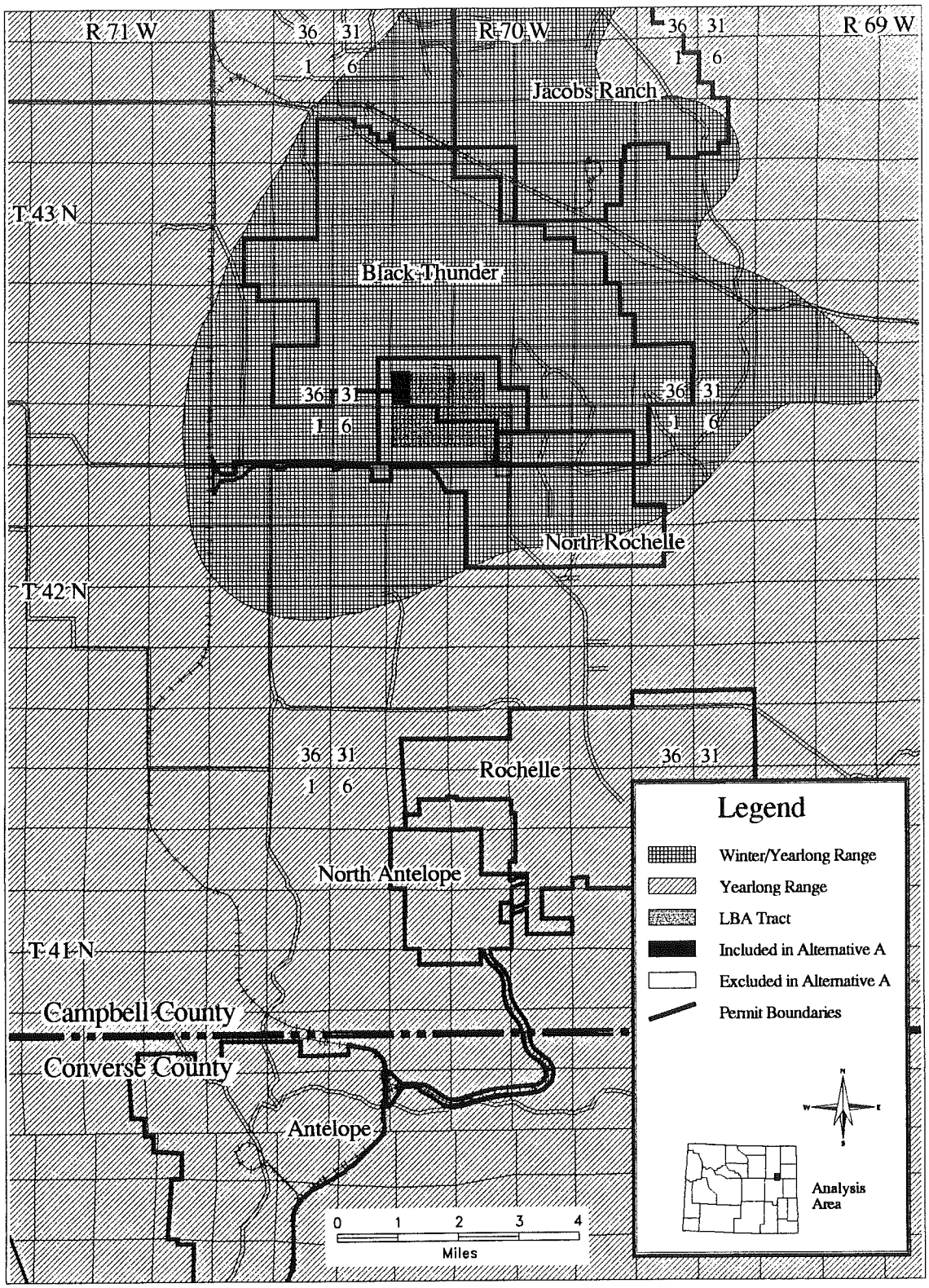


Figure 3.20 Pronghorn Seasonal Use Areas.

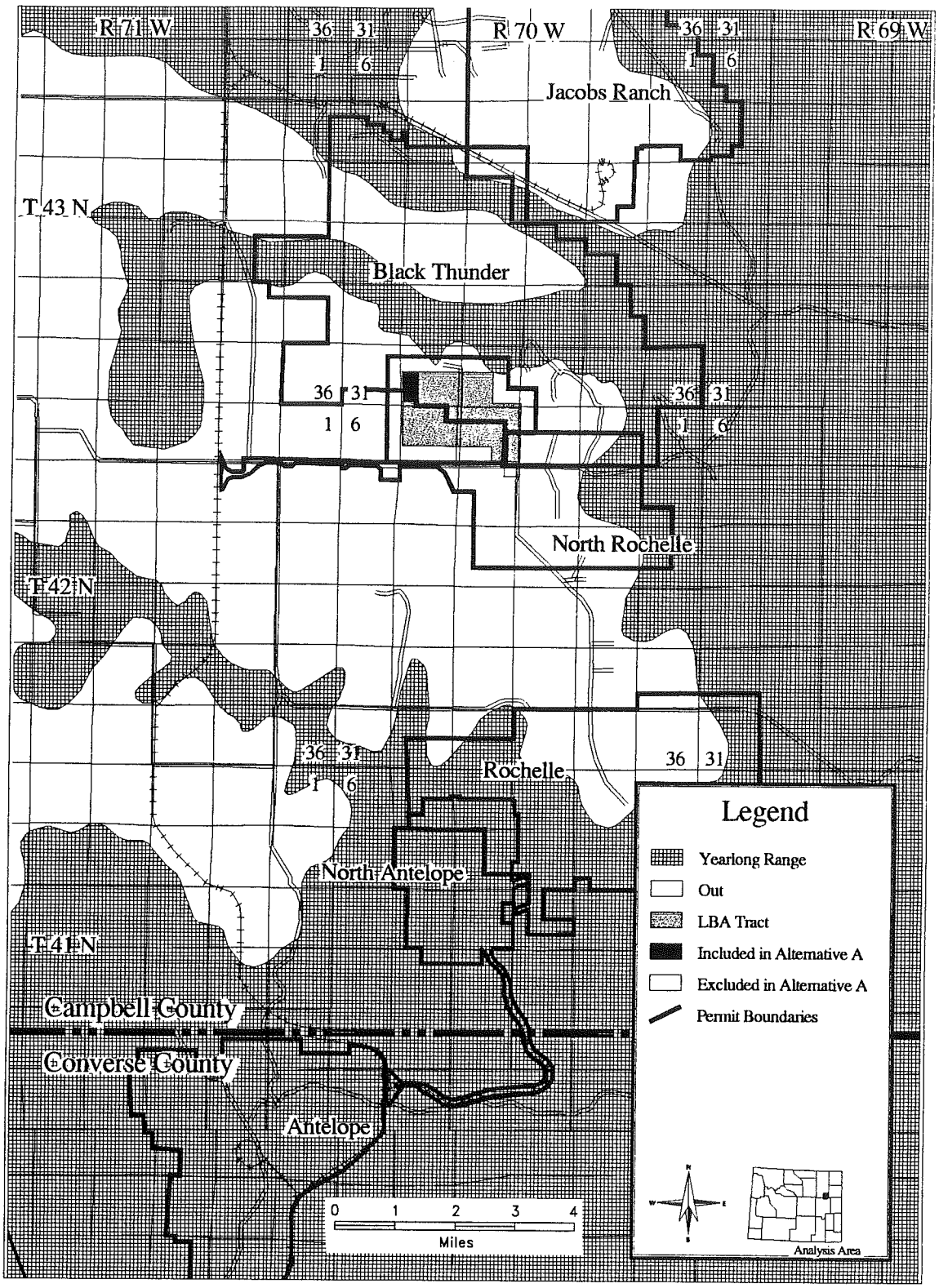


Figure 3.21 Mule Deer Seasonal Use Areas.

Public fishing opportunities are extremely limited in the PRB. Two fisheries exist in the general analysis area: Little Thunder Creek and Reno Reservoir. Little Thunder Creek supports channel catfish and a variety of nongame fish. Reno Reservoir provides public fishing and supports largemouth bass and bluegill. No fisheries exist on the LBA tract.

3.13 CULTURAL RESOURCES

Cultural resources, which are protected under the National Historic Preservation Act of 1966, are the nonrenewable remains of past human activity. The PRB appears to have been inhabited by aboriginal hunting and gathering people for more than 11,000 years. Throughout the prehistoric past, the area was used by highly mobile hunters and gatherers who exploited a wide variety of resources.

The general chronology for aboriginal occupation (dated as years before present [B.P.]) is:

- the Paleoindian period (11,000-7,500 years B.P.),
- the Archaic period (7,500-1,800 years B.P.),
- the Prehistoric period (1,800-400 years B.P.),
- the Protohistoric period (400-200 years B.P.), and
- the Historic period (200-120 years B.P.).

The Paleoindian period includes a series of cultural complexes identified by distinctive large projectile points (spear points) often associated with the remains of large, now-extinct mammals (mammoth, bison, camel, etc.). The Archaic period is characterized by a range of smaller side-notched, stemmed, or corner-notched projectile points and by more generalized subsistence pursuits including the gathering of plant resources. This lifeway continued to the Late Prehistoric period, which is marked by a technological change from dart projectiles to the bow and arrow and by the appearance of ceramics. During the Archaic and Late Prehistoric periods, the PRB was occupied by small bands of hunters and gatherers whose movements were determined to a large degree by seasonal and environmental changes which influenced the occurrence of subsistence resources (BLM 1979).

Protohistoric and early Historic sites are found in the PRB, including rare historic trade goods, sites and routes associated with early trappers and military expeditions, and early ranching attempts which date to the 1880s. A few small coal mining sites also exist.

Historic sites within the analysis area have been recorded as debris scatters representing sheepherder camps and related activities. No historic trails are known or have been recorded on the LBA tract; however, the Bozeman Trail crosses the southwestern portion of the PRB. Previous inventories indicate an estimated density of three sites per section (square mile) may occur throughout the LBA tract; this low density probably reflects the surface visibility of sites. However, isolated exposed bison bones have been found 10-15 ft below the surface in nearby arroyos. Thus, much of the evidence for prehistoric occupation is not apparent on the surface and can be identified only when vegetative cover and topsoil are removed.

Seventy-six percent of the proposed LBA tract has been inventoried at the Class III level. Approximately 340 acres in the LBA tract and 480 acres in the proposed permit boundary would need to be surveyed at the Class III level prior to surface disturbance.

Based on the file search (No. 20137) conducted on October 18, 1996, by the Cultural Records Office, Wyoming State Historic Preservation Office, five sites have been recorded to date on inventoried lands within and immediately adjacent to the LBA tract (Table 3.7). Two are prehistoric and include a lithic scatter and an open camp. Dateable cultural components are rare, but artifacts attributable to the Paleoindian and Late Archaic Besant culture have been reported. One site has produced obsidian, a material useful for its

Table 3.7 Cultural Sites Recorded Within the Proposed LBA Tract.

Site No.	Site Type	Inventory History	Recommendation
48CA640	Open camp	Hauff et al. 1981	Not eligible
48CA648	Historic debris	Hauff et al. 1981	Not eligible
48CA1771	Lithic scatter	Chapman and Miller 1982	Not eligible
48CA1772	Historic debris	Chapman and Miller 1982	Not eligible
48CA1773	Lithic scatter/homestead	Chapman and Miller 1982	Not eligible

distinctive sources and implications for trading networks. Historic sites include two trash scatters. One site is multicomponent, with both prehistoric and historic associations.

None of the above sites are currently considered as eligible for listing on the National Register of Historic Places (NRHP). However, formal Wyoming State Historic Preservation Office (SHPO) consultation has not occurred for any of the sites.

It is important to recognize that surface reconnaissance provides a limited evaluation of the depositional situation; it is possible that subsurface discoveries may be made when the soils cover has been removed.

3.14 NATIVE AMERICAN CONSULTATION AND TRUST RESOURCE ISSUES

The Crow, Shoshoni, Comanche, Arapaho, Cheyenne, and Sioux were the primary Native American groups which utilized the PRB (BLM 1979). Native American tribes have been consulted at a general level for the 1995-96 draft Buffalo Resource Area RMP. Native American consultation for this specific proposal was conducted during the review of the DEIS and FEIS. Tribes were sent certified letters requesting their comments concerning any religious or cultural areas within or near the LBA tract. To date, no sites or areas of traditional cultural interest have been identified on the LBA tract or within the proposed permit boundary. Tribes will again be sent certified letters requesting their comments on the FEIS when it is issued.

3.15 PALEONTOLOGICAL RESOURCES

A limited number of paleontological surveys has been conducted in the PRB, with most attention given to fossil vertebrates. Although vertebrate, invertebrate, and paleobotanical fossils have been encountered throughout the PRB, no significant localities are known. The identified fossils are common and have limited scientific value or significance. Plant and vertebrate fossils are abundant throughout the Wasatch and Fort Union Formations and are likely to occur on the LBA tract; however, there are no known surveys from the LBA tract.

3.16 VISUAL RESOURCES

Visual sensitivity levels are determined by people's concern for what they see and the frequency of travel through an area. Landscapes within the LBA tract include rolling sagebrush and short-grass prairie, which are common throughout the PRB. Existing surface mines form a somewhat continuous band on the east side of Highway 59 extending from north of Gillette to northern Converse County (about 75 mi, see Figure 1.2). Other man-made intrusions include ranching activities (fences, homesteads, livestock), oil and gas development (pumpjacks, pipeline ROWs), and electric power transmission lines. The scenic quality in the immediate lease area is fairly low because of the industrial nature of the adjacent existing mining operations.

The USFS has established visual quality objectives for the Thunder Basin National Grasslands (160 acres of which occur in the LBA tract). The management objective for these lands allow activities to visually dominate the landscape; however, alternations must be blended into the surrounding area so the original character (form, line, color, and texture) is retained. All mining activities on USFS lands must apply the standards and guidelines of the National Forest Visual Management System (USFS 1985).

3.17 NOISE

Existing noise sources in the area include adjacent coal mining activities, traffic on State Highway 59 and Reno Road, rail traffic, and wind. Studies of background noise levels at adjacent mines indicate that ambient sound levels generally are low, owing to the isolated nature of the area. Current noise levels in the LBA tract are estimated to be 40-60 A-weighted decibels (dBA), with the noise level increasing with increasing proximity to active mining at the Black Thunder or North Rochelle Mines. Mining activities are characterized by noise levels of 85-95 dBA at 50 ft from actual mining operations and activities (BLM 1992b). Table 3.8 presents noise levels associated with some commonly heard sounds.

3.18 TRANSPORTATION FACILITIES

Access to LBA tract is on Reno County Road via State Highway 59 and School Creek Road via Highway 450 (Figure 3.22). Reno County Road parallels the southern side of the LBA tract. A maintained dirt road runs north from Reno County Road through the LBA tract (Figure 3.23), and several two-tracks also occur in the LBA tract. The Highlight Road runs north/south about 7 mi to the west of the LBA tract, paralleling the Gillette-Douglas rail spur used jointly by the Burlington Northern, Santa Fe, and Union Pacific Railroads. This rail line serves all the existing coal mines in the southern PRB.

Much of the transportation system and facilities that would service the permitted North Rochelle Mine are not yet in place. These facilities would consist of a series of roads, a rail network, and internal transportation routes to facilitate mining operations (Figure 3.23). Reno road will be diverted south around the North Rochelle Mine in the near future (see Figure 3.23).

3.19 SOCIOECONOMICS

The social and economic study area for the proposed project involves primarily Campbell County and the cities of Gillette and Wright; however, it also includes the city of Douglas in Converse County. For example, employees of the North Antelope and Rochelle Mines, located just south of the North Rochelle Mine, reside in Gillette (33%), Wright (8%), Douglas (46%), and Glenrock (13%) (BLM 1992c). The communities of Gillette and Douglas would most likely attract any new residents due to their current population levels and the availability of services and shopping amenities.

A comprehensive socioeconomic profile of the BLM Buffalo Resource Area (which includes all of

Table 3.8 Comparison of Measured Noise Levels with Commonly Heard Sounds.[1]

Source	dBA	Description
Normal breathing	10	Barely audible
Rustling leaves	20	
Soft whisper (at 16 ft)	30	Very quiet
Library	40	
Quiet office	50	Quiet
Normal conversation (at 3 ft)	60	
Busy traffic	70	Noisy
Noisy office with machines, factory	80	
Heavy truck (at 49 ft)	90	Constant exposure endangers hearing

[1] Tipler (1991).

Campbell County) was prepared for the BLM under contract with the Department of Agricultural Economics, College of Agriculture, through the University of Wyoming's Cooperative Extension Service (University of Wyoming 1994). Much of the following discussion is derived from this report. Additional data sources include the Wyoming Department of Commerce, Wyoming Division of Economic Analysis, Wyoming Department of Employment, Wyoming Economic Development Office, and personal communications with local community development staff.

3.19.1 Population

According to 1990 census data, Campbell County had a population of 29,370, with Gillette accounting for 17,635 of the county's residents and Wright with 1,200. Converse County's population in 1990 was listed as 11,128, with 5,076 of the county's residents residing in Douglas.

3.19.2 Local Economy

Campbell County is the fastest growing coal-producing area in the U.S. and supplies about 25% of the national coal demand (BLM 1996g). The coal industry is the driving force behind the economic activity and employment in Campbell County. Currently, 16 coal mines are in operation in the county, with one more located just south of Campbell County in Converse County. Much of the remainder of the county's economy is based on oil and gas exploration and production, power generation, and agriculture.

Coal production in the area has shown a strong upward growth trend over the past several years. In 1990, nearly 153 million tons of coal were produced, generating nearly $1.4 billion of economic activity, including nearly $182 million of personal income and 8,238 full-time jobs, 2,600 of which were directly associated with mines. The indirect and induced effects of sales from the coal

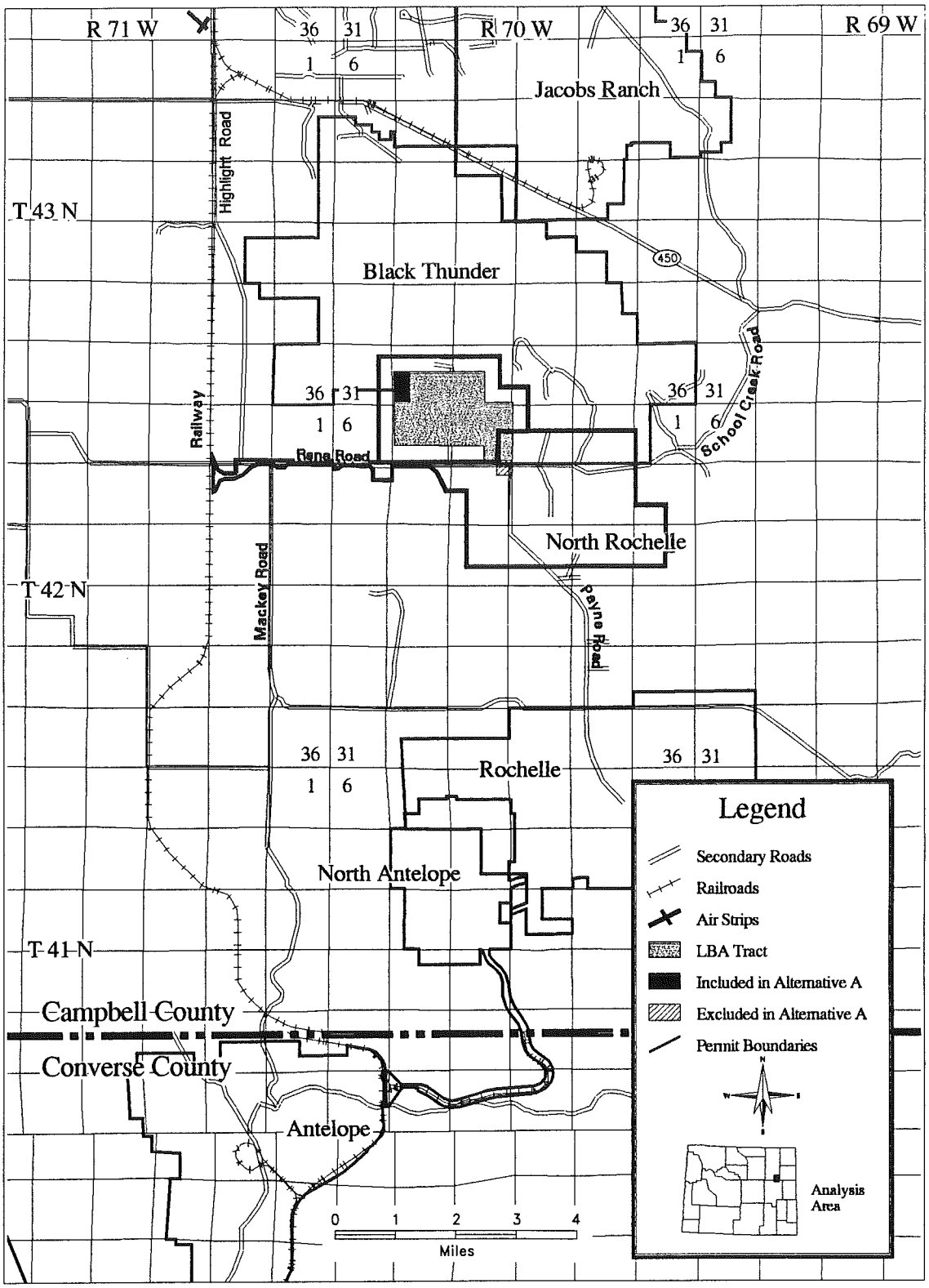


Figure 3.22 Transportation Facilities in the Analysis Area.

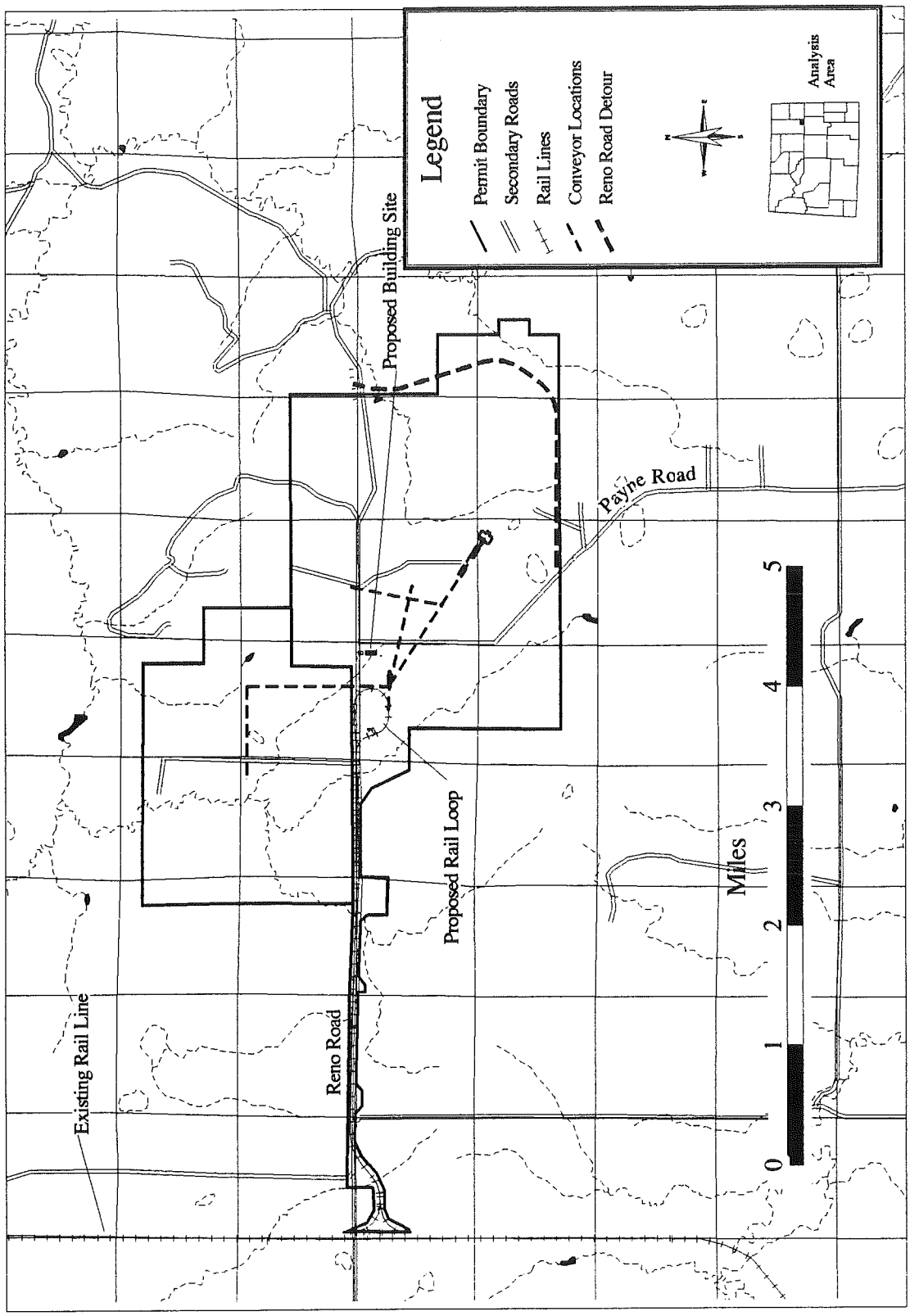


Figure 3.23 Planned Transportation System and Facilities at North Rochelle Mine.

industry are projected to contribute nearly 33% of the total economic activity for each dollar expended in the county. In 1994, 28% of the total employment and 47% of the total payroll in Campbell County was directly attributable to mining, and the average weekly mining wage ($889) was 67% greater than the overall average weekly wage for jobs in the county ($531).

Tax revenues from coal production in the area are presented in Table 3.9. Sales and use taxes are distributed to cities and towns within each county and to the county's general fund. Severance taxes are collected by the state for the removal or extraction of resources such as oil, natural gas, coal, and trona. The State of Wyoming retains approximately 83% of the severance tax, and the remainder is returned to the cities, towns, and counties. Ad valorem taxes, which include property taxes, are collected by the county and disbursed to schools, cities, towns, the state foundation, and various other subdivisions within the county. Mineral royalties are collected on the amount of production and the value of that production. The current royalty rate for federal coal leases is 12.5%, with half of this revenue returned to the state. Additional sources of revenue include lease bonus bids (also split with state) and annual rentals that are paid to the federal government. The total fiscal benefit to the State of Wyoming from coal mining in the PRB has been estimated at $1.10/ton of coal mined (University of Wyoming 1994).

3.19.3 Employment

Employment in the PRB coal mines has varied from 2,248 in 1980, to 3,174 in 1985, to 2,862 in 1990, and to 3,174 in 1995 (personal communication, January 22, 1997, with Marian Loomis, Wyoming Mining Association, Cheyenne). The present workforce at North Rochelle Mine is minimal; however, they have plans to hire 139 permanent employees, regardless of the decision made on this lease application.

3.19.4 Housing

According to the 1990 census, Campbell County contained 11,538 housing units, 7,078 of which were in Gillette. In 1993, the average cost of a new single family home was $135,808; the average cost of an existing family home was $73,753. Vacant housing in Gillette is estimated at about 549 units. Douglas contained 2,267 housing units in 1992, with an estimated 59 vacant units, including 24 single-family homes, 30 mobile homes, and five multi-family units. Housing is very limited in Wright, where an estimated 250 units existed as of June 1994, and 19 homes were for sale. All three communities currently report extremely tight housing markets with rental apartments also difficult to acquire.

3.19.5 Local Government Facilities and Services

The estimated population of Gillette (21,023) has maintained steady growth since 1987, when it totaled 17,054. Owing to the substantial revenues generated by coal production, local government facilities and services have kept pace with this growth and are adequate for the current population. The primary exception is a lack of space in the Gillette High School; however, approval of a recent bond issue will facilitate construction of a new school.

The current population of Douglas (5,275) is lower than its peak of 7,800 in 1982, and local government facilities and services are generally adequate for the current population. Primary exceptions include a shortage of physicians, although several physicians have recently moved to the area. The town also has limited building space (platted lots) available for future growth. Another concern is a lack of additional capacity in the middle and high schools. Some indoor recreational facilities may also be near or at capacity.

Table 3.9 Fiscal Revenues from Coal Production in Campbell County.

Year	Sales and Use Collections	Severance Tax Collections	Ad Valorem Tax Collections	Royalty Collections[1]	Total Collections
1990	$6.1 million	$61.2 million	$38.3 million	$107.1 million	$212.7 million
1995	$8.8 million	$87.6 million	$54.8 million	$153.3 million	$304.5 million

[1] Includes estimated royalties on nonfederal production.

Wright was established in 1976 by ARCO and is the nearest community to the southern group of mines. Wright's population peaked in 1985 at about 1,800 and decreased to 1,175 by 1994. Over the past few years, many of the coal mines have transitioned from working 10-hour shifts to 12-hour shifts. Many miners have thus relocated to Wright to cut down on commuting time, and the population has recently increased to about 1,400. Several coal service companies are also cutting back on travel allotments, which is further adding to Wright's current population growth. Wright's infrastructure is more than adequate for the current and planned population, and with the current building going on, they can double in population before services become limiting.

3.19.6 Social Conditions

Despite past boom and bust cycles in the area's economy, a relatively stable social setting now exists in these communities. Most residents have lived in the area for a number of years, social ties are well-established, and residents take great pride in their communities. Many of the people place a high priority on maintaining informal lifestyles and small town traditions, and there are some concerns that the area could be adversely affected by more than a modest growth in population. At the same time, there is substantial interest in enhancing the economic opportunities available in the area and a desire to accommodate reasonable levels of growth and development.

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter discloses the potential environmental consequences that may result from implementing the Proposed Action, Alternative A, and the No Action Alternative. Both action alternatives would require an area of about 2,600 acres to be permitted; this acreage would include the leased coal lands (1,440 acres for Proposed Action or 1,482 acres for Alternative A), which would be mined, and an adjacent strip of land that would be used for soil stockpiles, roads, sediment ponds, etc. (see Figure 2.4), but would not be mined. Thus, the environmental consequences of implementing either the Proposed Action or Alternative A are generally the same.

Surface mining and reclamation have been ongoing in the PRB for dozens of years. Certain measures that SMCRA and/or Wyoming statutes require that would reduce impacts are included as part of the Proposed Action, as discussed in Chapter 2. Some of these measures are also described in this section. The BLM and USFS also attach special coal stipulations to all leases (Appendix D). In addition, WDEQ technically reviews all mine permit application packages to ensure that the mining and reclamation plans comply with all state permitting requirements and that the proposed coal mining operation will comply with the performance standards of the OSM-approved Wyoming program (see Section 1.2). Appendix B presents a list of federal and state permitting requirements that would be necessary prior to mining. These regulations are designed to ensure mitigation of impacts from surface coal mining. The following impact assessment considers these measures.

Section 4.1 analyzes the direct and indirect impacts associated with leasing and mining the LBA tract under the Proposed Action and Alternative A. Section 4.2 presents the probable environmental consequences of the No Action Alternative (not issuing a lease for the tract). Section 4.3 discusses regulatory compliance, mitigation, and monitoring in terms of what is required by federal and/or state law (and is therefore part of the Proposed Action and alternatives) and any additional mitigation and monitoring that may be required. Section 4.4 summarizes the residual effects of the Proposed Action and Alternative A. Section 4.5 discusses the cumulative impacts that would occur if these lands were mined when added to other past, present, and reasonably foreseeable future actions. An evaluation of the ENCOAL Plant and the Two Elk power plant are included as cumulative impacts because it is the position of the proponents of these projects that the plants will be built whether or not the LBA tract is leased, and regardless of who leases it. Therefore, the impacts of these two proposals are independent of the actions being analyzed in this EIS. Section 4.6 analyzes the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity. Section 4.7 presents the irreversible and irretrievable commitments of resources that would occur with implementation of the proposed project.

4.1 DIRECT AND INDIRECT IMPACTS

Impacts can be beneficial or adverse, can be a primary result of an action (direct) or a secondary result (indirect), and can be permanent or long-lasting (long-term [i.e., lasting many years following mining and reclamation]) or temporary and of short duration (short-term [i.e., lasting only a few years following mining and reclamation]). Impacts can vary in degree from a slightly discernable change to a total change in the quality of the human environment. A negligible impact is an impact that may produce a change in the environment--this change may even be substantial--but would not necessarily be considered beneficial or adverse. For instance, surface mining will cause a very substantial change to the soils in the mined area; however, this change would not necessarily cause an impact on the quality of the human environment. A moderate impact would produce a modest change to the quality of the

human environment, and a significant impact would result in substantial change in the quality of the human environment.

4.1.1 Topography and Physiography

Surface coal mining would permanently alter the topography of the LBA tract. Topsoil would be stripped from the land, overburden would be blasted and stockpiled or directly sidecast into the already mined pit, and a seam of coal would be removed. The existing topography on the LBA tract would be substantially changed during mining. A 150- to 250-ft highwall would exist in the active pit, with large volumes of spoil and topsoil stockpiled for later reclamation. Trussler Creek would be diverted into a temporary channel. A direct, long-term impact would be topographic moderation. The restored land surface would contain fewer topographic features, but the basic drainage network would be retained. Following reclamation, the original surface elevation would be approximately 10 ft lower, due to removal of the coal. (The removal of 60 ft of coal would be partially offset by the overburden swelling that occurs when the overburden is blasted and removed.) The land surface would be restored to the approximate original contour; however, the terrain would be slightly flatter.

Direct adverse impacts resulting from this topographic moderation would include a reduction in microhabitats (i.e., cutbank slopes) for some wildlife species and a reduction in habitat diversity, particularly slope-dependent shrub communities and associated habitat. A potential indirect impact may be a reduction in big game carrying capacity. Direct beneficial impacts resulting from the lower and flatter terrain would include reduced water runoff and increased infiltration, resulting in a minor reduction in peak flows which may indirectly decrease erosion, increase vegetative productivity, and potentially accelerate recharge of groundwater. The approximate original drainage pattern would be restored, and stock ponds and playas would be replaced to provide livestock and wildlife watering sources. These topographic changes would not conflict with regional land use, and the postmining topography would adequately support anticipated land use.

4.1.2 Geology and Minerals

Mining would remove an average of 207 ft of overburden and 60 ft of coal over about 1,440 acres under the Proposed Action, or 1,482 acres under Alternative A. The replaced overburden would be a relatively homogenous (compared to the premining layered overburden), partly recompacted mixture averaging about 232 ft deep. Approximately 144 million tons of coal would be mined under the Proposed Action, compared to 149 million tons under Alternative A.

The geology from the base of the coal to the land surface would be subject to considerable long-term change on the LBA tract under either action alternative. The subsurface characteristics of these lands would be radically changed by mining. The replaced overburden (spoil) would be a mixture of the geologically distinct layers of sandstone, siltstone, and shales that currently exist. The resulting physical characteristics would also be significantly altered.

The development of other minerals potentially present on the LBA tract would not occur during mining; however, development of these resources could occur following mining. Coal bed methane associated with the removed coal would be irretrievably lost.

4.1.3 Soils

Consequences to soils from mining the LBA tract would include changes in the physical, biological, and chemical properties. Following reclamation, the soils would be unlike premining soils in texture, structure, color, accumulation of clays, organic matter, and chemical composition. The soils would be much more uniform in type, thickness, and texture. However, the replaced topsoil would support a stable and productive

vegetation community adequate in quantity and quality to support planned postmining land uses (i.e., wildlife habitat and rangeland).

Surface coal mining would directly impact 1,440 acres of soil on the LBA tract (1,482 acres for Alternative A) by increasing near-surface bulk density, which would then indirectly influence infiltration and runoff. The soils would tend to become more uniform in type, thickness, and texture (e.g., clayey and sandy soils may get mixed, resulting in a sandy clay loam). This uniform mixture would then be redistributed to a fairly even depth of about 29 inches. The chemical make-up and soil nutrient distribution would be more uniform in the mixed soils, resulting in more uniform vegetative productivity on the reclaimed land. Direct biological impacts would include a long-term reduction in soil organic matter, microbial populations, seeds, bulbs, rhizomes, and live plant parts, particularly if the soil is stockpiled before placement.

Following reclamation, soil loss due to steep topography may decrease on the LBA tract as a result of the topographic moderation. Soil losses during mining would be minimal; sediment control structures would trap eroded soil and revegetation would reduce wind erosion. Both of these measures are required by state regulations and are therefore considered part of the Proposed Action.

4.1.4 Air Quality

The WDEQ/AQD has issued Bluegrass an air quality Permit to Construct for the North Rochelle Mine. Bluegrass is authorized to mine at a maximum rate of 20 million tons per year, but the actual production rate would depend on market conditions and contracts. As stated in Section 2.1.1, anticipated annual production on the LBA tract would be 15 million tons per year. Bluegrass's permit was based on the results of computer modeling that predicted no violation of air quality standards and demonstrated that emissions would have no significant cumulative effect when added to emissions from neighboring mines at currently permitted production rates. Bluegrass would mine the LBA tract and their existing lease (North Rochelle Mine) using the same equipment with similar emission control methods. The overburden and coal thickness on the LBA tract are similar to the existing lease. Bluegrass does not propose to increase production above the currently permitted maximum rate, but acquisition of the LBA tract would allow production to be extended for 10 years. As a result, there would not be an increase in direct and indirect impacts to air quality, but there would be a continuation of the existing permitted impacts. If North Rochelle acquires the LBA tract, they will have to amend their air quality permit to include the LBA tract prior to mining the tract.

Air quality impacts resulting from, or associated with, mining operations would be limited primarily to the operational life of the mine. During the time the LBA tract is mined, the elevated TSP levels in the vicinity of the mining operation would continue, as would the elevated concentrations of gaseous emissions due to fuel combustion. Compliance with all state and federal air quality standards would be attained. As with current operations, mining would occur near Highway 450, Highway 59, and Reno County Road, making dust visible to the public. Mitigation measures discussed in Section 4.3.4 would minimize this impact.

Impacts from the Proposed Action and Alternative A would not be substantially different, except that a slightly larger area would be mined under Alternative A. Bluegrass would use conveyors to move coal from the pit area, so dust emissions should remain relatively constant. Blasting is not a major source of emissions at PRB mines (PM_{10} emission inventories show that overburden and coal blasting comprise less than 1% of the total emissions). Overburden removal, wind erosion, and coal haul roads generate the majority of dust.

The nearest Class I area is located approximately 80 mi east at Wind Caves National Park in

southwestern South Dakota, and no impacts on air quality are expected to occur there from mining this LBA tract.

4.1.5 Water Resources

Surface Water

Continuous changes in runoff characteristics and sediment discharges would occur during mining of the LBA tract because of changes in the location of diversions and the destruction and reconstruction of drainage channels as mining progresses. Sediment discharges could reach high values on the disturbed area because of scour and erosion. However, both state and federal regulations require that all surface runoff from mined lands pass through sedimentation ponds. Therefore, the sediment would be deposited before leaving the permit area. However, sediment produced by large storms (i.e., greater than the 10-year, 24-hour storm) could adversely impact downstream areas. Downstream impacts from large storms could increase if sedimentation ponds were full of water and sediment at the time of large storm, or if excessive runoff caused a dam failure. However, some sediment ponds would be designed for 25-year, 24-hour storms and 100-year, 24-hour storms. WDEQ would also require a monitoring program to assure that ponds would always be capable of holding at least 1 year's sediment accumulation.

Runoff would increase on the LBA tract due to loss of soil structure. However, soil structure would gradually reform over time, and vegetation (after successful reclamation) would retard surface flows and control runoff at approximately premining levels. The decrease in average slope of the reclaimed land would increase infiltration and reduce peak flows.

After mining and reclamation are complete, surface water flow, quality, and sediment discharge from the LBA tract would approximate premining conditions. However--because of the relocation of drainages--flow and sediment discharge from the subbasins within the tract would vary from their present locations and characteristics. The impacts described above would be similar for both the Proposed Action and Alternative A.

Groundwater

Mining of the LBA tract would primarily impact groundwater resources in two ways: 1) Mining would remove the coal aquifer and the overburden aquifer on the mined land and replace them with unconsolidated overburden (spoils); and 2) water levels in the coal aquifer adjacent to the mine would continue to be depressed as a result of seepage and dewatering from the open cut on the LBA tract.

Mining the LBA tract would remove the overburden aquifer on 1,440 acres (Proposed Action) or 1,482 acres (Alternative A). This aquifer would be replaced by spoil made up of the mixed shale, siltstone, and sandstone of the existing Wasatch Formation.

Rahn (1976) found that the permeability of a replaced spoil aquifer depends on the method of its emplacement. Replaced strip mine spoil is composed of a nonhomogeneous mixture of clay- to gravel-sized grains. Where the spoil has been placed by a dragline, this material is loosely compacted. Frequently, the coarsest grains roll down the spoil piles and form a layer of coarse rubble at the base. This results in a relatively permeable aquifer with a zone of higher permeability at the base. Spoil material emplaced by trucks, bulldozers, and/or scrapers, on the other hand, is more compacted and has lower permeability. Rahn (1976) reported an average permeability of 450 gallons per day per square foot (gal/day/ft^2) for spoils placed by dragline compared to 4 gal/day/ft^2 for spoils placed by bulldozer/scraper. He concluded that, all other things being equal, dragline-placed spoils have a permeability several times greater than that of the

natural aquifer, whereas bulldozer/scraper-placed spoils have a permeability about the same as the natural aquifer.

Proposed mining of the LBA tract would involve a combination dragline and truck-shovel operation. Therefore, the permeability of the replaced spoil could probably be greater than or equal to that of the undisturbed overburden.

The coal aquifer, which averages 60 ft in thickness and is a principal source of groundwater in the area, would be permanently removed on the LBA tract by mining.

Mining of the LBA tract should not increase the areal extent of current and anticipated drawdowns in the coal aquifer (see Section 4.5.5) because the LBA tract does not extend the area of coal removal farther west than the existing West Black Thunder lease and the rate of production is not anticipated to increase beyond that already permitted, but it would extend the duration of the drawdown for 11 years. The applicant would be required to conduct detailed groundwater modeling to predict the extent of water drawdown in the coal and overburden aquifers owing to the mining of the LBA tract. The applicant would also be required to drill monitoring wells to verify the validity of the modeling predictions. This modeling would be required as part of the WDEQ mine permitting procedure discussed in Section 1.2.

Wyoming State Engineer's Office records indicate a total of 282 water wells occur within 3 mi of the LBA tract. The majority (232) are owned by coal mining companies and are used for groundwater monitoring and water supply. Of the 50 noncoal-related wells, 15 are permitted for stock watering purposes and one is permitted for domestic use. This well is shallow and completed within the Quaternary alluvium of Boss Draw approximately 3 mi south of the LBA tract. The remaining noncoal-related wells are monitoring wells owned by either the USFS or the Water Resources Research Institute of the University of Wyoming. The majority of these wells will likely be impacted (either direct removal of the well or indirectly by water level drawdown) by approved mining operations occurring at North Rochelle and the adjacent mines. In compliance with SMCRA and Wyoming regulations, Bluegrass would be required to provide the owner of a water right whose water source is interrupted, discontinued, or diminished by mining, water of equivalent quantity and quality; this mitigation is thus part of the Proposed Action. The most probable source of replacement water would be one of the aquifers underlying the coal.

At the permitted production level, the North Rochelle Mine would require a maximum of about 272,000 gal of water per day. Of this, 14,000 gal would be potable water, 8,000 gal would be utility water, and 250,000 gal would be for dust control. Most of this water would be supplied by an existing well tapping the Tullock Aquifer at a depth of 1,200-2,000 ft. Bluegrass has an appropriation of 250 gal per minute (gpm) for this well from the Wyoming State Engineer's Office. Some water for dust control would come from inflow to the mine pit. Mining of the LBA tract would extend the life of the North Rochelle Mine by 11 years which would result in additional water being withdrawn from the Tullock Aquifer, but this additional water withdrawal would not be expected to extend the water level drawdown over a significantly larger area because of the discontinuous nature of the sands in the aquifer.

Coal removal is unlikely to affect the underlying Tongue River-Lebo and Tullock Aquifers because there is a relatively impermeable layer underlying the coal (Figure 3.6). The Tullock Aquifer would be impacted due to water withdrawal from the existing well at the mine; however, there would be no direct impacts to municipal wells (i.e., in Gillette and Wright) completed in the Tullock Aquifer as a result of pumping water from the well because of the discontinuous nature of water-bearing sands in the Tullock Aquifer. Indirect effects of mining the LBA tract on the Tullock and Tongue River-Lebo aquifers would be the use of

municipal water by North Rochelle employees who would live in the two communities for 10 additional years.

Once reclamation takes place, the hydraulic head in the various aquifers would start to recover. Recovery in the Tullock Aquifer, for which the decline in head represents a loss of pressure, should occur rapidly, with only an insignificant amount of decline remaining after a few months. The coal and spoil aquifers, on the other hand, would take much longer to recover. As mining progresses and spoils are placed in the mined-out pit, groundwater would begin to seep into the spoils from the sides of the pit and percolate down through the spoils from precipitation. Because groundwater moves very slowly through the coal and spoils (only tens of feet per year), it may take as long as 100 years for the water level in the entire spoil aquifer to reach premining levels. However, based on the backfill monitoring data that is currently available, it is likely that by the time surface reclamation is completed and the LBA tract is restored to rangeland, sufficient saturated material would be present to supply a stock well, particularly in the areas that were first mined. The clinker east of the existing North Rochelle lease is saturated, and could provide a good source of recharge to the reclaimed spoils in this area.

As the overburden is broken up during removal and replaced during reclamation, fresh spoil surfaces are exposed to groundwater that moves through the reclaimed spoils. Rahn (1976) and Van Voast (1978) have found that groundwater in spoil contains more calcium, sulfate, magnesium, manganese, and TDS than premining groundwater. TDS in the spoil water on the mined LBA tract may increase from the premining range of 800-3,900 mg/liter to a postmining range of 1,500-5,000 mg/liter. However, the postmining TDS concentrations would still be suitable for anticipated postmining land use (livestock water).

A study conducted for the adjacent Rochelle Mine (OSM 1982) showed that it would take the equivalent of five pore volumes (totally saturated soil conditions) of water moving through all of the spoils to dissolve all of the newly exposed minerals and restore premining water quality in the entire mined and reclaimed area. This study indicated that this process would take more than 11,000 years for the entire mined out area, although premining water quality would be reached along the edges of the mined out area more quickly and would gradually move in toward the center. Another study in North Dakota estimated that only one pore volume of water must leach the spoil before the dissolved solids concentration in the water would be comparable to premining conditions (USGS 1987).

Trace metals within the spoils would not be dissolved because the groundwater has a near neutral pH. Overburden analyses have shown that pH reduction occurs only in isolated zones where carbonaceous materials are present. Most of the overburden in this area contains an abundance of calcite (OSM 1982). During removal and replacement of the overburden, the isolated zones of carbonaceous material would be mixed with the rest of the overburden. The abundant calcite should neutralize this carbonaceous material and the pH of the overburden should remain near neutral.

As the groundwater moves westward out of the spoil, it would gradually improve in quality. Because groundwater moves slowly, ion exchange would occur between the groundwater and the aquifer matrix and ions would become adsorbed to the fine particles in the aquifer. Also, some dilution would occur as the plume of groundwater from the spoils dissipates and is mixed with groundwater from the undisturbed aquifer. Groundwater quality of these adjacent unmined lands would not be lowered to a level unacceptable for current uses (livestock watering).

Mining and reclamation on the LBA tract would have little, if any, effect on recharge. Scoria, the principal source of recharge to the coal aquifer, would not be disturbed. Recharge through the

spoils would be equal to or slightly greater than the recharge that occurs now through the overburden. The process of blasting, removing, and replacing this overburden would break up the more consolidated overburden material, which increases the permeability of that material. Because the permeability of the coal is dependant on secondary features (such as fractures) rather than intergranular openings as in the overburden and spoil, it is difficult to accurately compare permeability. Nevertheless, it appears that the permeability of the spoil would be greater than that of the undisturbed coal.

4.1.6 Alluvial Valley Floors

No designated alluvial valley floors exist in the LBA tract, and no direct, indirect, or cumulative impacts are anticipated to off-site alluvial valley floors.

4.1.7 Wetlands

All existing wetlands on the LBA tract would be destroyed by mining operations; however, U.S. Army Corps of Engineers' requirements to replace all impacted wetlands would mitigate this loss, so environmental impacts would be insignificant.

4.1.8 Vegetation

Mining of the LBA tract would progressively remove the native vegetation on 1,440 acres (Proposed Action) or 1,482 acres (Alternative A). Short-term indirect impacts associated with this vegetation removal would include increased erosion and habitat loss for wildlife and livestock. Potential long-term impacts include loss of habitat carrying capacity for some wildlife species as a result of reduced species diversity, particularly big sagebrush, on reclaimed lands.

Reclamation and revegetation of this land would occur concurrently with mining. Estimates of the time elapsed from topsoil stripping through reseeding of 1-year's operation are 3-9 years. A maximum of about 35% of the permit area would be removed from livestock production at any one time due to mining; grazing restrictions prior to mining and during reclamation would increase this to as much as 100% of the permit area (see Section 4.1.11, Land Use). This reduction in vegetative production would not seriously affect livestock production in the region, and long-term productivity on the reclaimed land would return to premining levels within several years following disturbance.

Initially, the reclaimed land would be dominated by grassland vegetation which would be less diverse than the premining vegetation. Estimates for the time it would take to restore sagebrush to premining density levels range from 20 to 100 years. An indirect impact of decreased big game habitat carrying capacity would be associated with this vegetative change. However, a diverse, productive, and permanent vegetative cover would be established on the proposed lease land within about 10 years following reclamation. The decrease in plant diversity would not seriously affect the potential productivity of the reclaimed areas, and the proposed postmining land use (wildlife habitat and rangeland) should be achieved even with the changes in vegetation composition and diversity. About 175 acres of surface disturbance would occur per year of mining on the LBA tract at the proposed rate of production, and by the time mining ceases, approximately 70% of the disturbed land would have been reseeded. The remaining 30% would be reseeded during the following 2-3 years. Reestablished vegetation would be dominated by species mandated in the reclamation seed mixtures (to be preapproved by WDEQ with USFS input). The majority of these species would be native to the LBA tract. The reclamation plan would also include steps to control site invasion by weedy species. Native vegetation from surrounding areas would gradually invade and become established on the reclaimed land. However, grassland vegetation would be the dominant community following reclamation. It must also be kept in mind that the majority of surface ownership on the LBA tract is private (see Figure 3.19), and the private landowners would

have the right to manipulate the vegetation on their lands as they desire, once the reclamation bond is released.

The climatic record for the western U.S. suggests that a severe drought could occur at least once during the life of the mine. Such a drought would severely hamper revegetation efforts during the drought year, since lack of sufficient moisture would reduce germination and could damage newly established plants. Even-aged vegetation would be more susceptible to disease than would plants of various ages. Severe thunderstorms could also adversely affect revegetation efforts. Once a stable vegetative cover is established, however, these events would have similar impacts as would occur on native vegetation.

Changes expected in the surface water network as a result of mining and reclamation would affect the reestablishment of vegetation patterns on the reclaimed areas to some extent. The postmining maximum slope would be comparable to premining slopes--about 25-30%; however, the average reclaimed slope would be less than the average premining slope. This slight flattening of the topography would inhibit the reestablishment of the site-specific slope-associated shrubland communities, but it also would reduce surface water runoff (and consequently erosion) and increase infiltration (and therefore, soil moisture availability to plants), which would benefit grassland establishment and productivity.

Following reclamation, the LBA tract would be a mixed prairie grassland with graminoid/forb-dominated riparian areas, and the overall species diversity would be reduced, especially for the shrub component. The amount of playa grassland to be restored has not yet been determined, but at least partial restoration would occur. Playas with wetland characteristics will fall under the jurisdiction of the U.S. Army Corps of Engineers. Detailed wetland mitigation plans would be developed at the permitting stage to ensure no net loss of wetlands on the project area.

The decrease in plant diversity would not seriously affect productivity of the reclaimed areas, regardless of the alternative selected, and the proposed postmining land use (wildlife habitat and rangeland) would be achieved, even with the changes in vegetative species composition and diversity.

4.1.9 Wildlife

Local wildlife populations would be directly and indirectly impacted by mining the LBA tract. These impacts would be both short-term (until successful reclamation is achieved) and long-term (persisting beyond successful completion of reclamation). During mining, many species of wildlife would be displaced to other areas. When animals are displaced, they may find equally suitable habitat that is not occupied by other animals, occupy suitable habitat that is already being used, or occupy poorer quality habitat than that from which they were displaced. In the second and third situations, displaced animals suffer from increased competition with other animals and are less likely to survive and reproduce. Unfortunately, these consequences are difficult to quantify and are also influenced by other factors such as weather, especially annual rainfall and snow depths.

Big game would be directly affected by mining activities from road kill resulting from continued vehicular traffic. Indirect impacts of surface coal mining on wildlife include temporary habitat loss, displacement, and harassment. During mining, animals would be displaced from the LBA tract. Alterations in the topography and vegetative cover, particularly the reduction in sagebrush density, would cause a decrease in carrying capacity and diversity on the LBA tract after mining and reclamation. Sagebrush would gradually become reestablished on the reclaimed land, but the topographic changes would generally be permanent. The reduction in food and cover would displace big game to adjacent ranges. Habitat loss would be incremental, occurring over

several years and allowing for gradual changes in big game distribution patterns. Big game residing in adjacent areas may be impacted by increased competition with displaced animals. However, since no crucial big game habitat occurs on the LBA tract, impacts would be insignificant.

Noise, dust, and associated human presence would also cause some localized avoidance of foraging areas adjacent to mining activities on the LBA tract. However, big game animals are highly mobile and can move to undisturbed areas if movements are not restricted (i.e., appropriate fencing materials are used). In addition, big game species have continued to occupy areas adjacent to active mine operations, suggesting that they become habituated to many such disturbances.

An additional adverse impact to pronghorn would be barriers to movement created by additional fences, spoil piles, and pits related to mining the LBA tract. To the extent possible, fencing would be designed to permit pronghorn antelope passage, but in some areas, the hazard would remain. During severe winter storms, pronghorn may not be able to negotiate these barriers, and some mortality could occur.

Site-specific impacts to pronghorn resulting solely from mining the LBA tract would not be significant, as no crucial pronghorn habitat is present. Mule deer, elk, and white-tailed deer would not be impacted, given their infrequent use of these lands and the availability of other areas.

Direct losses to small mammals would be higher than for other wildlife since the mobility of small mammals is limited and many would retreat into burrows when disturbed. Mammals such as coyotes, rabbits, etc., would be temporarily displaced to other habitats by mining and would return following reclamation. Populations of less mobile animals (such as mice) would decline during mining. However, these animals generally have a high reproductive potential and tend to re-invade and adapt to reclaimed areas quickly.

Mining of the LBA tract would eliminate potential sage grouse habitat. However, very few sage grouse have been observed using the LBA tract during annual wildlife monitoring surveys, and no leks have been located on or near the LBA tract (see Figure 3.14) (Triton Coal Company 1996).

It is unlikely that raptor populations would be deleteriously impacted by mining the LBA tract. However, individual birds may be impacted. Two historical golden eagle nest sites and two historical ferruginous hawk nest sites occur within the LBA tract permit boundary (see Figure 3.15). All of these nests have been inactive for several years and are now listed as being destroyed (Triton Coal Company 1996). Several other raptor nests (both intact and former) occur in close proximity to the LBA tract. Mining-related disturbance could cause these raptors to abandon these nests. Before Bluegrass could mine the LBA tract, they would have to prepare a raptor mitigation plan as part of the revised mining plan (which would be reviewed and approved by the USFWS). Any nests that would be impacted by mining operations would have to be relocated in accordance with that plan. Prior to the disturbance of any raptor nest, special purpose permits would have to be secured from the USFWS and WGFD. All active raptor nests within the mine permit area would be protected further by buffer zones. Mine-related disturbances are not allowed to encroach the near vicinity of any active raptor nest from March until hatching and disturbances near raptor nests containing nestlings is strictly limited to prevent danger to, or abandonment of, the young. These required mitigation measures are part of the Proposed Action.

Foraging habitat for raptors would be reduced until revegetation successfully attracts small mammals, which serve as their prey. The following required measures (which are part of the Proposed Action) would also ensure that site-specific impacts would be minimized: All power lines would be made raptor safe (Avian Power Line Interaction Committee 1994), and successful

revegetation would support substantial rodent (prey) populations.

Annual monitoring by other area mines has not documented any apparent declines in area eagle or hawk populations due to mining activities. Raptor sitings are common; however, reproductive rates are presently depressed in the area according to monitoring conducted by the WGFD, the BLM, and the USFS, and populations may be decreasing.

Mountain plover habitat would be impacted by mining the LBA tract. Mountain plover surveys, conducted in accordance with USFWS guidelines, would be required as part of the WDEQ permitting process. If plover habitat is identified on these lands, a habitat recovery and replacement plan would be required as part of the mine permit application. This plan, which would have to be approved by the USFWS, would be expected to reduce potential impacts to an acceptable level.

No other MBHFI regularly use the LBA tract, and raptors are the only MBHFI that breed in the area (Triton Coal Company 1996); therefore, mining would have negligible impacts on these species.

Disturbance of numerous stock ponds on the LBA tract would impact waterfowl which utilize the ponds for resting and feeding during migration. The creation of sedimentation ponds would partially mitigate this impact. WDEQ and the U.S. Army Corps of Engineers would also require creation of wetlands during reclamation which would minimize impacts. The LBA tract currently has limited value for waterfowl production.

Resident songbirds would have to compete for available adjacent territories and resources as their habitats are disturbed by mining operations. Where adjacent habitat is at carrying capacity, this competition would result in some mortality. Losses would be higher when habitat disturbance coincides with egg incubation and rearing of young. These effects would be short-term for grassland species but would last longer for shrub-dependent species. Several required measures would minimize these impacts. A diverse seed mixture with shrub groupings would provide food, cover, and edge effect, and cottonwood plantings would produce perching and nesting sites.

USFS Region 2 sensitive species habitat may be directly or indirectly impacted by changing the surface character of the LBA tract. Potential impacts may be either short-term (prior to reclamation) or long-term (persisting beyond successful completion of reclamation). When the lessee files an application for a surface mining permit, and prior to any habitat manipulation actions, these sensitive species will be evaluated in a Biological Evaluation.

4.1.10 Threatened, Endangered, and Candidate Species

Mining the LBA tract would not be expected to jeopardize the existence of any T&E species. No known critical habitat for T&E species exists on the LBA tract.

There are no prairie dog colonies on the LBA tract and surveys of nearby towns have produced no evidence of black-footed ferrets (see Figure 3.16). Bald eagles could potentially nest or roost on the LBA tract; however, there are no concentrated food sources for eagles on the LBA tract and the loss of any potential foraging habitat would be short-term. Peregrine falcon nesting habitat does not exist on the LBA tract, and there are no concentrated food sources for peregrines on the LBA tract. Suitable habitat for Ute lady's tresses is potentially present on the LBA tract (however, no Ute lady's tresses have been found on surveys of the adjacent permit areas), and surveys would be required prior to any mining activity. If any plants are found, development of a USFWS-approved mitigation plan would be required prior to mining. Mountain plover habitat potentially occurs on the LBA tract, but no plovers have been documented. Surveys for plovers would be required prior to any mining activity and if any plovers are found, development of a USFWS-

approved mitigation plan would be required prior to mining. No recent sightings of swift fox have been reported on or near the LBA tract; however, much of the PRB is potential swift fox habitat.

4.1.11 Land Use and Recreation

The major adverse environmental consequences of the Proposed Action or Alternative A on land use would be the reduction of livestock grazing, loss of wildlife habitat, curtailment of oil and gas development, and short-term loss of public land available for recreation activities on about 1,440 acres (Proposed Action) or about 1,482 acres (Alternative A) during active mining. Wildlife (particularly big game) and livestock (cattle and sheep) use would be displaced while the tract is being mined and reclaimed.

Oil and gas leases on the LBA tract could not be developed in areas where active mining is occurring. However, areas not being mined, or areas which are reclaimed after mining, could be drilled while mining and/or reclamation is occurring in adjacent areas. Coal bed methane resources on the LBA tract would be lost when the coal is removed.

Hunting on the LBA tract would be eliminated during construction, mining, and reclamation; however, the LBA tract is not currently utilized to any significant extent and the vast majority of the tract surface is privately owned (see Figure 3.19). Following reclamation, the land would be suitable for grazing and wildlife use, which are the historic land uses. Following reclamation bond release, management of the privately owned surface would revert to the private surface owner.

4.1.12 Cultural Resources

Cultural resources will be impacted by mining, but adverse impacts will be mitigated through data recovery and/or avoidance of significant properties. A total of five prehistoric, historic, and multicomponent (consisting of both prehistoric and historic components) sites has been recorded within the LBA tract. All of the currently recorded sites are not presently considered eligible for inclusion on the NRHP; however, formal SHPO consultation is required for concurrence with this evaluation. Class III surveys would be required for the uninventoried lands prior to mining; Class I reconnaissance to confirm the evaluation of unconcurred sites would also be required to comply with legislation. If eligible cultural properties are identified within the LBA tract and they cannot be avoided, a data recovery program would be implemented.

Cultural resources adjacent to the mine area may be impacted as a result of increased use of the area. There may be increased vandalism and unauthorized collecting associated with recreational activity and other pursuits.

4.1.13 Native American Concerns and Trust Resource Issues

No sites of Native American religious or cultural importance are known to occur on the LBA tract; if such sites or localities are identified at a later date, they will be taken into consideration.

4.1.14 Paleontological Resources

No unique or significant paleontological resources have been identified on the LBA tract, and the likelihood of encountering significant paleontological resources is small. Lease and permit conditions require that should previously unknown, potentially significant paleontological sites be discovered, work in that area shall stop and measures taken to assess and protect the site (see Appendix D).

4.1.15 Visual Resources

Visual impacts would be evident during mining; however, mining activity on the LBA tract would not be visible from any major travel routes and would be partly concealed by surrounding terrain.

Mining would affect landscapes classified by USFS as "common", and the landscape character would not be significantly changed following reclamation.

After reclamation, reclaimed terrain would be almost indistinguishable from the surrounding terrain. Slopes might appear smoother (less intricately dissected) than undisturbed terrain to the south and west, and sagebrush would not be as abundant for several years; however, within a few years after reclamation, the mined land would be distinguishable from the surrounding undisturbed terrain only to somebody very familiar with landforms and vegetation.

4.1.16 Noise

Noise levels on the LBA tract would be increased considerably by mining activities such as blasting, crushing, conveying, rail car loading, scraping, and hauling. The Noise Control Act of 1972 indicates that a 24-hour equivalent level of less than 70 A-weighted decibels (dBA) prevents hearing loss and that a level below 55 dBA, in general, does not constitute an adverse impact. OSM prepared a noise impact report for the Caballo Rojo Mine (OSM 1980) which determined that the noise level from crushers and a conveyor would not exceed 45 dBA at a distance of 1,500 ft. Explosives would be used during mining to fragment the overburden and coal and facilitate their excavation. The air overpressure created by such blasting is estimated to be 123 dbA at the location of the blast. At a distance of approximately 1,230 ft, the intensity of this blast would be reduced to 40 dBA. Since the nearest occupied dwelling is more than 4,000 ft away from the LBA tract, there should be no significant noise impacts.

Because of the remoteness of the site and because mining has already been permitted in the area, noise would have little off-site effect. Wildlife in the immediate vicinity of mining may be adversely affected; however, observations at other surface coal mines in the area indicate that wildlife generally adapt to increased noise associated with active coal mining. After reclamation is completed, noise would return to premining levels.

4.1.17 Transportation Facilities

No new or reconstructed transportation facilities will be required under the Proposed Action or Alternative A. Essentially all of the coal mined on the LBA tract would be transported by rail. Leasing the LBA tract would extend the length of time that coal is shipped from the permitted North Rochelle Mine. No active pipelines currently cross the LBA tract, and any relocation of utility lines would be handled according to specific agreements if the need arises. The Wyoming Department of Transportation routinely monitors traffic volumes on area highways, and if traffic exceeds design standards, improvements are made. Burlington Northern, Santa Fe, and Union Pacific have upgraded and will continue to upgrade their rail capacities to handle the increasing coal volume projected from the southern PRB with or without the leasing of the proposed LBA tract.

4.1.18 Socioeconomics

Leasing and subsequent mining of the LBA tract would not create additional jobs if mined as a maintenance tract, but would extend the life of an already permitted operation by 10 years. Leasing and mining the LBA tract as a production maintenance tract would not be expected to alter current employment levels. Coal prices are projected to remain relatively constant throughout the life of the mine (Wyoming State Geological Survey 1996), and the total direct fiscal benefit to the State of Wyoming from coal mining (taxes and royalties) has been estimated at $1.10/ton of coal mined (University of Wyoming 1994). Thus, the sale of 134 million tons of coal under the Proposed Action would generate $147 million to the state or $153 million under Alternative A. Assuming a price of $4.00 per ton and 93% recovery of the coal, the market value of the coal would be about $536 million for the Proposed Action ($556 million for Alternative A). Estimated economic multiplier for determining the

total economic impact to the local area (i.e., direct, indirect, and induced effects) range from 1.473467 (University of Wyoming 1994) to 1.796 (Campbell County Economic Development Corporation 1993). Applying an average economic multiplier of 1.5 to these revenues, the total economic impact from leasing and subsequent mining of the LBA tract would be about $804 million (Proposed Action) or $834 million (Alternative A). These economic impacts would benefit the local and regional economies.

4.2 NO ACTION ALTERNATIVE

Impacts on the existing North Rochelle lease and adjacent existing leases would be similar to those described in the preceding pages on topography and physiology, geology and minerals, soils, air quality, water resources, alluvial valley floors, wetlands, vegetation, wildlife, USFS Region 2 Sensitive Species, T&E species, land use and recreation, cultural resources, Native American concerns and trust resource issues, paleontological resources, visual resources, noise, transportation, and socioeconomics (see Table 2.5). The general nature and magnitude of cumulative impacts as summarized in Table 2.7, which would occur from implementation of the Proposed Action or Alternative A, would not be substantially different under the No Action Alternative. However, coal removal and the associated disturbance and impact would not occur on the 1,440 to 1,482 acres included in the Proposed Action or Alternative A, respectively. A portion of the surface of the LBA tract would probably be disturbed due to overstripping to allow coal to be recovered from the existing contiguous North Rochelle and Black Thunder coal leases. The economic impacts that would be derived from mining the LBA tract during an additional 10 years of mine operation would be lost. Without the LBA tract, operations at the North Rochelle Mine would end in 2010, when the existing lease is mined out and reclaimed. Not leasing this delineated suitable tract at this time may also result in a bypass of this federal coal.

4.3 REGULATORY COMPLIANCE, MITIGATION, AND MONITORING

In the case of surface coal mining, SMCRA and state law require a considerable amount of mitigation and monitoring. Mitigation and monitoring measures that are required by regulation are considered part of the Proposed Action and the alternatives. If impacts that are not mitigated by the existing required mitigation measures are identified during the coal leasing stage, then BLM or USFS can include additional mitigation measures as stipulations on the lease. No mitigation or monitoring measures beyond those required by SMCRA and state law have been identified as necessary for the North Rochelle LBA tract at this time. To illustrate the types of mitigation and monitoring measures that are required by SMCRA and state law, some of these measures are summarized in the resource discussions in this section.

4.3.1 Topography and Physiography

Given the WDEQ-mandated requirement to restore the postmining topography to the approximate original contour, no additional mitigation measures are recommended to address potentially adverse impacts.

4.3.2 Geology and Minerals

A WDEQ permit application requirement includes a conduct of a drilling and sampling program to determine overburden geochemistry and reclamation suitability. If unsuitable overburden is present, the applicant would be required to design the mine and reclamation plan to minimize any adverse impacts. These measures typically include mixing and/or selective placement of spoil. No additional mitigation measures are recommended.

4.3.3 Soils

Sufficient suitable overburden material exists on adjacent mines and is assumed to exist on the LBA tract. Selective placement of at least 5 ft of suitable overburden on the surface prior to replacing topsoil is assumed. With an anticipated 29 inches of topsoil available on the LBA tract, the top 7 ft of regraded surface material should meet WDEQ suitability guidelines for vegetation root zones. Monitoring of revegetation growth with corresponding application of appropriate soil amendments would ensure successful reclamation. These measures are required and are thus part of the Proposed Action. No additional mitigation or monitoring will be needed.

4.3.4 Air Quality

Current air quality regulations and regulatory practices are designed for, and have been historically demonstrated to be effective in, protecting ambient air from degradation from air pollutants generated from surface mining. Before the LBA tract could be mined, even as an extension of an approved operating permit, the existing air quality permit must be amended and approved by WDEQ. This additional modeling is expected to verify the previous analysis because there are no proposed changes in mining methods or rates under either action alternative.

The mitigation of impacts to air quality would be achieved through a combination of five regulatory activities: 1) dispersion modeling of mine plans for annual average particulate pollution impacts on ambient air; 2) use of particulate pollution control technologies; 3) use of specific work practices to minimize windborne fugitive particulate emissions; 4) on-site air quality monitoring to demonstrate compliance with ambient air quality standards; and 5) on-site compliance inspections of mining actives by state regulatory inspectors. Surface mines must comply with all five aspects of modeling, pollution control, pollution prevention, and compliance inspection as conditions for obtaining and maintaining an air quality operating permit.

Potential air pollution is further mitigated at the source by the requirement that facilities utilize EPA- and state-mandated Best Available Control Technology (BACT). In the case of surface coal mining, BACT involves the use of fabric filtration or wet scrubbing of coal storage silo and conveyor vents to mitigate generation of particulates in ambient air. WDEQ also specifies certain other methods for mitigating windborne fugitive emissions of particulates, including watering or chemical dust suppression of haul roads and exposed soils, containment of truck dumps and primary crushers, covering of conveyors, and prompt revegetation of exposed soil. Such measures are estimated to be 50-60% effective in mitigating windborne fugitive particulate emissions from roads and exposed land (WDEQ 1979). These are regulatory requirements and are therefore considered part of the Proposed Action.

WDEQ has also instituted local ambient air quality monitoring as a requirement for obtaining an air quality permit. Each mine in the PRB is required to install, maintain, and operate a certified ambient (off-site) monitor for PM_{10}, and to submit monitoring data to WDEQ as a measure of compliance with ambient air quality standards. Specific compliance with both air quality regulations and operating permit requirements is further assured through the mine site inspection activities conducted by WDEQ.

No additional mitigation measures would be necessary.

4.3.5 Water Resources

The cumulative hydrologic impacts associated with mining the LBA tract would be evaluated by the WDEQ based on site-specific data before the tract could be mined. Detailed mitigation plans would be developed at that time.

A WDEQ-required mitigation measure obligates the coal mine to provide the owner of a water right whose water source is interrupted, discontinued, or diminished by mining with water

of equivalent quantity and quality. This measure should adequately minimize potential impacts occurring to groundwater resources. WDEQ-required sedimentation ponds would adequately mitigate surface water impacts. Extensive surface and groundwater monitoring would also be required as part of the mine permitting procedures. Since these measures are required by state and federal law, they are considered part of the Proposed Action. No additional mitigation or monitoring measures have been identified.

4.3.6 Alluvial Valley Floors

A detailed study to identify alluvial valley floors is required by WDEQ prior to mine permitting. If any alluvial valley floors are identified, a detailed mitigation plan would be developed and approved by WDEQ prior to mining.

4.3.7 Wetlands

A detailed study to identify jurisdictional wetlands is required by the U.S. Army Corps of Engineers prior to mine permitting. If any jurisdictional wetlands are identified, a detailed mitigation plan would be developed at that time.

4.3.8 Vegetation

Continued higher-than-normal levels of erosion and undesirable plant species invasion are likely and normal on areas being reclaimed prior to the successful establishment of the desired species. A detailed reclamation plan would be prepared and approved by WDEQ prior to mining. This plan would provide specific measures to minimize erosion on reclaimed areas (i.e., mulching and the use of cover crops). Weed infestation would be chemically and mechanically controlled. Reduced species diversity on reclaimed areas, compared with premining diversity, is typical and would be mitigated to a large extent by the use of diverse and predominantly native species in permanent reclamation seed mixtures.

Although the reduction in topographic diversity would decrease the potential for vegetative diversity, a number of reclamation methods required in the reclamation plan would, at least partially, offset impacts to wildlife habitat diversity on the reclaimed areas. Community diversity within the postmine vegetation types would also be enhanced by direct hauling of topsoil, selective planting of shrubs in riparian areas, planting of sagebrush, creation of depressions and rock piles, and special planting procedures around rock piles.

WDEQ also requires posting of a reclamation performance bond. This bond is held for a minimum of 10 years to assure that the operator faithfully performs all required reclamation. No additional mitigation measures would be necessary.

4.3.9 Wildlife

Numerous mitigation measures are required by federal and state statutes to be incorporated into the mining and reclamation plans to minimize wildlife impacts. Required mitigation measures are considered to be part of the Proposed Action. These measures generally include: 1) restoring the premining topography to the maximum extent possible; 2) planting a diverse mixture of grasses, forbs, and shrubs in configurations beneficial to wildlife; 3) designing fences to permit wildlife passage; 4) raptor-proofing power transmission poles; 5) creating artificial raptor nest sites; 6) placing rock clusters and creating shallow depressions to add topographic diversity in reclamation; 7) reducing vehicle speed limits to minimize wildlife mortality; and 8) instructing employees not to harass or disturb wildlife.

The applicant would also be required to prepare a raptor mitigation plan, which must be reviewed by the USFWS. Additionally, the mining operations are required to conduct extensive wildlife monitoring surveys, both before and during mining. No additional mitigation measures would be necessary.

4.3.10 Threatened, Endangered, and Candidate Species

The required mitigation and monitoring practices described above would ensure protection of any previously unreported T&E species. USFWS-approved surveys would be conducted for Ute lady's tresses and mountain plovers prior to surface-disturbing activities. If prairie dogs invade the LBA tract, ferret searches would be conducted prior to surface disturbance. The results of such surveys would be reviewed by USFWS and by the USFS on affected federal surface before mining could proceed. Employees would be instructed to avoid disturbing bald eagles, and revegetation would restore the disturbed foraging areas. All power lines would be made raptor safe. These measures are required by state or federal law and are therefore considered part of the Proposed Action. No additional mitigation measures have been identified at this time.

4.3.11 Land Use and Recreation

Campbell County's public recreation facilities are some of the most extensively developed in the Rocky Mountain Region, and use by young, recreation-oriented residents is high. The relatively strong financial position of the county recreation program appears to assure future recreation opportunities for residents regardless of the development of the LBA tract or any other specific mine. Outdoor recreational opportunities should not be significantly impacted as a result of leasing and subsequent mining of the LBA tract. Converse County's financial position and recreational facilities are not as good as Campbell County's.

Since the majority of land to be impacted is private, no mitigation measures for the loss of public access during mining is recommended. Likewise, no mitigation is recommended for the loss of livestock grazing and wildlife habitat during mining.

4.3.12 Cultural Resources

Direct impacts to cultural resources would be mitigated following procedures specified in 36 CFR 800. As part of the permitting process, Class I and Class III inventories would be conducted on all state and federal lands and on private lands affected by federal undertakings unless landowner denial for access is documented in writing. All resources identified in these surveys would be evaluated for eligibility to the NRHP in consultation with the BLM and SHPO. Eligible or listed sites identified would be avoided, as would areas with high potential for significant cultural deposits. If any NRHP (eligible or listed) prehistoric sites found within the area cannot be avoided, a data recovery program would be implemented. Mining activities would be field-checked occasionally by a qualified BLM archaeologist. If historic or prehistoric materials are discovered during mining operation, appropriate BLM and USFS personnel would be notified immediately (see Appendix D). These required measures are part of the Proposed Action.

Potential impacts to cultural resources would be reduced through informing all personnel of the importance of the resources and the regulatory obligations to protect such resources. All personnel would be instructed that collection of cultural materials on public lands is prohibited.

4.3.13 Native American Concerns and Trust Resource Issues

No mitigation measures are recommended, beyond what is required by state and federal law.

4.3.14 Paleontological Resources

No mitigation measures are recommended, beyond what is required by state and federal law. If potentially significant paleontological resources are discovered during surface-disturbing activities, those activities will be suspended and the resource will be evaluated (Appendix D).

4.3.15 Visual Resources

No mitigation measures are recommended, beyond what is required by state and federal law.

4.3.16 Noise

No mitigation measures are recommended, beyond what is required by state and federal law.

4.3.17 Transportation Facilities

No mitigation measures are recommended, beyond what is required by state and federal law.

4.3.18 Socioeconomics

No mitigation measures are recommended, beyond what is required by state and federal law.

4.4 RESIDUAL IMPACTS

Residual impacts are unavoidable impacts that cannot be mitigated and would therefore remain following mining and reclamation.

4.4.1 Topography and Physiography

Topographic moderation would be a permanent consequence of mining. The secondary impacts to wildlife habitat diversity would also be considered permanent.

4.4.2 Geology and Minerals

Geology from the base of the coal to the surface would be subject to significant, long-term change.

4.4.3 Soils

Soil-forming processes would be disturbed by mining, resulting in long-term alteration of soil characteristics and, consequently, taxonomic classifications of the soils.

4.4.4 Air Quality

No residual impacts to air quality would occur following mining.

4.4.5 Water Resources

The coal aquifer would be permanently removed in the area being mined. After mining, it would take an estimated 100 years for the water in the restored overburden (spoil) aquifer to reach premining levels. The reduction in water quality in the spoils would also be long-term, but, in general, the water would be suitable for premining uses.

4.4.6 Alluvial Valley Floors

No residual impacts to alluvial valley floors would occur following mining.

4.4.7 Wetlands

No residual impacts to wetlands would occur following mining.

4.4.8 Vegetation

A reduction in slope-dependent shrub communities would be a permanent consequence of mining, and reclaimed vegetative communities may never completely match the surrounding native plant community.

4.4.9 Wildlife

Although the LBA tract would be reclaimed to as near original condition as possible, there would be some residual impacts. The topographic moderation would result in a permanent loss of habitat diversity and a decrease in slope-dependent shrub communities. This would reduce the carrying capacity of the land for shrub-dependent species.

4.4.10 Threatened, Endangered, and Candidate Species

No residual impacts to T&E or candidate species are expected.

4.4.11 Land Use and Recreation

No residual impacts to land use and recreation are expected.

4.4.12 Cultural Resources

Even with well-organized mitigation plans and associated procedures, impacts are unavoidable. It is neither possible nor practicable to mitigate all sites; thus, unmitigated sites will be permanently lost.

4.4.13 Native American Concerns and Trust Resource Issues

No residual impacts to Native American concerns and trust resource issues are expected.

4.4.14 Paleontological Resources

No residual impacts to significant paleontological resources are expected.

4.4.15 Visual Resources

No residual impacts to visual resources are expected.

4.4.16 Noise

No residual impacts are to noise are expected.

4.4.17 Transportation Facilities

No residual impacts to transportation facilities are expected.

4.4.18 Socioeconomics

No residual impacts to socioeconomics are expected.

4.5 CUMULATIVE IMPACTS

Cumulative impacts 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 occurring over time.

This section summarizes the cumulative impacts that are occurring as a result of existing development in the area, and discusses the change in cumulative impacts that would occur as a result of adding the mining of the LBA tract to other past, present and reasonably foreseeable development in this area.

Important points to keep in mind include: 1) the total areas of all mines would not be disturbed at once; 2) the number of acres, type of vegetation, etc., disturbed would vary from year to year; 3) the impacts to groundwater would vary as mining progresses through each permit area (depending on saturation, how close the next mine pit is, etc.); and 4) the intensity and extent of coal bed methane development is highly speculative. It is thus not feasible to precisely determine or quantify cumulative impacts at any given time or place.

Wyoming coal production has increased 2.5 times in the last 15 years, from 94.0 million tons in 1980 to 236.9 million tons in 1994, according to records of the Wyoming State Inspector of Mines. 1995 coal production from Campbell and Converse Counties was approximately 246.5 million tons, according to the Wyoming State Geological Survey (Wyoming State Geological Survey 1996). Coal production in 1996 from mines operating in Campbell and Converse Counties (excluding Dave Johnson) is estimated at 256.7 million tons (Gillette News Record, January 12, 1997).

Campbell and Converse Counties produce 85-95% of Wyoming coal each year. The increasing state production is primarily due to increasing sales of inexpensive low-sulfur PRB coal to electric utilities who must comply with requirements of the 1990 Clean Air Act Amendments. These electric utilities account for most of Wyoming's coal sales. Increases in demand for electricity will probably result in a continuing demand for federal coal from Wyoming's PRB (BLM 1996g).

In 1996, the BLM completed a report titled *Coal Development Status Check Powder River Federal Coal Region Montana & Wyoming* (BLM 1996f). This report documents actual cumulative mineral development impacts in the PRB during the last 15 years and compares them with the cumulative mineral development impacts predicted in previously prepared regional EISs. In Wyoming, the status check compares actual development in Campbell and Converse Counties with the predictions in the Eastern Powder River Coal FEIS (BLM 1979) and the Powder River Coal FEIS (BLM 1981). A primary conclusion reached in the status check was that regional coal production levels are within predicted coal production levels, except for the southern group of mines, where production has exceeded predictions. The Wyoming status check also considers predictions that were made in *Cumulative Potential Hydrologic Impacts of Surface Coal Mining in the Eastern Powder River Structural Basin* (Martin et al. 1988). The status check is thus incorporated by reference into this EIS.

Oil and gas production generally has decreased in Wyoming's PRB since the 1981 regional EIS was prepared. In recent years, more wells have been plugged annually than have been drilled. The exception to this trend is the current interest in developing shallow coal bed methane resources just west of the coal mines. Since 1992, the BLM has prepared four EAs analyzing coal bed methane development projects in this area. An EIS for coal bed methane development south of Gillette (Figure 3.5) is in preparation and an EA for coal bed methane development north of Gillette was mailed to the public in December 1996 because companies are proposing new coal bed methane projects or additional drilling in existing fields. The proximity of the coal bed methane development to the coal mines creates the potential for overlapping impacts to groundwater. Only about half of the oil and gas rights in the area of current coal bed methane development interest are federal, with the remainder being private and state. Coal bed methane wells are being drilled on private and state oil and gas leases after approval by the Wyoming Oil and Gas Conservation Commission and the Wyoming State Engineer's Office. Federal approval of drilling on federal oil and gas leases in new project proposals north of Gillette is now proceeding; however, drilling on federal leases south of Gillette is currently awaiting completion of the EIS.

Other mineral development levels in Wyoming's PRB are currently less than predicted in the regional EISs. In the 1970s, significant uranium development was anticipated in southwestern Campbell County and northwestern Converse County, but this development never materialized because the price of uranium dropped in the early 1980s. There are two active *in situ* uranium operations in Converse and Johnson Counties and two additional *in situ* operations are proposed, but there are no active uranium mines or mills. The price of uranium has increased significantly in the past year. This could result in an increase in *in situ* uranium production and mining in Wyoming. However, the State Geologist does not expect another uranium boom.

Scoria is quarried primarily by coal mines, but also by a few excavation and construction firms, for use as road surfacing material. Bentonite is mined in parts of Wyoming's PRB, but not in Campbell or Converse Counties.

There are currently 17 active surface coal mines and two inactive mines in Campbell and northern Converse Counties, Wyoming. The inactive mines are the Clovis Point/East Gillette Mine and the Rocky Butte Mine. The Clovis Point/East Gillette

Mine was active from October 1986 through February 1988 and July 1994 through June 1996, in order to produce coal to meet federal diligent development requirements, which have been met at this time. The Rocky Butte Mine is still in the developmental stage. The mines are located just west of the outcrop of the thick Fort Union coal beds, where the coal is at the shallowest depth. The proposed North Rochelle LBA tract is situated in the middle of a nearly continuous corridor of six coal mines in southern Campbell and northern Converse Counties, Wyoming. This southern corridor is approximately 24 mi long and 8 mi wide (see Figure 3.1). Four maintenance leases including about 8,900 acres of federal coal (Jacobs Ranch, West Black Thunder, North Antelope/ Rochelle, and Antelope) have been issued to mines in this southern group since decertification, which has resulted in a 33% increase in the acres of leased federal coal in this group of mines since 1990 (Figure 4.1). BLM is currently processing three maintenance leases including approximately 9,500 acres of federal coal in this group of mines (North Rochelle, Thundercloud, and Powder River). If these three maintenance leases are issued, the increase since 1990 in acres of leased federal coal in the southern group of mines would be 68%. Issuance of the 1,440-acre North Rochelle LBA tract under the Proposed Action (approximately 1,482 acres under Alternative A) would represent an increase of about 4% in acreage of leased federal coal in the southern group of mines.

In May of 1996, Evergreen Enterprises submitted a lease application for federal coal located north of the Jacobs Ranch Mine (Figure 4.1). This lease application is for a new mine start rather than for maintenance on an existing mine. Kennecott also submitted an application in February, 1997 for federal coal adjacent to their existing operations at the Antelope Mine. BLM has not yet begun processing either of these new lease applications, which must still be reviewed by the PRRCT. There is also a potential for development of coal bed methane resources in a large area west of the coal mines (see Figure 3.5).

It is possible that construction may commence in 1997 on three projects in the vicinity of the North Rochelle LBA: 1) North Rochelle Mine facilities and rail loop (see Section 2.1.2); the ENCOAL Plant, which will be located within the rail loop at the North Rochelle Mine (see Figure 3.23); and the Two Elk power plant, which will be located east of the Black Thunder Mine.

The ENCOAL Plant will consist of three 5,500 ton/day parallel modules with an associated 240 megawatt (MW) co-generation power plant. The power plant boiler will burn coal fines from the plant, as well as some minor purge gas streams, and will produce enough electricity to run the ENCOAL Plant and the North Rochelle mine. Excess electricity will be available for external sale. ENCOAL has submitted a request for amendment to the North Rochelle mining permit to WDEQ/LQD, since the ENCOAL Plant will be located within the rail loop at the North Rochelle Mine. ENCOAL is also pursuing a surface land exchange with the USFS because the proposed location for the ENCOAL facilities is on USFS surface. In addition, ENCOAL has filed a Permit Amendment Application with the Industrial Siting Division of WDEQ for the proposed LFC plant, and an air quality permit application with WDEQ/AQD. Other permits that will be obtained include a wastewater permit from WDEQ, a permit for a quantity of water from the Wyoming State Engineer's Office, and various construction and waste disposal permits from the state and county.

Two Elk would be a coal-fired power plant located about 3 miles northeast of the North Rochelle LBA and would generate 250 Mw. The plant would burn low Btu "waste coal" and coal fines as well

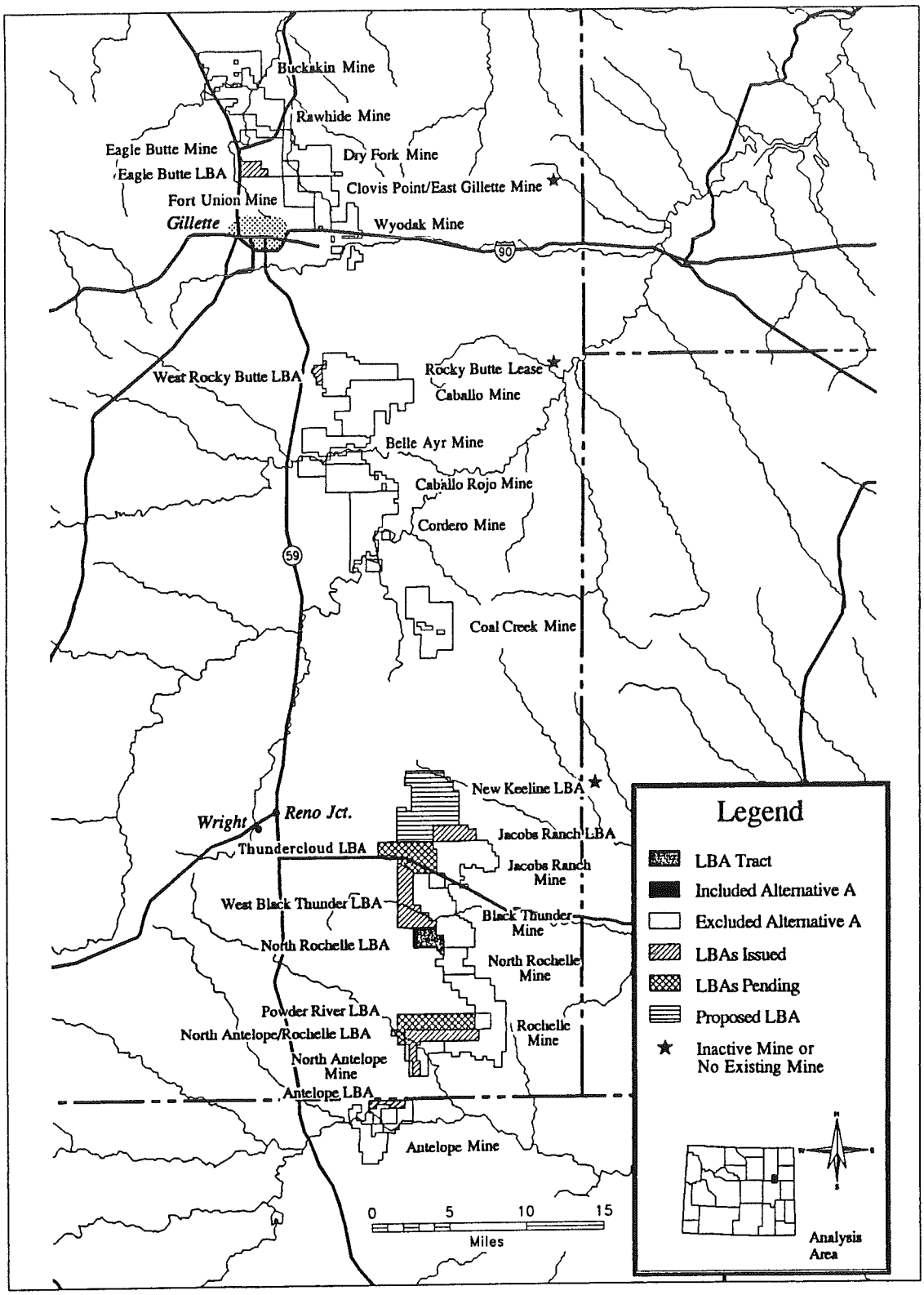


Figure 4.1 Existing and Proposed Federal Coal Leases.

as sub-bituminous coal in a pulverized coal boiler. This ability to burn low Btu waste coal and fines will allow the Two Elk plant to recover fuel values that might otherwise be lost, and thereby generate electric power more efficiently than existing coal-fired plants. Coal and waste coal will be transported from the mine to the power plant by direct truck haul on unpaved roads, and ash will be returned to the mine by enclosed, 4-wheel off-highway trucks. An application for an air quality Permit to Construct has been submitted to WDEQ but, as of April 1, 1997, has not been determined to be complete. No final decisions have been made as to how much water would be used, or where it would come from. Various scenarios for "wet" and "dry" operations are being evaluated at this time. Other permits that will be obtained include a wastewater permit from WDEQ and various construction and waste disposal permits from the state and county.

4.5.1 Topography and Physiography

Following surface coal mining and reclamation, topography will be modified in an elongated corridor east of and paralleling Highway 59 from just north of Gillette, Wyoming, south for about 75 mi. The topography in the PRB is characterized by relatively flat or rolling topography. After reclamation, these characteristics will be emphasized in the reclaimed area. Premining features that were more topographically unique (e.g., steeper hills and gullies, rock outcrops, etc.) will generally be smoothed out. The reduction in topographic diversity may lower the carrying capacity for big game in the reclaimed areas; however, big game ranges are generally very large and mining activities are, in general, not located in habitats defined as crucial. The overall flattening and lowering of the topography would result in increased infiltration of surface water and reduced peak flows from the drainages. These changes would not be significant because the streams typically flow from west to east across the area rather than north to south along the entire corridor. Therefore, only a very small part of each stream's drainage area would be disturbed (see Section 4.5.5). Mining the North Rochelle LBA tract would increase the area of disturbance in the southern group of mines by about 4%.

4.5.2 Geology and Minerals

The PRB coal region encompasses an area of about 20,000 mi^2 and contains nearly 240 billion tons of sub-bituminous coal resources (BLM 1979). Campbell County has a total surface area of about 4,760 mi^2, of which approximately 4% is within current mine permit boundaries. Coal mining in this area disturbs about 2,000 acres annually with about 1,850 acres reclaimed annually (BLM 1996g). Mining and reclamation rates are expected to continue to increase through the year 2015, but the balance between reclamation and mining should remain about the same. A group of six mines, including North Rochelle and the LBA tract, exist in the southern portion of the PRB. Production of coal in the southern mine group began in 1977 at the Black Thunder Mine. The current maximum permitted production rate is 152 million tons per year from the six mines. An estimated 3 billion tons of leased coal underlies these six mines, and additional unleased deeper coal reserves are present adjacent to these mines. Approximately 52,000 acres are contained in the existing permit boundaries and will be disturbed--42,000 acres by mining and 10,000 acres by roads, railroads, facilities, temporary stockpiles, and other mine-related activities and structures. This represents approximately 20% of the analysis area (see Figure 3.1). Under the Proposed Action, annual coal production from the North Rochelle Mine and the LBA tract would be 15 million tons (304.1 million tons for the life of the mine) and surface disturbance would be 5,080 acres.

In the PRB, the coal reserves currently leased represent a small percentage of the total coal reserves, but a large percentage of the shallowest (hence, the most economical to recover) reserves. Removal of this coal is an irreversible and irretrievable impact. PRB coal was used to

generate electricity for the public in 19 states and Canada in 1995. The members of the public in those states benefit from the low utility rates related to the price of coal, clean air due to the low sulfur content of the coal, and from the royalties and bonus payments that the federal government receives from the coal. Locally, continued sale of PRB coal helps stabilize municipal, county, and state economies.

4.5.3 Soils

The six existing southern mines as permitted would disturb approximately 52,000 acres throughout their combined lives (they would disturb about 800 acres annually during active mining). Assuming 10 years from initial disturbance to reclamation of a parcel of land for use by domestic livestock, a total of approximately 14,000 acres (12% disturbed by North Rochelle and LBA tract) would be unsuitable for such use at any given time during active mining. However, the replaced topsoil would support a stable and productive vegetation community adequate in quantity and quality to support planned postmining land uses (i.e., wildlife habitat and rangeland). The total area of disturbance for the ENCOAL Plant would include 73 acres inside the North Rochelle mine rail loop, 45 acres for topsoil stockpiles, and 29 acres for a reservoir. Portions of this disturbance would be areas common with the mine. Total disturbance for North Rochelle mine facilities would be approximately 250 acres. Environmental concerns would be addressed in the North Rochelle mine permit issued by WDEQ/LQD.

4.5.4 Air Quality

According to current regulatory standards by which air quality is defined, surface mining and coal bed methane development in the PRB has not resulted in impacts to air quality that have exceeded federal or state standards.

The nearest Class I area is located approximately 80 mi east of the analysis area at Wind Cave National Park in southwestern South Dakota, and no impacts on air quality in excess of that permitted by regulation are known to have occurred in this area due to PRB mines.

WDEQ follows a modeling protocol which includes all mine-generated air pollutants from all nearby mines (within 2 mi) to determine impacts to ambient air quality. Known as the "Mine A/Mine B" modeling procedure, this model evaluates the total impacts of a given mining operation, including those impacts from and on neighboring mines. The protocol is restricted as a matter of state regulatory policy to evaluation of the average annual impacts ($<50\ \mu g/m^3\ PM_{10}$). If the LBA tract is leased under the Proposed Action or Alternative A, WDEQ would require that ambient air quality modeling be conducted that would consider all proposed mining at the North Rochelle, Black Thunder, and Jacobs Ranch Mines. It would not include the Antelope, North Antelope, or Rochelle Mines because these operations are more than 2 mi from the LBA tract.

Figure 4.2 is from the Black Thunder Mine's 1994 cumulative air quality modeling analysis for their revised operating permit. It illustrates the relatively minimal off-site particulate impact of mining on ambient air quality. The figure shows the calculated PM_{10} concentrations from mining Jacobs Ranch (top, right), Black Thunder (middle), and North Rochelle (bottom, right), and the rapid decay of PM_{10} concentrations with increased distance from the mining areas. This modeling effort demonstrates that, given the total extraction of 87 million tons of coal in the impact area, the 50 $\mu g/m^3$ annual average PM_{10} standard would not be exceeded for the modeled year (2011).

Based on predictive models conducted for PRB mines, mining operations do not have significant off-site particulate pollution impacts, even when production and pollution from neighboring mines are considered. However, this prediction has been based on the assumptions that mining activities are sufficiently removed from the permit boundaries

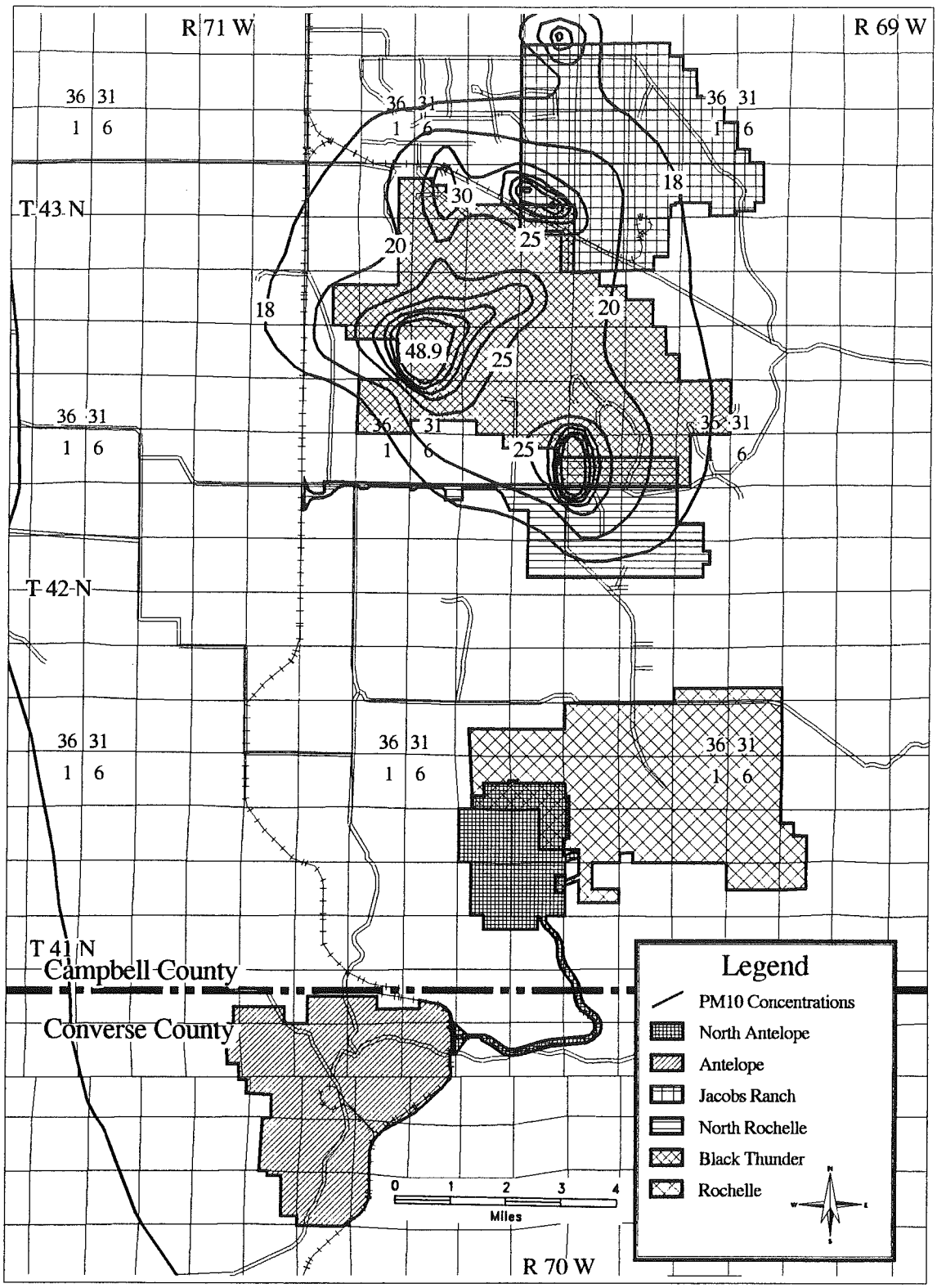


Figure 4.2 Modeled Annual Average PM_{10} Concentrations, Black Thunder Mine, Year 2011 (WDEQ 1994). Model Basis Includes 15 $\mu g/m^3$ Ambient PM_{10} Background Concentration.

and that neighboring mines are not actively mining in the immediate vicinity (within 0.6-2.5 mi). Previous modeling (BLM 1992a) has shown that incremental particulate pollution impacts decrease to insignificant levels (<1 $\mu g/m^3$ PM_{10} annual average) within 6 mi of active mining.

Dispersion modeling conducted by WDEQ shows that the maximum expected annual TSP concentration from the currently permitted North Rochelle, Black Thunder, and Jacobs Ranch Mines in the year 2000 would be around 55 $\mu g/m^3$ near North Rochelle's northern permit boundary (the year 2000 was modeled because the cumulative impact of the mines to air quality is expected to be greatest then). This is well within the state standard of 150 $\mu g/m^3$. Similar dispersion modeling will be required by WDEQ prior to mining the LBA tract.

An application for an air quality Permit to Construct for the ENCOAL Plant was submitted to WDEQ on November 20, 1996. Proposed emission limits include approximately 2,700 tons/year (TPY) of NO_x, 2,100 TPY of SO_2, 2,600 TPY of CO, 353 TPY of particulates, and 1,040 TPY of VOCs. The ENCOAL Plant will use Best Available Control Technology--the use of such technology is mandated by law. An air quality permit will not be issued unless the proposed facility is in compliance with air quality regulations. Modeling for air quality at the ENCOAL Plant must include mining at adjacent operating mines, including North Rochelle, which is presently permitted to mine at a maximum rate of 20 million tons per year.

Two Elk is anticipated to release 1,619 TPY of NO_x, 2,163 TPY of SO_2, 361 TPY of CO, 544 TPY of particulates, 43 TPY of non-methane total organic compounds, and 1.88 TPY of lead. An application for an air quality Permit to Construct has been submitted to WDEQ, but, as of April 1, 1997, has not been determined to be complete. Pollution controls for Two Elk will qualify as Best Available Control Technology, and Two Elk must be determined to be in compliance with applicable ambient air quality standards prior to issuance of an air quality permit. Modeling for Two Elk will consider mining at adjacent mines.

4.5.5 Water Resources

Surface Water

Changes in drainage patterns and surface disturbance are decreasing and will continue to decrease flows in most of the ephemeral and intermittent drainages exiting the mine sites. Development of coal bed methane resources in the area west of the mines would potentially increase surface flow in some drainages. The EIS being prepared to analyze the impacts of coal bed methane development south of Gillette (see Figure 3.5) estimates that a maximum average surface discharge of 20 gpm from 423 wells distributed to 80 discharge points would result in a maximum discharge of approximately 0.22 cfs. This increased flow represents 20-100% of the 2-year, 24-hour flood flows from 1 square mile. Since the coal bed methane-produced water is of relatively good quality, it is sometimes diverted by the surface landowner into reservoirs for livestock use, which would reduce the amount of coal bed methane-produced water that would ultimately reach the major channels.

The USGS has predicted that major streams in the PRB will exhibit increased runoff ranging from 0.4% in the Cheyenne River to 4.3% in Coal Creek due to cumulative disturbance as a result of existing surface coal mining (Martin et al. 1988). However, the USGS considered mining the existing North Rochelle lease at a rate of only 8 million tons per year. The increased mining rate at the North Rochelle Mine (15 million tons/year), the increased mining rates at adjacent mines, and the addition of previous and pending LBAs, including the North Rochelle tract, would increase this runoff figure. Coal bed methane development was also not considered in that analysis, but depending on the level of development, runoff could increase substantially in some of the area's streams. However, to date, water produced by

coal bed methane wells has typically been used for stock or other purposes by the surface landowners in the area of development. Drainage from all six southern mines combines in the Cheyenne River where Black Thunder Creek enters. The drainage area of the Cheyenne River basin at this point is approximately 2,430 mi^2. The entire area of disturbance from these six mines as currently permitted would impact approximately 2% of the drainage basin of the Cheyenne River, and this disturbance would occur over about 50 years. Planned LBAs and the New Keeline Mine would raise this disturbance acreage to roughly 3% of the Cheyenne River Drainage Basin.

Sediment yield should not increase significantly in area streams even with the addition of mining the pending and planned LBA tracts and the potential for coal bed methane development because, as discussed in Section 4.1.5, state and federal regulations require that all surface runoff from mined lands pass through sedimentation ponds. The potential for cumulative adverse impacts to the Cheyenne River drainage is also minimal because it is typically dry for a substantial portion of the year.

Groundwater

The southern group of mines would use about 1,736 acre-ft of water per year for drinking, sanitation, washing equipment, and dust control. This water would come from deep wells and from seepage into the mine pits. The southern mines will pump an estimated 1,400 acre-ft per year from the pits and dewatering wells. There are currently no coal bed methane wells adjacent to the southern group of mines; however, in 1995, approximately 1,900 acre-ft of water was produced from 133 coal bed methane wells located about 20 mi northwest of this group of mines. This is about 14 acre-ft per well per year. As a result of pit dewatering and coal bed methane production, water levels in the coal could be lowered over as much as 800 mi^2, and water levels in the overburden could be lowered in as much as 200 mi^2. Impacts to wells completed in the overburden and coal aquifers could range from a slight lowering of the water level to completely drying up the well. Increased consumption from water supply wells in aquifers below the coal will lower water levels in those aquifers. However, drawdown in these deeper aquifers will not occur over wide areas because few wells are completed in these aquifers, the wells are generally more than a mile apart, and the sandstones in these aquifers are generally discontinuous and have limited areal extent. The water levels will gradually recover, as reclamation proceeds and coal bed methane reserves are depleted. Coal companies are required by state and federal law to replace any water sources that are interrupted, discontinued, or diminished. North of Gillette, a coal bed methane operator and local landowners have developed a water well mitigation agreement that can be used on a case-by-case basis as development proceeds. This same agreement is being used to some extent by operators in the assessment area.

In 1987, the USGS, in cooperation with the WDEQ and OSM, conducted a study of the hydrology of the eastern PRB to provide hydrologic information necessary to perform required assessments. The resulting description of the cumulative effects of all current and anticipated mining (as of 1987) on the hydrologic system of the eastern PRB is presented in the *Cumulative Potential Hydrologic Impacts of Surface Coal Mining in the Eastern Powder River Structural Basin, Northeastern Wyoming*, which is generally referred to as CHIA (Martin et al. 1988). This report details the potential cumulative groundwater impacts of surface coal mining in the area is incorporated by reference into this EIS.

The CHIA is currently being updated. As a result of the cooperative agreement between WDEQ, OSM, BLM, the State Engineer's Office, the University of Wyoming, and the Wyoming State Geological Survey, a water well database has been developed using data from the mines' monitoring wells. As a pilot project, this database is being used with a drawdown model, which was also developed under the cooperative agreement,

to predict cumulative drawdown as a result of currently approved mining at the North Rochelle, Black Thunder, and Jacobs Ranch mines. The results of this model analysis are not yet available.

In order for mining of the LBA tract to proceed, it must be permitted by WDEQ/LQD. As part of this process, the applicant must assess the probable hydrologic consequences of mining the LBA tract and the WDEQ/LQD must find that the cumulative hydrologic impacts of all anticipated mining would not cause material damage to the hydrologic balance outside the permit area.

The cumulative hydrologic impacts associated with mining the LBA tract will be reevaluated by the WDEQ/LQD based on site-specific, current data before the tract can be mined. Each time a mine permit application or a revision is made, the WDEQ/LQD assesses cumulative hydrologic impacts based on site-specific information, which is targeted to determine the cumulative impacts of the applicant's mine or changes in the applicant's mining plan in combination with other mines or activities in the area.

Assessing cumulative groundwater impacts in this EIS will rely on a comparison of the predictions in the 1988 CHIA with monitoring information gathered since publication of the CHIA. Monitoring programs, which are required by WDEQ/LQD and administered by the mining companies, have been established in the Eastern PRB. Each mine is required to monitor groundwater levels in the coal itself as well as in shallower aquifers in the area surrounding their operations. There are also requirements for drilling monitoring wells in the backfill areas of the mines to record water level recovery.

The Gillette Area Groundwater Monitoring Organization (GAGMO), a voluntary group which was formed in 1980, assembles and reports the annual hydrologic monitoring data that is collected by the coal mining companies operating in the eastern PRB of Wyoming. Members of GAGMO include most of the companies with operating or proposed mines in this area, WDEQ, Wyoming State Engineer's Office, BLM, USGS, and OSM.

Each year, GAGMO contracts with an independent firm to publish the results of the monitoring for that year. In 1991, GAGMO published a 10-year report, and in 1996 a 15-year report. The 15-year report summarized the water monitoring data collected from 1980 to 1995 in the Wyoming Powder River Basin (Hydro-Engineering 1996).

The major groundwater issues that have been identified related to surface coal mining 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 effects of the use of water from the subcoal Fort Union Formation by the mines; and
- changes in water quality as a result of mining.

The impacts of large-scale surface coal mining on a cumulative basis 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 groundwater concern. The following discussion of recharge, movement, and discharge of water in the spoil aquifer is excerpted from the CHIA (Martin et al. 1988:24):

> Postmining recharge, movement and discharge of groundwater in the Wasatch aquifer and Wyodak coal aquifer will probably not be substantially different from premining conditions. Recharge rates and mechanisms will not change substantially. Hydraulic conductivity of the spoil aquifer will be approximately the

same as in the Wasatch aquifer and the Wyodak coal aquifer allowing groundwater to move from recharge areas where clinker is present east of mine areas through the spoil aquifer to the undisturbed Wasatch aquifer and Wyodak coal aquifer to the west.

GAGMO data from 1990 to 1994 verifies that recharge is continuing in the backfill (Hydro-Engineering 1991a, 1992, 1993, 1994, 1995). Wells that have been drilled to monitor water levels in backfill indicate that recharge is occurring in reclaimed areas of the mines. The water monitoring summary reports prepared each year by GAGMO list current water levels in the monitoring wells completed in the backfill, and compare them with the 1980 water levels, as estimated from the 1980 coal water level contour maps. In the 1991 GAGMO 10-year report, some recharge had occurred in 89% of the backfill wells reported for that year. Over the past 3 years, water was present in approximately 92% of the backfill wells.

The cumulative size of the backfill area in the PRB would be increased by mining of the recently issued leases and the currently proposed LBA tracts. However, since reclamation is initiated concurrently with mining, and the monitoring data demonstrate that recharge of the backfill is occurring, it is not anticipated that additional significant impacts would occur as a result of any of these leasing actions. In the case of the North Rochelle Mine, mining began in 1990 and reclamation has begun, but a significant change in the cumulative impacts is not expected as a result of issuing the 1,440-acre North Rochelle LBA tract.

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. However, not all clinker is saturated. Some clinker is mined for road-surfacing material, but 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. Therefore, the major recharge source for the spoil aquifer is not being disturbed by current mining. Clinker does not occur on the LBA tract.

The second major groundwater issue is the extent of water level drawdown in the coal and shallower aquifers in the area surrounding the mines. Most of the monitoring wells included in the GAGMO 10-year and 15-year reports 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 ft to 420 ft in depth. The changes in water levels in the coal seams after 10 years and 15 years of monitoring are shown in Figures 4.3 and 4.4, respectively. These maps, which are taken from the GAGMO 10- and 15-year reports, show the area where actual drawdown in the coal seam is greater than 5 ft, in comparison with the predicted worst-case 5-ft drawdown derived from groundwater modeling done by the mines. Determination of the 5-ft drawdown contour is required as part of WDEQ/LQD's mine permitting process. Figure 4.4 shows that the actual drawdowns are within the mines' predicted worst-case drawdowns except in Area 2, which includes the Caballo, Belle Ayr, Caballo Rojo, and Cordero mines. Similarly, the actual 5-ft drawdown levels are within the CHIA's predicted cumulative drawdown level except in the group of mines in Area 2. This is due to overlapping coal bed methane and coal mining impacts. For the southern group of mines, the actual 15-year drawdown lies within the cumulative drawdown predicted by CHIA.

The 1988 CHIA predicted the approximate area of 5 ft or more water level decline in the Wyodak coal aquifer that would 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. All of the currently producing mines were considered in the CHIA analysis (Martin et al.

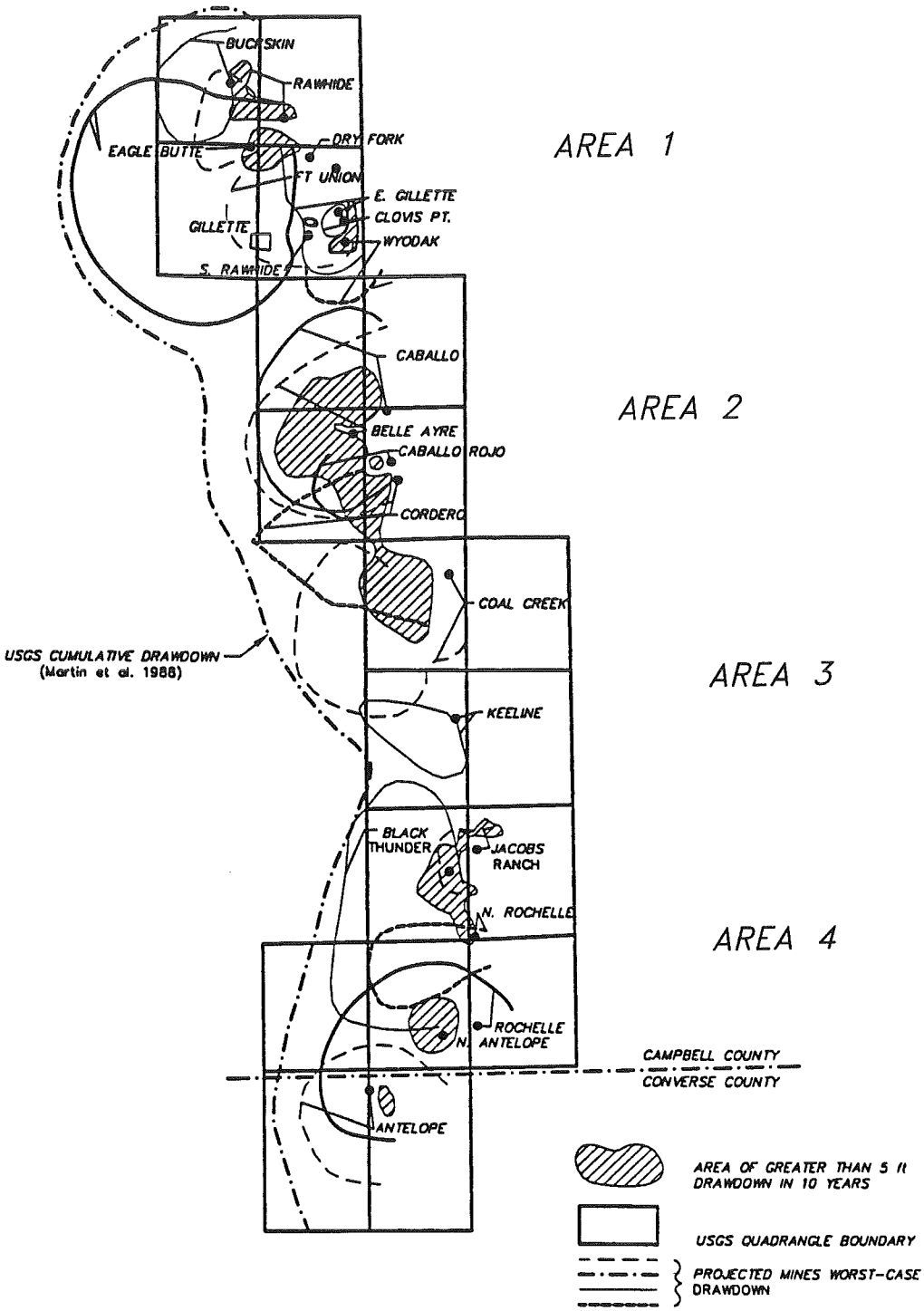


Figure 4.3 Comparison Between the 1990 Cumulative Drawdowns and the Mines' Worst Case and the USGS-predicted Cumulative Drawdowns (Modified from Hydro-Engineering [1991b]).

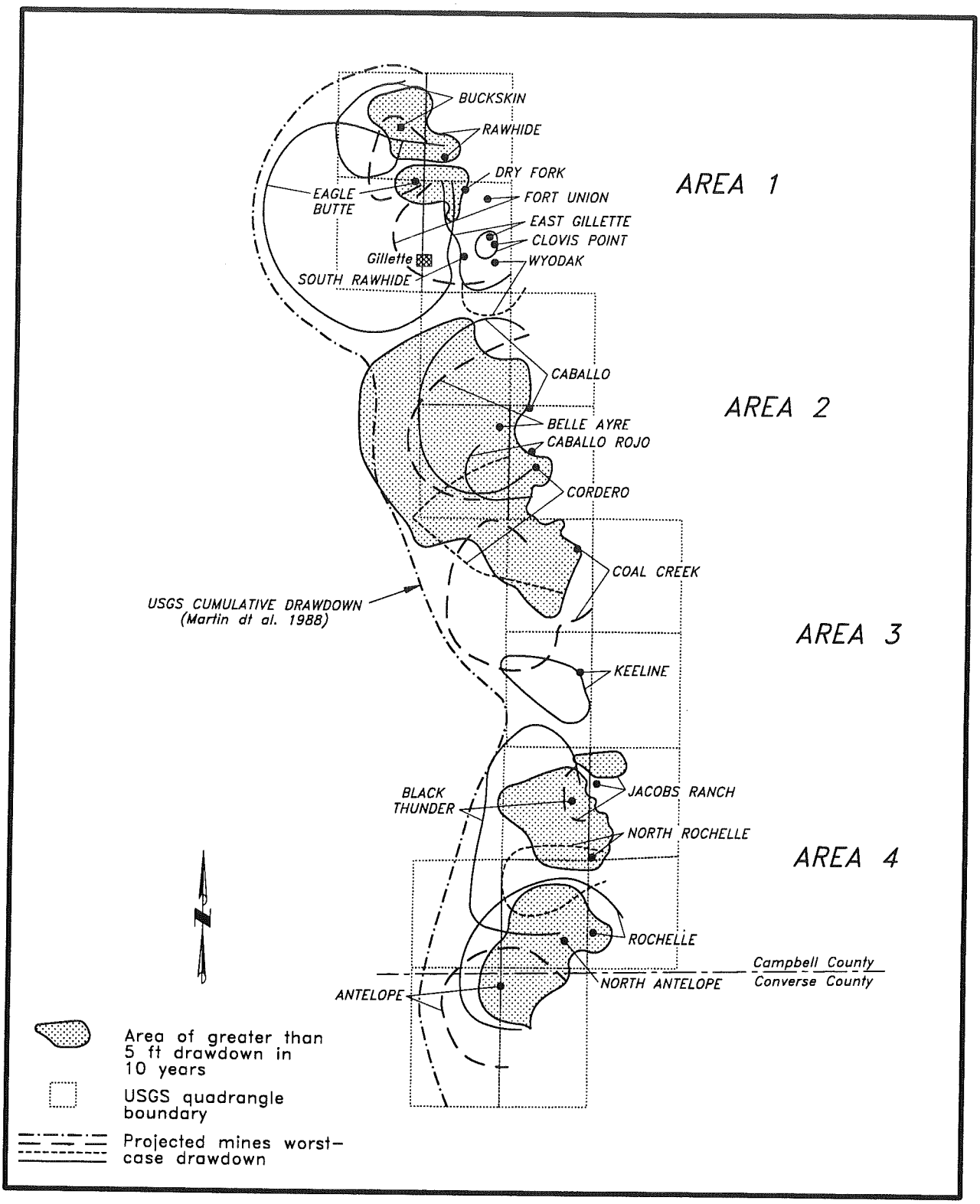


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Figure 4.4 Comparison Between the 1995 Cumulative Drawdowns and the Mines' Worst Case and the USGS-predicted Cumulative Drawdowns (Modified from Hydro-Engineering [1996]).

1988), but coal bed methane development was not anticipated at the time that analysis was prepared. The CHIA pilot study in preparation at this time does consider potential coal bed methane development in its analysis. The 1988 CHIA assumes that water supply wells completed in the coal may be affected as far away as 8 mi from mine pits as a result of the anticipated coal mining, but the effects at that distance were assumed to be minimal.

Wells in the Wasatch Formation were considered to be impacted by drawdown only if they were within 2,000 ft of a mine pit (Martin et al. 1988:29). Drawdown extends farther in the coal than in the shallower aquifers (Wasatch Formation, alluvium, and clinker) because the coal is a confined aquifer that is really extensive. The area in which the Wasatch Formation and alluvium experience a 5-ft drawdown would be smaller than the area of drawdown in the coal because the shallower aquifers are generally discontinuous and of limited areal extent. Clinker is extensive east of the mines and aquifer pump tests at high rates in the clinker have shown very little drawdown because of its very high transmissivity.

Based on the above assumptions, the CHIA estimated that about 3,000 wells in the area would be subject to impact by current and anticipated mining in Wyoming's PRB. 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 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. All wells listed in Appendix E which are completed in the coal or shallower aquifers and are located within the USGS-predicted cumulative drawdown (see Figure 4.3) may potentially be subject to impact (i.e., water level decline).

Of the 1,200 water supply wells subject to impact in the CHIA, about 580 are completed in the Wasatch Aquifer, about 100 in the Wyodak Coal Aquifer, and about 280 in strata below the coal. There is no completion data available for the remainder of these wells (about 240).

The additional groundwater impacts that would be expected as a result of extending mining into the LBAs issued or proposed to date would be to extend the drawdown areas in the area surrounding the proposed new leases. The LBAs, in general, would not bring mining operations substantially closer to one another, so there would not be any substantial increase in overlapping, or cumulative, drawdown area between mines. In the case of the North Rochelle LBA, mining operations may occur closer to Black Thunder operations for a longer period of time. The actual drawdown contours for the mines in the southern group with issued or proposed LBAs that would maintain their current operations are within the cumulative drawdown anticipated in the CHIA, and monitoring indicates that recharge has been occurring and is continuing to occur in the backfill in that area (GAGMO). Therefore, additional significant impacts in water level drawdown related to coal mining for the maintenance leases, including the North Rochelle LBA, are not anticipated. However, dewatering activities associated with reasonably foreseeable coal bed methane development has the potential to extend the drawdown in the coal aquifer over a larger part of the southern PRB.

Potential water level decline in the subcoal Fort Union Formation is the third major groundwater issue. According to the Wyoming State Engineer's records (1991), 14 mines held permits for 42 wells between 400 ft and 10,000 ft deep. The zone of completion of these wells was not specified, and not all of the wells were producing (for example, three of the permits were held by an inactive mine, and one of the wells permitted by the Black Thunder Mine has not been used since 1984).

Water level declines in the Tullock have been documented in the Gillette area. According to

Crist (1991), these declines are most likely attributable to pumpage for municipal use by Gillette and for use at subdivisions and trailer parks in and near the city of Gillette. Most of the water level declines in the subcoal Fort Union wells occur within 1 mi of the pumped wells (Crist 1991; Martin et al. 1988). The mine facilities in the PRB are separated by a distance of 1 mi or more, so little interference between mine supply wells would be expected.

In response to concerns voiced by regulatory personnel, several mines have conducted impact studies of the subcoal Fort Union Formation. The OSM commissioned a cumulative impact study of the subcoal Fort Union Formation to study the effects of mine facility wells on this aquifer unit (OSM 1984). 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 the Gillette area, water levels in this aquifer are probably declining because the city of Gillette and several subdivisions are utilizing water from the formation (Crist 1991). (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 ft or more, a drawdown of 100 to 200 ft in the vicinity of a pumped well would not dewater the aquifer.

The mines adjacent to the proposed maintenance LBAs all have permits from the State Engineer for deeper wells. Extending the life of these mines with the LBAs would result in additional water being withdrawn from the Tullock. The additional water withdrawals would not be expected to extend the area of water level drawdown over a significantly larger area due to the discontinuous nature of the sands in the Tullock Aquifer.

According to the State Engineer's Office, the only permitted wells drilled below 1,000 ft in a 100 mi^2 area surrounding Wright are four wells permitted to the City of Wright. As discussed above, most of the water level declines in the subcoal Fort Union wells occur within 1 mi of pumped wells. The North Rochelle LBA, about 12 mi southeast of Wright, would not contribute significantly to any cumulative impact on the water supply for that town.

The fourth issue of concern with groundwater is the effect of mining on 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?

In a 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 coal aquifer (Martin et al. 1988). This is expected because blasting and movement of the overburden materials 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. 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 (USGS 1987). One pore volume of water is the volume of water which would be required to fill the pore space or open space in the spoils following reclamation. The time required for one pore volume of water to pass through the spoil aquifer is greater than the time required for the postmining groundwater system to re-establish equilibrium. According to the CHIA, estimates of the time required to reestablish equilibrium range

from tens to hundreds of years (Martin et al. 1988).

Chemical analyses of 336 samples collected between 1981 and 1986 from 45 wells completed in spoil aquifers at 10 mines indicated that the quality of water in the spoil will, in general, meet state standards for use for livestock when recharge occurs (Martin et al. 1988). The major current use of water from the aquifers being replaced by the spoils (the Wasatch and Wyodak-Anderson Coal Aquifers) is for livestock because these aquifers are typically high in dissolved solids in their premining state (Martin et al. 1988).

According to monitoring data published by GAGMO (Hydro-Engineering 1991a, 1991b, 1992, 1993, 1994, 1995), average TDS values in backfill wells have ranged from 400 to 25,000 mg/l. Of the backfill wells reported in the 1993 annual GAGMO report (Hydro-Engineering 1993), TDS in 71% were less than 5,000 mg/L, TDS in 25% were between 5,000 and 10,000 mg/L, and TDS in 4% were above 10,000 mg/L. This data supports the conclusion that water from the spoils would generally be acceptable for its current use, which is livestock watering, before and after equilibrium is established. The incremental effect of all recent leasing on groundwater quality would be to increase the total volume of spoil and, thus, the time to reestablish equilibrium.

The ENCOAL Plant will apply to WDEQ/WQD for a wastewater permit in 1998, and did apply to the Wyoming State Engineer's Office for a quantity of water available decision in January 1997. The request is currently pending. They anticipate using approximately 800 gpm of groundwater and surface water, although final plans for the water supply have not been finalized. Two Elk has not yet decided how much water they will use or where it will come from. They are evaluating various scenarios for "wet" and "dry" operations at the present time.

4.5.6 Alluvial Valley Floors

No cumulative impacts to alluvial valley floors are expected to occur as a result of leasing and subsequent mining of the North Rochelle LBA tract.

4.5.7 Wetlands

No cumulative impacts to wetlands are expected to occur as a result of leasing and subsequent mining of the North Rochelle LBA tract.

4.5.8 Vegetation

Most of the land that is being or will be disturbed is grassland, sagebrush shrubland, or rough breaks and is used for grazing and wildlife habitat. Rangeland is, by far, the predominant land use in the PRB, comprising 92% of the land in Campbell and Converse Counties. A small amount of dryland farming would be disrupted by mining. At the completion of mining, it is anticipated that all disturbed land will be reclaimed for grazing and wildlife habitat in the form of mixed grass prairie and sagebrush shrubland. Some of the minor community types, such as those occurring on scoria and rough breaks, will not be restored to premining levels.

In any given year, approximately 6,000 acres of land disturbed by mining activities at the six existing southern surface coal mines would not be reclaimed to the point of planting with permanent seed mixtures. Over the life of the six southern mines (as now permitted), a total of about 52,000 acres would be disturbed. This is the total acreage contained in the mine permit boundaries, however, only about 35,500 acres are currently included in federal coal leases. If the North Rochelle LBA tract is leased, the area of disturbance in the southern group of mines would be increased by about 1,900 acres, or 4% (see Table 2.4). Almost all of this acreage would be native rangeland.

Several impacts to vegetation will occur as a result of existing, already-approved operations at these six mines. Most of the surface disturbance would occur in two vegetation types: mixed grass prairie (25%) and Wyoming big sagebrush (40%). All six mines plan to restore these two types to approximately their premining areal extent. It is estimated that it would take from 20 to 100 years for big sagebrush density to reach premining levels. The big sagebrush component provides important wildlife habitat (particularly for mule deer, pronghorn, and sage grouse). The reduction in acreage of big sagebrush vegetation type would, therefore, reduce the carrying capacity of the reclaimed lands for mule deer, pronghorn, and sage grouse populations.

Although some of the less extensive native vegetation types (e.g., graminoid/forb riparian and forest-dominated riparian) would be restored during reclamation, most of the minor types (e.g., greasewood fans) would not. Consequently, community and species diversities would initially be lower on reclaimed lands. The shrub and tree components would take the longest to be restored to premining conditions. Replacement of mature trees with seedlings or saplings would, over the short term, reduce potential nesting sites for raptors and other bird species. Shrub cover and forage values would gradually increase in the years following reclamation. Over longer periods of time, species reinvasion and shrub establishment on reclaimed lands should largely restore the species and community diversity on these lands to premining levels. The dryland crop and irrigated crop vegetation types would be completely restored following mining.

Over the long term, the net effect of the cumulative mine reclamation plans may be the restoration, at least in part, of all eight vegetation types originally found in the area. However, the shrub component may be substantially reduced in areal extent. Shrubs are relatively unproductive for livestock, but very important for wildlife. All of the vegetation types found in the cumulative analysis area, as on the LBA tract, are fairly typical for this region of eastern Wyoming.

4.5.9 Wildlife

Cumulative impacts to most wildlife will increase as additional habitat is disturbed. Raptor and grouse breeding areas have been diminishing statewide for at least the last 30 years due, in part, to surface-disturbing activities. Coal mining and gas exploration and development have been identified as potential contributors to the decline in their breeding habitat. Therefore, no surface occupancy and disturbance, as well as seasonal restriction stipulations, have been applied to operations occurring on or near these crucial areas on public lands. These restrictions and stipulations have helped to protect important raptor and grouse habitat. Erection of transmission poles and planting of trees on reclaimed land will gradually replace raptor nesting and perching sites. There is little crucial habitat for waterfowl or fish on the mine sites. Small- and medium-sized animals will rapidly move back into the areas once reclamation is completed.

Numerous grazing management projects (fencing, reservoir development, spring development, well construction, vegetative treatments) have also impacted wildlife habitat in the area. The consequences of these developments have proven beneficial to some species and detrimental to others. Fencing has aided in segregation and distribution of livestock grazing, but sheep-tight woven wire fence has severely restricted antelope movement. Water developments are used by wildlife; however, without proper livestock management, many of these areas can become overgrazed. The developed reservoirs provide waterfowl, fish, and amphibian habitat. Vegetation manipulations have included the removal or reduction of native grass-shrublands and replacement with cultivated crops (mainly alfalfa/grass hay), as well as a general reduction of shrubs (mainly sagebrush) in favor of grass. These changes have increased spring and summer

habitat for grazing animals, but have also reduced the important shrub component that is critical for winter range, thus reducing overwinter survival for big game and sage grouse. The reduction in sagebrush has been directly blamed for the downward trend in the sage grouse populations.

Significant cumulative impacts to pronghorn resulting from already-approved concentrated mining and related disturbance in the southern group of mines have been predicted as additional habitat is disturbed and barriers are created to seasonal and daily movements. Significant cumulative secondary impacts also have been predicted because of the increased human population resulting in more poaching, increased vehicle/pronghorn collisions, and increased disturbance, in general. Issuance of the LBA tract would contribute to these cumulative impacts on pronghorn. Since there is little use of the LBA tract by other big game species (mule deer, elk, and white-tailed deer), cumulative impacts to these species would be insignificant.

The area of active mining in the southern group of mines lacks relatively large numbers of raptor nests. The largest concentration of nesting activity in the area is associated with the rough breaks country a few miles east of active mining in the Rochelle Hills, and past, present, and future mining is not impacting this raptor concentration. The creation of artificial raptor nest sites and raptor perches may ultimately enhance raptor populations in the mined area. On the other hand, where power poles border roads, perched raptors may continue to be illegally shot and continued road kills of scavenging eagles may result. Any influx of people into previously undisturbed land may also result in increased disturbance of nesting and fledgling raptors.

Cumulative impacts to waterfowl from already-approved mining, as well as the proposed LBA tract, would be insignificant because most of these birds are transient and most of the ponds are ephemeral. In addition, the more permanent impoundments and reservoirs that are impacted by mining would be restored. Sedimentation ponds and wetland mitigation areas would provide areas for waterfowl during mining.

Direct habitat disturbance from already-approved mining, as well as the LBA tract, should not significantly affect regional sage grouse populations because few vital sage grouse wintering areas or leks have been, or are planned to be, disturbed. However, noise related to the mining activity could indirectly impact sage grouse reproductive success. Sage grouse leks close to active mining could be abandoned if mining-related noise elevates the existing ambient noise levels. Surface coal mining activity is known to contribute to a drop in male sage grouse attendance at leks close to active mining, and over time, this can alter the distribution of breeding grouse (Remington and Braun 1991). Because sage grouse populations throughout Wyoming have been declining over the past several years, this impact could be significant to the local population when evaluated with the cumulative impacts of all energy-related development occurring in the area.

The existing and proposed mines in the southern PRB would cumulatively cause a reduction in habitat for other mammal and bird species. Many of these species are highly mobile, have access to adjacent habitats, and possess a high reproductive potential. As a result, these species should respond quickly and invade suitable reclaimed lands as reclamation proceeds.

Cumulative impacts on fish habitat and populations would be minimal because local drainages generally have limited value due to intermittent or ephemeral flows. Some of the permanent pools along drainages support minnows and other nongame fish, and the larger impoundments and streams in the area which have fish populations would be restored following mining.

Additional discussions of cumulative impacts to wildlife from coal development and industrialization of the eastern PRB are discussed in BLM regional EISs for the area (BLM 1974,

1979, 1981, 1984b), and these documents are incorporated by reference into this EIS. The impacts predicted in these documents have generally not been exceeded.

Cumulative impacts to USFS Region 2 Sensitive Species will be evaluated in a Biological Evaluation specific to this group when the lessee files an application for a surface mining permit, prior to mine development.

4.5.10 Threatened, Endangered, and Candidate Species

The USFWS has evaluated potential impacts to T&E species on the existing permit areas and have, in general, determined that no adverse impacts would occur to protected species.

OSM prepared a biological assessment of the eastern PRB in 1982 which concluded that mining operations might affect bald eagles. Following requirements of the Endangered Species Act, OSM requested a biological opinion from the USFWS, which was expanded to include a commentary on black-footed ferrets and peregrine falcons (personal communication, March 4, 1982, with John G. Wood, USFWS Acting Area Director). The opinion stated that cumulative impacts would not be adverse for bald eagles or peregrines but might be adverse for ferrets. As a result, OSM requires ferret surveys within 1 year of surface disturbance, either as a commitment in the mine plan or as a permit stipulation. USFWS requirements also mandate surveys for Ute lady's tresses and mountain plovers in potential habitat prior to surface-disturbing activities. Any potential impacts to T&E species would then be mitigated. Thus, no significant cumulative impact to T&E species are projected, with or without the LBA tract.

4.5.11 Land Use and Recreation

In addition to reducing livestock grazing and wildlife habitat, surface coal mining also disrupts oil and gas development and limits access to public lands, although the majority of the surface area being mined is privately owned.

Cumulative impacts resulting from energy extraction in the PRB include a reduction of livestock grazing and subsequent revenues, a reduction in habitat for some species of wildlife (particularly pronghorn and mule deer), and loss of recreational access to public lands (particularly for hunters).

There are no recreation facilities, wilderness areas, etc., in the immediate vicinity of the existing southern group of mines, and the majority of the land is seldom used by the public except for dispersed recreation (e.g., hunting), off-road vehicles, and sightseeing. Hunting and other public access is generally limited inside of the mine permit areas for safety reasons. However, approximately 80% of this land surface is private and access is controlled by the landowner.

The increased human presence associated with the cumulative energy development in the PRB has likely increased levels of legal and illegal hunting. Conversely, the mines in the area have become refuges for big game animals during hunting seasons since they are often closed to hunting. Energy development-related secondary impacts to wildlife have and will continue to result from human population growth. Energy development has been the primary cause of human influx into the eastern PRB. Mining the LBA tract will not increase employment levels, but will increase the years of production at the existing mine.

The demand for outdoor recreational activities, including hunting and fishing, has increased proportionately. However, at the same time these demands are increasing, wildlife habitat and populations are being reduced. This conflict between decreased habitat availability and increased recreational demand has had (or may have) several impacts: demand for hunting licenses may increase to the point that a lower success in drawing particular licenses will occur; hunting and fishing, in general, may become less

enjoyable due to more limited success and overcrowding; poaching may increase; the increase in people and traffic has and may continue to result in shooting of nongame species and road kills; and increased off-road activities have and will continue to result in disturbance of wildlife during sensitive wintering or reproductive periods.

Campbell County's public recreation facilities are some of the most extensively developed in the Rocky Mountain Region, and use by young, recreation-oriented residents is high. The relatively strong financial position of the county recreation program appears to assure future recreation opportunities for residents regardless of the development of the LBA tract or any other specific mine. Converse County's recreational facilities are not as advanced.

4.5.12 Cultural Resources

In most cases, treatment of eligible sites is confined to those that would be directly impacted, while those that may be indirectly impacted receive little or no consideration unless a direct mine-associated effect can be established. The high population levels associated with coal development coupled with increased access to remote areas would result in increased vandalism both on and off mine property. Lands in which coal is strip-minable (shallow overburden) may contribute to the permanent unintentional destruction of segments of the archeological record.

A majority of the known cultural resource sites in the PRB have been recorded as a result of studies at existing and proposed coal mines. An average density estimate of 8.5 sites per mi^2 (640 acres) can be made based on inventories at existing mines in the area, and approximately 50% of these sites are typically eligible for the NRHP. Approximately 550 cultural resource sites will be impacted by already-approved mines, with an estimated 140 of these sites being eligible for nomination to the NRHP. Clearly, a number of significant sites, or sites eligible for nomination to the NRHP, have been or will be impacted by coal mining operations within the PRB. Ground disturbance, the major impact, can affect the integrity of or destroy a site. Changes in setting or context greatly impact historical properties. Mitigation measures such as stabilization, restoration, or moving of buildings may cause adverse impacts to context, in-place values, and overall integrity. Additionally, loss of sites through mitigation can constitute an adverse impact by eliminating the site from the regional database and/or affecting its future research potential.

Beneficial results or impacts can also be expected from coal development. Valuable data are collected during cultural resource surveys. Data that would otherwise not be collected until some time in the future, or lost in the interim, are made available for study. Mitigation also results in the collection and preservation of data that would otherwise be lost.

4.5.13 Native American Concerns and Trust Resource Issues

No cumulative impacts to Native American traditional values or religious sites are expected to occur as a result of leasing and subsequent mining of the North Rochelle LBA tract.

4.5.14 Paleontological Resources

Impacts to paleontological resources as a result of the already-approved cumulative energy development occurring in the PRB consist of losses of plant, invertebrate, and vertebrate fossil material for scientific research, public education (interpretive programs), and other values. Losses have and will result from the destruction, disturbance, or removal of fossil materials as a result of surface-disturbing activities, as well as unauthorized collection and vandalism. A beneficial impact of surface mining can be the exposure of fossil materials for scientific

examination and collection, which might never occur except as a result of overburden removal, exposure of rock strata, and mineral excavation.

4.5.15 Visual Resources

A principal visual impact in this area is the visibility of mine pits and facility areas. However, anyone likely to see these facilities would either be passing through the area or visiting it on mine-related business. Except from the air, the pits or the facilities are not visible from more than a few miles away. Issuance of the LBA tract would not change this impact.

After mining, the reclaimed slopes might appear somewhat smoother than premining slopes and there would be fewer gullies than at present. Even so, the landscape of the reclaimed mines would look very much like undisturbed landscape in the area.

4.5.16 Noise

Existing land uses within the PRB (e.g., mining, livestock grazing, oil and gas production, transportation, recreation) contribute to noise levels, but wind is generally the primary noise source. Mining on the LBA tract would not increase the number of noise-producing facilities within the PRB, but it would lengthen the time this particular noise source would exist and may augment the level of impacts to other resources (e.g., increased exposure of wildlife to noise impact, increased noise impacts to recreational users). Mining-related noise is generally masked by the wind at short distances, so cumulative overlap of noise impacts between mines is not likely.

Recreational users and grazing lessees utilizing lands surrounding active mining areas do hear mining-related noise; but this has not been reported to cause a significant impact. As stated above, wildlife in the immediate vicinity of mining may be adversely affected by noise; however, observations at other surface coal mines in the area indicate that wildlife generally adapt to noise conditions associated with active coal mining.

Cumulative increases in noise from trains serving the PRB mines have caused substantial increases (more than 5 dBA) in noise levels along segments of the rail lines over which the coal is transported to markets. However, no significant adverse impacts have been reported as a result.

4.5.17 Transportation Facilities

No new cumulative impacts to transportation facilities are expected to occur as a result of leasing and subsequent mining of the North Rochelle LBA tract. The planned transportation facilities for North Rochelle will be built with or without the LBA tract, and employment levels will not change with the LBA tract, but the length of employment will be extended. North Rochelle traffic levels will be maintained for a longer period.

Construction workers at the ENCOAL Plant would be bused from Gillette and Wright to the project site, and the busing program may be extended to other communities if warranted and cost effective.

4.5.18 Socioeconomics

Because of all the energy-related development that has been occurring in and around Campbell County during the past 30 years, socioeconomic impacts are a major concern. Wyoming's economy has been structured around the basic industries of extractive minerals, agriculture, tourism, timber, and manufacturing. Even though each of these basic industries are important, the extractive mineral industry has long been a vital part of Wyoming's economy. Many Wyoming communities depend on the mineral industry for much of their economic well being. The assessed valuation on total minerals produced in 1990 accounted for 91% of the state's total assessed valuation. Because most minerals are taxed a percentage of their assessed valuation, this makes the mineral industry a significant revenue base for

both local and state government in Wyoming (Department of Commerce Economic and Community Development Division, Energy Section 1992).

Coal production in the PRB is projected to reach a record high of 319 million tons in the year 2002 before declining to about 295 million tons in 2005 (BLM 1996a). Coal prices are projected to remain relatively constant throughout this period (BLM 1996e). By 2005, annual coal production is projected to generate about $2.6 billion of total economic activity, including $351 million of personal income, and would support the equivalent of nearly 15,885 full-time positions (BLM 1996a).

The North Rochelle mine is scheduled for construction beginning in the second quarter of 1997, and this would coincide with construction of the ENCOAL Plant. The North Rochelle construction peak (226 construction workers plus an operations workforce of 36) would occur in the fourth quarter of 1997, as the ENCOAL Plant would begin to build towards its projected third quarter 1998 peak of 1,560 workers (Planning Information Corporation 1997). Two Elk would begin in the third quarter of 1997 and, as currently planned, would have a peak workforce of 752 in the second quarter of 1998--one quarter before the ENCOAL Plant peak. If the three projects proceed as currently planned, the combined peak construction workforce would total an estimated 2,431 workers in the second quarter of 1998. The cumulative operations workforce for the ENCOAL Plant and North Rochelle would total an estimated 222 workers when both projects are operational. The Two Elk operations workforce estimates are not yet available. The percent of local hires for the three projects would be 22%, or a peak total of 569 local hires, whereas an estimated 1,862 non-local workers would be required during the peak construction quarter. Non-local population increases would peak at 2,900 in the second quarter of 1998, and most would reside in Campbell County. Increases in school enrollment would peak at an estimated 304 children in the fourth quarter of 1998. Cumulative housing demand in communities would peak in the second quarter of 1998 at 1,186 units, not including a proposed construction camp in Wright proposed by the ENCOAL Plant to house 500 single-status workers. Housing supply would be adequate to satisfy this demand.

If all three projects proceed as planned, cumulative construction-related sales and use tax revenues to local governments would total an estimated $12.5 million and the State of Wyoming would receive an estimated $17 million. Impact assistance payments would be $6.5-$7 million, and the incremental annual ad valorem tax revenues to the appropriate local government taxing entities could exceed $8 million in current dollars once the ENCOAL Plant and North Rochelle mine are operational, assuming current mill levies and excluding depreciation.

4.6 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The North Rochelle Mine would be able to produce coal at the anticipated production level for 26 years under the Proposed Action or Alternative A. As the coal is mined, almost all components of the present ecological system, which have developed over a long period of time, would be modified. In partial consequence, the reclaimed land would be topographically lower, and although it would have approximately the original contour, it would lack some of the original diversity of geometric form.

The forage and associated grazing and wildlife habitat that the LBA tract provides would be lost during mining and reclamation. During mining of the LBA tract, there would be a loss of native vegetation on 1,440 acres (Proposed Action) or 1,482 acres (Alternative A) with an accompanying disturbance of wildlife habitat and grazing land. However, it is estimated that the mine site would be returned to equivalent or better forage production capacity for domestic livestock within about 40 years after initial disturbance. Long-term

productivity would depend largely on postmining range-management practices, which to a large extent would be controlled by private landowners.

Mining would disturb antelope habitat, but the LBA tract would be suitable for antelope following successful reclamation. Reduced topographic diversity would make the area permanently less suitable for mule deer. Despite loss and displacement of wildlife during mining, it is anticipated that reclaimed habitat would support a diversity of wildlife species similar to premining conditions. The diversity of species found in undisturbed rangeland would not be completely restored on the leased lands for an estimated 50 years after the initiation of disturbance and re-establishment of mature sagebrush habitat--which is crucial for antelope and sage grouse--could take even longer.

There would be a deterioration of the groundwater quality in the lease area because of mining; however, the water quality would still be adequate for livestock and wildlife. This deterioration would probably occur over a long period of time. During mining, depth to groundwater would increase as much as 5 mi away from the pit in the coal aquifer. The water levels in the coal aquifer should return to premining levels at some distant time (possibly 70-100 years) after mining has ceased. There would be a temporary depletion of the quantity of groundwater when the pit intercepts the aquifer and the water is pumped out; however, there should be no permanent depletion after mining.

Mining operations and associated activities would degrade the visual resources of the area on a short-term basis. Following removal of surface facilities and completion of reclamation, the long-term impact on visual resources would be negligible.

Short-term impacts to recreation values may occur from reduction in big game populations due to habitat disturbance. These changes would primarily impact hunting in the lease area. However, because reclamation would result in a wildlife habitat similar to that which presently exists, there should be no long-term adverse impacts on recreation.

Both the Proposed Action and Alternative A would extend the life of the mine for 11 years, thereby enhancing the long-term economy of the region.

4.7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The major commitment of resources would be the mining and consumption of 144 million tons (Proposed Action) or 149 million tons (Alternative A) of coal to be used for electrical power generation. Coal bed methane associated with this coal would also be irreversibly and irretrievably lost. It is estimated that 1-2% of the energy produced would be required to mine the coal, and this energy would also be irretrievably lost.

The quality of topsoil on approximately 1,440 acres (Proposed Action) or 1,482 acres (Alternative A) would be irreversibly changed. Soil formation processes, although continuing, would be irreversibly altered during mining-related activities. Newly formed soil material would be unlike that in the natural landscape.

Loss of life may conceivably occur due to the mining operation and vehicular and train traffic. On the basis of strip-mine accident rates in Wyoming as determined by the Mine Safety and Health Administration, fatal accidents occur at the rate of 0.02 per 200,000 man-hours worked. Disabling (lost-time) injuries occur at the rate of 2.76 per 200,000 man-hours worked. This potential loss of life would be an irretrievable commitment of human resources.

Disturbance of all known historic and prehistoric sites on the mine site would be mitigated to the maximum extent possible. However, accidental destruction of presently unknown archeological or paleontological values would be irreversible and irretrievable.

5.0 CONSULTATION AND COORDINATION

In addition to this EIS, other factors and consultations are considered and play a major role in determining the decision on this proposed lease application. These include the following.

Regional Coal Team Consultation. The North Rochelle lease application was reviewed and discussed at the June 16, 1993, PRRCT meeting in Billings, Montana. The PRRCT determined that the lands in the application met the qualifications as a production maintenance tract and approved the application for processing by the lease-by-application method.

Governor's Consultation. The BLM Wyoming State Director notified the Governor of Wyoming on November 17, 1992, that a lease application had been filed with the BLM.

Public Notice. The BLM filed a public notice on November 17, 1992, announcing that this coal lease application had been received and requested public comment. The BLM also published a Notice of Intent to Prepare an Environmental Impact Statement, in the Federal Register on November 24, 1995, requesting public comments and announcing the time, date, and location of a public scoping meeting.

EPA published a Notice of Availability of a Draft Environmental Impact Statement in the Federal Register on November 8, 1996, and BLM published a Notice of Availability of a Draft Environmental Impact Statement and Notice of Public Hearing in the Federal Register on November 14, 1996.

Attorney General Consultation. After a coal lease sale, but prior to issuance of a lease, the BLM will solicit the opinion of the U.S. Attorney General on whether the planned lease issuance creates a situation inconsistent with federal anti-trust laws. The Attorney General is allowed 30 days to make this determination. If the Attorney General has not responded in writing within the 30 days, the BLM can proceed with issuance of the lease.

Other Consultations. Other federal, state, and local governmental agencies that were directly consulted in preparation of this EIS are listed in Table 5.1.

List of Preparers. Table 5.2 provides a listing of the BLM/USFS interdisciplinary team and the third-party consultant personnel who prepared this EIS.

Distribution List. This EIS was distributed to numerous congressional offices, federal agencies, state governments, local governments, industry representatives, interest groups, and individuals for their review and comment (Table 5.3).

Table 5.1 Other Federal, State, and Local Governmental Agencies Consulted in EIS Preparation.

Agency or Organization	Individual	Position
Powder River Regional Coal Team	5 Voting Members and 21 Nonvoting Members	
U.S. Fish and Wildlife Service	Steve Brockman Charles P. Davis	Wildlife Biologist Field Supervisor
Wyoming Game and Fish Department	Andrea Cerovski Patrick Hnilicka Bob Luce Olin Oedekoven Joe White Mark Zornes	Nongame Bird Biologist Wildlife Biologist Nongame Biologist Wildlife Biologist Deputy Director Wildlife Biologist
Wyoming Department of Commerce	John T. Keck	State Historic Preservation Office
Wyoming Department of Environmental Quality, Air Quality Division	Marc Arn	Analyst
Wyoming Economic Development Office	Ann McGowan	Community Specialist
Wyoming Division of Economic Analysis	Wayne Liu	Economist
Wyoming State Geological Survey	James Case	Geologist
Wyoming Natural Diversity Database	Mary Neighbours	Information Manager
Wyoming State Engineer's Office	Sue Lowry	Economic Specialist
Wyoming Public Service Commission	Jon F. Jaquot	Chief Engineer
Wyoming Oil and Gas Commission	Molly DeVore	Information Specialist
Gillette Planning Department	Tom Langston	Director Community Development
Douglas Planning Department	Tim Strong	Community Development Officer
City of Wright	Harry Underwood	Planner

Table 5.2 List of Preparers.

Name	Education/Experience	EIS Responsibility
BLM/USFS/OSM INTERDISCIPLINARY TEAM		
Core Team		
Nancy Doelger, BLM	M.S., B.S. Geology, 18 years professional experience	Project Coordinator
Mike Karbs, BLM	M.S. Regional Planning and Public Policy, B.S. Mineral Engineering, 20 years professional experience	Document Reviewer
Eugene Jonart, BLM	B.S. Forest/Range Management, 29 years professional experience	Document Reviewer
David Geer, USFS	B.S. Forest Resource Management, 20 years professional experience	Project Coordinator
Floyd McMullen, OSM	M.S. Environmental Science, B.S. Range/Forest Management, 22 years professional experience	Project Coordinator
Support Team		
Glen Nebecker, BLM	M.S., B.S. Botany, 16 years professional experience	Document Reviewer
B.J. Earle, BLM	B.A. Archaeology, 20 years professional experience	Cultural Resources
Larry Gerard, BLM	B.S. Wildlife Management, 20 years professional experience	Wildlife Resouces
Tom Durst, BLM	Ph.D., M.S., B.S. Geology, 22 years professional experience	Geology and Minerals
Mike Brogan, BLM	B.S. Watershed Management/Hydrology/Forestry, 18 years professional experience	Hydrology
Joe Meyer, BLM	B.S. Watershed Management with Soils Minor, 14 years professional experience	Soils
Bruce Lessig, BLM	B.S. Earth Science, 20 years professional experience	Mine Engineering
Laura Steele, BLM	23 years professional experience	Adjudicator
Tom Enright, BLM	B.S. Forestry, 30 years professional experience	Document Reviewer
Bob Janssen, BLM	M.S. Geology, B.S. Earth Science, 20 years professional experience	Geologist
Vern Rulli, BLM	M.S. Geology, B.S. Geologic Engineering, 18 years professional experience	Mine Engineering
Joe Reddick, USFS	B.S. Forestry, 25 years professional experience	Lands and Minerals
Tim Byer, USFS	B.S. Wildlife Management, 13 years professional experience	Wildlife
Sherry Dahl-Cox, USFS	B.S. Agronomy and Soil Science, 8 years professional experience	Rangeland Management
Toni Strauss, USFS	B.S. Range Management, 6 years professional experience	Rangeland Management
Jeff Tupala, USFS	B.S. Forestry, M.S. Landscape Architecture, 8 years professional experience	Visual Resources
Mark Wilcox, USFS	B.S. Resource Economics, M.S. Hydrology, 20 years professional experience	Hydrology
Bill Steenson, USFS	M.S. Forest Science, 30 years professional experience	Environmental Coordinator

Table 5.2 (Continued)

Name	Education/Experience	EIS Responsibility
TRC MARIAH ASSOCIATES INC.		
Scott A. Benson	M.S. Environmental Engineering, B.S. Wildlife Management, 14 years professional experience	Project Management, Report Preparation
Roger A. Schoumacher	M.S. Fisheries, B.S. Wildlife Management; 30 years professional experience	Quality Assurance
William M. Harding	M.A. Anthropology, B.A. Anthropology; 9 years professional experience	Cultural Resources
Monica Anderson	B.S. Civil Engineering (pend.); 2 years professional experience	Physical Resources
David Lanning	M.S. Range Management/Water Resources, B.S. Zoology and Physiology; 10 years professional experience	Biological Resources
Diane M. Thomas	M.S. Zoology and Physiology, B.S. Wildlife Conservation and Management, B.A. English; 8 years professional experience	Technical Editing
Genial G. DeCastro	B.S. Business Administration; 15 years professional experience	Document Production
Scott Walker	M.S. Interdisciplinary Studies, B.S. Geology; 12 years professional experience	Geographic Information System
Marla Burrow	M.S. Urban Planning, B.S. Environmental Design; 6 years professional experience	Geographic Information System/CADD
LIDSTONE & ANDERSON		
Chris Lidstone	M.S. Fluvial Geomorphology, B.S. Geology; 16 years professional experience	Water Resources
Jay Schug	M.S. Water Resources (pend.), B.S. Natural Resources Planning; 10 years professional experience	Water Resources
QESTEK ENGINEERING, INC.		
Jim Glass	Ph.D. Chemical Engineering, M.S. Chemical Engineering; 24 years professional experience	Air Quality

Table 5.3 Distribution List.

Full EIS

Powder River Regional Coal Team Voting Members

Jim Geringer
Governor of Wyoming
Cheyenne, WY

Marc Racicot
Governor of Montana
Helena, MT

Al Pierson
BLM Wyoming State Director
Cheyenne, WY

Larry Hamilton
BLM Montana State Director
Billings, MT

Robert Bennett
BLM Deputy State Director
Minerals and Land
Cheyenne, WY

Powder River Regional Coal Team Non-Voting Members

Hord Tipton
BLM Assistant Director
Energy and Mineral Resources
Washington, D.C.

Kemper McMaster
U.S. Fish & Wildlife Service,
Region 6
Helena, MT

Billie Clark
Office of Surface Mining Reclamation
& Enforcement
Western Field Operations
Denver, CO

John Byers
U.S. Forest Service
Medicine Bow National Forest
Laramie, WY

Deborah Liggett
NPS, Devils Tower National
Monument
Devils Tower, WY

Eugene Jonart
BLM Wyoming Coal Coordinator
Cheyenne, WY

Ed Hughes
BLM Montana Coal Coordinator
Billings, MT

Carol Molnia
U.S. Geological Survey
Denver, CO

Richard Stefanic
Bureau of Indian Affairs
Billings, MT

Chairman William Walksalong
Northern Cheyenne Tribal Council
Lame Deer, MT

Madame Chairman Clara Nomee
Crow Tribal Council
Crow Agency, MT

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Department of Community
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Gillette, WY

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Big Horn County Planning Board
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Ted Fletcher
Powder River County
Ashland, MT

Joan Stahl
Rosebud County Commissioner
Forsyth, MT

Lyle Rising
Office of the Regional Solicitor
Rocky Mountain Region
Denver, CO

Brenda Aird
BLM Solids Group
Washington, D.C.

Mary Jennings
U.S. Fish & Wildlife Service
Cheyenne, WY

David Pennington
Bureau of Indian Affairs
Billings, MT

Roger Baker
Office of Surface Mining
Denver, CO

Dave Geer
U.S. Forest Service
Douglas, WY

Bill Radden-Lesage
BLM Human Resource Group
Washington, D.C.

Congressional Offices

U.S. Congresswoman Barbara Cubin
Casper, WY

U.S. Senator Michael Enzi
Gillette, WY

U.S. Senator Craig Thomas
Casper, WY

Federal Agencies

Bureau of Land Management
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Miles City, MT

National Park Service
Washington, D.C. (5 copies)

Office of Surface Mining Reclamation
& Enforcement
Casper, WY
Washington, D.C. (3 copies)

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U.S. Geological Survey
Washington, D.C. (3 copies)

U.S. Environmental Protection Agency
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OFA, Washington, D.C. (5 copies)

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OEPR, Washington, D.C. (5 copies)
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Natural Resources Library,
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Washington, D.C. (3 copies)

U.S. Department of Agriculture
Forest Service
Washington, D.C.

U.S. Department of Defense, USAF
Washington, D.C.

U.S. Army Corps of Engineers
Cheyenne, WY
Omaha, NE

U.S. General Accounting Office
Denver, CO

Minerals Management Service
Denver, CO
Washington, D.C. (3 copies)

MMS Evaluation Standards
Denver, CO

Office of Surface Mining Technical Library
Denver, CO

State Government

Representative Dick Erb
Gillette, WY

State Agencies

Wyoming State Clearinghouse
Cheyenne, WY (15 copies)

Wyoming State Historic Preservation Office
Cheyenne, WY

Wyoming Department of Environmental Quality
Sheridan, WY

Wyoming Game and Fish Department
Cheyenne, WY
Gillette, WY
Sheridan, WY

Wyoming State Geological Survey
Laramie, WY

Wyoming Department of Transportation
Cheyenne, WY

Wyoming Department of Employment Research and Planning
Casper, WY

Local Government

Campbell County Commissioners
Gillette, WY

City of Gillette
Gillette, WY

Converse County Commissioners
Douglas, WY

Indian Tribes & Tribal Governments

Arapahoe Tribal Council
Fort Washakie, WY

Northern Arapahoe Business Tribal Council
Fort Washakie, WY

Francis Brown
Riverton, WY

William C'Hair
Arapahoe, WY

Shoshone Tribal Council
Fort Washakie, WY

Shoshone Tribal Business Council
Fort Washakie, WY

Haman Wise
Fort Washakie, WY

John Tarnesse
Fort Washakie, WY

Crow Tribal Council
Crow Agency, MT

Crow Tribal Administration
Crow Agency, MT

Northern Cheyenne Cultural Committee
Lame Deer, MT

Northern Cheyenne Tribe, Inc.
Lame Deer, MT

Oglala Sioux Tribal Council
Pine Ridge, SD

Cheyenne River Sioux Tribal Council
Eagle Butte, SD

Crow Creek Sioux Tribal Council
Fort Thompson, SD

Flandreau Santee Sioux Executive Committee
Flandreau, SD

Santee Sioux Tribal Council
Niobrara, NE

Mr. Clifford Long Sioux
Busby, MT

Mr. Steve Brady
Lame Deer, MT

Table 5.3 (Continued)

Industry and Business

Wright Chamber of Commerce
Wright, WY

Amax Coal Company
Gillette, WY

Triton Coal Company
Evansville, IN

Decker Coal Company
Omaha, NE

Thunder Basin Coal Company
Wright, WY

Powder River Coal Company
Gillette, WY

Kerr-McGee Coal Corporation
Oklahoma City, OK
Gillette, WY

Wyodak Resources Development Corporation
Gillette, WY

Caballo Rojo Coal Company
Gillette, WY

Antelope Coal Company
Gillette, WY

Kennecott Energy Company
Gillette, WY

Cordero Mining Company
Gillette, WY

Dry Fork Coal Company
Gillette, WY

Bridgeview Coal Company
Farmington, PA

Consol, Inc.
Pinckneyville, IL

Triton Coal Company
Gillette, WY

Evergreen Enterprises
Casper, WY

PacifiCorp/Interwest Mining Company
Resource Department
Salt Lake City, UT

Union Pacific Resources Company
Rock Springs, WY
Fort Worth, TX

Apache Corporation
Denver, CO

Atlantic Richfield Company
Denver, CO
Los Angeles, CA

Berenergy Corporation
Denver, CO

Daube Company
Ardmore, OK

Fulton Producing Company
Denver, CO

M&K Oil Company
Gillette, WY

Marc Rich & Company
New York, NY

Marshall & Winston
Midland, TX

Meridian Oil
Englewood, CO

Northern Production Company
Gillette, WY

Oilfield Salvage Services Company
Lakewood, CO

Pioneer Oil & Gas
Midvale, UT

Southland Royalty Company
Fort Worth, TX

Universal Resources Corp.
Salt Lake City, UT

Yates Drilling Company
Artesia, NM

Bridle Bit Ranch Company
Gillette, WY

Western Water Consultants, Inc.
Sheridan, WY

Powder River Eagle Studies Inc.
Gillette, WY

Royal Gold, Inc.
Denver, CO

BXG, Inc.
Boulder, CO

TRC Mariah Associates Inc.
Laramie, WY

P&M Coal Company
Englewood, CO

C.H. Snyder Company
Kittanning, PA

Mine Engineers, Inc.
Cheyenne, WY

Marston & Marston
St. Louis, MO

Allen & Associates
San Francisco, CA

Ark Land Company
Fairview, IL

Shea & Gardner
Washington, D.C.

ECC
Casper, WY

Riverside Technology, Inc.
Fort Collins, CO

CE&MT, Inc.
Gillette, WY

Foster-Wheeler Environmental
Lakewood, CO

Table 5.3 (Continued)

Greystone
Englewood, CO

Hardin & Associates
Castle Rock, CO

Intermountain Resources
Laramie, WY

L.E. Peabody & Associates
Alexandria, VA

Meineadair Consultants
Arvada, CO

Interest Groups & Professional Societies

Powder River Basin Resource Council
Sheridan, WY

Wyoming Outdoor Council
Lander, WY

Sierra Club
Sheridan, WY

Audubon Society
Casper, WY

Friends of the Bow/
Biodiversity Associates
Laramie, WY

Foundation for North American Wild Sheep
Cody, WY

Wyoming Association of Professional Archaeologists
Casper, WY

Wyoming Mining Association
Cheyenne, WY

Wyoming Heritage Society
Casper, WY

Medicine Wheel Alliance
Huntley, MT

National Mining Association
Washington, D.C.

Sinapu
Boulder, CO

The Greens/Green Party USA
Chicago, IL

Individuals

Bill Harbrecht
Billings, MT

Jim Nyenhuis
Fort Collins, CO

Nicholas Ashton Wylie
Madison, WI

Ralph Barbero
Arlington, VA

Mark Winland
Gillette, WY

Shawn G. Grindstaff
Farmington, MO

Bill Saulcy
Encampment, WY

Don Duerr
Laramie, WY

Arnold Cunningham
Laramie, WY

Ladd Frary
Grand Junction, CO

John Williams
Portland, OR

Della K. Foree Revocable Trust
Dallas, TX

Deanna A. Larson
Lancaster, CA

Franceille Larson
Dallas, TX

Kim D. Larson
Dallas, TX

Peggy Lynn Larson
Dallas, TX

Sally B. Larson
Dallas, TX

Dan E. Tracy, et al.
Gillette, WY

Asa Reed
Longmont, CO

Media

Coal Transportation Report
Washington, D.C.

Libraries

The Libraries
Colorado State University
Fort Collins, CO

University of Wyoming Libraries
Laramie, WY (2 copies)

Table 5.3 (Continued)

Executive Summary

Federal Agencies

Bureau of Land Management
Mills, WY

National Park Service
Washington, D.C. (5 copies)

U.S. Geological Survey
Cheyenne, WY

U.S. General Accounting Office
Denver, CO

Minerals Management Service
Denver, CO

State Government

Senator Jim Twiford
Douglas, WY

Senator Michael B. Enzi
Gillette, WY

Representative John J. Hines
Gillette, WY

Senator Larry Gilbertz
Gillette, WY

Representative Bruce Hinchey
Casper, WY

Representative Sylvia Gams
Cowley, WY

Senator Boyd L. Eddins
Smoot, WY

Senator Robert Grieve
Savery, WY

Representative John Marton
Buffalo, WY

Senator John Schiffer
Kaycee, WY

Representative Marlene Simons
Beulah, WY

Representative Frank Moore
Douglas, WY

Representative Eli D. Bebout
Riverton, WY

Rep. George B. McMurtrey
Rozet, WY

Senator Gerald E. Geis
Worland, WY

Senator Bill Barton
Upton, WY

Representative Rick Badgett
Sheridan, WY

Representative Bruce Burns
Sheridan, WY

Representative Bill Bensel
Sheridan, WY

Senator Tom Kinnison
Sheridan, WY

Representative Ross Diercks
Lusk, WY

Representative Roger Huckfeldt
Torrington, WY

Representative Patti MacMillan
Laramie, WY

Representative Jeff Wasserburger
Gillette, WY

Representative Rick Tempest
Casper, WY

State Agencies

Wyoming Department of
Environmental Quality
Sheridan, WY

Wyoming Oil and Gas Conservation
Commission
Casper, WY

Wyoming State Engineer's Office
Cheyenne, WY

Wyoming Division of Econ. Analysis
Cheyenne, WY

Montana DEQ
Coal & Uranium Bureau
Helena, MT

Local Government

Campbell County Commissioner
Mr. Dave Shippy
Gillette, WY

Campbell County Economic
Development Committee
Gillette, WY

Campbell County School
Superintendent
Gillette, WY

City of Gillette
Gillette, WY

Town of Wright
Wright, WY

Converse County Commissioner
Mr. Leon Chamberlain
Douglas, WY

Converse County Planning Office
Douglas, WY

Converse County Joint Powers Board
Douglas, WY

City of Douglas
Douglas, WY

Table 5.3 (Continued)

Industry and Business

Gillette Chamber of Commerce
Gillette, WY

Wright Chamber of Commerce
Wright, WY

Douglas Chamber of Commerce
Douglas, WY

Thunder Basin Coal Company
Wright, WY

Powder River Coal Company
Gillette, WY

Fort Union, Ltd.
Gillette, WY

Triton Coal Company
Gillette, WY

KN Energy
Lakewood, CO

Berenenergy Corporation
Denver, CO

Elliot & Waterman
Newcastle, WY

Zephyr Exploration
Casper, WY

Tri-County Electric Association
Sundance, WY

Western Water Consultants, Inc.
Sheridan, WY

CH2M Hill
Englewood, CO

Poudre Environmental Cons., Inc.
Fort Collins, CO

Shea & Gardner
Washington, D.C.

ECC
Casper, WY

Riverside Technology, Inc.
Fort Collins, CO

Interest Groups & Professional Societies

Wyoming Wildlife Federation
Cheyenne, WY

Audubon Society
Sheridan, WY

The Nature Conservancy
Laramie, WY
Lander, WY

Wyoming Stock Growers Association
Cheyenne, WY

Thunder Basin Grazing Association
Douglas, WY

Inyan Kara Grazing Association
Newcastle, WY

Wyoming Wool Growers Association
Casper, WY

Wyoming Heritage Society
Casper, WY

Petroleum Association of Wyoming
Casper, WY

Wyoming Public Lands Council
Casper, WY

Wyoming Multiple Use Coalition
Casper, WY

Wyoming Banker's Association
Cheyenne, WY

Wind River Multiple Use Advocates
Riverton, WY

United Mine Workers of America
Gillette, WY

Law Fund
Boulder, CO

Individuals

Ted Olson

Media

Gillette News-Record
Gillette, WY

Rocky Mountain Oil Journal
Denver, CO

Western Coal Newsletter
Knoxville, TN

Cheyenne-Wyoming Eagle
Cheyenne, WY

Associated Press
Cheyenne, WY

Casper Star-Tribune
Casper, WY

The Douglas Budget
Douglas, WY

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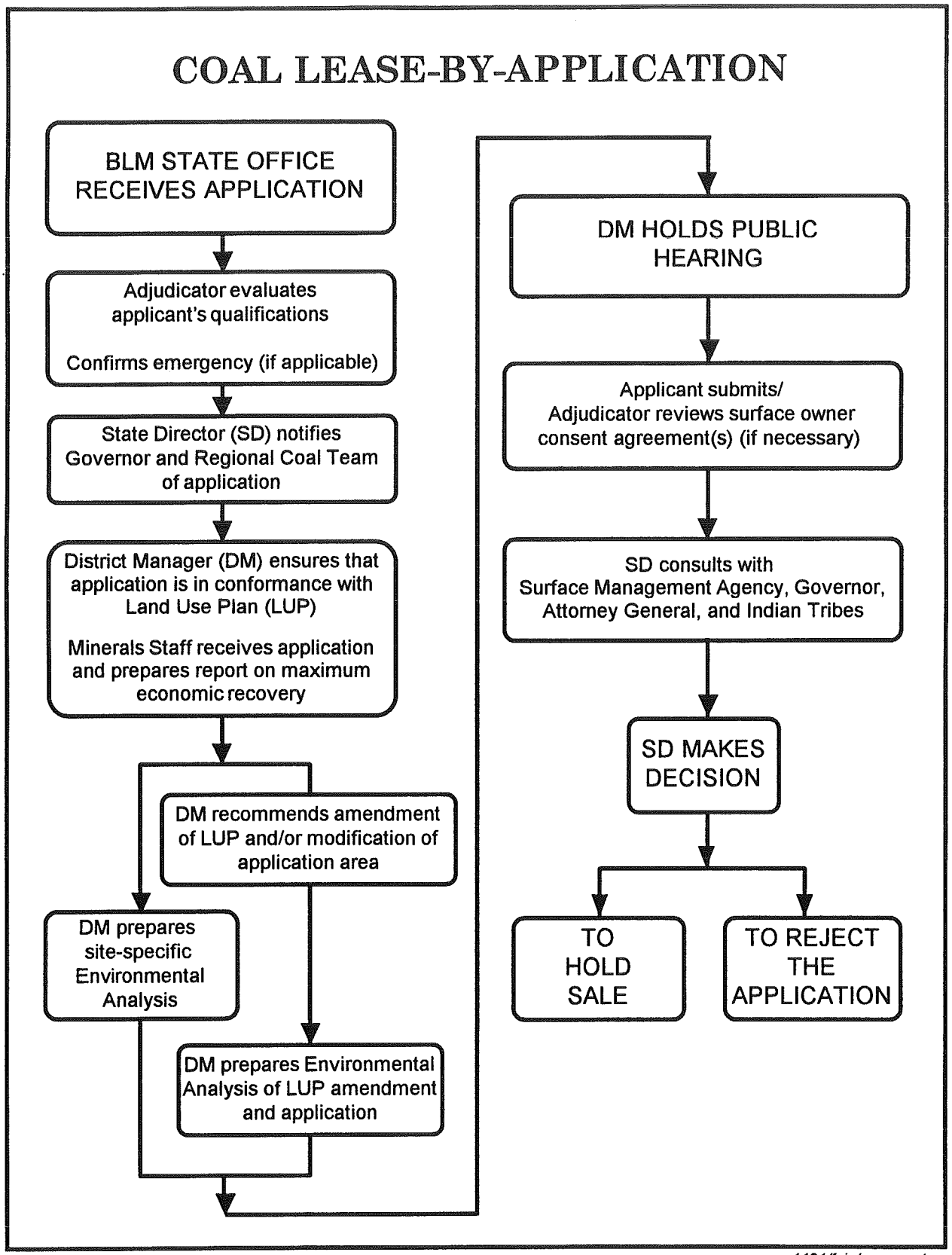
APPENDIX A:

COAL LEASE-BY-APPLICATION FLOW CHART



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APPENDIX B:

FEDERAL AND STATE PERMITTING REQUIREMENTS AND AGENCIES

FEDERAL AND STATE PERMITTING REQUIREMENTS AND AGENCIES

Agency	Lease/Permit/Action
FEDERAL	
Bureau of Land Management	Coal Lease Resource Recovery and Protection Plan Scoria Sales Contract Exploration Drilling Permit
U.S. Forest Service	Special Use Permits Contract for Sale of Mineral Materials
Office of Surface Mining Reclamation and Enforcement	Mining Plan Approval Document Preparation SMCRA Oversight
Department of the Interior	Mining Plan Approval
Mine Safety and Health Administration	Safety Permit and Legal I.D.
Bureau of Alcohol, Tobacco, and Firearms	Explosives Manufacturer's License Explosives Use and Storage Permit
Federal Communication Commission	Radio Permit: Ambulance Mobile Relay System Radio License
Nuclear Regulatory Commission	Radioactive By-products Material License
Army Corps of Engineers	Authorization of Impacts to Wetlands and Other Waters of the U.S.
Environmental Protection Agency	Hazardous Waste I.D. Number
Department of Transportation	Hazardous Waste Shipment Notification
Federal Aviation Administration	Radio Tower Permit
STATE	
State Land Commission	Coal Lease Scoria Lease
Department of Environmental Quality, Land Quality Division	Permit and License to Mine
Department of Environment Quality, Air Quality Division	Air Quality Permit to Operate Air Quality Permit to Construct
Department of Environmental Quality, Water Quality Division	National Pollution Discharge Elimination System Water Discharge Permit Permit to Construct Sedimentation Pond Authorization to Construct Septic Tank and Leach Field Authorization to Construct and Install a Public Water Supply and Sewage Treatment System
Department of Environmental Quality, Solid Waste Management	Solid Waste Disposal Permit-Permanent and Construction
State Engineer's Office	Appropriation of Surface Water Permits Appropriation of Groundwater Permits
Industrial Siting Council	Industrial Siting Certification of Non-Jurisdiction
Department of Health	Radioactive Material Certification of Registration

APPENDIX C:

UNSUITABILITY FINDINGS

UNSUITABILITY FINDINGS

Unsuitability Criteria	Findings for Thunder Basin National Grasslands (TBNG) Study Area (USFS 1985)[1]	Validation for North Rochelle LBA Tract
1. Federal Land Systems. With certain exceptions, 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.	TBNG is not part of a National Forest, and none of the other listed federal land categories are present in the study area.	There are no unsuitable findings for this criteria on the LBA tract.
2. Rights-of-way and Easements. Federal lands that are within ROWs 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.	ROWs and buffers for the Burlington Northern Railroad and Tri-County 230-kV transmission line were declared unsuitable.	There are no unsuitable findings for this criteria on the LBA tract.
3. Buffer zones for ROWs, communities, and buildings. Federal lands within 100 ft of a ROW of a public building, school, church, community or institutional building, or public park, or within 300 ft of an occupied dwelling are unsuitable for leasing.	Within the TBNG, a school at Wilkinson Ranch headquarters, Wyoming State Highway 59, and five ranch headquarters were determined to meet the intent of this criterion.	There are no unsuitable findings for this criteria on the LBA tract.
4. Wilderness Study Areas. Federal lands designated as Wilderness Study Areas are unsuitable for leasing while under review for possible wilderness designation.	No land within the TBNG review area are within a Wilderness Study Area.	There are no unsuitable findings for this criteria on the LBA tract.
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 the National Register of Natural Landmarks are unsuitable for leasing.	No lands in TBNG review area meet the scenic criteria, as outlined.	There are no unsuitable findings for this criteria on the LBA tract.
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 lease for the duration of the study, except where mining would not jeopardize the purpose of the study.	No lands in the TBNG review area are under permit except small enclosures being used to gage reclamation success on existing mines.	There are no unsuitable findings for this criteria on the LBA tract.
7. Historic Lands and Sites. All districts, sites, buildings, structures, and objects of historic, architectural, archaeological, 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 for lease.	On the basis of consultation with the State Historic Preservation Office, there were no unsuitable findings under this criterion in the TBNG review area.	There are no unsuitable findings for this criteria on the LBA tract.

Unsuitability Findings (Continued)

Unsuitability Criteria	Findings for Thunder Basin National Grasslands (TBNG) Study Area (USFS 1985)[1]	Validation for North Rochelle LBA Tract
8. Natural Areas. Federal lands designated as natural areas or as National Natural Landmarks are unsuitable.	No lands in the TBNG are designated as natural areas or as National Natural Landmarks.	There are no unsuitable findings for this criteria on the LBA tract.
9. Critical Habitat for Threatened or Endangered Plant and Animal Species. Federally designated critical habitat for T&E plant and animal species are unsuitable for leasing.	There is no habitat meeting federally designated criterion for T&E plant or animal species within the TBNG review area.	There are no unsuitable findings for this criteria on the LBA 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 for leasing.	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 for this criteria on the LBA tract.
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 USFS found numerous eagle nests, and buffer zones were established, and determined that coal leasing can occur within the buffer zone if the nests are protected with stipulations and site mitigation plans. There were no unsuitable findings under this criterion, but lands involved in buffer zones are subject to special lease stipulations.	Special lease stipulations may be required to assure protection and mitigation. However, there are no unsuitable findings, the North Rochelle LBA tract is available for further consideration.
12. Bald or Golden Eagle Roost and Concentration Areas. Bald and golden eagle roost and concentration areas on federal lands during migration and wintering are unsuitable for leasing 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 TBNG review area. Mining planned in the review area is not likely to jeopardize the continued existence of the bald eagle. Coal leasing can occur and adequate protection can be provided. There were no unsuitable findings in the TBNG review area.	There are no unsuitable findings for this criteria on the LBA tract.
13. Federal lands containing an active falcon (excluding kestrel) cliff nesting site and a suitable buffer zone shall be considered unsuitable for leasing.	After consultation with the U.S. Fish and Wildlife Service (USFWS), it was determined that this criterion does not apply in TBNG.	There are no unsuitable findings for this criteria on the LBA tract.
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 for leasing.	After consultation with the USFWS, it was determined that this criterion does not apply in TBNG.	There are no unsuitable findings for this criteria on the LBA tract.

Unsuitability Findings (Continued)

Unsuitability Criteria	Findings for Thunder Basin National Grasslands (TBNG) Study Area (USFS 1985)[1]	Validation for North Rochelle LBA Tract
15. Fish and Wildlife Habitat for Resident Species. Federal lands which the surface management agency and state jointly agree are wildlife habitat for resident species of high interest to the state, and which are essential for maintaining these priority wildlife species, shall be considered unsuitable for leasing.	Sage grouse leks were found on and near the TBNG review area. However, methods of mining can be developed which will not have a significant long-term impact on the grouse or their habitat. Therefore, the areas involved in leks and buffer zones are not unsuitable.	There are no unsuitable findings for this criteria on the LBA tract.
16. Floodplains. Federal lands in riverine, coastal, and special floodplains shall be considered unsuitable for leasing unless stipulated methods of mining can be undertaken without substantial threat of loss of life, property, or natural value.	After consultation with the U.S. Geological Survey (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 TBNG review area are available for further consideration.	There are no unsuitable findings for this criteria on the LBA tract.
17. Municipal Watersheds. Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable for leasing.	There are no municipal watersheds in the TBNG review area.	There are no unsuitable findings for this criteria on the LBA tract.
18. National Resource Waters. Federal lands with national resource waters, as identified by states in their Water Quality Management Plans, and 1/4-mi buffer zones shall be unsuitable for leasing.	There are no national resource waters within the TBNG review area.	There are no unsuitable findings for this criteria on the LBA tract.
19. Alluvial Valley Floors (AVFs). All lands identified by the surface management agency, in consultation with the state, as AVFs where mining would interrupt, discontinue, or prelude farming, are unsuitable for leasing. 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 for leasing.	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 for lease.	No identified potential AVFs occur on the LBA tract.
20. State or Indian Tribe Proposed Criteria. Federal lands to which is applicable a criterion proposed by the state or Indian Tribe located in the planning area and adopted by rule making by the Secretary are unsuitable for leasing.	The State of Wyoming has no applicable criteria, and there are no Indian Tribes located in the planning area. Therefore, there is no unsuitability finding.	There are no unsuitable findings for this criteria on the LBA tract.

[1] U.S. Forest Service. 1985. Land and Resource Management Plan, Medicine Bow National Forest and Thunder Basin National Grassland, USDA Forest Service, October 1985.

APPENDIX D:

BLM SPECIAL COAL LEASE STIPULATIONS, FOREST SERVICE STIPULATIONS, AND FORM 3400-12 COAL LEASE

SPECIAL COAL LEASE STIPULATIONS

In addition to observing the general obligations and standards of performance of current regulations, the lessee shall comply with and be bound by the following stipulations. These stipulations are also imposed on the lessee's agents and employees. 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 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 Bureau of Land Management (BLM) or of the surface 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 the required level of intensity. The cultural resources inventory shall be conducted by a qualified professional cultural resource specialist (i.e., archeologist, historian, or historical architect, as appropriate) and authorized officer (AO) of the surface managing agency (BLM, if the surface is privately owned), and a report of the inventory and recommendations for protection of any cultural resources identified shall be submitted to the Assistant Director of the Western Support Center of the Office of Surface Mining, the BLM AO (if activities are associated with the coal exploration outside an approved mining permit area) and the AO of the surface managing agency, if different. The lessee shall undertake measures, in accordance with instructions from the Assistant Director or AO 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 AO.

(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.

(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 AO of the surface managing agency. The lessee shall not disturb such resources except as may be subsequently authorized by the Assistant Director or AO. Within two working days of notification, the Assistant Director or AO will evaluate or have evaluated any cultural resources discovered and will determine if any action is required to protect or preserve such discoveries. The cost of data recovery for cultural resources during lease operations shall be borne by the surface managing agency unless otherwise specified by the BLM AO or the surface managing agency AO (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 any surface-disturbing activities, the find will be reported to the AO immediately. Surface-disturbing activities will be suspended within 250 ft 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) and prevent the potential loss of any significant paleontological value. Operations within 250 ft of such a discovery will not be resumed until written authorization to proceed is issued by the AO. 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.

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 a coal lease 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.

RESOURCE RECOVERY AND PROTECTION

Any proposed bypass of federal coal determined to be economically recoverable must have the written approval of the BLM AO 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 AO. The Notice of Noncompliance will include the amount of damages to be assessed for the unauthorized bypass of federal coal as determined by the AO. The amount of damages, at a minimum, will be the amount of royalty to be assessed as determined by the AO to compensate the federal government for the unauthorized bypass 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 area. 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 re-establish 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 Land of the United States*. The survey will be recorded in the appropriate county records, with a copy sent to the AO.

NOTICE FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF DEPARTMENT OF AGRICULTURE

The permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the Code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the permit. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of an exploration plan by the Secretary of the Interior, (2) uses of all existing improvements, such as forest development roads, within and outside the area permitted by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by an exploration plan approved by the Secretary of the Interior.

All matters related to this stipulation are to be addressed

to: District Ranger

at: 809 S. 9th Street, Douglas, WY 82633

Telephone: (307) 358-4690

who is the authorized representative of the Secretary of Agriculture.

NOTICE

CULTURAL AND PALEONTOLOGICAL RESOURCES - The Forest Service (FS) is responsible for assuring that the leased lands are examines to determine if cultural resources are present and to specify mitigation measures. Prior to undertaking the surface-disturbing activities on the lands covered by this lease, the lessee or operator, unless notified to the contrary by the FS, shall:

1. Contact the FS to determine if a site specific cultural resource inventory is required. If a survey is required, then:

2. Engage the services of a cultural resource specialist acceptable to the FS to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the FS for review and approval at the time a surface disturbing plan of operation is submitted.

3. Implement mitigation measures required by the FS and BLM to preserve or avoid destruction of cultural resource values. Mitigation may include relocation of proposed facilities, testing, salvage, and recordation of other protective measures. All costs of the inventory and mitigation will be borne by the lessee or operator, and all data and materials salvaged will remain under the jurisdiction of the U.S. Government as appropriate.

The lessee or operator shall immediately bring to the attention of the FS and BLM any cultural or paleontological resources or any other objects of scientific interest discovered as a result of surface operations under this lease, and shall leave such discoveries intact until directed to proceed by FS and BLM.

ENDANGERED OR THREATENED SPECIES - The FS is responsible for assuring that the leased land is examined prior to undertaking any surface-disturbing activities to determine effects upon any plant or animal species listed or proposed for listing as endangered or threatened, or their habitats. The findings of this examination may result in some restrictions to the operator's plans or even disallow use and occupancy that would be in violation of the Endangered Species Act of 1973 by detrimentally affecting endangered or threatened species or their habitats.

The lessee/operator may, unless notified by the FS that the examination is not necessary, conduct the examination on the leased lands at his discretion and cost. This examination must be done by or under the supervision of a qualified resource specialist approved by the FS. An acceptable report must be provided to the FS identifying the anticipated effects of a proposed action on endangered or threatened species or their habitats.

Form 3400-12
(April 1984)
(Formerly 3520-1)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

COAL LEASE

Serial Number

PART I. LEASE RIGHTS GRANTED

This lease, entered into by and between the UNITED STATES OF AMERICA, hereinafter called lessor, through the Bureau of Land Management, and *(Name and Address)*

hereinafter called lessee, is effective *(date)* , for a period of 20 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of the 20th lease year and each 10-year period thereafter.

Sec. 1. This lease is issued pursuant and subject to the terms and provisions of the:

☐ Mineral Lands Leasing Act of 1920, Act of February 25, 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;

☐ Mineral Leasing Act for Acquired Lands, Act of August 7, 1947, 61 Stat. 913, 30 U.S.C. 351-359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any bonuses, rents, and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants and leases to lessee the exclusive right and privilege to drill for, mine, extract, remove, or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

containing acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE - Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $ for each lease year.

(b) RENTAL CREDITS - Rental shall not be credited against either production or advance royalties for any year.

Sec. 2. (a) PRODUCTION ROYALTIES - The royalty shall be percent of the value of the coal as set forth in the regulations. Royalties are due to lessor the final day of the month succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES - Upon request by the lessee, the authorized officer may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS - Lessee shall maintain in the proper office a lease bond in the amount of $. The authorized officer may require an increase in this amount when additional coverage is determined appropriate.

Sec. 4. DILIGENCE - This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years shall terminate the lease. Lessee shall submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after lease issuance.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. LOGICAL MINING UNIT (LMU) - Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease shall become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION - At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all reasonable times for the inspection of any duly authorized officer of lessor, the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee shall allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS - Lessee shall comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee shall not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area shall be submitted to the authorized officer.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee shall take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits not covered hereunder and approving easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY - Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at lease twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 9. (a) TRANSFERS

- ☐ This lease may be transferred in whole or in part to any person association or corporation qualified to hold such lease interest.
- ☐ This lease may be transferred in whole or in part to another public body or to a person who will mine the coal on behalf of, an for the use of, the public body or to a person who for the limite purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.
- ☐ This lease may only be transferred in whole or in part to anothe small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest *must* be approved in accordance with the regulations.

(b) RELINQUISHMENT - The lessee may relinquish in writing at an time all rights under this lease or any portion thereof as provided in th regulations. Upon lessor's acceptance of the relinquishment, lessee shall be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIP MENT, ETC. - At such time as all portions of this lease are returned to lessor, lessee shall deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for th preservation of the mine workings on the leased premises or deposit and place all workings in condition for suspension or abandonmen Within 180 days thereof, lessee shall remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, m chinery, equipment, tools, and materials remaining on the leased lanc beyond 180 days, or approved extension thereof, shall become th property of the lessor, but lessee shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface owned by third parties, lessor shall waive the requirement for remov provided the third parties do not object to such waiver. Lessee shal prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulation reclaim all lands the surface of which has been disturbed, dispose of s debris or solid waste, repair the offsite and onsite damage caused b lessee's activity or activities incidental thereto, and reclaim access roads or trails.

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT - If lessee fails to comp with applicable laws, existing regulations, or the terms, conditions ar stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the lessor only by judicial proceedings. This provision shall not b construed to prevent the exercise by lessor of any other legal ar equitable remedy, including waiver of the default. Any such remedy waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS-IN-INTEREST - Each obligation this lease shall extend to and be binding upon, and every benefit here shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION - Lessee shall indemnify and hold harmle the United States from any and all claims arising out of the lesse activities and operations under this lease.

Sec. 14. SPECIAL STATUTES - This lease is subject to the Federal Water Pollution Control Act (33 U.S.C. 1151—1175), the Clean Air Act (U.S.C. 1857 et. seq.), and to all other applicable laws pertaining exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et. seq.).

Sec. 15. SPECIAL STIPULATIONS -

Sec. 15. SPECIAL STIPULATIONS (Cont'd.) -

THE UNITED STATES OF AMERICA

	By
Company or Lessee Name	
(Signature of Lessee)	(Signing Officer)
(Title)	(Title)
(Date)	(Date)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

This form does not constitute an information collection as defined by 44 U.S.C. 3502 and therefore does not require OMB approval.

☆ U.S. Government Printing Office: 1984—444-228/15210

APPENDIX E:

WYOMING STATE ENGINEER'S OFFICE
WELL INVENTORY,
OCTOBER 1996

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	69	2	SENE				P67822W	UNA	STO	USA USDA FOREST SERVICE	MATHESON SPRING #T B 50	07/06/1984	2.00	6.00	6.00	NO	YES
41	69	5	SWSE				P9562W	CAN	STO	FOREST SERVICE USDA	TECKLA #TB 155	06/17/1971					
41	69	6	NESW				P55241W	UNA	MON	ROCHELLE COAL COMPANY	GW42R17	01/26/1981	.00	266.30	UNK	NO	YES
41	69	6	NWSW				P46754W	UNA	MON	ROCHELLE COAL COMPANY	GW-42-R-1	02/28/1979	.00	135.00	113.65	NO	YES
41	69	6	NWSW				P49860W	UNA	MON	ROCHELLE COAL COMPANY	GW42R1A	12/31/1980	.00	154.00	142.10	NO	YES
41	69	6	SENW				P71472W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 36	11/12/1985	.00	201.50	DRY	YES	YES
41	69	6	SWNE				P67821W		STO	USA USDA FOREST SERVICE	SOUTH TECKLA SPRING #T B 49	07/06/1984	1.00	8.00	8.00	NO	YES
41	69	6	SWSW				P60437W	UNA	MON	ROCHELLE COAL COMPANY	GW42R30	04/29/1982	.00	134.80	130.30	NO	YES
41	69	7	NWSE				P60429W	UNA	MON	ROCHELLE COAL COMPANY	GW42R22	04/29/1982	.00	133.00	130.00	NO	YES
41	69	7	SENE				P60428W	UNA	MON	ROCHELLE COAL COMPANY	GW42R21	04/29/1982	.00	172.00	155.00	NO	YES
41	69	7	SWNE				P26787W	ABA	MIS	PEABODY COAL COMPANY	1025	04/18/1974	.00	240.00	162.60	NO	YES
41	69	7	SWNE				P26788W	ABA	MON	PEABODY COAL COMPANY	1027	04/18/1974	.00	160.00	134.60	NO	YES
41	69	7	SWNE				P26789W	ABA	MIS	PEABODY COAL COMPANY	1028	04/18/1974	.00	190.00	139.30	NO	NO
41	69	7	SWNE				P49861W	UNA	MON	ROCHELLE COAL COMPANY	GW42R2A	08/31/1979	.00	121.50	105.94	NO	NO
41	69	7	SWNE				P49862W	UNA	MON	ROCHELLE COAL COMPANY	GW42R2C	09/13/1979	.00	180.00	134.30	NO	YES
41	69	7	SWSW				P60431W	UNA	MON	ROCHELLE COAL COMPANY	GW42R24	04/29/1982	.00	74.00	66.18	NO	YES
41	69	10	NESE				P67824W		STO	USA USDA FOREST SERVICE	IRWIN SPRING #T B 52	07/06/1984	1.00	8.00	8.00	NO	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	69	12	SWSW				P67793W		STO	USA USDA FOREST SERVICE	IRWIN SPRING #T B 8	06/26/1984	1.50	8.00	8.00	NO	YES
41	69	12	SWSW				P67823W		STO	USA USDA FOREST SERVICE	MATHESON SPRING #T B 51	07/06/1984	1.00	8.00	8.00	NO	YES
41	69	15	NWSW				P60106W	CAN	STO	JOHN C. DILTS, JR.	WILDA #1	04/05/1982					
41	69	16	SESW				P48010W	UNA	MON	ROCHELLE COAL COMPANY	GW42RA1	05/14/1979	.00	27.00	13.98	NO	YES
41	69	16	SWNE				P46755W	UNA	MON	ROCHELLE COAL COMPANY	GW42R2U	02/28/1979	.00	300.00	238.10	NO	YES
41	69	16	SWSE				P48011W	UNA	MON	ROCHELLE COAL COMPANY	GW42RA2	05/14/1979	.00	23.00	UNK	NO	YES
41	69	16	SWSW				P60158W		STO	JOHN C. DILTS, JR.	MORGAN #1	04/12/1982	25.00	900.00	245.00	NO	YES
41	69	17	NWSW				P67817W		STO	USA USDA FOREST SERVICE	DILTS SPRING #T.B. 43	07/06/1984	3.00	6.00	5.00	NO	YES
41	69	17	SWSE				P48012W	UNA	MON	ROCHELLE COAL COMPANY	GH42RA3	05/14/1979	.00	29.00	UNK	NO	YES
41	69	18	SENW				P60430W	UNA	MON	ROCHELLE COAL COMPANY	GW42R23	04/29/1982	.00	108.00	106.00	NO	YES
41	69	19	SESW				P12739P		STO	USDA FOREST SERVICE	IRWIN #TB 62	12/30/1963	4.00	UNK	UNK	NO	NO
41	69	21	SENW				P11658P		STO	IRWIN LIVESTOCK CO.	IRWIN 8	09/30/1954	5.00	125.00	54.00	NO	YES
41	69	21	SESW				P65364W		STO	IRWIN LIVESTOCK CO.	IRWIN 28 D&S	09/02/1983	12.00	484.00	120.00	YES	YES
41	69	21	SWNE				P46756W	UNA	MON	ROCHELLE COAL COMPANY	GW42R3	02/28/1979	.00	330.00	229.47	NO	YES
41	69	23	SENE				P95636W	UNA	STO	IRWIN LIVESTOCK CO	WILDCAT #3	06/08/1994	3.00	300.00	230.00	NO	YES
41	69	25	SENW				P67522W		STO	USA USDA FOREST SERVICE	IRWIN #T B 65	06/01/1984	4.00	170.00	160.00	NO	NO
41	70	0	NESE				P54728W		MON	NORTH ANTELOPE COAL COMPANY	NA-47	11/17/1980	.00	120.00	14.55	NO	YES
41	70	1	NENE				P26215W	ABA	MIS	PEABODY COAL COMPANY	P-2 HOLE #3B	02/25/1974	.00	240.00	UNK	NO	NO
41	70	1	NENE				P26218W	ABA	MIS	PEABODY COAL COMPANY	P-5 #3	02/25/1974	.00	240.00	UNK	NO	YES

Sorts: TWP RNG SEC QTR-QTR
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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	1	NENE				P26219W	ABA	MIS	PEABODY COAL COMPANY	P-6 #3A	02/25/1974	.00	160.00	UNK	NO	YES
41	70	1	NENE				P45662W		MON	ANTELOPE COAL COMPANY	OWAL-12	10/26/1978	.00	24.00	UNK	NO	YES
41	70	1	NENE				P45661W		MON	ANTELOPE COAL COMPANY	OWAL-13	10/27/1978	.00	20.00	UNK	NO	YES
41	70	1	NENE				P46757W	UNA	MON	ROCHELLE COAL COMPANY	GW42R4	02/28/1979	.00	154.00	UNK	NO	YES
41	70	1	NENW				P60438W	UNA	MON	ROCHELLE COAL COMPANY	GW42R31	04/29/1982	.00	175.40	146.90	NO	YES
41	70	1	NWSW				P46758W	CAN	MON	PEABODY COAL COMPANY	GW 42 R 5	02/28/1979					
41	70	1	SENE				P71471W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 35	11/12/1985	.00	123.00	DRY	NO	YES
41	70	1	SWSE				P55243W	UNA	MON	ROCHELLE COAL COMPANY	GW42R15	01/26/1981	.00	272.00	UNK	NO	YES
41	70	1	SWSW				P77345W	ABA	MON	ROCHELLE COAL COMPANY	GW 42 R 52	06/24/1988	.00	195.00	191.00	NO	YES
41	70	2	NWSE				P26786W	ABA	MIS	PEABODY COAL COMPANY	8B	04/18/1974	.00	165.00	UNK	NO	YES
41	70	2	SENE				P74299W		MON	POWDER RIVER COAL COMPANY	GW 42 R 43	03/23/1987	.00	224.00	222.00	NO	YES
41	70	2	SENW				P77337W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 48 B	06/24/1988	.00	134.50	68.65	NO	YES
41	70	2	SESE				P26217W	ABA	MIS	PEABODY COAL COMPANY	P-4 #8	02/25/1974	.00	385.00	297.60	NO	YES
41	70	2	SESE				P26226W	ABA	MIS	PEABODY COAL COMPANY	PC #13 8A	03/07/1974	.00	260.00	219.50	NO	YES
41	70	2	SWNW				P77336W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 48 A	06/24/1988	.00	195.00	194.40	NO	YES
41	70	2	SWSE				P8998P		STO	USDA FOREST SERVICE	TECKLA #T B 133	06/07/1968	4.00	395.00	UNK	NO	YES
41	70	2	SWSE				P55239W	A&C	MON	ROCHELLE COAL COMPANY	GW42R19	01/26/1981	.00	320.00	DRY	NO	YES
41	70	3	NESW				P74300W	A&C	MON	POWDER RIVER COAL COMPANY	GW 42 R 44	03/23/1987	.00	80.00	52.70	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	3	NWSW				P77339W	CAN	MON	ROCHELLE COAL COMPANY	GW 42 R 50 A	06/24/1988					
41	70	3	NWSW				P77340W	CAN	MON	ROCHELLE COAL COMPANY	GW 42 R 50 B	06/24/1988					
41	70	3	NWSW				P77341W	CAN	MON	ROCHELLE COAL COMPANY	GW 42 R 50 C	06/24/1988					
41	70	3	SESW				P55240W	CAN	MON	ROCHELLE COAL COMPANY	GW42R18	01/26/1981	.00	175.00	UNK	NO	YES
41	70	3	SESW				P74301W	A&C	MON	POWDER RIVER COAL COMPANY	GW 42 R 45	03/23/1987	.00	47.00	41.70	NO	YES
41	70	3	SWNE				P101749W	UNA	MIS	POWDER RIVER COAL CO	WEST PIT SUMP #1	03/12/1996					
41	70	4	SWNE				P54725W		MON	NORTH ANTELOPE COAL COMPANY	NA-36B	11/17/1980	.00	178.00	94.02	NO	YES
41	70	4	SWNE				P54731W	A&C	MON	NORTH ANTELOPE COAL COMPANY	NA-36A	11/17/1980	.00	270.00	209.16	NO	NO
41	70	4	SWSE				P26214W	ABA	MIS	PEABODY COAL COMPANY	P-1 HOLE #6	02/25/1974	.00	300.00	225.00	YES	YES
41	70	4	SWSE				P49814W	UNA	MON	ROCHELLE COAL COMPANY	NA-12A	07/24/1979	.00	310.00	225.00	NO	YES
41	70	4	SWSE				P49815W	UNA	MON	ROCHELLE COAL COMPANY	NA-12B	07/24/1979	.00	210.00	173.19	YES	YES
41	70	4	SWSE				P49816W	CAN	MON	PEABODY COAL CO.	NA 12C	07/24/1979					
41	70	4	SWSE				P49817W	CAN	MIS	PEABODY COAL CO.	NA 12D	07/24/1979					
41	70	4	SWSE				P52249W	CAN	MON	PEABODY COAL COMPANY	NA-18	05/29/1980	.00	235.00	181.00	NO	YES
41	70	4	SWSE				P55528W	A&C	MON	NORTH ANTELOPE COAL CO.	NA-18	01/13/1981	.00	245.00	168.19	NO	YES
41	70	4	SWSW				P93589W	UNA	MIS	POWDER RIVER COAL COMPANY	NADW-3	10/15/1993					
41	70	4	SWSW				P93590W	A&C	MIS	POWDER RIVER COAL COMPANY	NADW-4	10/15/1993	UNK	214.00	125.00	NO	NO
41	70	4	SWSW				P93596W	A&C	MIS	POWDER RIVER COAL COMPANY	NA-69	10/15/1993	UNK	169.00	118.30	YES	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	4	SWSW				P97268W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NORTH ANTELOPE SUMP 6	09/01/1994					
41	70	5	NESE				P54720W		MON	NORTH ANTELOPE COAL COMPANY	NA-59	11/17/1980	.00	166.50	123.05	NO	YES
41	70	5	NESE				P93593W	A&C	MIS	POWDER RIVER COAL COMPANY	NADW-7	10/15/1993	UNK	225.00	107.75	NO	YES
41	70	5	NESW				P55517W	ABA	MON	NORTH ANTELOPE COAL CO.	AW 50	01/13/1981	.00	13.50	6.07	NO	YES
41	70	5	NESW				P61264W		MON	NORTH ANTELOPE COAL COMPANY	AW-57	06/18/1982	.00	14.45	9.18	NO	NO
41	70	5	NESW				P98691W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NA-DW-14	04/07/1995					
41	70	5	NWNW				P54723W		MON	NORTH ANTELOPE COAL COMPANY	NA-38B	11/17/1980	.00	200.00	68.85	NO	YES
41	70	5	NWNW				P54733W		MON	NORTH ANTELOPE COAL COMPANY	NA-38A	11/17/1980	.00	282.50	105.97	NO	YES
41	70	5	NWSE				P49811W	UNA	MON	NORTH ANTELOPE COAL COMPANY	NA 10	07/24/1979	.00	85.00	20.40	NO	YES
41	70	5	NWSE				P55523W		MON	NORTH ANTELOPE COAL CO.	NA-15	01/13/1981	.00	114.00	57.33	NO	YES
41	70	5	NWSE				P93594W	UNA	MIS	POWDER RIVER COAL COMPANY	NADW-8	10/15/1993	40.00	250.00	111.60	NO	YES
41	70	5	SENE				P54724W		MON	NORTH ANTELOPE COAL COMPANY	NA-37B	11/17/1980	.00	200.00	53.63	NO	YES
41	70	5	SENE				P54732W		MON	NORTH ANTELOPE COAL COMPANY	NA-37A	11/17/1980	.00	303.00	169.98	NO	YES
41	70	5	SESE				P93591W	UNA	MIS	POWDER RIVER COAL COMPANY	NADW-5	10/15/1993	20.00	246.00	112.00	NO	YES
41	70	5	SESE				P93592W	A&C	MIS	POWDER RIVER COAL COMPANY	NADW-6	10/15/1993	UNK	235.00	122.00	NO	YES
41	70	5	SESW				P55516W	ABA	MON	NORTH ANTELOPE COAL CO.	AW 49	01/13/1981	.00	16.50	4.28	YES	YES

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41	70	5	SESW				P61262W		MON	NORTH ANTELOPE COAL COMPANY	AW-55	06/18/1982	.00	17.50	10.74	NO	NO
41	70	5	SESW				P61263W		MON	NORTH ANTELOPE COAL COMPANY	AW-56	06/18/1982	.00	13.40	8.55	NO	NO
41	70	5	SESW				P98690W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NA-DW-12	04/07/1995					
41	70	5	SWNE				P51869W	CAN	MON	PEABODY COAL COMPANY	NA-14	04/21/1980	.00	216.00	56.44	NO	YES
41	70	5	SWSE				P26220W	ABA	MIS	PEABODY COAL COMPANY	P-7 #2	02/25/1974	.00	180.00	45.50	YES	YES
41	70	5	SWSE				P26221W	ABA	MIS	PEABODY COAL COMPANY	P-8 #2A	02/25/1974	.00	89.00	18.60	YES	YES
41	70	5	SWSE				P52241W	A&C	MON	NORTH ANTELOPE COAL COMPANY	AW-51	05/29/1980	.00	18.00	10.00	NO	YES
41	70	6	NWSE				P25607P		STO	PAUL & EDITH RUTH WILKINSON	WILKINSON #3	01/14/1974	4.00	805.00	FLO	NO	YES
41	70	6	SENE				P43104W	CAN	MON	PEABODY COAL COMPANY	SOW 1B - ANTELOPE	04/28/1978					
41	70	6	SENE				P43105W	CAN	MON	PEABODY COAL COMPANY	SOW 1C ANTELOPE	04/28/1978	.00	UNK	UNK	NO	NO
41	70	6	SENE				P43106W	CAN	MON	PEABODY COAL COMPANY	SOW 1D ANTELOPE	04/28/1978	.00	UNK	UNK	NO	NO
41	70	6	SESE				P54729W		MON	NORTH ANTELOPE COAL COMPANY	NA-43B	11/17/1980	.00	145.00	41.57	NO	YES
41	70	6	SESE				P54738W		MON	NORTH ANTELOPE COAL COMPANY	NA-43A	11/17/1980	.00	228.00	84.51	NO	YES
41	70	6	SWNE				P38844W	UNA	MON	NORTH ANTELOPE COAL COMPANY	SOW LA ANTELOPE	06/27/1977	.00	19.00	4.00	NO	YES
41	70	6	SWNE				P54734W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-39	11/17/1980	.00	121.50	UNK	NO	NO
41	70	6	SWNE				P54735W		MON	NORTH ANTELOPE COAL COMPANY	NA-40	11/17/1980	.00	105.50	2.61	NO	YES
41	70	6	SWNE				P54736W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-41	11/17/1980	.00	121.50	UNK	NO	NO
41	70	6	SWNE				P54737W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-42	11/17/1980	.00	121.50	UNK	NO	NO

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41	70	6	SWSW	L21			P84156W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NA-66	12/20/1990	.00	363.00	188.85	NO	YES
41	70	7	SESE				P43100W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	DOW 105A - ANTELOPE	04/28/1978	.00	500.00	194.00	NO	YES
41	70	7	SESE				P43101W	UNA	MON	NORTH ANTELOPE COAL COMPANY	DOW 105B - ANTELOPE	04/28/1978	.00	500.00	173.00	NO	YES
41	70	7	SESE				P43102W	UNA	MON	NORTH ANTELOPE COAL COMPANY	DOW 105C - ANTELOPE	04/28/1978	.00	500.00	142.00	NO	YES
41	70	7	SWNE				P55526W		MON	NORTH ANTELOPE COAL CO.	NA-17A	01/13/1981	.00	285.00	179.81	YES	YES
41	70	7	SWNE				P55527W	A&C	MON	NORTH ANTELOPE COAL CO.	NA-17B	01/13/1981	.00	200.00	119.45	YES	YES
41	70	7	SWNW				P77346W		MON	NORTH ANTELOPE COAL COMPANY	NA 60 A	06/24/1988	.00	494.00	320.00	NO	YES
41	70	7	SWNW				P77347W	CAN	MON	NORTH ANTELOPE COAL COMPANY	NA 60 B	06/24/1988					
41	70	8	NENE				P52242W	UNA	MON	NORTH ANTELOPE COAL COMPANY	AW-52	05/29/1980	.00	16.00	10.00	NO	YES
41	70	8	NENW				P93161W	UNA	MIS	POWDER RIVER COAL COMPANY	NA-74	10/01/1993	.00	180.00	113.42	NO	YES
41	70	8	NESE				P26216W	ABA	MIS	PEABODY COAL COMPANY	P-3 HOLE #4	02/25/1974	.00	23.00	13.10	NO	YES
41	70	8	NESE				P38845W	CAN	MON	PEABODY COAL COMPANY	SOW 2A ANTELOPE	06/27/1977					
41	70	8	NESE				P38850W	ABA	MON	NORTH ANTELOPE COAL COMPANY	SOW-2B-ANTELOPE	06/27/1977	.00	16.40	DRY	NO	YES
41	70	8	NESE				P38855W	A&C	MON	PEABODY COAL COMPANY	SOW-2C-ANTELOPE	06/27/1977	.00	21.90	7.17	NO	YES
41	70	8	NESE				P57656W	CAN	STO	NORTH ANTELOPE COAL COMPANY	FINAL IMPOUNDMENT MINIMUM POOL	05/15/1981					
41	70	8	NESW				P54726W		MON	NORTH ANTELOPE COAL COMPANY	NA-48	11/17/1980	.00	105.00	29.39	NO	YES
41	70	8	NWNE				P55511W		MON	NORTH ANTELOPE COAL CO.	AW-3	01/13/1981	.00	16.50	5.86	YES	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	8	NWNE				P55518W		MON	NORTH ANTELOPE COAL COMPANY	AW-51	01/13/1981	.00	27.00	7.08	YES	YES
41	70	8	NWNE				P93160W	UNA	MON	POWDER RIVER COAL COMPANY	NA-73	10/01/1993					
41	70	8	SENE				P51868W	CAN	MON	PEABODY COAL COMPANY	NA-15	04/21/1980	.00	110.70	33.28	NO	YES
41	70	8	SENE				P55519W	A&C	MON	NORTH ANTELOPE COAL CO.	AW-52	01/13/1981	.00	18.00	10.87	YES	YES
41	70	8	SENE				P55522W	A&C	MON	NORTH ANTELOPE COAL CO.	NA-14	01/13/1981	.00	220.00	33.96	NO	YES
41	70	8	SENW				P52247W	CAN	MON	PEABODY COAL COMPANY	NA-17A	05/29/1980	.00	362.00	188.00	NO	YES
41	70	8	SENW				P52248W	CAN	MON	PEABODY COAL COMPANY	NA-17B	05/29/1980	.00	200.00	195.00	NO	YES
41	70	8	SESE				P49806W	CAN	MON	PEABODY COAL COMPANY	NA-8A	07/24/1979	.00	202.00	118.00	YES	YES
41	70	8	SESE				P49807W	CAN	MON	PEABODY COAL COMPANY	NA-8B	07/24/1979	.00	202.00	118.73	NO	YES
41	70	8	SESE				P49808W	CAN	MON	PEABODY COAL COMPANY	NA-8C	07/24/1979	.00	206.00	120.00	NO	YES
41	70	8	SESE				P49809W	CAN	MON	PEABODY COAL COMPANY	NA 8D	07/24/1979	.00	270.00	119.82	NO	YES
41	70	8	SESE				P81068W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	SP 7 NA	10/06/1989	.00	114.00	100.00	NO	YES
41	70	8	SWNE				P49810W	UNA	MON	NORTH ANTELOPE COAL COMPANY	NA 9	07/24/1979	.00	221.00	92.00	YES	YES
41	70	8	SWNE				P93159W	UNA	MIS	POWDER RIVER COAL COMPANY	NA-72	10/01/1993	.00	149.00	96.55	NO	YES
41	70	9	NESE				P74193W	ABA	MON	POWDER RIVER COAL COMPANY	SOW 2A ANTELOPE	03/06/1987	.00	18.60	12.00	NO	YES
41	70	9	NWNW				P49812W	A&C	MON	NORTH ANTELOPE COAL COMPANY	NA-11A	07/24/1979	.00	188.00	105.00	YES	YES
41	70	9	NWNW				P49813W	A&C	MON	NORTH ANTELOPE COAL COMPANY	NA-11B	07/24/1979	.00	189.00	107.50	NO	YES
41	70	9	NWNW				P93587W	UNA	MIS	POWDER RIVER COAL COMPANY	NADW-1	10/15/1993					

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	9	NWNW				P93588W	UNA	MIS	POWDER RIVER COAL COMPANY	NADW-2	10/15/1993					
41	70	9	NWSW				P93595W	UNA	MIS	POWDER RIVER COAL COMPANY	NADW-9	10/15/1993					
41	70	9	SENE				P49818W	A&C	MON	ROCHELLE COAL COMPANY	NA-13A	07/24/1979	.00	137.00	56.00	YES	YES
41	70	9	SENE				P49819W	A&C	MON	ROCHELLE COAL COMPANY	NA-13B	07/24/1979	.00	50.00	DRY	NO	NO
41	70	9	SWNE				P46759W	ABA	MON	PEABODY COAL COMPANY	GW 42 R 6	02/28/1979	.00	264.80	192.44	NO	YES
41	70	9	SWNW				P2314W		STO	JOHN C. DILTS, JR.	DILTS #21	07/18/1951	4.00	700.00	.00	NO	YES
41	70	9	SWSE				P54751W		MON	NORTH ANTELOPE COAL COMPANY	NA-22	11/17/1980	.00	48.50	27.65	NO	YES
41	70	9	SWSW				P54742W	A&C	MON	NORTH ANTELOPE COAL COMPANY	NA-49	11/17/1980	.00	83.00	37.02	NO	YES
41	70	9	SWSW				P61265W		MON	NORTH ANTELOPE COAL COMPANY	AW-58	06/18/1982	.00	32.50	24.37	NO	NO
41	70	9	SWSW				P61266W		MON	NORTH ANTELOPE COAL COMPANY	AW-59	06/18/1982	.00	33.20	25.16	NO	YES
41	70	9	SWSW				P61267W		MON	NORTH ANTELOPE COAL COMPANY	AW-60	06/18/1982	.00	37.00	24.46	NO	YES
41	70	9	SWSW				P61268W		MON	NORTH ANTELOPE COAL COMPANY	AW-61	06/18/1982	.00	30.10	24.46	NO	YES
41	70	10	NENE				P60435W	A&C	MON	ROCHELLE COAL COMPANY	GW42R28	04/29/1982	.00	212.67	DRY	NO	YES
41	70	10	NENW				P89497W	A&C	MIS	POWDER RIVER COAL COMPANY	SP-5-R	09/21/1992	.00	100.00	97.80	NO	YES
41	70	10	NESE				P69073W	UNA	DEW	ROCHELLE COAL COMPANY	ROCHELLE PIT SUMP #1	09/23/1981	300.00	UNK	UNK	NO	YES
41	70	10	NESE				P81077W	ABA	MIS	ROCHELLE COAL COMPANY	SP 1 R	10/16/1989	.00	140.00	DRY	NO	YES
41	70	10	NESE				P81078W	UNA	MIS	ROCHELLE COAL COMPANY	SP 2 R	10/16/1989	.00	140.00	DRY	NO	YES

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	10	NESE				P81079W	UNA	MIS	ROCHELLE COAL COMPANY	SP 3 R	10/16/1989	.00	140.00	DRY	NO	YES
41	70	10	NESW				P54743W	CAN	MON	NORTH ANTELOPE COAL COMPANY	NA-50	11/17/1980	.00	121.00	116.78	NO	YES
41	70	10	NWNW				P60434W	A&C	MON	ROCHELLE COAL COMPANY	GW42R27	04/29/1982	.00	73.70	DRY	NO	YES
41	70	10	SENW				P54744W	CAN	MON	NORTH ANTELOPE COAL COMPANY	NA-51	11/17/1980	.00	94.00	56.51	NO	YES
41	70	10	SESW				P76141W	UNA	RES	ROCHELLE COAL COMPANY	ROCHELLE #2	12/21/1987	400.00	5265.0	521.00	YES	YES
41	70	10	SWNE				P60433W	ABA	MON	ROCHELLE COAL COMPANY	GW 42 R 26	04/29/1982	.00	133.40	DRY	NO	YES
41	70	10	SWNE				P89496W	CAN	MIS	POWDER RIVER COAL COMPANY	SP-4-R	09/21/1992					
41	70	11	NWNE				P60436W	CAN	MON	ROCHELLE COAL COMPANY	GW42R29	04/29/1982	.00	220.10	128.30	NO	YES
41	70	11	NWNE				P71470W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 34	11/12/1985	.00	220.20	DRY	NO	YES
41	70	11	SENE				P46760W	A&C	MON	ROCHELLE COAL COMPANY	GW42R7	02/28/1979	.00	264.70	99.20	NO	YES
41	70	11	SENE				P49863W	A&C	MON	ROCHELLE COAL COMPANY	GW42R7A	08/31/1979	.00	128.30	102.50	NO	YES
41	70	11	SWNE				P101750W	UNA	MIS	POWDER RIVER COAL CO	EAST PIT SUMP #1	03/12/1996					
41	70	11	SWSE				P46761W	UNA	MON	ROCHELLE COAL COMPANY	GW42R8	02/28/1979	.00	130.00	UNK	NO	YES
41	70	12	NWNE				P61524W	CAN	MIS	PHILLIPS PETROLEUM CO	MORGAN RIKER #1	07/29/1982	100.00	1820.0	400.00	NO	YES
41	70	12	NWNE				P62724W	CAN	MIS	PHILLIPS PETROLEUM COMPANY	ENL OF MORGAN RIKER #1	12/01/1982	50.00	1820.0	400.00	YES	YES
41	70	12	NWNE				P80718W	CAN	MIS	PHILLIPS PETROLEUM COMPANY	MORGAN RIKER #1	08/28/1989	150.00	1820.0	400.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	12	NWNE				P86094W	UNA	MIS	POWDER RIVER COAL COMPANY	ROCHELLE #3	09/13/1991	.00	1820.0	400.00	NO	YES
41	70	12	NWNE				P86949W	CAN	STO	USA USDA FOREST SERVICE	MORGAN RIKER #TB 250	12/30/1991					
41	70	12	SENW				P60432W	UNA	MON	ROCHELLE COAL COMPANY	GW42R25	04/29/1982	.00	77.20	66.00	NO	YES
41	70	13	SENW				P46762W	UNA	MON	ROCHELLE COAL COMPANY	GW42R9	02/28/1979	.00	304.70	44.05	NO	YES
41	70	13	SENW				P49864W	UNA	MON	ROCHELLE COAL COMPANY	GW42R9A	08/31/1979	.00	24.70	6.15	NO	YES
41	70	14	SESE				P55521W	A&C	MON	NORTH ANTELOPE COAL COMPANY	AW-54	01/13/1981	.00	17.00	5.82	YES	YES
41	70	15	SENW				P29356W	UNA	RES	ROCHELLE COAL COMPANY	ROCHELLE #1	01/08/1975	300.00	1978.0	151.40	NO	YES
41	70	16	NENE				P55514W		MON	NORTH ANTELOPE COAL CO.	AW-42	01/13/1981	.00	16.00	UNK	NO	YES
41	70	16	NENW				P52243W	UNA	MON	NORTH ANTELOPE COAL COMPANY	AW-53	05/29/1980	.00	21.00		NO	YES
41	70	16	NENW				P55520W	A&C	MON	NORTH ANTELOPE COAL CO.	AW-53	01/13/1981	.00	23.00	21.82	NO	YES
41	70	16	NENW				P81069W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	SP 8 NA	10/06/1989					
41	70	16	NENW				P81070W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	SP 9 NA	10/06/1989					
41	70	16	NENW				P81071W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	SP 10 NA	10/06/1989	.00	21.00	DRY	NO	YES
41	70	16	NESW				P61712W		DEW	NORTH ANTELOPE COAL COMPANY	NORTH ANTELOPE SUMP II	08/23/1982	150.00	86.50	35.00	NO	NO
41	70	16	NWNE				P43088W	ABA	MON	PEABODY COAL COMPANY	SOW 113 - ANTELOPE	04/28/1978	.00	40.00	5.00	NO	YES
41	70	16	NWNE				P43089W	ABA	MON	PEABODY COAL COMPANY	DOW 114 - ANTELOPE	04/28/1978	.00	40.00	5.00	NO	YES
41	70	16	NWNE	L10			P53031W	UNA	DEW	NORTH ANTELOPE COAL COMPANY	NORTH ANTELOPE SUMP #1	12/18/1978	3500.0	75.00	75.00	NO	YES

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	16	NWNE				P57655W		RES	NORTH ANTELOPE COAL COMPANY	ENL NORTH ANTELOPE SUMP #1	01/21/1981	.00	75.00	75.00	NO	YES
41	70	16	NWNE				P70529W		MON	NORTH ANTELOPE COAL COMPANY	SP 1 NA	07/01/1985	.00	64.00	31.60	YES	YES
41	70	16	NWNE				P70530W		MON	NORTH ANTELOPE COAL COMPANY	SP 1A NA	07/01/1985	.00	64.00	32.00	YES	YES
41	70	16	NWNE				P70531W		MON	NORTH ANTELOPE COAL COMPANY	SP 2 NA	07/01/1985	.00	20.30	20.10	YES	YES
41	70	16	NWNE				P70532W		MON	NORTH ANTELOPE COAL COMPANY	SP 3 NA	07/01/1985	.00	10.50	DRY	NO	YES
41	70	16	NWNE				P70533W		MON	NORTH ANTELOPE COAL COMPANY	SP 4 NA	07/01/1985	.00	20.30	17.80	YES	YES
41	70	16	NWSE				P54746W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-29	11/17/1980	.00	52.00	16.18	NO	YES
41	70	16	NWSE				P55513W		MON	NORTH ANTELOPE COAL CO.	AW-35	01/13/1981	.00	20.50	3.21	YES	YES
41	70	16	NWSE				P55515W		MON	NORTH ANTELOPE COAL CO.	AW-47	01/13/1981	.00	16.50	1.89	YES	YES
41	70	16	NWSW				P43094W	ABA	MON	PEABODY COAL COMPANY	SOW 119 - ANTELOPE	04/28/1978	.00	80.00	UNK	NO	YES
41	70	16	NWSW				P43095W	ABA	MON	PEABODY COAL COMPANY	DOW 120 ANTELOPE	04/28/1978	.00	260.00	179.00	NO	YES
	70	16	NWSW	L8			P53031W	UNA	RES	WYO BOARD OF LAND COMMISSIONERS		12/18/1978	3500.0	75.00	75.00	NO	YES
41	70	16	NWSW				P54727W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA 30	11/17/1980	.00	126.50	126.39	NO	YES
	70	16	NWSW				P57655W		MIS	WYO BOARD OF LAND COMMISSIONERS		01/21/1981	.00	75.00	75.00	NO	YES
41	70	16	SENE				P41375W	CAN	MON	PEABODY COAL COMPANY	DOW 102 ANTELOPE	06/17/1977					
41	70	16	SENE				P41376W	CAN	MON	PEABODY COAL COMPANY	SOW 101 ANTELOPE	06/17/1977					
41	70	16	SENW				P49805W	CAN	MON	PEABODY COAL COMPANY	NA 7	07/24/1979					
41	70	16	SENW				P54745W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-25B	11/17/1980	.00	97.00	88.26	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	16	SENW				P54750W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-25A	11/17/1980	.00	124.50	89.77	NO	YES
41	70	16	SENW				P72577W		MON	NORTH ANTELOPE COAL COMPANY	SP 5 NA	05/29/1986	.00	100.00	80.00	NO	YES
41	70	16	SENW				P72578W		MON	NORTH ANTELOPE COAL COMPANY	SP 5A NA	05/29/1986	.00	100.50	80.00	NO	YES
41	70	16	SESE				P112G	UNA	STO	JOHN C. DILTS, JR.	JOHN DILTS #3 WELL	07/25/1951	6.00	260.00	230.00		YES
41	70	16	SESE				P54747W		MON	NORTH ANTELOPE COAL COMPANY	NA-33	11/17/1980	.00	105.00	12.00	NO	YES
41	70	16	SESE				P54748W		MON	NORTH ANTELOPE COAL COMPANY	NA-35	11/17/1980	.00	101.00	13.36	NO	YES
41	70	16	SESE				P54749W		MON	NORTH ANTELOPE COAL COMPANY	NA-34	11/17/1980	.00	101.00	12.16	NO	YES
41	70	16	SESW				P43092W	UNA	MON	NORTH ANTELOPE COAL COMPANY	SOW 117 - ANTELOPE	04/28/1978	.00	55.00	20.00	NO	YES
41	70	16	SESW				P43093W	UNA	MON	NORTH ANTELOPE COAL COMPANY	DOW 118 - ANTELOPE	04/28/1978	.00	250.00	38.00	NO	YES
41	70	16	SESW				P53030W	UNA	RES	NORTH ANTELOPE COAL COMPANY	NORTH ANTELOPE MINE #201	12/18/1978	285.00	2050.0	FLO	YES	YES
41	70	16	SWNE				P43090W	ABA	MON	PEABODY COAL COMPANY	SOW 115 - ANTELOPE	04/28/1978	.00	50.00	22.60	NO	YES
41	70	16	SWNE				P43091W	ABA	MON	PEABODY COAL COMPANY	DOW 116 - ANTELOPE	04/28/1978	.00	250.00	20.50	NO	YES
41	70	16	SWNW				P54730W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-24	11/17/1980	.00	33.00	DRY	NO	YES
41	70	16	SWSE				P52244W	UNA	MON	NORTH ANTELOPE COAL COMPANY	AW-54	05/29/1980	.00	17.00	5.00	NO	YES
41	70	16	SWSE				P55512W		MON	NORTH ANTELOPE COAL CO.	AW-31	01/13/1981	.00	16.50	2.74	YES	YES
41	70	16	SWSE				P61269W		MON	NORTH ANTELOPE COAL COMPANY	AW-62	06/18/1982	.00	29.80	9.89	NO	YES
41	70	16	SWSE				P61270W		MON	NORTH ANTELOPE COAL COMPANY	AW-63	06/18/1982	.00	37.30	4.98	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	16	SWSW				P79944W	UNA	DEW	NORTH ANTELOPE COAL COMPANY	NORTH ANTELOPE SUMP V	05/18/1989	250.00	30.00	FLO	NO	NO
41	70	17	NENE				P54721W	A&C	MON	NORTH ANTELOPE COAL COMPANY	NA-53	11/17/1980	.00	31.50	11.33	NO	YES
41	70	17	NENE				P81067W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	SP 6 NA	10/06/1989	.00	123.25	109.40	NO	YES
41	70	17	NESW				P49803W	UNA	MON	NORTH ANTELOPE COAL COMPANY	NA-5	07/24/1979	.00	215.00	79.60	YES	NO
41	70	17	NWSE				P41373W	ABA	MON	PEABODY COAL COMPANY	DOW 104 ANTELOPE	06/17/1977					
41	70	17	NWSE				P41374W	CAN	MON	PEABODY COAL COMPANY	SOW 103 ANTELOPE	06/17/1977					
41	70	17	NWSE				P54719W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-6B	11/17/1980	.00	166.50	123.05	NO	YES
41	70	17	SENE				P54752W	ABA	MON	NORTH ANTELOPE COAL COMPANY	NA-23	11/17/1980	.00	91.50	46.51	NO	YES
41	70	17	SENE				P79942W	UNA	DEW	NORTH ANTELOPE COAL COMPANY	NORTH ANTELOPE SUMP III	05/18/1989	250.00	30.00	FLO	NO	NO
41	70	17	SENE				P79943W	UNA	DEW	NORTH ANTELOPE COAL COMPANY	NORTH ANTELOPE SUMP IV	05/18/1989	250.00	30.00	FLO	NO	NO
41	70	17	SENE				P89495W	CAN	MIS	POWDER RIVER COAL COMPANY	SP-11-NA	09/21/1992	.00	144.00	131.81	NO	YES
41	70	17	SENW				P43096W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	SOW 121 - ANTELOPE	04/28/1978	.00	40.00	30.40	NO	YES
41	70	17	SENW				P43097W	UNA	MON	NORTH ANTELOPE COAL COMPANY	DOW 122 - ANTELOPE	04/28/1978	.00	330.00	184.00	NO	YES
41	70	17	SESE				P49804W	CAN	MON	PEABODY COAL CO.	NA-6	07/24/1979	.00	251.50	150.00	NO	YES
41	70	17	SWSW				P54722W		MON	NORTH ANTELOPE COAL COMPANY	NA-44B	11/17/1980	.00	240.00	146.06	NO	YES
41	70	17	SWSW				P54739W		MON	NORTH ANTELOPE COAL COMPANY	NA-44A	11/17/1980	.00	335.00	221.14	NO	YES
41	70	18	NENE				P41371W	ABA	MON	PEABODY COAL COMPANY	DOW 106 ANTELOPE	06/17/1977	.00	340.00	290.00	YES	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	18	NENE				P41372W	A&C	MON	NORTH ANTELOPE COAL COMPANY	SOW 105 ANTELOPE	06/17/1977	.00	40.00	24.00	YES	YES
41	70	18	NENE				P43103W	ABA	MON	PEABODY COAL COMPANY	DOW 105D - ANTELOPE	04/28/1978	.00	UNK	UNK	NO	NO
41	70	18	NWNW				P77348W		MON	NORTH ANTELOPE COAL COMPANY	NA 61 A	06/24/1988	.00	463.00	328.00	NO	YES
41	70	18	SENW				P33290W		STO	USDA FOREST SERVICE	BELL #T B 199 (DEEPENED)	05/17/1976	10.00	644.00	300.00	YES	YES
41	70	18	SWNW				P77349W		MON	NORTH ANTELOPE COAL COMPANY	NA 61 B	06/24/1988	.00	507.00	330.00	NO	YES
41	70	18	SWSE				P43098W	ABA	MIS	PEABODY COAL COMPANY	SOW 123 - ANTELOPE	04/28/1978	.00	UNK	UNK	NO	NO
41	70	18	SWSE				P43099W	ABA	MON	PEABODY COAL COMPANY	DOW 124 - ANTELOPE	04/28/1978	.00	450.00	70.00	NO	YES
41	70	19	SWNE				P77350W		MON	NORTH ANTELOPE COAL COMPANY	NA 62 A	06/24/1988	.00	393.00	300.00	NO	YES
41	70	19	SWNE				P77351W		MON	NORTH ANTELOPE COAL COMPANY	NA 62 B	06/24/1988	.00	439.00	296.00	NO	YES
41	70	19	SWNE				P77352W	CAN	MON	NORTH ANTELOPE COAL COMPANY	NA 62 C	06/24/1988					
41	70	20	NENE				P52245W	CAN	MON	PEABODY COAL COMPANY	NA-16A	05/29/1980	.00	209.00	182.00	NO	YES
41	70	20	NENE				P52246W	CAN	MON	PEABODY COAL COMPANY	NA-16B	05/29/1980	.00	120.00	118.00	NO	YES
41	70	20	NESE				P41369W	CAN	MIS	US FOREST SERVICE	DOW 108 ANTELOPE	06/17/1977					
41	70	20	NESE				P41370W	ABA	MON	US FOREST SERVICE	SOW 107 ANTELOPE	06/17/1977					
41	70	20	NESE				P74197W		MON	POWDER RIVER COAL COMPANY	SOW 107 NORTH ANTELOPE	03/06/1987	.00	230.00	198.00	NO	YES
41	70	20	NESE				P74198W		MON	POWDER RIVER COAL COMPANY	DOW 108 NORTH ANTELOPE	03/06/1987	.00	300.00	198.00	NO	YES
41	70	20	NWNE				P55524W	CAN	MON	NORTH ANTELOPE COAL CO.	NA-16A	01/13/1981	.00	209.00	134.61	YES	YES
41	70	20	NWNE				P55525W	CAN	MON	NORTH ANTELOPE COAL CO.	NA-16B	01/13/1981	.00	120.00	65.45	YES	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	20	NWSE				P77353W	CAN	MON	NORTH ANTELOPE COAL COMPANY	NA 63	06/24/1988					
41	70	20	SWSW				P41367W	CAN	MON	US FOREST SERVICE	DOW-110-ANTELOPE	06/17/1977					
41	70	20	SWSW				P41368W	CAN	MIS	US FOREST SERVICE	SOW 109 ANTELOPE	06/17/1977					
41	70	20	SWSW				P74199W		MON	POWDER RIVER COAL COMPANY	SOW 109 NORTH ANTELOPE	03/06/1987	.00	210.00	185.00	NO	YES
41	70	20	SWSW				P74200W		MON	POWDER RIVER COAL COMPANY	DOW 110 NORTH ANTELOPE	03/06/1987	.00	300.00	240.00	NO	YES
41	70	21	NESE				P41475W	CAN	MON	PEABODY COAL COMPANY	TEST WELL #1	01/11/1978					
41	70	21	NESE				P41478W	CAN	MON	PEABODY COAL COMPANY	OBW 3 ANTELOPE	01/11/1978					
41	70	21	NESE				P41479W	CAN	MON	PEABODY COAL COMPANY	OBW 4 ANTELOPE	01/11/1978					
41	70	21	NESE				P41490W	CAN	MON	PEABODY COAL COMPANY	SOW 17 ANTELOPE	01/11/1978					
41	70	21	NESE				P54741W		MON	NORTH ANTELOPE COAL COMPANY	NA-46	11/17/1980	.00	90.00	DRY	NO	YES
41	70	21	NWSE				P41477W	CAN	MON	PEABODY COAL COMPANY	OBW 2 ANTELOPE	01/11/1978					
41	70	21	SENW				P54740W		MON	NORTH ANTELOPE COAL COMPANY	NA-45	11/17/1980	.00	91.50	DRY	NO	YES
41	70	21	SESE				P41476W	CAN	MON	PEABODY COAL COMPANY	OBW 1 ANTELOPE	01/11/1978					
41	70	21	SESE				P41481W	CAN	MON	PEABODY COAL COMPANY	SOW 8 ANTELOPE	01/11/1978					
41	70	21	SESE				P41482W	CAN	MON	PEABODY COAL COMPANY	SOW 9 ANTELOPE	01/11/1978					
41	70	21	SESE				P41483W	CAN	MON	PEABODY COAL COMPANY	SOW 10 ANTELOPE	01/11/1978					
41	70	21	SESE				P41484W	CAN	MON	PEABODY COAL COMPANY	SOW 11 ANTELOPE	01/11/1978					
41	70	21	SESE				P41485W	CAN	MON	PEABODY COAL COMPANY	SOW 12 ANTELOPE	01/11/1978					
41	70	21	SESE				P41486W	CAN	MON	PEABODY COAL COMPANY	SOW 13 ANTELOPE	01/11/1978					
41	70	21	SESE				P41487W	CAN	MON	PEABODY COAL COMPANY	SOW 14 ANTELOPE	01/11/1978					
41	70	21	SESE				P41488W	CAN	MON	PEABODY COAL COMPANY	SOW 15 ANTELOPE	01/11/1978					
41	70	21	SESE				P41489W	CAN	MON	PEABODY COAL COMPANY	SOW 16 ANTELOPE	01/11/1978					

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	21	SESE				P41491W	CAN	MON	PEABODY COAL COMPANY	SOW 18 ANTELOPE	01/11/1978					
41	70	21	SESE				P41492W	CAN	MON	PEABODY COAL COMPANY	SOW 19 ANTELOPE	01/11/1978					
41	70	21	SESE				P41493W	CAN	MON	PEABODY COAL COMPANY	SOW 20 ANTELOPE	01/11/1978					
41	70	21	SESE				P41494W	CAN	MON	PEABODY COAL COMPANY	SOW 21 ANTELOPE	01/11/1978					
41	70	21	SESE				P41509W	CAN	MON	PEABODY COAL COMPANY	SOW 22 ANTELOPE	01/20/1978					
41	70	22	NENE				P38851W	UNA	MON	NORTH ANTELOPE COAL COMPANY	SOW 3B ANTELOPE	06/27/1977	.00	40.00	12.20	YES	YES
41	70	22	SWSW				P38846W	CAN	MON	PEABODY COAL COMPANY	SOW 3A ANTELOPE	06/27/1977					
41	70	22	SWSW				P38856W	CAN	MON	PEABODY COAL COMPANY	SOW 3C ANTELOPE	06/27/1977					
41	70	22	SWSW				P43107W	ABA	MON	PEABODY COAL COMPANY	SOW 3D - ANTELOPE	04/28/1978	.00	UNK	UNK	NO	NO
41	70	22	SWSW				P74194W		MON	POWDER RIVER COAL COMPANY	SOW 3A ANTELOPE	03/06/1987	.00	40.00	8.40	NO	YES
41	70	25	SENE				P77354W	CAN	MON	NORTH ANTELOPE COAL COMPANY	NA 64 A	06/24/1988					
41	70	25	SENE				P77355W	CAN	MON	NORTH ANTELOPE COAL COMPANY	NA 64 B	06/24/1988					
41	70	27	NWNW				P41480W	CAN	MON	PEABODY COAL COMPANY	SOW 7 ANTELOPE	01/11/1978					
41	70	28	NESE				24/3/302	UNA	STO	POWDER RIVER COAL COMPANY	PRCC-18	02/29/1996					
41	70	28	NESW				P77356W		MON	NORTH ANTELOPE COAL COMPANY	NA 65 A	06/24/1988	.00	206.00	184.20	NO	YES
41	70	28	NESW				P77357W		MON	NORTH ANTELOPE COAL COMPANY	NA 65 B	06/24/1988	.00	230.00	186.70	NO	YES
41	70	28	SENW				P38861W	ABA	MON	PEABODY COAL COMPANY	SOW 111 ANTELOPE	06/27/1977	.00	171.00		NO	YES
41	70	28	SENW				P38862W	ABA	MON	PEABODY COAL COMPANY	DOW 112 ANTELOPE	06/27/1977	.00		UNK	NO	NO
41	70	31	NESE				P44496W	CAN	MIS	INC. INDUSTRIAL PIPELINES SOUTH CENTRAL	BN #2	08/08/1978	35.00	23.00	6.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	70	31	NESE				P44498W	CAN	MIS	INC. INDUSTRIAL PIPELINES SOUTH CENTRAL	BN #4	08/08/1978					
41	70	31	NESE				P44499W	CAN	MIS	INC. INDUSTRIAL PIPELINES SOUTH CENTRAL	BN #5	08/08/1978					
41	70	33	SWNW				P89494W	UNA	MIS	POWDER RIVER COAL COMPANY	NA-63	09/21/1992	.00	105.00	51.00	NO	YES
41	70	35	NWSW				P172G	UNA	STO	JOHN C. DILTS, JR.	JOHN DILTS #4 WELL	11/17/1952	78.00	600.00	FLO		YES
41	71	1	NENE				P45666W		MON	ANTELOPE COAL COMPANY	TWC-2	10/27/1978	.00	35.00	UNK	NO	YES
41	71	1	NWNE				P101200W	UNA	MON	POWDER RIVER COAL COMPANY	PRCC-13	01/02/1996	.00	60.00	31.75	NO	YES
41	71	1	SWNW				P71738W	UNA	STO	USA USDA FOREST SERVICE	WILKINSON SPRING TB #55	01/14/1986					
41	71	2	NENE				P57759W	CAN	MIS	INC. VALENTINE CONSTRUCTION	THUNDER CREEK #1	07/07/1981	80.00	480.00	30.00	NO	YES
41	71	2	NENE				P95333W	UNA	DOM	HARRY G. PUTNAM	JINX #2	07/30/1981	6.00	360.00	45.00	NO	YES
41	71	2	NENE				P95332W	UNA	DOM	HARRY G. PUTNAM	JINX #3	02/12/1986	20.00	480.00	50.00	NO	YES
41	71	2	SENE				P57757W	CAN	STO	HARRY G. PUTNAM	JINX #1	07/30/1981					
41	71	2	SENE				P95331W	UNA	DOM	HARRY G. PUTNAM	JINX #1	02/12/1986					
41	71	3	NESW				P12754P		STO	USDA FOREST SERVICE	MATHESON #TB 42	12/30/1951	4.00	122.00	UNK	NO	NO
41	71	3	NWSE				P44330W		STO	USDA FOREST SERVICE	MARG #5	07/20/1978	3.00	163.00	94.00	NO	YES
41	71	3	SWNE				P45652W		MON	ANTELOPE COAL COMPANY	OWA-9	10/27/1978	.00	150.00	UNK	NO	YES
41	71	4	NWSW				P57979W	ABA	MON	ANTELOPE COAL COMPANY	OWA-23	08/24/1981	.00	159.00	DRY	NO	YES
41	71	6	SWNW				P5611P		STO	ROBERT E. ISENBERGER	LY #1	05/02/1960	5.00	344.00	280.00		YES
41	71	7	NWSE				P23598W		STO	PATRICIA L. ISENBERGER	LY #3	07/25/1973	10.00	252.00	100.00	NO	YES

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41	71	7	NWSW				P23603P		STO	PATRICIA L. ISENBERGER	SPRING #8	07/25/1973	25.00	8.00	UNK	NO	YES
41	71	10	SESW				P70729W	ABA	STO	JERRY DILTS	BRIDLE BIT RANCH #3	07/23/1985	.00	270.00	UNK	NO	YES
41	71	11	NENE				P58121W		MIS	BIG HORN FRACTIONATION	B H FRAC #1	05/18/1981	25.00	396.00	250.00	NO	YES
41	71	12	SWNW				P96422W	UNA	MON	POWDER RIVER COAL CO	PRCC-5A	08/02/1994	.00	468.00	301.60	NO	YES
41	71	12	SWNW				P96423W	UNA	MON	POWDER RIVER COAL CO	PRCC-5B	08/02/1994	.00	370.00	55.30	NO	YES
41	71	12	SWNW				P96424W	UNA	MON	POWDER RIVER COAL CO	PRCC-5C	08/02/1994	.00	556.00	290.28	NO	YES
41	71	13	NENW				P67440W	CAN	MON	ANTELOPE COAL COMPANY	OWA-24	05/22/1984					
41	71	13	NENW				P67441W		MON	ANTELOPE COAL COMPANY	OWC-19	05/22/1984	.00	473.00	315.00	NO	YES
41	71	13	NWNW				P67807W		STO	USA USDA FOREST SERVICE	WILKINSON SPRING #T B 39	06/27/1984	.50	8.00	8.00	NO	YES
41	71	14	SESE				P44331W		STO	USDA FOREST SERVICE	MARG #6	07/20/1978	3.00	605.00	100.00	NO	YES
41	71	19	NWNE				P5612P		STO	ROBERT E. ISENBERGER	LY #2	02/09/1969	1.00	175.00	60.00		YES
41	71	21	SESW				P23604P		STO	PATRICIA L. ISENBERGER	SPRING #9	07/25/1973	25.00	8.00	UNK	NO	YES
41	71	24	NENW				P96882W	UNA	MIS	WESCO, INC	WESCO #1	08/24/1994	18.00	596.00	288.00	NO	YES
41	71	24	SESE				P67443W	CAN	MON	ANTELOPE COAL COMPANY	OWA-20	05/22/1984					
41	71	24	SESE				P67444W		MON	ANTELOPE COAL COMPANY	OWC-14	05/22/1984	.00	335.00	221.50	NO	YES
41	71	24	SWNE				P63112W		STO	BRIDLE BIT RANCH	BRIDLE BIT RANCH #1	02/11/1983	6.00	442.00	230.00	NO	YES
41	71	26	NENE				P57977W		MON	ANTELOPE COAL COMPANY	OWA-19	08/24/1981	.00	210.00	141.00	NO	YES
41	71	26	NENE				P57980W		MON	ANTELOPE COAL COMPANY	OWC-13	08/24/1981	.00	264.00	133.00	NO	YES
41	71	27	NWNW				P57978W		MON	ANTELOPE COAL COMPANY	OWA-21	08/24/1981	.00	324.00	216.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
41	71	27	NWNW				P57981W		MON	ANTELOPE COAL COMPANY	OWC-15	08/24/1981	.00	403.70	213.00	NO	YES
41	71	29	SWNW				P23601P		STO	PATRICIA L. ISENBERGER	LY #6	07/25/1973	7.00	250.00	UNK	NO	NO
41	71	35	NWNW				P60508W	CAN	MIS	ANTELOPE COAL COMPANY	OLD ANTELOPE PIT #1	12/14/1981					
41	72	24	NESE	L19	R R		P88921W	CAN	MIS	WYO DEPT. OF TRANSPORTATION	ROBINSON #3	07/29/1992	55.00	300.00	27.50	YES	YES
41	72	24	NESE	L19	R R		P88922W	CAN	MIS	WYO DEPT. OF TRANSPORTATION	ROBINSON #4	07/29/1992	55.00	300.00	35.75	NO	YES
41	72	24	NESE	L19	R R		P88923W	CAN	MIS	WYO DEPT. OF TRANSPORTATION	ROBINSON #5	07/29/1992	55.00	320.00	36.58	NO	YES
41	72	24	NESE	L19	R R		P88924W	CAN	MIS	WYO DEPT. OF TRANSPORTATION	ROBINSON #6	07/29/1992	55.00	300.00	31.08	NO	YES
41	72	24	SWSE				P69060W	CAN	MIS	PATRICIA L. ISENBERGER LITTON	ARTESIAN #1	04/17/1984	25.00	861.00	15.00	NO	YES
41	72	24	SWSE			CU5/283A	P69891W	ADJ	MIS	PARTICIA L. ISENBERGER LITTON	ARTESIAN #1	04/08/1985	25.00	861.00	15.00	NO	YES
42	69	2	NWNE				P4824P		STO	IRA L. & ANNA E. SMALL	KRAUSE #1	04/20/1965	5.00	225.00	50.00		YES
42	69	3	SWNW				P5856P		STO	RENO LIVESTOCK CORP.	HEARTSPEAR 2	03/31/1960	1.50	210.00	170.00		YES
42	69	7	NENE				P67794W		STO	USA USDA FOREST SERVICE	RENO SPRING #T B 13	06/26/1984	1.00	8.00	8.00	NO	NO
42	69	7	NWNW				P5855P		STO	RENO LIVESTOCK CORP.	HEARTSPEAR 1	12/31/1930	11.00	120.00	UNK	YES	NO
42	69	10	NWNE				P20567W		STO	USDA FOREST SERVICE	RENO #T B 170	04/13/1973	5.00	480.00	220.00	NO	YES
42	69	12	NENE				P8957P		STO	USDA FOREST SERVICE	RENO #T B 81	03/30/1960	3.00	210.00	170.00	NO	YES
42	69	14	SWNE				P67818W		STO	USA USDA FOREST SERVICE	ELK SPRING #T.B. 45	07/06/1984	1.50	6.00	4.00	NO	YES
42	69	15	NWSE				P67795W		STO	USA USDA FOREST SERVICE	HANSEN SPRING #T B 15	06/26/1984	1.50	8.00	8.00	NO	NO
42	69	16	SWNE				P70138W		STO	JACK DILTS	SCHOOL #1	05/21/1985	2.00	1.00	FLO	NO	NO

Sorts: TWP RNG SEC QTR-QTR
Priority Date

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Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	69	19	NWNW				P46764W	UNA	MON	ROCHELLE COAL COMPANY	GW42R11	02/28/1979	.00	347.00	301.96	NO	YES
42	69	22	SENE				P67819W		STO	USA USDA FOREST SERVICE	RENO SPRING #T B 47	07/06/1984	3.00	6.00	4.00	NO	YES
42	69	23	NWNE				P62460W	CAN	STO	ROBERT MACKEY	MACKEY #2	09/02/1981					
42	69	25	NWNE				P74113W	UNA	DOM	PINEY CANYON ESTATES	PINEY CANYON #2	02/26/1987	5.00	130.00	90.00	NO	YES
42	69	25	SWNE				P73895W		DOM	ENDRE HOWARD	PINAY CANYON #1	01/21/1987					
42	69	25	SWSE				P67799W		STO	USA USDA FOREST SERVICE	MATHESON SPRING #T B 26	06/27/1984	1.00	8.00	8.00	NO	NO
42	69	26	SENW				P67796W		STO	USA USDA FOREST SERVICE	CRIB SPRING #T B 16	06/26/1984	1.00	8.00	8.00	NO	YES
42	69	28	SWNE				P67820W		STO	USA USDA FOREST SERVICE	NORTH TECKLA SPRING #T B 48	07/06/1984	.50	8.00	8.00	NO	YES
42	69	29	NWNW				P8985P		STO	USDA FOREST SERVICE	TECKLA #T B 112	07/30/1966	3.00	60.00	34.00	NO	YES
42	69	30	SESE				P71474W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 38	11/12/1985	.00	194.20	166.00	NO	YES
42	69	31	NESE				P8975P		STO	USDA FOREST SERVICE	TECKLA #T B 101	08/10/1965	4.00	107.00	70.00	NO	YES
42	69	31	NWNW				P26224W	ABA	MIS	PEABODY COAL COMPANY	P-11 5A	02/25/1974	.00	260.00	UNK	NO	NO
42	69	31	NWNW				P26225W	ABA	MON	PEABODY COAL COMPANY	P-12 #5	02/25/1974	.00	250.00	170.40	NO	YES
42	69	31	NWNW				P49867W		MON	ROCHELLE COAL COMPANY	GW-42-R-11A	08/31/1979	.00	179.20	137.15	NO	YES
42	69	31	NWSE				P60427W	UNA	MON	ROCHELLE COAL COMPANY	GW42R20	04/29/1982	.00	201.70	157.00	NO	YES
42	69	31	SENE				P71475W	CAN	MON	ROCHELLE COAL COMPANY	GW 42 R 39	11/12/1985					
42	69	31	SENW				P71476W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 40	11/12/1985	.00	240.80	235.00	NO	YES
42	69	31	SWNW				P60439W	UNA	MON	ROCHELLE COAL COMPANY	GW42R32	04/29/1982	.00	165.50	126.60	NO	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	69	31	SWSE				P46765W	UNA	MON	ROCHELLE COAL COMPANY	GW42R12	02/18/1979	.00	262.00	193.88	NO	YES
42	69	31	SWSE				P49868W	UNA	MON	ROCHELLE COAL COMPANY	GW42R12A	08/31/1979	.00	134.70	UNK	NO	YES
42	69	31	SWSW				P29743W		STO	USDA FOREST SERVICE	TURNER #T. B. 190	05/07/1975	10.00	440.00	230.00	NO	YES
42	69	32	SESE				P46767W	UNA	MON	ROCHELLE COAL COMPANY	GW42R14	02/28/1979	.00	130.00	85.87	NO	YES
42	69	32	SWNE				P46766W	ABA	MON	PEABODY COAL COMPANY	GW-42-4-13	02/18/1979	.00	10.00	.00	NO	NO
42	69	34	SESW				P58819W		STO	JACK DILTS	RED SPRINGS	10/30/1981	5.00	1.00	FLO	NO	NO
42	70	1	SWSE				P5870W	CAN	STO	RENO LIVESTOCK CORP.	HEARTSPEAR 16	06/22/1970					
42	70	1	SWSW				P60921W	CAN	MON	SHELL OIL COMPANY-MINING	1 13 04	05/10/1982					
42	70	2	NESE				P60920W	CAN	MON	SHELL OIL COMPANY-MINING	2 09 04	05/10/1982					
42	70	2	NWSW				P26434W		MON	ATLANTIC RICHFIELD COMPANY	BTW WW-14	04/08/1974	.00	180.00	UNK	NO	YES
42	70	2	SESE				P58037W	CAN	MON	SHELL OIL COMPANY - MINING	2-16-02	08/31/1981					
42	70	2	SESE				P58038W	UNA	MON	SMC MINING COMPANY	2-16-U4	08/31/1981	.00	40.00	UNK	NO	YES
42	70	2	SESW				P60926W	CAN	MON	SHELL OIL COMPANY-MINING	2 13 C41	05/10/1982					
42	70	2	SESW				P60927W	CAN	MON	SHELL OIL COMPANY-MINING	2 13 C42	05/10/1982					
42	70	2	SESW				P102330W	UNA	MON	TRITON COAL COMPANY	MW96-1	05/14/1996					
42	70	2	SWSE				P59233W	CAN	MIS	SHELL OIL COMPANY-MINING	WSW-1	11/23/1981					
42	70	2	SWSE				P59235W	UNA	MON	SMC MINING COMPANY	2-15-041	11/23/1981	.00	80.00	48.70	NO	NO
42	70	2	SWSE				P59236W	UNA	MON	SMC MINING COMPANY	2-15-042	11/23/1981	.00	80.00	48.70	NO	YES
42	70	2	SWSE				P59237W	UNA	MON	SMC MINING COMPANY	2-15-043	11/23/1981	.00	134.00	50.00	NO	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	70	2	SWSE				P75818W	UNA	MIS	SMC MINING COMPANY	WSW 1	10/13/1987					
42	70	2	SWSE				P82702W	UNA	STO	SMC MINING COMPANY	OVERFILING OF WSW-1	05/21/1990	3.50	85.00	50.00	NO	NO
42	70	2	SWSW				P5858P		STO	RENO LIVESTOCK CORP.	HEARTSPEAR 4	06/08/1962	2.00	255.00	120.00	NO	YES
42	70	2	SWSW				P52157W	UNA	MON	SMC MINING COMPANY	2-14-0	05/05/1980	.00	245.00	UNK	NO	YES
42	70	3	NESE				P26427W	UNA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW-20	04/08/1974	.00	260.00	163.00	YES	YES
42	70	3	NESE				P29004W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW 20A	01/30/1975	UNK	260.00	164.22	NO	YES
42	70	3	NWSW				P26426W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW #19	04/08/1974	.00	281.00	166.08	YES	YES
42	70	3	NWSW				P26433W		MON	ATLANTIC RICHFIELD COMPANY	BTW WW-13	04/08/1974	.00	195.00	85.50	YES	YES
42	70	3	NWSW				P29003W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW19A	01/30/1975	UNK	285.00	209.41	YES	YES
42	70	3	SESE				P49892W		MON	SHELL OIL COMPANY	3-16	09/19/1979	.00	360.00	163.00	NO	YES
42	70	3	SESW				P50559W		MON	SHELL OIL COMPANY	3-14	10/31/1979	.00	340.00	64.00	NO	NO
42	70	3	SESW				P77334W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 46	06/24/1988	.00	44.50	16.00	NO	YES
42	70	3	SWSE				P50558W		MON	SHELL OIL COMPANY	3-15	10/31/1979	.00	320.00	197.00	NO	NO
42	70	4	NESW				P97971W	UNA	STO	ATLANTIC RICHFIELD COMPANY	4-PW-1	12/15/1994	15.00	242.00	185.00	NO	YES
42	70	4	SWSW				P5857P	UNA	STO	ATLANTIC RICHFIELD COMPANY	HEARTSPEAR 3	07/31/1966	2.00	233.00	110.00	NO	YES
42	70	4	SWSW				P97862W	CAN	STO	ATLANTIC RICHFIELD COMPANY	ENL. HEARTSPEAR 3	11/07/1994					
42	70	6	SWSW				P5859P		STO	RENO LIVESTOCK CORP.	HEARTSPEAR 5	12/31/1970	2.00	UNK	UNK	NO	NO
42	70	6	SWSW				P85872W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTR-160	08/20/1991	.00	425.00	242.77	NO	YES
42	70	7	SENE				P5865P		STO	NAN HENDERSON	HEARTSPEAR 11	08/31/1966	1.50	75.00	25.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	70	8	SESE				P69514W	CAN	STO	USDA FOREST SERVICE	SHELL #TB 259	03/04/1985					
42	70	8	SESE				P78847W	UNA	STO	USDA FOREST SERVICE	TB 259	01/03/1989					
42	70	9	NWNE				P53870W	CAN	MON	SHELL OIL COMPANY - MINING	TWW-2	07/25/1980					
42	70	9	NWNE				P55763W	CAN	RES	SHELL OIL COMPANY - MINING	TWW-2	12/22/1980					
42	70	9	NWNE				P78990W	UNA	RES	SMC MINING COMPANY	TWW 2	01/03/1989					
42	70	9	NWSE				P50557W		MON	SHELL OIL COMPANY	9-10	10/31/1979	.00	390.00	233.00	NO	NO
42	70	9	NWSE				P52158W	UNA	MON	SMC MINING COMPANY	9-10-02	05/05/1980	.00	280.00	.00	NO	YES
42	70	9	NWSE				P52159W	UNA	MON	SMC MINING COMPANY	9-10-04	05/05/1980	.00	280.00	.00	NO	NO
42	70	9	NWSE				P54791W	UNA	MON	SMC MINING COMPANY	9-10-042	11/20/1980	.00	270.00	162.50	NO	YES
42	70	9	NWSE				P87905W	UNA	MIS	SMC MINING COMPANY	9-10-05	05/11/1992	.00	270.00	UNK	NO	NO
42	70	9	SESW				P60918W	CAN	MON	SHELL OIL COMPANY-MINING	9 14 C4	05/10/1982					
42	70	9	SWNW				P60917W	CAN	MON	SHELL OIL COMPANY-MINING	9 05 C4	05/10/1982					
42	70	9	SWSE				P49894W		MON	SHELL OIL COMPANY	9-15	09/19/1979	.00	440.00	227.00	NO	NO
42	70	9	SWSE				P52160W	UNA	MON	SMC MINING COMPANY	9-15-C21	05/05/1980	.00	350.00	.00	NO	NO
42	70	9	SWSE				P52167W	UNA	MON	SMC MINING COMPANY	9-15-C22	05/05/1980	.00	350.00	225.60	NO	YES
42	70	9	SWSE				P54777W	UNA	MON	SMC MINING COMPANY	AL-1B	11/20/1980	.00	16.50	7.60	NO	YES
42	70	9	SWSE				P54778W	UNA	MON	SMC MINING COMPANY	AL-1D	11/20/1980	.00	15.70	9.40	NO	YES
42	70	10	NENW				P49896W		MON	SHELL OIL COMPANY	10-3	09/19/1979	.00	360.00	242.00	NO	NO
42	70	10	NESW				P60932W	CAN	MON	SHELL OIL COMPANY-MINING	10 11 C4	05/10/1982					
42	70	10	NWSE				P50249W		MON	SHELL OIL COMPANY	10-10	10/04/1979	.00	320.00	126.00	NO	NO
42	70	10	NWSW				P49897W		MON	SHELL OIL COMPANY	10-12	09/19/1979	.00	420.00	232.00	NO	NO
42	70	10	NWSW				P49898W		MON	SHELL OIL COMPANY	11-5	09/19/1979	.00	280.00	96.00	NO	NO

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	70	10	SESW				P60929W	CAN	MON	SHELL OIL COMPANY-MINING	10 14 C43	05/10/1982					
42	70	10	SESW				P60930W	CAN	MON	SHELL OIL COMPANY-MINING	10 14 C41	05/10/1982					
42	70	10	SESW				P60931W	CAN	MON	SHELL OIL COMPANY-MINING	10 14 C42	05/10/1982					
42	70	11	NENE				P52166W	CAN	MON	SHELL OIL COMPANY-MINING	TWW 1	05/05/1980					
42	70	11	NENE				P54787W	UNA	MON	SMC MINING COMPANY	11-1-A4	11/20/1980	.00	15.00	13.40	NO	YES
42	70	11	NENW				P102331W	UNA	MON	TRITON COAL COMPANY	MW96-3	05/14/1996					
42	70	11	NENW				P102332W	UNA	MON	TRITON COAL COMPANY	MW96-2	05/14/1996					
42	70	11	NESE				P58039W	UNA	MON	SMC MINING COMPANY	11-9-042	08/31/1981	.00	73.00	61.00	NO	YES
42	70	11	NESE				P58040W	UNA	MON	SMC MINING COMPANY	11-09-041	08/31/1981	.00	98.00	60.00	NO	YES
42	70	11	NESE				P59234W	CAN	MIS	SHELL OIL COMPANY-MINING	WSW-2	11/23/1981					
42	70	11	NESE				P75819W	UNA	MIS	SMC MINING COMPANY	WSW 2	10/13/1987	120.00	103.00	59.30	NO	YES
42	70	11	NESE				P80624W	UNA	RES	SMC MINING COMPANY	PIT SUMP #1	08/16/1989	675.00	162.50	140.50	NO	NO
42	70	11	NWNW				P50250W		MON	SHELL OIL COMPANY	11-4	10/04/1979	.00	260.00	152.00	NO	NO
42	70	11	NWNW				P54783W		MON	CABALLO ROJO INC.		11/20/1980	.00	335.00	147.90	NO	YES
42	70	11	NWSW				P54785W	A&C	MON	SMC MINING COMPANY	11-12-U2	11/20/1980	.00	260.00	127.50	NO	YES
42	70	11	NWSW				P60928W	CAN	MON	SHELL OIL COMPANY-MINING	11 12 C41	05/10/1982					
42	70	11	NWSW				P60933W	CAN	MON	SHELL OIL COMPANY-MINING	11 12 C42	05/10/1982					
42	70	11	NWSW				P84150W	CAN	MIS	SHELL MINING COMPANY	11-5-HW5	12/21/1990					
42	70	11	NWSW				P84151W	UNA	MIS	SMC MINING COMPANY	11-12-HW6	12/21/1990	.00	120.00	34.75	NO	YES
42	70	11	NWSW				P84152W	CAN	MIS	SHELL MINING COMPANY	11-5-HW7	12/21/1990					
42	70	11	NWSW				P84153W	CAN	MIS	SHELL MINING COMPANY	11-5-HW8	12/21/1990					

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42	70	11	SENW				P49899W		MON	SHELL OIL COMPANY	11-6	09/19/1979	.00	200.00	77.00	NO	NO
42	70	11	SENW				P49900W	A&C	MON	SHELL OIL COMPANY	11-6	09/19/1979	.00	197.00	130.00	NO	NO
42	70	11	SENW				P52163W	UNA	MON	SMC MINING COMPANY	11-6-U2	05/05/1980	.00	240.00	.00	NO	NO
42	70	11	SENW				P52164W	UNA	MON	SMC MINING COMPANY	11-6-U4	05/05/1980	.00	240.00	.00	NO	NO
42	70	11	SENW				P54779W	UNA	MON	SMC MINING COMPANY	AL-2B	11/20/1980	.00	13.50	5.70	NO	YES
42	70	11	SENW				P54784W	UNA	MON	SMC MINING COMPANY	11-6-U21	11/20/1980	.00	280.00	76.10	NO	YES
42	70	11	SESE				P58210W	UNA	DEW	SMC MINING COMPANY	NORTH ROCHELLE MINE PIT	04/22/1981					
42	70	11	SWNE			CU2/280A	P8894W	ADJ	STO	RENO LIVESTOCK CORPORATION	HEARTSPEAR 19	04/23/1971	25.00	80.00	35.00	NO	YES
42	70	11	SWNE				P54788W	UNA	MON	SMC MINING COMPANY	11-7-A4	11/20/1980	.00	38.00	29.90	NO	YES
42	70	11	SWNE				P80694W	CAN	MIS	SHELL MINING COMPANY	ENL HEARTSPEAR 19	09/08/1989	100.00	72.80	32.90	NO	NO
42	70	11	SWNW				P52161W	UNA	MON	SMC MINING COMPANY	11-5-C21	05/05/1980	.00	200.00	.00	NO	NO
42	70	11	SWNW				P52162W	UNA	MON	SMC MINING COMPANY	11-5-C22	05/05/1980	.00	200.00	.00	NO	YES
42	70	11	SWNW				P54780W	UNA	MON	SMC MINING COMPANY	AL-2D	11/20/1980	.00	13.00	10.90	NO	YES
42	70	11	SWNW				P54781W	UNA	MON	SMC MINING COMPANY	AL-2E	11/20/1980	.00	14.50	4.90	NO	YES
42	70	11	SWNW				P54782W	UNA	MON	SMC MINING COMPANY	AL-2F	11/20/1980	.00	12.00	4.70	NO	YES
42	70	11	SWNW				P84146W	CAN	MIS	SHELL MINING COMPANY	11-5-HW1	12/21/1990					
42	70	11	SWNW				P84147W	CAN	MIS	SHELL MINING COMPANY	11-5-HW2	12/21/1990					
42	70	11	SWNW				P84148W	CAN	MIS	SHELL MINING COMPANY	11-5-HW3	12/21/1990					
42	70	11	SWNW				P84149W	CAN	MIS	SHELL MINING COMPANY	11-5-HW4	12/21/1990					
42	70	11	SWSW				P96887W	A&C	MON	SMC MINING COMPANY	MW-1	08/29/1994					
42	70	12	NENW				P58041W	UNA	MON	SMC MINING COMPANY	12-03-A4	08/31/1981	.00	12.00	UNK	NO	YES
42	70	12	NENW				P58042W	UNA	MON	SMC MINING COMPANY	12-03-C4	08/31/1981	.00	30.00	3.00	NO	YES
42	70	12	NESW				P60922W	CAN	MON	SHELL OIL COMPANY-MINING	12 11 04	05/10/1982					

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42	70	13	NESW				P54789W	UNA	MON	SMC MINING COMPANY	13-11-A4	11/20/1980	.00	18.00	DRY	NO	YES
42	70	13	NWNE				P54786W	UNA	MON	SMC MINING COMPANY	13-3-A4	11/20/1980	.00	18.50	17.00	NO	YES
42	70	13	NWSW				P54790W	UNA	MON	SMC MINING COMPANY	13-6-A4	11/20/1980	.00	25.00	DRY	NO	YES
42	70	13	SWNW				P52165W	UNA	MON	SMC MINING COMPANY	13-6-0	05/05/1980	.00	200.00	.00	NO	NO
42	70	14	NENE				P60923W	CAN	MON	SHELL OIL COMPANY-MINING	14 01 C42	05/10/1982					
42	70	14	NENE				P60924W	CAN	MON	SHELL OIL COMPANY-MINING	14 01 C41	05/10/1982					
42	70	14	NWNE				P49891W	UNA	MON	SHELL OIL COMPANY	14-2	09/19/1979	.00	300.00	157.00	NO	NO
42	70	14	NWNW				P50251W		MON	SHELL OIL COMPANY	14-4	10/04/1979	.00	340.00	35.00	NO	NO
42	70	14	NWSE				P58043W	CAN	MON	SHELL OIL COMPANY - MINING	14-10-04	08/31/1981					
42	70	14	NWSE				P58044W	CAN	MON	SHELL OIL COMPANY - MINING	14-10-C2	08/31/1981					
42	70	14	NWSE				P58045W	UNA	MON	SMC MINING COMPANY	14-10-U4	08/31/1981	.00	285.00	DRY	NO	YES
42	70	14	NWSW				P58046W		MON	SHELL OIL COMPANY - MINING	14-12-U4	08/31/1981	.00	340.00	DRY	NO	YES
42	70	14	NWSW				P58047W	CAN	MON	SHELL OIL COMPANY - MINING	14-12-C2	08/31/1981					
42	70	14	NWSW				P58048W	CAN	MON	SHELL OIL COMPANY - MINING	14-12-C4	08/31/1981					
42	70	14	SENE				P49893W	UNA	MON	SMC MINING COMPANY	14-8	09/19/1979	.00	240.00	144.00	NO	NO
42	70	14	SENE				P60925W	CAN	MON	SHELL OIL COMPANY-MINING	14 08 C42	05/10/1982					
42	70	14	SENE				P60934W	CAN	MON	SHELL OIL COMPANY-MINING	14 08 41	05/10/1982					
42	70	15	NENW				P49895W		MON	SHELL OIL COMPANY	15-3	09/19/1979	.00	400.00	144.00	NO	NO
42	70	15	NWSW				P60916W	CAN	MON	SHELL OIL COMPANY-MINING	15 12 C4	05/10/1982					

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42	70	15	SENE				P50555W		MON	SHELL OIL COMPANY	15-8	10/31/1979	.00	320.00	126.00	NO	NO
42	70	15	SWNW				P10798W	CAN	IND	JOE D. BANKS		10/27/1971	72.50	590.00	520.00	NO	NO
42	70	15	SWNW				P50556W		MON	SHELL OIL COMPANY	15-5	10/31/1979	.00	420.00	152.00	NO	NO
42	70	15	SWSW				P8951P		STO	USDA FOREST SERVICE	RENO #T B 52	03/20/1961	4.00	435.00	290.00	NO	YES
42	70	15	SWSW				P26223W	ABA	MON	PEABODY COAL COMPANY	P-10	02/25/1974	270.00	380.00	173.30	NO	YES
42	70	16	NESW				P60919W	CAN	MON	SHELL OIL COMPANY-MINING	16 11 C4	05/10/1982					
42	70	18	NWSE				P8981P		STO	USDA FOREST SERVICE	WILKINSON #T B 107	08/02/1966	4.00	110.00	96.00	NO	YES
42	70	19	NESW				P25605P		STO	PAUL & EDITH RUTH WILKINSON	WILKINSON #1	01/14/1974	5.00	12.00	3.00	NO	YES
42	70	21	SESE				P42620W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #23	03/10/1978	.00	200.00	UNK	NO	NO
42	70	21	SWSE				P40092W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #1-D	08/22/1977	.00	255.00	162.00	YES	YES
42	70	21	SWSE				P40093W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #1-F	08/22/1977	.00	200.00	175.00	YES	YES
42	70	21	SWSE				P77331W		MON	POWDER RIVER COAL COMPANY	GW PRCC 1	06/24/1988	.00	378.00	324.30	NO	YES
42	70	21	SWSW				P42617W	CAN	MIS	USDA FOREST SERVICE	SEAM MONITOR WELL #20	03/10/1978					
42	70	22	SWSW				P26222W	CAN	MON	PEABODY COAL COMPANY	P-9	02/25/1974					
42	70	23	NESE				P67797W		STO	USA USDA FOREST SERVICE	RENO SPRING #T B 17	06/26/1984	1.00	8.00	6.00	NO	YES
42	70	25	NESW				P12746P		STO	USDA FOREST SERVICE	EDWARDS #TB 32	12/30/1950	4.00	98.00	UNK	NO	NO
42	70	25	SWSE				P71473W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 37	11/12/1985	.00	267.80	DRY	NO	YES
42	70	26	SWSW				P8960P		STO	USDA FOREST SERVICE	EDWARDS #T B 84	07/31/1964	4.00	464.00	UNK	NO	YES
42	70	27	NWNE				P39795W		MON	USDA FOREST SERVICE	FOREST SERVICE MONITOR WELL #1	07/29/1977	.00	165.00	UNK	NO	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	70	27	SESE				P40091W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #1-B	08/22/1977	.00	165.00	UNK	NO	YES
42	70	27	SESE				P40097W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #2-J	08/22/1977	.00	35.00	UNK	NO	YES
42	70	27	SESE				P42632W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #35	03/10/1978	.00	35.00	UNK	NO	YES
42	70	27	SESE				P77333W		MON	POWDER RIVER COAL COMPANY	GW PRCC 3	06/24/1988	.00	265.50	261.40	NO	YES
42	70	27	SWSE				P9561W	CAN	STO	USDA FOREST SERVICE	EDWARDS #TB 154	06/17/1971					
42	70	27	SWSE				P42628W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #31	03/10/1978	.00	200.00	UNK	NO	YES
42	70	27	SWSW				P42629W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #32	03/10/1978	.00	200.00	UNK	NO	YES
42	70	27	SWSW				P77332W		MON	POWDER RIVER COAL COMPANY	GW PRCC 2	06/24/1988	.00	357.00	269.20	NO	YES
42	70	28	NENW				P25764W	CAN	MON	ROBERT R. & DOROTHY YVONNE MACKEY	MACKEY #42	01/22/1974					
42	70	28	NWNW				P93162W	UNA	MIS	POWDER RIVER COAL COMPANY	PRCC-4	10/01/1993	.00	400.00	280.00	NO	YES
42	70	28	SESE				P25763W	CAN	MON	ROBERT R. & DOROTHY YVONNE MACKEY	MACKEY #41	01/22/1974					
42	70	28	SWNE				P25768W	CAN	MON	ROBERT R. & DOROTHY YVONNE MACKEY	MACKEY #88	01/22/1974					
42	70	28	SWSW				P25762W	ABA	MON	ROBERT R. & DOROTHY YVONNE MACKEY	MACKEY #40	01/22/1974	UNK	440.00	UNK	NO	YES
42	70	28	SWSW				P25701W	UNA	STO	POWDER RIVER COAL COMPANY	MACKEY #2	01/29/1974	20.00	570.00	160.00	NO	YES
42	70	30	SENW				P96431W	UNA	MON	POWDER RIVER COAL CO	PRCC-8A	08/02/1994	.00	390.00	235.20	NO	YES
42	70	30	SENW				P96432W	UNA	MON	POWDER RIVER COAL CO	PRCC-8B	08/02/1994	.00	390.00	237.00	NO	YES
42	70	30	SENW				P96433W	UNA	MON	POWDER RIVER COAL CO	PRCC-8C	08/02/1994	.00	392.00	237.60	NO	YES
42	70	30	SENW				P96434W	UNA	MON	POWDER RIVER COAL CO	PRCC-8D	08/02/1994	.00	310.00	153.70	NO	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	70	30	SENW				P96435W	UNA	MON	POWDER RIVER COAL CO	PRCC-8E	08/02/1994	.00	480.00	221.00	NO	YES
42	70	31	NWSE	L18			P84157W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NA-67A	12/20/1990	.00	333.00	128.66	NO	YES
42	70	31	NWSE	L18	D		P84158W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NA-67B	12/20/1990	.00	250.00	51.54	NO	YES
42	70	31	NWSE	L18	D		P84159W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NA-67C	12/20/1990	.00	332.00	129.12	NO	YES
42	70	31	NWSE	L18	D		P84160W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NA-67D	12/20/1990	.00	400.00	127.49	NO	YES
42	70	31	SWSW				P96437W	UNA	MON	POWDER RIVER COAL CO	AW-64	08/02/1994	.00	12.00	3.50	NO	YES
42	70	31	SWSW				P96438W	UNA	MON	POWDER RIVER COAL CO	AW-65	08/02/1994	.00	11.00	5.20	NO	YES
42	70	31	SWSW				P96439W	UNA	MON	POWDER RIVER COAL CO	AW-66	08/02/1994	.00	9.00	6.50	NO	YES
42	70	32	NENW				P60275W	CAN	MIS	INC. ENERCOR	ENERCOR #1	03/12/1982	80.00	485.00	90.00	NO	YES
42	70	32	NENW				P92214W	UNA	MIS	POWDER RIVER COAL COMPANY	POWDER RIVER #4	06/28/1993	100.00	485.00	90.00	NO	YES
42	70	32	NWNW				P25766W	ABA	MON	ROBERT R. & DOROTHY YVONNE MACKEY	MACKEY #44	01/22/1974	UNK	420.00	UNK	NO	YES
42	70	32	NWSE				P25702W	UNA	STO	POWDER RIVER COAL COMPANY	MACKEY #1	01/29/1974	7.50	85.00	35.00	NO	NO
42	70	32	NWSE	L14	D		P84161W	UNA	MIS	NORTH ANTELOPE COAL COMPANY	NA-68	12/20/1990	.00	331.00	186.30	NO	YES
42	70	32	NWSW				P25767W	ABA	MON	ROBERT R. & DOROTHY YVONNE MACKEY	MACKEY #45	01/22/1974	UNK	400.00	UNK	NO	YES
42	70	32	SESE				P25765W	CAN	MON	ROBERT R. & DOROTHY YVONNE MACKEY	MACKEY #43	01/22/1974					
42	70	32	SWNE				P25769W	CAN	MON	ROBERT R. & DOROTHY YVONNE MACKEY	MACKEY #89	01/22/1974					
42	70	33	NESW				P42623W	CAN	MON	USDA FOREST SERVICE	SEAM MONITORING WELL #26	03/10/1978					
42	70	33	NWNW				P42618W	CAN	MIS	USDA FOREST SERVICE	SEAM MONITOR WELL #21	03/10/1978					

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42	70	33	SENE				P40098W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #2-L	08/22/1977	.00	50.00	UNK	NO	YES
42	70	33	SENW				P40101W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #3 D	08/22/1977	.00	260.00	UNK	NO	YES
42	70	33	SENW				P40102W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #3-P	08/22/1977	.00	80.00	46.00	YES	YES
42	70	33	SESE				P40099W		MON	USDA FOREST SERVICE	SEAM MONTORING WELL #3-M	08/22/1977	.00	220.00	UNK	NO	YES
42	70	33	SESW				P40094W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #1-H	08/22/1977	.00	80.00	53.00	YES	YES
42	70	33	SESW				P42622W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #25	03/10/1978	.00	220.00	UNK	NO	NO
42	70	33	SESW				P42624W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #27	03/10/1978	.00	80.00	UNK	NO	YES
42	70	33	SESW				P42626W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #29	03/10/1978	.00	264.00	UNK	NO	YES
42	70	33	SESW				P42630W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #33	03/10/1978	.00	80.00	UNK	NO	NO
42	70	33	SWNE				P40096W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #2-J	08/22/1977	.00	50.00	UNK	NO	YES
42	70	33	SWNE				P40100W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #3-N	08/22/1977	.00	260.00	UNK	NO	YES
42	70	33	SWNE				P42625W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #28	03/10/1978	.00	160.00	UNK	NO	NO
42	70	33	SWNW				P42619W	CAN	MIS	USDA FOREST SERVICE	SEAM MONITOR WELL #22	03/10/1978					
42	70	33	SWSE				P42627W		MON	USDA FOREST SERVICE	SEAM MONITOR WELL #30	03/10/1978	.00	255.00	UNK	NO	YES
42	70	33	SWSE	L15	D		P84162W	CAN	MIS	ROCHELLE COAL CO.	NA-69	12/20/1990					
42	70	33	SWSW				P42621W	CAN	MON	USDA FOREST SERVICE	SEAM MONITOR WELL #24	03/10/1978					

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42	70	34	NENE				P40095W		MON	USDA FOREST SERVICE	SEAM MONITORING WELL #2-1	08/22/1977	.00	160.00	121.00	YES	YES
42	70	34	NWSE	L14	D		P84163W	UNA	MIS	ROCHELLE COAL CO.	NA-70	12/20/1990	.00	275.00	273.57	NO	YES
42	70	34	SESE				P42633W	CAN	MON	USDA FOREST SERVICE	SEAM MONITOR WELL #37	03/10/1978					
42	70	34	SESW				P77338W	CAN	MON	ROCHELLE COAL COMPANY	GW 42 R 49	06/24/1988					
42	70	34	SESW	L16	D		P84164W	UNA	MIS	ROCHELLE COAL CO.	NA-71	12/20/1990	.00	199.00	159.99	NO	YES
42	70	34	SWNE				P77342W	CAN	MON	ROCHELLE COAL COMPANY	GW 42 R 51 A	06/24/1988					
42	70	34	SWNE				P77343W	CAN	MON	ROCHELLE COAL COMPANY	GW 42 R 51 B	06/24/1988					
42	70	34	SWNE				P77344W	CAN	MON	ROCHELLE COAL COMPANY	GW 42 R 51 C	06/24/1988					
42	70	34	SWSW				P42631W	CAN	MIS	USDA FOREST SERVICE	SEAM MONITOR WELL #34	03/10/1978					
42	70	35	SESE				P77335W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 47	06/24/1988	.00	247.00	244.00	NO	YES
42	70	35	SWNW				P74298W	CAN	MON	POWDER RIVER COAL COMPANY	GW 42 R 42	03/23/1987					
42	70	35	SWNW				P79165W		MON	POWDER RIVER COAL COMPANY	GW 42 R 49	02/27/1989	.00	259.00	256.00	NO	YES
42	70	36	NENW				P60440W	UNA	MON	ROCHELLE COAL COMPANY	GW42R33	04/29/1982	.00	176.40	34.10	NO	YES
42	70	36	NESW				P55242W	UNA	MON	ROCHELLE COAL COMPANY	GW42R16	01/26/1981	.00	295.00	UNK	NO	YES
42	70	36	NWNW				P49865W	UNA	MON	ROCHELLE COAL COMPANY	GW42R10A	08/31/1979	.00	222.40	203.66	NO	YES
42	70	36	NWNW				P49866W	UNA	MON	ROCHELLE COAL COMPANY	GW42R10C	08/31/1979	.00	285.00	280.50	NO	YES
42	70	36	SESE				P61483W	CAN	STO	J. C. DILTS	WADE #1	07/19/1982					

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	70	36	SWNW				P71477W	UNA	MON	ROCHELLE COAL COMPANY	GW 42 R 41	11/12/1985	.00	278.00	DRY	NO	YES
42	70	36	SWSW				P63168W	UNA	MIS	PHILLIPS PETROLEUM COMPANY	JACK'S GAMBLE #1	01/27/1983	25.00	760.00	220.00	YES	YES
42	70	36	SWSW				P102631W	UNA	STO	DANIEL/JOYCE TRACY	JACK'S GAMBLE #1	06/06/1996					
42	71	2	NENW				P12757P		STO	USDA FOREST SERVICE	REVLAND #TB 35	12/30/1950	4.00	165.00	UNK	NO	NO
42	71	2	NWSW				P44327W		STO	USDA FOREST SERVICE	MARG #2	07/20/1978	3.00	373.00	117.00	NO	YES
42	71	3	NESW				P101801W	UNA	STO	BRIDLE BIT RANCH CO.	BBRC BLACK BUTTE #1	03/20/1996					
42	71	7	SWSW				P78879W		DOM	BRIDLE BIT RANCH CO.	BRIDLE BIT RANCH #3H	01/23/1989	25.00	730.00	320.00	NO	YES
42	71	8	NENE				P63972W	CAN	STO	BRIDLE BIT RANCH CO.	BRIDLE BIT #2	04/29/1983					
42	71	10	NWNE				P98861W	UNA	STO	JERRY DILTS	BBRC BIRDSALL #1	04/21/1995					
42	71	11	NWNE				P25580W	CAN	STO	USDA FOREST SERVICE	STUART #T B 174	01/09/1974					
42	71	11	SWNE				P32145W		STO	USDA FOREST SERVICE	STUART #T.B. 174	02/10/1976	10.00	380.00	120.00	NO	YES
42	71	12	SESE				P8987P		STO	USDA FOREST SERVICE	STUART #T B 115	07/13/1961	4.00	172.00	100.00	NO	YES
42	71	13	SWSW				P12755P		STO	USDA FOREST SERVICE	STUART #TB 36	12/30/1950	4.00	121.00	UNK	NO	NO
42	71	19	NESE				P12760P		STO	USDA FOREST SERVICE	MATHESON #TB 33	12/30/1951	4.00	175.00	UNK	NO	NO
42	71	22	NWSE				P12759P	CAN	STO	USDA FOREST SERVICE	MATHESON #TB 34	12/30/1950	4.00	169.00	UNK	NO	NO
42	71	24	NWNW				P96436W	UNA	MON	POWDER RIVER COAL CO	PRCC-9A	08/02/1994	.00	517.00	245.00	NO	YES
42	71	24	NWSE				P61754W		STO	USDA FOREST SERVICE	PCC WILKINSON RANCH #1	08/11/1982	5.00	110.00	56.00	NO	YES
42	71	25	SWSW				P96440W	UNA	MON	POWDER RIVER COAL CO	AW-67	08/02/1994	.00	12.80	4.00	NO	YES
42	71	25	SWSW				P96441W	UNA	MON	POWDER RIVER COAL CO	AW-68	08/02/1994	.00	19.00	3.00	NO	YES
42	71	25	SWSW				P96442W	UNA	MON	POWDER RIVER COAL CO	AW-69	08/02/1994	.00	11.60	6.90	NO	YES
42	71	26	NESE				P25606P		STO	PAUL & EDITH RUTH WILKINSON	WILKINSON #2	01/14/1974	2.50	220.00	100.00	NO	YES
42	71	26	NESE				P84792W	UNA	DOM	POWDER RIVER COAL COMPANY	WILKINSON #5	03/25/1991	5.00	280.00	100.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
42	71	26	NESW				P100773W	UNA	MON	POWDER RIVER COAL COMPANY	AW-71	10/24/1995					
42	71	26	NWSW				P96428W	UNA	MON	POWDER RIVER COAL CO	PRCC-7A	08/02/1994	.00	398.00	136.20	NO	YES
42	71	26	NWSW				P96429W	UNA	MON	POWDER RIVER COAL CO	PRCC-7B	08/02/1994	.00	396.00	136.70	NO	YES
42	71	26	NWSW				P96430W	UNA	MON	POWDER RIVER COAL CO	PRCC-7C	08/02/1994	.00	483.00	125.60	NO	YES
42	71	26	NWSW				P100772W	UNA	MON	POWDER RIVER COAL COMPANY	AW-70	10/24/1995					
42	71	26	SWNE				P101198W	UNA	MON	POWDER RIVER COAL COMPANY	PRCC-11	01/02/1996	.00	65.00	29.92	NO	YES
42	71	26	SWNW				P5848W		STO	PAUL WILKINSON	MIDDLE PASTURE #1	06/16/1970	2.50	140.00	.00	NO	YES
42	71	26	SWNW				P25608P		STO	PAUL & EDITH RUTH WILKINSON	WILKINSON #4	01/14/1974	4.00	110.00	FLO	NO	YES
42	71	27	NENW				P29746W		STO	USDA FOREST SERVICE	WRIGHT #T B 195	05/07/1975	10.00	175.00	30.00	NO	YES
42	71	27	SWSE				P101197W	UNA	MON	POWDER RIVER COAL COMPANY	PRCC-10	01/02/1996	.00	40.00	6.87	NO	YES
42	71	30	NENW				P29747W		STO	USDA FOREST SERVICE	PEABODY #T B 196	05/07/1975	3.00	520.00	124.00	NO	YES
42	71	32	NWNW				P53195W		STO	DILTS BROS.	DILTS BROS. #1	08/04/1981	10.00	735.00	200.00	NO	YES
42	71	33	SENE				P12758P		STO	USDA FOREST SERVICE	MATHESON #TB 72	12/30/1963	4.00	UNK	UNK	NO	NO
42	71	34	NWSE				P44329W		STO	USDA FOREST SERVICE	MARG #4	07/20/1978	3.00	183.00	95.00	NO	YES
42	71	35	NWSE				P96426W	UNA	MON	POWDER RIVER COAL CO	PRCC-6B	08/02/1994	.00	313.00	52.00	NO	YES
42	71	35	NWSE				P96427W	UNA	MON	POWDER RIVER COAL CO	PRCC-6C	08/02/1994	.00	498.00	127.80	NO	YES
42	71	35	SWNE				P96425W	UNA	MON	POWDER RIVER COAL CO	PRCC-6A	08/02/1994	.00	398.00	163.00	NO	YES
42	71	35	SWSE				P12756P		STO	USDA FOREST SERVICE	WILKINSON #TB 129	12/30/1966	4.00	20.00	UNK	NO	NO
42	71	36	NENE				P101199W	UNA	MON	POWDER RIVER COAL COMPANY	PRCC-12	01/02/1996	.00	70.00	39.41	NO	YES
42	71	36	NWNW				P33646W	UNA	MON	THUNDER BASIN COAL COMPANY	ECH 8	06/02/1976	.00	399.00	132.00	YES	YES

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42	71	36	SENW				P100774W	UNA	MON	POWDER RIVER COAL COMPANY	AW-72	10/24/1995					
42	71	36	SWNE				P101689W	UNA	STO	POWDER RIVER COAL COMPANY	PRCC-19	02/29/1996	7.00	668.00	80.00	NO	YES
43	68	30	SWSW				P44041W	CAN	STO	WYOMING STATE HIGHWAY DEPARTMENT	KEELINE #3	07/06/1978					
43	69	1	NESW				P25933W		STO	USDA FOREST SERVICE	KEELINE #T B 175	02/25/1974	50.00	350.00	UNK	NO	NO
43	69	1	NWSE				P30523W		STO	WARREN VOSS	VOSS - KEELINE #1	07/14/1975	25.00	395.00	90.00	NO	YES
43	69	6	NWNE				P54820W	CAN	MON	WATER RESOURCES RESEARCH INSTITUTE	OBS #7	11/21/1980					
43	69	7	NENW				P28711W	ABA	IND	KERR-MCGEE COAL CORP.	39-7	12/11/1974	UNK	140.00	115.00	NO	YES
43	69	7	NENW				P28905W		MIS	KERR-MEGEE COAL CORPORATION	KMG 1C-7	01/03/1975	UNK	140.00	101.80	NO	YES
43	69	7	NENW				P79993W	UNA	MON	KERR-MCGEE COAL CORPORATION	JRM 7 2K	06/13/1989					
43	69	7	NESW				P41614W	CAN	STO	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #5	04/18/1977					
43	69	7	NESW				P56997W	ABA	MON	KERR-MCGEE COAL CORPORATION	JRM 7-5C	03/09/1981	.00	140.00	87.00	NO	YES
43	69	7	NESW				P68199W		STO	KERR-MCGEE COAL CORPORATION	JLL-7-1	08/14/1984	8.00	260.00	104.00	NO	YES
43	69	7	NESW				P70569W		STO	KERR-MCGEE COAL CORPORATION	JLL 7 2	07/05/1985	8.00	400.00	95.00	NO	YES
43	69	7	SENW				P28709W	ABA	IND	KERR-MCGEE COAL CORP.	37-7	12/11/1974	UNK	76.00	40.00	NO	YES
43	69	7	SENW				P28710W	ABA	IND	KERR-MCGEE COAL CORP.	38-7	12/11/1974	UNK	120.00	81.00	NO	YES
43	69	9	SENW				P41307W		STO	USDA FOREST SERVICE	KEELINE # TB 209	12/06/1977	8.00	250.00	80.00	NO	YES
43	69	13	SWSW				P67805W		STO	USA USDA FOREST SERVICE	CANYON SPRING #T B 37	06/27/1984	.50	6.00	6.00	NO	YES

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	69	15	NENE				P67806W		STO	USA USDA FOREST SERVICE	HA CREEK SPRING #T B 38	06/27/1984	.50	4.00	4.00	NO	YES
43	69	18	NWNW				P28602P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 18 1	12/03/1974	5.00	237.00	205.00	NO	NO
43	69	18	SWSE				P28603P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 18 2	12/03/1974	15.00	170.00	115.00	NO	YES
43	69	19	NENE				P53033W		STO	CHARLES E. OR FRANCES P. ERRINGTON	ERRINGTON UNIT #1	07/16/1980	20.00	180.00	60.00	NO	YES
43	69	19	NWSE				P63838W		DOM	DAVID & ANNE ROWE	ROWE #1	04/25/1983	12.00	159.00	70.00	NO	YES
43	69	19	SENW				P28604P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 19 1	12/03/1974	10.00	110.00	UNK	NO	NO
43	69	19	SENW				P28605P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 19 2	12/03/1974	10.00	160.00	160.00	NO	NO
43	69	19	SESE				P101904W	UNA	DOM	KARL/TONYA BERTAGNOLE	BERTAGNOLE #1	03/26/1996					
43	69	20	SENW				P28601P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 20 1	12/03/1974	3.00	4.00	4.00	NO	NO
43	69	21	NESE				P12740P		STO	USDA FOREST SERVICE	JACOBS #TB 40	12/30/1951	4.00	105.00	UNK	NO	NO
43	69	22	SWSE				P8962P		STO	USDA FOREST SERVICE	KEELINE #T B 86	06/24/1964	4.00	262.00	UNK	NO	YES
43	69	24	NESW				P31765W	CAN	MIS	CITIES SERVICE OIL COMPANY	WATER SUPPLY #1	12/23/1975	40.00	520.00	420.00	NO	YES
43	69	24	NESW				P51549W	CAN	MIS	CITIES SERVICE COMPANY	WATER SUPPLY #1	03/24/1980	40.00	520.00	420.00	YES	YES
43	69	24	NESW				P67364W	UNA	MIS	WELLSTAR CORPORATION	WATER SUPPLY #1	03/16/1984	40.00	520.00	420.00	YES	YES
43	69	24	NESW				P95852W	UNA	STO	USDI, BLM	WATER SUPPLY #1 (OVERFILING)	06/20/1994	25.00	520.00	420.00	YES	YES
43	69	24	NWNW				P67798W		STO	USA USDA FOREST SERVICE	KEELINE SPRING #T B 19	06/27/1984	.25	8.00	8.00	NO	YES
43	69	25	SESE				P41496W	CAN	MIS	WYOMING STATE HIGHWAY DEPARTMENT	LITTLE THUNDER #1	01/16/1978	130.00	356.00	27.00	NO	NO
43	69	25	SESE				P64421W		STO	FOREST SERVICE USDA	KEELINE #T B 254	06/22/1983					

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	69	25	SWSE				P45818W	CAN	IND	WYOMING HIGHWAY DEPARTMENT	LITTLE THUNDER #5	11/13/1978	130.00	320.00	28.50	NO	YES
43	69	25	SWSE				P98379W	UNA	STO	USDA FOREST SERVICE	SMALL #TB-273	02/24/1995					
43	69	26	SESE				P27254W		STO	IRA LESLIE & ANNA ELIZABETH SMALL	SMALL #1	07/03/1974	20.00	220.00	40.00	NO	YES
43	69	26	SESW				P41597W	CAN	MIS	WYOMING STATE HIGHWAY DEPARTMENT	IRA SMALL #1	01/25/1978	45.00	360.00	72.50	NO	YES
43	69	26	SESW				P41598W	CAN	IND	WYOMING STATE HIGHWAY DEPARTMENT	IRA SMALL #2	01/25/1978					
43	69	26	SESW				P54983W		STO	IRA SMALL	SMALL #3	11/26/1980	17.00	360.00	72.50	NO	YES
43	69	26	SWSE				P4825P		STO	IRA L. & ANNA E. SMALL	KRAUSE #2 (DEEPENED)	12/31/1935	5.00	200.00	15.00		NO
43	69	26	SWSE				P41736W		STO	IRA L. & ANNA E. SMALL	ENL KRAUSE #2	02/07/1978	10.00	480.00	226.00	NO	YES
43	69	27	SESE				P56438W		DOM	SHARON K. CARLSON	C B #1	04/17/1981	20.00	240.00	170.00	NO	YES
43	69	27	SESE				P63111W		STO	DENNIS D. BORGIALLI	BORGIALLI #1	02/11/1983	10.00	260.00	90.00	NO	YES
43	69	28	NENW				P52982W	CAN	STO	USA USDA FOREST SERVICE	WORK CENTER #T B 227	07/11/1980	20.00	346.00	91.00	NO	YES
43	69	28	NENW			CU5/282A	P62894W	ADJ	STO	USDA FOREST SERVICE	WORK CENTER # T B 227	12/21/1982	20.00	346.00	91.00	NO	YES
43	69	28	NESE				P67067W		DOM	RUSS KOSTEN	KOSTEN #1	04/23/1984	18.00	190.00	120.00	NO	YES
43	69	28	SWNE				P63416W		DOM	LLOYD D. & DORANN M. GORSUCH	GORSUCH #1	03/03/1983	10.00	600.00	100.00	NO	YES
43	69	31	NWNW				P67901W		STO	USA USDA FOREST SERVICE	RENO SPRING #T B 65	07/10/1984	1.00	4.00	4.00	NO	YES
43	69	35	NENW				P32666W		STO	IRA L. AND-OR ANNA E. SMALL	SMALL #2	03/24/1976	20.00	365.00	180.00	NO	YES
43	69	36	NWSE				P31318W	CAN	MIS	FOUR WAY COMPANY OF WYOMING, INC.	FOUR WAY CO. WELL #3	10/20/1975	75.00	730.00	75.00	NO	YES
43	70	1	NENW				P28708W	ABA	IND	KERR-MCGEE COAL CORP.	6A (4C-1)	11/25/1974	UNK	160.00	34.00	YES	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	1	NESE				P52337W		MON	W.R.R.I.	OBS #2	05/06/1980	.00	80.00	18.00	NO	YES
43	70	1	NESE				P57001W		MON	KERR-MCGEE COAL CORPORATION	JRM 1-3C	03/09/1981	.00	180.00	84.00	NO	YES
43	70	1	NESE				P95945W	UNA	MON	KERR-MCGEE COAL CORP	JRM 1-1ST	06/14/1994	.00	75.00	26.00	NO	YES
43	70	1	NESE				P95946W	UNA	MON	KERR-MCGEE COAL CORP	JRM 1-2ST	06/14/1994	.00	60.00	36.35	NO	YES
43	70	1	NESE				P98159W	UNA	STO	KERR-MCGEE COAL CORP	JRM #20	10/03/1994	400.00	.00	.00	NO	NO
43	70	1	NESW				P28904W		MIS	KERR-MCGEE COAL CORPORATION	KMG1C-1	01/03/1975	UNK	180.00	34.00	NO	YES
43	70	1	NWNE				P52336W		MON	W.R.R.I.	OBS #1	05/06/1980	.00	103.00	74.68	NO	YES
43	70	1	NWNW				P28908W		MIS	KERR-MCGEE COAL CORPORATION	KMG 4C-1	01/03/1975	UNK	180.00	31.00	NO	YES
	70	1	NWSW				P28904W					01/03/1975	UNK	180.00	34.00	NO	YES
	70	1	SESW				P28904W					01/03/1975	UNK	180.00	34.00	NO	YES
43	70	1	SESW				P57003W		MON	KERR-MCGEE COAL CORPORATION	JRM 1-2C	03/09/1981	.00	175.00	91.00	YES	YES
43	70	1	SWNE				P95947W	UNA	MON	KERR-MCGEE COAL CORP	JRM 1-3ST	06/14/1994	.00	77.00	51.00	NO	YES
43	70	1	SWNE				P95948W	UNA	MON	KERR-MCGEE COAL CORP	JRM 1-4ST	06/14/1994	.00	80.00	57.25	NO	YES
	70	1	SWSW				P28904W					01/03/1975	UNK	180.00	34.00	NO	YES
43	70	2	NENE				P28607P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 2 1	12/03/1974	8.00	255.00	185.00	NO	YES
43	70	2	NWNW				P4767W	CAN	STO	MCCUTCHIN DRILLING CO.	J M #1	03/04/1970					
43	70	2	NWNW				P28911W		MIS	KERR-MCGEE COAL CORPORATION	KMG 9C-2	01/03/1975	UNK	200.00	149.00	NO	YES
43	70	2	NWSW				P28909W		MIS	KERR-MCGEE COAL CORPORATION	KMG 5C-2	01/03/1975	UNK	195.00	138.00	NO	YES
43	70	2	SWNW				P57000W		MON	KERR-MCGEE COAL CORPORATION	JRM 2-3C	03/09/1981	.00	213.00	162.00	YES	YES

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	3	NENW				P28707W	ABA	IND	KERR-MCGEE COAL CORP.	4A (9C-3)	11/25/1974	UNK	240.00	154.00	YES	YES
43	70	3	NWNW				P28912W		MIS	KERR-MCGEE COAL CORPORATION	KMG 9C-3	01/03/1975	UNK	240.00	167.40	NO	YES
43	70	3	NWNW				P59433W	CAN	MIS	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #11	04/20/1981					
43	70	3	NWNW				P57227W	CAN	MIS	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #14	06/01/1981					
43	70	3	NWSW				P28606P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 3 1	12/03/1974	5.00	220.00	208.00	NO	NO
43	70	3	NWSW				P56999W		MON	KERR-MCGEE COAL CORPORATION	JRM 3-2C	03/09/1981	.00	223.00	183.00	NO	YES
43	70	3	SENW				P56998W		MON	KERR-MCGEE COAL CORPORATION	JRM 3-3C	03/09/1981	.00	270.00	213.00	YES	YES
43	70	3	SWSW				P28910W		MIS	KERR-MCGEE COAL CORPORATION	KMG 5C-3	01/03/1975	UNK	220.00	161.80	NO	YES
43	70	4	SENW				P74933W		MON	KERR-MCGEE COAL CORPORATION	JRM 4 1C	06/19/1987	.00	290.80	214.00	NO	YES
43	70	4	SWSE				P74932W		MON	KERR-MCGEE COAL CORPORATION	JRM 4 1W	06/19/1987	.00	225.00	865.00	NO	YES
43	70	5	NWSW				P8961P		STO	USDA FOREST SERVICE	JACOBS #T B 85	07/31/1964	4.00	268.00	UNK	NO	YES
43	70	5	NWSW				P99921W	UNA	MON	KERR-MCGEE COAL CORP	JRM T5-10C	08/01/1995	.00	286.00	149.00	NO	YES
43	70	5	SENE				P99924W	UNA	MON	KERR-MCGEE COAL CORP	JRM T5-11W	08/01/1995	.00	200.00	76.00	NO	YES
43	70	6	NESE				P5869W	CAN	STO	RENO LIVESTOCK CORP.	HEARTSPEAR 15	06/22/1970					
	70	6	NESW				P2976P					06/11/1961	5.00	260.00	130.00	NO	YES
	70	6	NWSE				P2976P					06/11/1961	5.00	260.00	130.00	NO	YES
43	70	6	NWSE				P99926W	UNA	MON	KERR-MCGEE COAL CORP	JRM T6-8W	08/01/1995	.00	160.00	43.00	NO	YES
43	70	6	NWSW				P99925W	UNA	MON	KERR-MCGEE COAL CORP	JRM T6-7C	08/01/1995	.00	258.00	56.00	NO	YES
	70	6	SENW				P2976P					06/11/1961	5.00	260.00	130.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	6	SWNE				P2976P		STO	MILLS LAND & LIVESTOCK CO., INC.	MILLS #25	06/11/1961	5.00	260.00	130.00	NO	YES
43	70	7	NESE				P99928W	UNA	MON	KERR-MCGEE COAL CORP	JRM T7-6W	08/01/1995	.00	145.00	23.00	NO	YES
43	70	7	NWNE				P5867W	ABA	STO	RENO LIVESTOCK CORPORATION	HEARTSPEAR 13	06/22/1970	25.00	210.00	7.00	NO	YES
43	70	7	NWNW				P38081W		MON	THUNDER BASIN COAL COMPANY	BTW 16	06/02/1977	.00	100.00	18.30	NO	YES
43	70	7	NWNW				P38085W		MON	THUNDER BASIN COAL COMPANY	BTR 27	06/02/1977	.00	296.00	102.00	YES	YES
43	70	7	NWSE				P19254P		STO	KENNETH & SYLVIA REVLAND	REVLAND #2	09/30/1954	7.50	36.00	UNK	NO	YES
43	70	7	SENW				P28706W	ABA	IND	KERR-MCGEE COAL CORP.	#1A (1C-15)	11/25/1974	UNK	80.00	52.00	YES	YES
43	70	7	SENW				P31781W	ABA	IND	WYOMING STATE HIGHWAY DEPARTMENT	RENO #2	01/07/1976	UNK	260.00	UNK	NO	YES
43	70	7	SWNE				P99927W	UNA	MON	KERR-MCGEE COAL CORP	JRM T7-5C	08/01/1995	.00	261.00	114.00	NO	YES
43	70	7	SWNE				P100818W	UNA	MON	KERR-MCGEE COAL CORP	JRM T7-5UC	10/30/1995	.00	185.00	113.00	NO	YES
43	70	7	SWNW				P31780W		STO	RENO LIVESTOCK CORPORATION	RENO #1	01/07/1976	25.00	110.00	10.67	NO	YES
43	70	7	SWSW				P81595W	UNA	STO	JACOBS LAND AND LIVESTOCK	#1 SOUTH CONSOL	01/08/1990	10.00	100.00	20.00	NO	YES
43	70	8	NENE				P67545W		STO	USA USDA FOREST SERVICE	JACOBS #T.B. 204	06/07/1984	4.00	354.00	170.00	NO	YES
43	70	8	NESE				P39104W		STO	INC. STUART BROTHERS	CONSOL #1	07/15/1977	5.00	290.00	100.00	NO	YES
43	70	8	SESW				P99920W	UNA	MON	KERR-MCGEE COAL CORP	JRM T8-9W	08/01/1995	.00	82.00	11.00	NO	YES
43	70	8	SWNE				P99929W	UNA	MON	KERR-MCGEE COAL CORP	JRM T8-8C	08/01/1995	.00	194.00	139.00	NO	YES
43	70	9	NWNE				P99995W	UNA	MON	KERR-MCGEE COAL CORP	JRM 9-1T	08/15/1995					
43	70	9	NWNE				P99996W	UNA	MON	KERR-MCGEE COAL CORP	JRM 9-2T	08/15/1995					
43	70	9	NWNE				P99998W	UNA	MON	KERR-MCGEE COAL CORP	JRM 9-10B	08/15/1995					

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	9	NWNW				P38080W	ABA	MON	THUNDER BASIN COAL COMPANY	BTW 15	06/02/1977	.00	150.00	138.00	YES	YES
43	70	9	NWNW				P38084W	ABA	MON	THUNDER BASIN COAL COMPANY	BRT 26	06/02/1977	.00	215.00	144.70	YES	YES
43	70	9	SENE				P99997W	UNA	MON	KERR-MCGEE COAL CORP	JRM 9-3T	08/15/1995					
43	70	9	SESE				P38079W	ABA	MON	THUNDER BASIN COAL COMPANY	BTW 2A	06/02/1977	.00	150.00	37.60	YES	YES
43	70	9	SESE				P38083W		MON	THUNDER BASIN COAL COMPANY	BTR 3A	06/02/1977	.00	230.00	170.00	YES	YES
43	70	10	NENE				P5223W	CAN	STO	ANNA RUTH MCKINZIE	ANNA #1	03/09/1970					
43	70	10	NENE				P70088W		MIS	KERR-MCGEE COAL CORPORATION	JRM #18	05/03/1985	400.00	1784.0	324.00	NO	YES
43	70	10	NWNE				P61635W		DEW	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #1	02/10/1982	300.00	112.00	104.00	NO	YES
43	70	10	SESW				P56995W		MON	KERR-MCGEE COAL CORPORATION	JRM 10-3C 10-3W	03/09/1981	.00	180.00	169.00	NO	YES
43	70	10	SWNE				P28913W		MIS	KERR-MCGEE COAL CORPORATION	KMG 9C-10	01/03/1975	UNK	170.00	147.80	NO	YES
43	70	10	SWNE				P57002W	ABA	MON	KERR-MCGEE COAL CORPORATION	JRM 10 1C	03/09/1981	.00	168.00	153.00	NO	YES
43	70	10	SWNW				P56996W		MON	KERR-MCGEE COAL CORPORATION	JRM 10-2C	03/09/1981	.00	230.00	182.00	YES	YES
43	70	11	NENW				P28907W	CAN	MON	KERR-MCGEE COAL CORPORATION	KMG 3C-11	01/03/1975	UNK	160.00	114.00	NO	YES
43	70	11	NESE				P779W		IRR	JACOBS LAND & LIVESTOCK CO.	SHROYER #1	08/14/1961	350.00	45.00	25.00	NO	YES
43	70	11	NESE				P28610P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 11 1	12/03/1974	10.00	43.00	UNK	NO	NO
43	70	11	NESW				P36278W	ABA	MON	KERR-MCGEE COAL CORPORATION	4CK-11	02/17/1977	.00	75.00	50.00	NO	YES
43	70	11	NESW				P36280W	CAN	MON	KERR-MCGEE COAL CORPORATION	6K-11	02/17/1977					

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43	70	11	NESW				P36281W	ABA	MON	KERR-MCGEE COAL CORPORATION	7C-11	02/17/1977	.00	77.00	43.00	NO	YES
43	70	11	NESW				P36282W	CAN	MIS	KERR-MCGEE COAL CORPORATION	8C-11	02/17/1977					
43	70	11	NWNW				P28600W	CAN	STO	JACOBS LAND & LISVESTOCK COMPANY	JACOBS 11 2	12/03/1974					
43	70	11	NWNW				P40409W	CAN	STO	JACOBS LAND & LIVESTOCK COMPANY	11 3	09/02/1977					
43	70	11	NWNW				P42910W	CAN	MIS	KERR-MCGEE COAL CORPROATION	JACOBS RANCH MINE #6	02/10/1978					
43	70	11	NWNW				P56993W		MON	KERR-MCGEE COAL CORPORATION	JRM 11-2K	03/09/1981	.00	100.00	84.00	NO	YES
43	70	11	NWNW				P56994W		MON	KERR-MCGEE COAL CORPORATION	JRM11-1C	03/09/1981	.00	175.00	137.00	NO	YES
43	70	11	SENE				P77664W	UNA	MIS	KERR-MCGEE COAL CORPORATION	JRM #19	08/04/1988	400.00	1876.0	392.00	NO	YES
43	70	11	SESW				P29425W		STO	JACOBS LAND & LIVESTOCK COMPANY	JACOBS RANCH MINE #2	04/24/1974	50.00	180.00	45.20	NO	YES
43	70	11	SESW				P36279W	ABA	MON	KERR-MCGEE COAL CORPORATION	5C-11	02/17/1977	1.80	53.00	18.00	YES	YES
43	70	11	SESW				P45536W		STO	KERR-MCGEE COAL CORPORATION	ENL JACOB RANCH MINE #2	10/05/1978	150.00	180.00	45.20	NO	YES
43	70	11	SWSE				P61139W		MON	KERR-MCGEE COAL CORPORATION	JRM 11-1R	06/01/1982	.00	83.00	55.25	NO	YES
43	70	11	SWSW				P46510W		DEW	KERR-MCGEE COAL CORP.	JACOBS RANCH MINE #6	12/21/1978	160.00	110.00	28.00	NO	YES
43	70	11	SWSW				P53074W		MIS	KERR-MCGEE COAL CORPORATION	ENL JACOBS RANCH MINE #2	07/29/1980					
43	70	11	SWSW				P57229W		MIS	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #16	06/01/1981	275.00	1100.0	202.80	YES	YES
43	70	11	SWSW				P57034W	CAN	MON	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #16 TEST HOLE	06/05,					

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	12	NENE				P56992W	ABA	MON	KERR-MCGEE COAL CORPORATION	JRM 12-1C	03/09/1981	.00	130.00	112.00	YES	YES
43	70	12	NENE				P95949W	UNA	MON	KERR-MCGEE COAL CORP	JRM 12-1R	06/14/1994	.00	125.00	112.01	NO	YES
43	70	12	NESE				P41613W		DEW	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #4	04/18/1977	400.00	UNK	UNK	YES	YES
43	70	12	NWNW				P74050W		DEW	KERR-MCGEE COAL CORPORATION	ENL JACOBS RANCH MINE #4	12/19/1978	.00	UNK	UNK	YES	YES
43	70	12	NWSW				P53075W	CAN	MIS	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #7	07/29/1980					
43	70	12	NWSW				P56991W	ABA	MON	KERR-MCGEE COAL CORPORATION	JRM 12 2K	03/09/1981	.00	95.00	84.00	NO	YES
43	70	12	NWSW				P57228W	CAN	MIS	CORPORATION KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #15	06/01/1981					
43	70	12	NWSW				P79994W	UNA	MON	KERR-MCGEE COAL CORPORATION	JRM 12 3K	06/13/1989					
43	70	12	SESE				P59432W	CAN	MIS	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #10	04/20/1981					
43	70	14	NWNE				P28609P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 14 1	12/03/1974	2.00	8.00	8.00	NO	NO
43	70	14	NWNE				P56990W	CAN	MON	KERR-MCGEE COAL CORPORATION	JRM 14-1C	03/09/1981					
43	70	14	NWNE				P68198W		STO	KEER-MCGEE COAL CORPORATION	JLL-14-1	08/14/1984	8.00	342.00	109.00	NO	YES
43	70	14	NWNW				P53076W	CAN	MIS	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #8	07/29/1980					
43	70	14	NWSW			CU2/514A	P29426W	ADJ	MIS	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #3	04/24/1974	50.00	679.00	111.70	YES	YES
43	70	14	NWSW				P57230W		MIS	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #17	06/01/1981	300.00	1798.0	250.00	YES	YES
43	70	14	NWSW				P57035W	CAN	MON	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #17 TEST HOLE	06/05/1981					

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	14	SWNW				P65503W		MON	KERR-MCGEE COAL CORPORATION	JRM 14-1S	09/26/1983	.00	90.00	64.00	NO	YES
43	70	14	SWNW				P65504W		MON	KERR-MCGEE COAL CORPORATION	JRM 14-2S	09/26/1983	.00	100.00	76.40	NO	YES
43	70	14	SWSE				P48650W	CAN	MIS	WYOMING STATE HIGHWAY DEPARTMENT	BURNING COAL BANK DRAW #1	06/20/1979					
43	70	15	NESE				P29424W	CAN	STO	KERR-MCGEE COAL CORPORATION	JACOBS RANCH MINE #1	06/12/1974	500.00	112.00	UNK	NO	YES
43	70	15	NESW				P67506W		MON	KERR-MCGEE COAL CORPORATION	JRM 15 2R	05/31/1984	.00	83.00	80.00	YES	YES
43	70	15	NWNW				P28906W		MIS	KERR-MCGEE COAL CORPORATION	KMG 1C-15	01/03/1975	UNK	185.00	145.00	NO	YES
43	70	15	NWNW				P56989W		MON	KERR-MCGEE COAL CORPORATION	JRM15-4W	03/09/1981	.00	135.00	85.00	YES	YES
43	70	15	NWSW				P34482W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-5A	08/12/1976	.00	18.00	.00	NO	YES
43	70	15	NWSW				P34486W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-5B	08/12/1976	.00	18.00	.00	NO	YES
43	70	15	NWSW				P34490W		MON	WATER RESOURCES RESEARCH INSITUTE	LTB-5C	08/12/1976	.00	20.00	.00	NO	YES
43	70	15	SENE				P45673W		MON	KERR-MCGEE COAL CORPORATION	JR-7	10/27/1978	.00	180.00	160.00	NO	YES
43	70	15	SESE				P45674W		MON	KERR-MCGEE COAL CORPORATION	JR-8	10/27/1978	.00	28.83	23.00	NO	YES
43	70	15	SESW				P45670W		MON	KERR-MCGEE COAL CORPORATION	JR-3	10/27/1978	.00	62.00	31.00	NO	YES
43	70	15	SESW				P45671W		MON	KERR-MCGEE COAL CORPORATION	JR-5	10/27/1978	.00	39.20	11.00	NO	NO
43	70	15	SWSE				P45672W		MON	KERR-MCGEE COAL CORPORATION	JR-6	10/27/1978	.00	34.75	21.00	NO	YES
43	70	16	NENE				P20484W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #2	04/09/1973	UNK	116.00	34.08	YES	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	16	NENE				P20485W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #3	04/09/1973	UNK	195.00	158.31	YES	YES
43	70	16	NENE				P61197W		MON	THUNDER BASIN COAL COMPANY	BTBW-1	06/23/1982	.00	157.00	DRY	NO	YES
43	70	16	NENE				P61198W		MON	THUNDER BASIN COAL COMPANY	BTBW-2	06/23/1982	.00	81.00	57.80	YES	YES
43	70	16	NESE				P34493W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-5D	08/12/1976	.00	14.00	.00	NO	YES
43	70	16	NESE				P34495W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-5E	08/12/1976	.00	14.00	.00	NO	YES
43	70	16	NESE				P58787W	UNA	DEW	THUNDER BASIN COAL COMPANY	BT PIT 3	10/20/1981	400.00	95.00	92.00	NO	YES
43	70	16	NWSE				P61199W	CAN	MON	THUNDER BASIN COAL COMPANY	BTBW 3	06/23/1982					
43	70	16	NWSE				P61200W	CAN	MON	THUNDER BASIN COAL COMPANY	BTBW 4	06/23/1982					
43	70	16	NWSW				P34661W	CAN	TEM	ATLANTIC RICHFIELD COMPANY	BT-FU-16-1	08/27/1976	20.00	190.00	118.00	YES	YES
43	70	16	NWSW				P45312W	ABA	RES	THUNDER BASIN COAL COMPANY	BTR 16A	12/08/1977	50.00	190.00	118.00	NO	YES
43	70	16	NWSW				P57383W	CAN	DEW	THUNDER BASIN COAL COMPANY	BTR-16	04/27/1981					
43	70	16	SENW				P99231W	UNA	STO	THUNDER BASIN COAL COMPANY	BT-FU-16-2	03/28/1995	25.00	250.00	80.00	NO	YES
43	70	16	SWSW				P39031W	UNA	DEW	THUNDER BASIN COAL COMPANY	BT PIT 1	06/30/1977	200.00	55.00	55.00	NO	YES
43	70	17	NENE				P20482W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #2	04/09/1973	.00	177.00	90.94	YES	YES
43	70	17	NENE				P20483W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #2A	04/09/1973	UNK	176.00	89.15	NO	YES
43	70	17	NENE				P32384W	ABA	MIS	ATLANTIC RICHFIELD COMPANY	ENL BTR-WW #2	03/04/1976	25.00	177.00	90.94	YES	YES

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43	70	17	NENE				P45315W	ABA	RES	THUNDER BASIN COAL COMPANY	ENL BTR-WW #2	12/21/1977	25.00	177.00	90.94	YES	YES
43	70	17	NENW				P20480W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #1	04/09/1973	UNK	196.00	70.95	YES	YES
43	70	17	NENW				P20481W		IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #1	04/09/1973	UNK	110.00	63.00	YES	YES
43	70	17	NESE				P5863P	CAN	STO	ATLANTIC RICHFIELD COMPANY	HEARTSPEAR 9	04/30/1969	1.50	276.00	60.00	NO	NO
43	70	17	NESW				P32383W	UNA	RES	ATLANTIC RICHFIELD COMPANY	BTR32	03/04/1976	50.00	233.00	88.00	YES	YES
43	70	17	NESW				P45316W	ABA	RES	THUNDER BASIN COAL COMPANY	ENL BTR 32	12/21/1977	50.00	233.00	88.00	YES	YES
43	70	17	NESW				P45317W	CAN	RES	THUNDER BASIN COAL COMPANY	BT FH 17 1	03/31/1978					
43	70	17	NESW				P43346W	UNA	RES	ATLANTIC RICHFIELD COMPANY	BT FU 17 2	05/05/1978	315.00	2428.0	168.00	YES	YES
43	70	17	NWNE				P34483W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-15A	08/12/1976	.00	39.00	16.00	NO	NO
43	70	17	NWNE				P34487W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-15B	08/12/1976	.00	39.00	15.00	NO	NO
43	70	17	NWNE				P34491W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-15C	08/12/1976	.00	63.00	15.00	NO	NO
43	70	17	NWNE				P64562W		MON	THUNDER BASIN COAL COMPANY	BTBW - 3	06/24/1983	.00	128.00	DRY	NO	YES
43	70	17	SENW				P20509W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #16	04/09/1973					
43	70	17	SENW				P20510W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #16A	04/09/1973					
43	70	17	SENW				P20511W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #11	04/09/1973					
43	70	17	SWNW				P5973W	CAN	STO	INC. STUART BROTHERS	SWP #3	05/29/1970	25.00	291.00	65.00	NO	YES

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	17	SWNW				P45313W		RES	THUNDER BASIN COAL COMPANY	BTR 33	12/09/1977	43.00	291.00	65.00	YES	YES
43	70	17	SWSE				P60216W	CAN	MIS	THUNDER BASIN COAL COMPANY	BTR-72	12/16/1981	60.00	200.00	98.00	NO	YES
43	70	19	NESE				P4393W		STO	USDA FOREST SERVICE	RENO LIVESTOCK #T B 146	01/20/1970	5.00	390.00	140.00	NO	YES
43	70	19	NWNW				P38086W		MON	THUNDER BASIN COAL COMPANY	BTR 28	06/02/1977	.00	404.00	131.20	YES	YES
43	70	19	SESE				P60218W	CAN	MIS	THUNDER BASIN COAL COMPANY	BT-FU-29-1	12/18/1981	250.00	2200.0	273.80	NO	YES
43	70	19	SESE				P69200W	UNA	RES	THUNDER BASIN COAL COMPANY	BT FU 29 1	02/02/1984	250.00	2200.0	273.80	NO	YES
43	70	19	SESW				P74074W	CAN	DEW	THUNDER BASIN COAL COMPANY	LITTLE THUNDER EMBANKMENT DEWATERING WELL A	02/18/1987					
43	70	19	SWSE				P74075W	CAN	DEW	THUNDER BASIN COAL COMPANY	LITTLE THUNDER EMBANKMENT DEWATERING WELL B	02/18/1987					
43	70	20	NENE				P70906W	CAN	MON	THUNDER BASIN COAL COMPANY	BTB 4	08/16/1985					
43	70	20	NENE				P75057W		MON	THUNDER BASIN COAL COMPANY	BTB 4	06/29/1987	.00	188.00	DRY	NO	YES
43	70	20	NWNW				P20486W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #4	04/09/1973	UNK	246.00	98.55	YES	YES
43	70	20	NWNW				P20487W		IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #3	04/09/1973	UNK	165.00	39.00	YES	YES
43	70	20	SESE				P20494W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #8	04/09/1973	.00	260.00	152.17	YES	YES
43	70	20	SESE				P20495W		IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #6	04/09/1973	UNK	172.00	80.80	YES	YES
43	70	20	SESE				P25126W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW #6A	12/10/1973	.00	90.00	59.01	YES	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	20	SWSW				P20492W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #7	04/09/1973	UNK	260.00	103.60	YES	YES
43	70	20	SWSW				P20493W		IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #5	04/09/1973	UNK	106.00	26.04	YES	YES
43	70	21	NENE				P20491W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #6	04/09/1973	UNK	226.00	131.27	YES	YES
43	70	21	NWNW				P20488W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #5	04/09/1973	UNK	185.00	64.80	YES	YES
43	70	21	NWNW				P20489W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #5A	04/09/1973	UNK	185.00	63.64	NO	YES
43	70	21	NWNW				P20490W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTW WW #4	04/09/1973	UNK	100.00	23.45	YES	YES
43	70	21	NWNW				P32382W		RES	ATLANTIC RICHFIELD COMPANY	BTR-WW-#5	03/04/1976	25.00	185.00	62.00	YES	YES
43	70	21	NWNW				P37606W		RES	ATLANTIC RICHFIELD COMPANY	ENL BTR-WW #5	02/18/1977	12.00	185.00	62.00	YES	YES
43	70	21	NWNW				P45314W	ABA	RES	THUNDER BASIN COAL COMPANY	ENL BTR WW #5	12/21/1977	37.00	185.00	62.00	YES	YES
43	70	21	NWSE				P86046W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTB-6	09/04/1991	.00	177.00	120.34	NO	YES
43	70	21	NWSE				P86354W	UNA	MIS	THUNDER BASIN COAL COMPANY	21-OFS	09/12/1991					
43	70	21	SESE				P20496W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #9	04/09/1973	UNK	180.00	112.59	YES	YES
43	70	21	SESE				P20498W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTW WW #7	04/09/1973	UNK	98.00	54.02	YES	YES
43	70	22	NENE				P5864P		STO	RENO LIVESTOCK CORP.	HEARTSPEAR 10	12/31/1924	2.00	UNK	UNK	NO	NO
43	70	22	NENW				P62341W	CAN	MON	THUNDER BASIN COAL COMPANY	BTR-36	10/08/1982	.00	98.92	45.72	NO	YES
43	70	22	NENW				P62342W	CAN	MON	THUNDER BASIN COAL COMPANY	BTS-26	10/08/1982	.00	79.54	45.72	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	22	NENW				P62799AW	ABA	MON	THUNDER BASIN COAL COMPANY	BTR 37	11/18/1982	.00	102.59	46.62	NO	YES
43	70	22	NENW				P62799BW	ABA	MON	THUNDER BASIN COAL COMPANY	BTS 27	11/18/1982	.00	77.62	44.95	NO	YES
43	70	22	NENW				P62340W	CAN	MON	THUNDER BASIN COAL COMPANY	BTS-25	10/08/1983	.00	84.15	44.86	NO	YES
43	70	22	NWNE				P66515W	CAN	DEW	THUNDER BASIN COAL CO.	BT SC PIT 1	01/31/1984	50.00	70.00	69.00	NO	NO
43	70	22	NWNW				P96804W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 26	08/17/1994	.00	188.00	.00	NO	YES
43	70	22	SENW				P87565W	UNA	MIS	THUNDER BASIN COAL COMPANY	BT-SC-PIT-1	04/02/1992	500.00	70.00	42.00	NO	NO
43	70	22	SENW				P89492W	CAN	MIS	THUNDER BASIN COAL COMPANY	BT-SC-PIT-1A	09/15/1992					
43	70	22	SENW				P96805W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 27	08/17/1994	.00	145.00	.00	NO	YES
43	70	22	SESE				P34503W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-12	08/12/1976	.00	57.00	.00	NO	YES
43	70	22	SESW				P96806W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 28	08/17/1994	.00	155.00	150.00	NO	YES
43	70	22	SWSE				P20499W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #10	04/09/1973	UNK	120.00	90.75	NO	YES
43	70	22	SWSE				P25116W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW #10E	12/10/1973	.00	139.00	96.46	NO	YES
43	70	22	SWSE				P25117W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW #10D	12/10/1973	.00	139.00	100.15	NO	YES
43	70	22	SWSE				P25118W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR-WW #10C	12/10/1973	.00	95.00	90.00	NO	YES
43	70	22	SWSE				P25119W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR-WW #10B	12/10/1973	.00	90.00	.00	NO	YES
43	70	22	SWSE				P25120W		MON	ATLANTIC RICHFIELD COMPANY	BTR-WW #10A	12/10/1973	.00	142.00	97.78	YES	YES

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Priority Date

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With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	24	NWNE				P89325W	UNA	STO	JACOBS LAND AND LIVESTOCK	STRINGER #1	09/01/1992	20.00	360.00	180.00	NO	YES
43	70	24	SESW				P28608P		STO	JACOBS LAND & LIVESTOCK CO.	JACOBS 24 1	12/03/1974	5.00	50.00	UNK	NO	NO
43	70	26	NENW				P34485W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-4B	08/12/1976	.00	25.00	17.00	NO	YES
43	70	26	NENW				P34497W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-6	08/12/1976	.00	49.00	31.00	NO	YES
43	70	26	NWNE				P34500W	UNA	MON	WATER RESEARCH INSTITUTE	LTB-9	08/12/1976	.00	28.00	20.00	NO	YES
43	70	26	NWNW				P34501W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-10	08/12/1976	.00	19.00	16.00	NO	YES
43	70	26	SENW				P23694W	UNA	IND	ATLANTIC RICHFIELD COMPANY	BT-FU-3	08/02/1973	.00	152.00	21.16	YES	YES
43	70	26	SENW				P26425W		MON	ATLANTIC RICHFIELD COMPANY	BTA-28	04/08/1974	.00	27.00	14.07	YES	YES
43	70	26	SENW				P34481W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-4A	08/12/1976	.00	20.00	13.00	NO	YES
43	70	26	SENW				P34489W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-4C	08/12/1976	.00	22.00	17.00	NO	YES
43	70	26	SENW				P34492W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-4D	08/12/1976	.00	20.00	15.00	NO	YES
43	70	26	SENW				P34494W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-4E	08/12/1976	.00	20.00	15.00	NO	YES
43	70	26	SENW				P34496W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB 4F	08/12/1976	.00	20.00	15.00	NO	YES
43	70	26	SENW				P34498W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-7	08/12/1976	.00	25.00	20.00	NO	YES
43	70	26	SENW				P72707W	ABA	DEW	THUNDER BASIN COAL COMPANY	26 SR 1 DEWATERING WELL TRENCH G	06/12/1986	.00	10.00	10.00	NO	YES
43	70	26	SENW				P72708W	ABA	DEW	THUNDER BASIN COAL COMPANY	26 SR 1 DEWATERING WELL TRENCH H	06/12/1986	.00	20.00	10.00	NO	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	26	SWNW				P34499W	UNA	MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-8	08/12/1976	.00	9.00	6.00	NO	YES
43	70	26	SWNW				P72703W	CAN	DEW	THUNDER BASIN COAL COMPANY	26 SR 1 DEWATERING WELL TRENCH C	06/12/1986					
43	70	26	SWNW				P72704W	ABA	DEW	THUNDER BASIN COAL COMPANY	26 SR 1 DEWATERING WELL TRENCH D	06/12/1986	.00	20.00	8.00	NO	YES
43	70	26	SWNW				P72705W	ABA	DEW	THUNDER BASIN COAL COMPANY	26 SR 1 DEWATERING WELL TRENCH E	06/12/1986	.00	20.00	10.00	NO	YES
43	70	26	SWNW				P72706W	ABA	DEW	THUNDER BASIN COAL COMPANY	26 SR 1 DEWATERING WELL TRENCH F	06/12/1986	.00	20.00	8.00	NO	YES
43	70	26	SWSW				P77853W	UNA	DEW	THUNDER BASIN COAL COMPANY	BT SC PIT 2	08/18/1988	40.00	22.00	7.00	NO	YES
43	70	27	NENE				P26432W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW 25	04/08/1974	.00	40.00	.00	NO	YES
43	70	27	NENE				P29421W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BT-FH #1	01/31/1975					
43	70	27	NENE				P34502W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-11	08/12/1976	.00	90.00	63.00	NO	YES
43	70	27	NESE				P26429W		MON	ATLANTIC RICHFIELD COMPANY	BTR WW-22	04/08/1974	.00	88.00	34.00	YES	YES
43	70	27	NESE				P26430W		MON	ATLANTIC RICHFIELD COMPANY	BTR WW-23	04/08/1974	.00	56.00	17.83	YES	YES
43	70	27	NESE				P62798AW		MON	THUNDER BASIN COAL COMPANY	BTR-34	09/03/1982	.00	68.40	39.15	NO	YES
43	70	27	NESE				P62798BW		MON	THUNDER BASIN COAL COMPANY	BTS-23	09/03/1982	.00	32.80	DRY	NO	YES
43	70	27	NESE				P72701W	CAN	DEW	THUNDER BASIN COAL COMPANY	26 SR 1 DEWATERING WELL TRENCH A	06/12/1986					
43	70	27	NESW				P23695W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW#151	08/02/1973	UNK	108.00	20.53	YES	YES
43	70	27	NWNE				P23697W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #154	08/02/1973	UNK	118.00	59.85	YES	YES

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	27	NWNW		R R		P90243W	UNA	MIS	THUNDER BASIN COAL COMPANY	BT-FU-27-1	11/30/1992	90.00	318.00	57.30	NO	YES
43	70	27	NWNW	L4			P93320W	UNA	MIS	THUNDER BASIN COAL COMPANY	NEAR PIT #1	10/26/1993	.00	91.50	83.00	NO	YES
43	70	27	NWSW				P75198W		DEW	THUNDER BASIN COAL COMPANY	BT DW 1	07/20/1987	10.00	20.00	6.12	NO	YES
43	70	27	NWSW				P75199W		DEW	THUNDER BASIN COAL COMPANY	BT DW 2	07/20/1987	10.00	19.00	5.92	NO	YES
43	70	27	NWSW				P75200W		DEW	THUNDER BASIN COAL COMPANY	BT DW 3	07/20/1987	10.00	28.00	14.77	NO	YES
43	70	27	NWSW				P75201W		DEW	THUNDER BASIN COAL COMPANY	BT DW 4	07/20/1987	10.00	29.00	16.93	NO	YES
43	70	27	NWSW				P75202W		DEW	THUNDER BASIN COAL COMPANY	BT DW 5	07/20/1987	10.00	20.00	6.53	YES	YES
43	70	27	NWSW				P75203W	CAN	DEW	THUNDER BASIN COAL COMPANY	BT DW 6	07/20/1987					
43	70	27	NWSW				P76122W	CAN	DEW	THUNDER BASIN COAL COMPANY	BT DW 7	12/15/1987	10.00	21.00	7.62	NO	YES
43	70	27	NWSW				P76123W	CAN	DEW	THUNDER BASIN COAL COMPANY	BT DW 8	12/15/1987	10.00	20.00	6.28	NO	YES
43	70	27	NWSW				P76124W	CAN	DEW	THUNDER BASIN COAL COMPANY	BT DW 9	12/15/1987	10.00	20.00	8.08	NO	YES
43	70	27	NWSW				P76125W	CAN	DEW	THUNDER BASIN COAL COMPANY	BT DW 10	12/15/1987	10.00	24.00	12.01	NO	YES
43	70	27	NWSW				P77128W	ABA	DEW	THUNDER BASIN COAL COMPANY	BT DW 11	06/03/1988	45.00	20.00	11.00	NO	YES
43	70	27	SENE				P26431W		MON	ATLANTIC RICHFIELD COMPANY	BTR WW-24	04/08/1974	.00	40.00	13.02	YES	YES
43	70	27	SENE				P60217W	CAN	MIS	THUNDER BASIN COAL COMPANY	BT-FU-27-1	12/18/1981					
43	70	27	SENE				P72702W	CAN	DEW	THUNDER BASIN COAL COMPANY	26 SR 1 DEWATERING WELL TRENCH B	06/12/1986					

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	27	SENE				P88750W	UNA	STO	THUNDER BASIN COAL COMPANY	BT-PIT 5	06/02/1992	200.00	PIT	UNK	NO	NO
43	70	27	SESE				P62797AW		MIS	THUNDER BASIN COAL COMPANY	BTR-35	09/03/1982	.00	79.50	41.63	NO	YES
43	70	27	SESE				P62797BW		MON	THUNDER BASIN COAL COMPANY	BTS-24	09/03/1982	.00	39.00	DRY	NO	YES
43	70	27	SWNE				P23696W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW#153	08/02/1973	UNK	87.00	34.03	YES	YES
43	70	27	SWNW				P99323W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTB-7	05/30/1995					
43	70	27	SWSE				P24599W		MON	ATLANTIC RICHFIELD COMPANY	BTR-WW #156	09/17/1973	.00	100.00	44.35	YES	YES
43	70	27	SWSW				P20502W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #12	04/09/1973	UNK	117.00	51.95	NO	YES
43	70	27	SWSW				P20503W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #12A	04/09/1973	UNK	118.00	52.64	YES	YES
43	70	27	SWSW				P25113W		MON	ATLANTIC RICHFIELD COMPANY	BT-FU-4	12/10/1973	.00	145.00	68.00	YES	YES
43	70	27	SWSW				P25114W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW #12C	12/10/1973	.00	116.00	53.82	NO	YES
43	70	27	SWSW				P25115W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW #12B	12/10/1973	.00	112.00	51.67	NO	YES
43	70	27	SWSW				P25121W		MON	ATLANTIC RICHFIELD COMPANY	BT-FU-5	12/10/1973	.00	196.00	69.46	NO	YES
43	70	28	NENE				P20497W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #9A	04/09/1973					
43	70	28	NESE				P76979W	ABA	MON	THUNDER BASIN COAL COMPANY	BTM 88 2	05/18/1988	.00	139.10	71.50	NO	YES
43	70	28	NWNE				P57179W	UNA	DEW	THUNDER BASIN COAL COMPANY	BT PIT 2	02/18/1981	400.00	120.00	115.00	NO	YES
43	70	28	NWSE				P20514W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTW WW #12	04/09/1973	.00	80.00	32.00	NO	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	28	NWSE				P76978W	CAN	MON	THUNDER BASIN COAL COMPANY	BTM 88 1	05/18/1988					
43	70	28	NWSW				P7409W	CAN	STO	RENO LIVESTOCK CORP.	HEARTSPEAR 18	12/15/1970					
43	70	28	NWSW				P77129W	CAN	DEW	THUNDER BASIN COAL COMPANY	BT DW 12	06/03/1988					
43	70	28	SENW				P20512W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #17	04/09/1973	.00	159.00	72.10	NO	YES
43	70	28	SENW				P20513W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #17A	04/09/1973	.00	154.00	74.85	YES	YES
43	70	28	SESE				P76981W	ABA	MON	THUNDER BASIN COAL COMPANY	BTM 88 4	05/18/1988	.00	117.80	89.50	NO	YES
43	70	28	SESW				P96799W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 21	08/17/1994	.00	142.00	.00	NO	YES
43	70	28	SWNE				P80677W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTB 5	09/07/1989	.00	97.00	DRY	NO	YES
43	70	28	SWSE				P76980W	ABA	MON	THUNDER BASIN COAL COMPANY	BTM 88 3	05/18/1988	.00	116.80	101.60	NO	YES
43	70	28	SWSW				P20500W		IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #11	04/09/1973	UNK	226.00	105.44	YES	YES
43	70	28	SWSW				P20501W		IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #8	04/09/1973	UNK	135.00	45.08	NO	YES
43	70	28	SWSW				P96798W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 20	08/17/1994	.00	170.00	.00	NO	YES
43	70	29	NENW				P99801W	UNA	MON	THUNDER BASIN COAL COMPANY	BTA-50	07/18/1995	.00	25.00	DRY	NO	YES
43	70	29	NENW				P99802W	UNA	MON	THUNDER BASIN COAL COMPANY	BTA-51	07/18/1995	.00	25.00	DRY	NO	YES
43	70	29	NWNE				P99803W	UNA	MON	THUNDER BASIN COAL COMPANY	BTA-52	07/18/1995	.00	25.00	DRY	NO	YES
43	70	29	SENW				P34480W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-3A	08/12/1976	.00	16.00	14.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	29	SENW				P34484W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-3B	08/12/1976	.00	14.00	11.00	NO	YES
43	70	29	SENW				P34488W		MON	WATER RESOURCES RESEARCH INSTITUTE	LTB-3C	08/12/1976	.00	14.00	14.00	NO	YES
43	70	29	SESW				P59334W	CAN	MIS	WOODS PETROLEUM CORPORATION	PANOS FEDERAL #1	01/18/1982					
43	70	30	NESE				P74076W	ABA	DEW	THUNDER BASIN COAL COMPANY	B K EMBANKMENT DEWATERING WELL	02/18/1987	70.00	10.00	5.00	NO	YES
43	70	30	NWNW				P85873W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTW-19	08/20/1991	.00	270.00	167.90	NO	YES
43	70	31	SESE				P39601W	ABA	MIS	MICHIGAN WISCONSIN PIPELINE CO	THUNDER CREEK WATER SUPPLY WELL #1	08/19/1977	.00	280.00	100.00	NO	YES
43	70	32	NWNE				P85871W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTW-18	08/20/1991	.00	133.00	17.25	NO	YES
43	70	32	NWNW				P44614W		MON	THUNDER BASIN COAL COMPANY	BTR-31	08/22/1978	.00	248.00	130.90	NO	YES
43	70	32	NWSE				P5861P		STO	RENO LIVESTOCK CORP.	HEARTSPEAR 7	08/31/1966	2.00	233.00	170.00	NO	YES
43	70	32	SWNE				P7408W		STO	TENO LIVESTOCK CORPORATION	HEARTSPEAR 17	12/15/1970	25.00	130.00	15.00	NO	YES
43	70	33	NENE				P20504W	CAN	IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #9	04/09/1973					
43	70	33	NENE				P76984W	ABA	MON	THUNDER BASIN COAL COMPANY	BTM 88 7	05/18/1988	.00	129.50	117.80	NO	YES
43	70	33	NENW				P96801W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 23	08/17/1994	.00	214.00	.00	NO	YES
43	70	33	NWNE				P76982W	CAN	MON	THUNDER BASIN COAL COMPANY	BTM 88 5	05/18/1988	.00	145.90	113.70	NO	YES
43	70	33	NWNE				P96800W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 22	08/17/1994	.00	117.00	.00	NO	YES
43	70	33	NWNE				P96802W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 24	08/17/1994	.00	144.00	.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	33	NWSE				P88749W	UNA	STO	THUNDER BASIN COAL COMPANY	BT-PIT 4	06/02/1992	200.00	PIT	UNK	NO	NO
43	70	33	SENE				P76985W	ABA	MON	THUNDER BASIN COAL COMPANY	BTM 88 8	05/18/1988	.00	179.80	157.00	NO	YES
43	70	33	SENW				P87564W	UNA	STO	THUNDER BASIN COAL COMPANY	ENL BT-PIT-1 WELL	04/02/1992	.00	55.00	55.00	NO	YES
43	70	33	SENW				P96803W	UNA	MON	THUNDER BASIN COAL COMPANY	BTB - 25	08/17/1994	.00	194.00	.00	NO	YES
43	70	33	SESW				P88751W	UNA	STO	THUNDER BASIN COAL COMPANY	BT-PIT 6	06/02/1992	200.00	PIT	UNK	NO	NO
43	70	33	SWNE				P39031W	UNA	RES	WYO BOARD OF LAND COMMISSIONERS		06/30/1977	200.00	55.00	55.00	NO	YES
43	70	33	SWNE				P76983W	CAN	MON	THUNDER BASIN COAL COMPANY	BTM 88 6	05/18/1988	.00	186.10	139.40	NO	YES
43	70	33	SWSE				P20506W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #14	04/09/1973	UNK	220.00	121.10	YES	YES
43	70	33	SWSE				P20507W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTW-WW #10	04/09/1973	UNK	90.00	UNK	YES	YES
43	70	33	SWSE				P25125W		MON	ATLANTIC RICHFIELD COMPANY	BTW-WW #10A	12/10/1973	.00	143.00	29.68	NO	YES
43	70	34	SESW				P20508W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR-WW #15	04/09/1973	UNK	147.00	UNK	NO	YES
43	70	34	SESW				P25122W		MON	ATLANTIC RICHFIELD COMPANY	BTW-11A	12/10/1973	.00	137.00	UNK	YES	YES
43	70	34	SESW				P25123W		MON	ATLANTIC RICHFIELD COMPANY	BTR-WW #15B	12/10/1973	.00	216.00	154.80	YES	YES
43	70	34	SESW				P25124W		MON	ATLANTIC RICHFIELD COMPANY	BTW-WW #11	12/10/1973	.00	130.00	118.18	YES	YES
43	70	34	SWNE				P20505W	ABA	IND	ATLANTIC RICHFIELD COMPANY	BTR WW #13	04/09/1973	UNK	211.00	139.50	YES	YES
43	70	35	SESW				P26428W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BTR WW 21	04/08/1974	.00	240.00	.00	NO	YES

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T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	70	35	SESW				P26435W	CAN	MON	ATLANTIC RICHFIELD COMPANY	BTW WW 15	04/08/1974					
43	71	1	NENE				P9681W		STO	BELLE FOURCHE PIPELINE CO.	SOUTH HILIGHT #1	07/13/1971	30.00	346.00	221.00	NO	YES
43	71	1	NWSE				P99923W	UNA	MON	KERR-MCGEE COAL CORP	JRM T1-8W	08/01/1995	.00	141.00	10.00	NO	YES
43	71	1	NWSW				P99922W	UNA	MON	KERR-MCGEE COAL CORP	JRM T1-7C	08/01/1995	.00	400.00	125.00	NO	YES
43	71	2	NWSE				P19251P		STO	KENNETH & SYLVIA REVLAND	REVLAND #1	09/30/1954	7.50	147.00	80.00	NO	YES
43	71	2	SWSW				P48534W	CAN	MIS	BURLINGTON NORTHERN INC.	MARY ANN #4	05/29/1979					
43	71	3	SWSE				P3050W		STO	INC. STUART BROTHERS	STUART #10	09/15/1969	5.00	145.00	60.00	NO	YES
43	71	4	SWNE				P3343W		STO	STUART BROTHERS INC.	STUART #8	10/06/1969	5.00	273.00	160.00	NO	YES
43	71	6	NWSE				P101219W	UNA	STO	PAUL R/RUBY H STUART	RED WINDMILL #1	01/08/1996	5.00	135.00	72.00	NO	NO
43	71	8	SWSW				P12761P		STO	USDA FOREST SERVICE	RENO #TB 41	12/30/1951	4.00	152.00	UNK	NO	NO
43	71	10	SWNE				P45855W		STO	USDA FOREST SERVICE	MARG #13	10/11/1978	3.00	383.00	79.00	NO	YES
43	71	11	SENW				P12762P		STO	USDA FOREST SERVICE	STUART #TB 37	12/30/1950	4.00	146.00	UNK	NO	NO
43	71	11	SESE				P44615W	CAN	MIS	ATLANTIC RICHFIELD COMPANY	BTR 30	08/22/1978					
43	71	11	SESE				P50925W	ABA	MON	ATLANTIC RICHFIELD COMPANY	BRT 30	11/28/1979	.00	418.00	131.00	NO	NO
43	71	12	SWNE			CU1/173A	P5866W	ADJ	STO	RENO LIVESTOCK CORP.	HEARTSPEAR 12	06/22/1970	25.00	212.00	6.00	NO	YES
43	71	13	NESW				P5862P		STO	RENO LIVESTOCK CORP.	HEARTSPEAR 8	08/31/1968	2.00	324.00	90.00	NO	YES
43	71	13	SWNE				P94495W	UNA	MIS	ENERGX, LTD	ENERGX LITTLE THUNDER 7-13	12/08/1993					
43	71	13	SWSE				P94496W	UNA	MIS	ENERGX, LTD	ENERGX LITTLE THUNDER 15-13	12/08/1993					
43	71	14	SENW				P19253P		STO	KENNETH & SYLVIA REVLAND	REVLAND #3	12/31/1950	7.50	80.00	UNK	NO	NO

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	71	15	NENW				P81415W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTR 157	12/06/1989	.00	535.00	206.70	NO	YES
43	71	16	NWNW				P40081W	CAN	MIS	ATLANTIC RICHFIELD COMPANY	WCH 1B	09/28/1977					
43	71	16	SENW				P40080W	CAN	MON	ATLANTIC RICHFIELD COMPANY	WCH 1A	09/28/1977					
43	71	16	SESE				P33997W		MON	THUNDER BASIN COAL COMPANY	WCH 3	07/06/1976					
43	71	19	NWNW				P38082W		MON	ATLANTIC RICHFIELD COMPANY	BTW 17	06/02/1977	.00	125.00	85.50	YES	YES
43	71	21	SENE				P32088W		MON	UNIVERSITY OF WYOMING WRRI	LTB 2A	01/16/1976	.00	100.00	37.00	NO	YES
43	71	21	SENE				P32089W		MON	UNIVERSITY OF WYOMING WRRI	LTB 2B	01/16/1976	.00	200.00	36.00	NO	YES
43	71	21	SENE				P32090W		MON	UNIVERSITY OF WYOMING WRRI	LTB 2C	01/16/1976	.00	574.00	191.00	NO	YES
43	71	21	SENE				P84348W	UNA	STO	USDA FOREST SERVICE	EDWARDS #T.B. 266	02/05/1991	2.50	574.00	191.00	NO	YES
43	71	22	NWNW				P8912W		STO	USDA FOREST SERVICE	RENO #T B 152	05/04/1971	4.00	UNK	UNK	NO	NO
43	71	22	SWNW				P8913W		STO	USDA FOREST SERVICE	RENO #T B 153	05/24/1971	5.00	UNK	UNK	NO	NO
43	71	23	SWSW				P44326W		STO	USDA FOREST SERVICE	MARG #1	07/20/1978	3.00	375.00	230.00	NO	YES
43	71	25	NESE				P95139W	UNA	MIS	ENERGX, LTD	ENERGX 9-25 ARCO	03/22/1994					
43	71	25	NESW				P5868W	CAN	STO	RENO LIVESTOCK CORP.	HEARTSPEAR 14	06/22/1970					
43	71	25	SESE				P5860P		STO	RENO LIVESTOCK CORP.	HEARTSPEAR 6	12/31/1930	1.50	UNK	UNK	NO	NO
43	71	25	SESE				P95138W	UNA	MIS	ENERGX, LTD	ENERGX 16-25 ARCO	03/22/1994					
43	71	26	NENW				P81416W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTR 158	12/06/1989	.00	502.00	194.20	NO	YES
43	71	28	SWNW				P101905W	UNA	STO	BRIDLE BIT RANCH CO.	BBRC BLACK BUTTE #2	03/26/1996					
43	71	30	NENE				P25793W	ABA	MON	HARRY R. & HARRIET P. UNDERWOOD	UNDERWOOD #36	01/22/1974	UNK	420.00	UNK	NO	YES

Sorts: TWP RNG SEC QTR-QTR
Priority Date

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

Report: GW - JTRSSTD95
Prepared: 10/14/96 09:34 AM

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
43	71	30	NWNW				P25792W	CAN	MON	HARRY R. & HARRIET P. UNDERWOOD	UNDERWOOD #35	01/22/1974					
43	71	30	SENW				P56708W		STO	HARRY UNDERWOOD	UNDERWOOD WELL #3	03/31/1981	25.00	717.00	70.00	NO	YES
43	71	31	NENW				P25794W	CAN	MON	HARRY R. & HARRIET P. UNDERWOOD	UNDERWOOD #37	01/22/1974					
43	71	31	SESE				P25796W	ABA	MON	HARRY R. & HARRIET P. UNDERWOOD	UNDERWOOD #39	01/22/1974	UNK	600.00	85.00	NO	YES
43	71	31	SWSW				P25795W	CAN	MON	HARRY R. & HARRIET P. UNDERWOOD	UNDERWOOD #38	01/22/1974					
43	71	34	NWSE				P44328W		STO	USDA FOREST SERVICE	MARG #3	07/20/1978	60.00	353.00	125.00	NO	YES
43	71	35	SWNW				P14237W		STO	USDA FOREST SERVICE	STUART #T.B. 165	06/14/1972	5.00	275.00	70.00	NO	YES
43	71	35	SWNW				P44452W	CAN	MIS	INDUSTRIAL PIPELINES SOUTH CENTRAL INC.	BURLINGTON CONSTRUCTION #1	08/04/1978	100.00	360.00	100.00	NO	YES
43	71	36	NWNW				P33645W	UNA	MON	THUNDER BASIN COAL COMPANY	ECH 7	06/02/1976	.00	395.00	161.00	YES	YES
43	71	36	SWSW				P85874W	UNA	MIS	THUNDER BASIN COAL COMPANY	BTR-159	08/20/1991	.00	392.00	191.13	NO	YES
43	72	2	SESW				P41506W	CAN	MIS	WYOMING STATE HIGHWAY DEPARTMENT	STEWART BROTHERS #5	01/18/1978	.00	258.00	69.00	NO	YES
43	72	11	NWNE				P41502W	CAN	IND	WYOMING STATE HIGHWAY DEPARTMENT	STEWART BROTHERS #1	01/18/1978	.00	234.50	69.50	NO	YES
43	72	11	SENE				P41507W	CAN	MIS	WYOMING STATE HIGHWAY DEPARTMENT	STEWART BROTHERS #6	01/18/1978					
43	72	11	SWNE				P41503W	CAN	IND	WYOMING STATE HIGHWAY DEPARTMENT	STEWART BROTHERS #2	01/18/1978					
43	72	12	NENW				P41505W	CAN	MIS	WYOMING STATE HIGHWAY DEPARTMENT	STEWART BROTHERS #4	01/18/1978					
43	72	12	NWNW				P41504W	CAN	IND	WYOMING STATE HIGHWAY DEPARTMENT	STEWART BROTHERS #3	01/18/1978					
44	71	16	NWNW				P40085W	ABA	MON	THUNDER BASIN COAL COMPANY	WCH 2E	09/28/1977	.00	768.40	330.00	YES	YES

WYOMING WELL INVENTORY PREPARED BY THE WYOMING STATE ENGINEER'S OFFICE
With Tns greater than or equal to 41 and with Tns less than or equal to 43 and with Rng greater than or equal to 69 and with Rng less than or equal to 71 and with County equal to 17

T	R	S	QQ	Lots	Surv Code	Cert Order No	Permit Number	Permit Status	Well Use Codes	Applicant Name	Facility Name	Priority Date	Actual Yield (gpm)	Well Depth (feet)	Static Water Level	Chem Anal	Well Log
44	71	16	SENW				P60640W	CAN	MON	ATLANTIC RICHFIELD CO.	RH 1-MUA-2	08/03/1981					
47	71	23	NWNW				P62179W	CAN	RES	CORDERO MINING COMPANY	NORTH PIT SUMP #2	03/15/1982					
47	71	31	NESE				P88919W	UNA	IND	RAYMOND T. DUNCAN	HAIGHT 5-31	07/16/1992	31.00	4721.0	600.00	NO	NO

APPENDIX F:

U.S. FOREST SERVICE, REGION 2, SENSITIVE SPECIES

U.S. FOREST SERVICE, REGION 2, SENSITIVE SPECIES

FISH

- Flathead chub (*Hybopsis gracilis*). The flathead chub is common in most drainages east of the Continental Divide. Within the boundaries of the Thunder Basin National Grasslands (TBNG), flathead chub have been collected along perennial reaches of Antelope Creek, the Cheyenne River, and the Little Powder River. Typically, flathead chub occur in large silty rivers and seldom in ponds or in lakes.
- Plains topminnow (*Fundulus sciadicus*). In Wyoming, the plains topminnow is found in streams of the North and South Platte drainages, in the Niobrara River, and in headwaters of the Cheyenne River system. It usually inhabits clear, sand- or gravel-bottomed streams with considerable vegetation.

REPTILES AND AMPHIBIANS

- Northern leopard frog (*Rana pipiens*). The northern leopard frog is found throughout Wyoming and is relatively common. The frog is found in or near permanent water with associated vegetation. On occasion, this frog is found near temporary ponds several miles from permanent water. The northern leopard frog rests near pond and lake margins. During the summer months, it may be found foraging actively in protected places among sedges, cattails, and taller grasses.
- Tiger salamander (*Ambystoma tigrinum*). Tiger salamanders are found throughout Wyoming from the lowest elevations to about 10,000 feet. They require a fairly moist environment and seek out places that provide a refuge from the drying influence of sun and wind. Transformed individuals are primarily terrestrial, migrating to ponds and lakes in the spring to breed and remaining there through most of the summer. Larvae may be found in intermittent streams and stockponds, as well as lakes and ponds.
- Milk snake (*Lampropeltis triangulum*). Milk snakes are found under flat stones, decaying logs and stumps, boards, or other debris. They may be found in prairie systems, river bottoms (broadleaf woodlands), rocky hillsides, and coniferous forests.

MAMMALS

- Swift fox (*Yulpes velox*). The swift fox is a yearlong resident in upland grasslands habitats of the TBNG. It prefers grasslands without shrubs and open areas with loose enough soils for burrowing.

BIRDS

- American bittern (*Botaurus lentiginosus*). The American bittern is a summer resident that occasionally may occur on the TBNG. The bird's habitat is marshes, swamps, reedy lakes, slow-moving rivers, moist meadows, and dense riparian thickets.
- Western yellow-billed cuckoo (*Coccyzus americanus*). This bird is found in cottonwood or willow/riparian areas.
- Greater sandhill crane (*Grus canadensis*). The sandhill crane is a summer resident. The nesting habitat consists primarily of marshes, wet-moist meadow grasslands, sedge meadows. An open area with shallow water and, in places, dense vegetation such as willows, sedges, grasses, or rushes is optimal.
- Long-billed curlew (*Numenius americanus*). The long-billed curlew is a summer resident in sagebrush-grasslands. It prefers open areas of shortgrass flats with few shrubs for nesting.

- Ferruginous hawk (*Buteo regalis*). The ferruginous hawk is a summer resident of the TBNG. Individuals of this species nest in rock outcrops, on the ground, in a bank, or in coniferous trees. On the TBNG, most ferruginous hawks are ground nesters and are found throughout the grasslands.
- White-faced ibis (*Plegadis chihi*). White-faced ibis are uncommon summer residents in wetland areas of the plains. Habitat is almost exclusively ponds, marshes, muddy pools, stream margins, and river banks for breeding, feeding, and resting. Nesting habitat includes bulrushes or cattails, occasionally on the ground on an island.
- Common loon (*Gavia immer*). The common loon is found along rivers or near lakes or ponds with deep water and vegetation up to the water's edge.
- Merlin (*Falco columbarius*). The merlin is a year-round resident which uses a variety of habitats. Merlins prefer open areas to hunt and primarily coniferous forests in which to nest. They also may be found in deciduous woodlands along rivers. In winter, they frequent open parklands and prairies with a few scattered trees.
- Western burrowing owl (*Athene cunicularia*). Burrowing owls are summer residents in the area. They commonly use vacant prairie dog burrows in shortgrass areas and other vacant burrows such as rabbit or badger holes in upland grassland areas with few shrubs.
- Loggerhead shrike (*Lanius ludovicianus*). The loggerhead shrike is a summer resident in upland sagebrush shrubland/grasslands and is also found in pine-juniper woodlands. Shrubs and lookout perches adjacent to feed areas are important to this species.
- Fox sparrow (*Passerella iliaca*). Fox sparrows are year-round residents on the TBNG. They inhabit native riparian shrub with adjacent coniferous forest or woodland-chaparral, as well as burned coniferous and logged/thinned forests, aspen woodland, and willow thickets.
- Black-backed woodpecker (*Picoides arcticus*). This woodpecker is a yearlong resident. Its habitat includes coniferous forests, especially forests that have burned. It nests in cavities in conifers.
- Mountain plover (*Charadrius montanus*). The mountain plover is a summer resident of the shortgrass and mid-grass grasslands. Plovers prefer bare ground or grassy areas without shrubs and vegetative height under 4 inches. Shortgrass habitats modified by prairie dogs, fire, or heavier grazing are frequently selected for nesting. Mountain plovers prefer sites with broad level topography.
- Upland sandpiper (*Bartramia longicauda*). The upland sandpiper is a summer resident on the TBNG. Its habitat is upland grassland with few shrubs, and it nests in a depression on open ground, feeding in open areas where visibility is good.
- Baird's sparrow (*Ammodramus bairdii*). Baird's sparrow is a summer resident on the TBNG. It frequents upland grasslands and is a ground nester in open prairie.
- Black tern (*Chlidonias niger*). The black tern is a summer resident of the TBNG. Black terns inhabit freshwater marshes, wet meadows, and marshy lakes and nest on a floating mat of dead vegetation, often on a muskrat house.
- Lewis' woodpecker (*Melanerpes lewis*). Lewis' woodpecker is a summer resident of the TBNG. Its habitat is cottonwood riparian areas and open ponderosa-pine or pine-juniper coniferous forests. Both dead and live trees are used for nest sites and as foraging perches. Scattered snags or live trees and brushy undergrowth must be available.

INVERTEBRATES

- There are no sensitive invertebrate species or potential habitat known to occur within this portion of the TBNG at this time.

APPENDIX G:

COMMENT LETTERS AND RESPONSE ON THE DEIS

1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2466

97 JAN 13 PM 1:52

JAN 10 1997

Ref: 8EPR-EP

Ms. Nancy Doelger
Bureau of Land Managment
Casper District Office
1701 East "E" Street
Casper, WY 82601

RE: North Rochelle Coal Lease Application (WYW127221) DEIS

Dear Ms. Doelger:

In accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the Region VIII Office of the Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) for the referenced project. We offer the following comments for your consideration.

The Proposed Action is to hold a competitive lease sale for the federal coal lands as applied for (approximately 1,440 acres of federal coal reserves containing an estimated 144 million tons of coal), subject to the standard coal lease stipulations and to special coal lease stipulations developed for the Wyoming Powder River Basin (PRB). The DEIS provides an analysis of environmental impacts associated with a combination of dozer, truck-shovel and dragline conventional surface mining action. Further, the Bureau of Land Management (BLM) will use the analysis to decide whether or not to hold a competitive lease sale and issue a federal coal lease.

We commend the Bureau of Land Management for a well organized and informative document. In particular, the discussion related to surface and ground water issues and impacts is quite thorough. We do have concerns with the Air Quality discussion as well as some other issues and analysis. Please refer to the enclosure for our specific comments and recommendations.

Based on the procedures the EPA uses to evaluate the adequacy of the information in the EIS and the environmental impacts of the proposed action, the DEIS for the North Rochelle Coal Lease Application (WYW127221) will be listed in the Federal Register in category EC-2 (environmental concerns, additional information needed).

This rating indicates that our review has identified the need for additional information, data and discussion in the final EIS (FEIS).

The EPA appreciates the opportunity to review and comment on the DEIS. If we can provide further explanation of our concerns please contact Mike Hammer of my staff at (303) 312-6563.

Sincerely,

Carol L. Campbell

Carol L. Campbell, Director
Ecosystems Protection Program

Enclosure

SPECIFIC COMMENTS AND RECOMMENDATIONS
ON THE NORTH ROCHELLE COAL LEASE APPLICATION DEIS

1. Many figures in the DEIS showing the LBA tract and the existing leases have no distance scale (i.e. Figures ES.1, ES.2, ES.4, 2.1, 2.3 and 3.1).

Recommend that a distance scale showing milage increments and kilometer increments be added to all figures indicating the spacial relationship of the LBA tract and existing leases (mines). If the squares on some of the figures indicate a one square mile cross section, then include this information in the key for the figure.

2. The final sentence on page ES-11, "Ongoing groundwater mitigation plans appear to be adequately mitigating impacts..." is confusing. How do plans mitigate impacts?

Recommend that the sentence be changed to discuss what ongoing groundwater actions are mitigating impacts.

3. The final sentence on page 3.9 compares average TSP and PM10 concentrations in the PRB relative to coal and overburden removal. It is unclear whether these averages are based on an annual period or a 24-hour period.

Recommend that the sentence be changed by adding the word "annual" to describe the averages. (e.g. "Annual average TSP and PM10 concentrations".) Also, in figure 3.5 on page 3-11, the title should state "Coal Production vs. Annual Average Particulate Concentrations".

4. Section 3.5 AIR QUALITY, has no meteorological wind data. The first paragraph on page 3-10 states that average annual particulate levels have remained relatively constant even though coal production has increased. It would be helpful to know the location of Basin Mine Monitors and the Gillette SLAMS with respect to the mining locations. Also, the percentage of the year that wind direction is such that the monitors are downwind of mining operations needs to be addressed.

Recommend that a wind rose representative of the assessment area be included in Section 3.5. Section 3.5 should include a figure showing the location of the monitors with respect to current mining operations.

5. The last sentence of the first paragraph on page 3-11 states, "The EPA has not yet established an increment for PM10 under the Prevention of Significant Deterioration regulations: however...".

The EPA has established a PSD increment. Recommend that the above sentence be changed to state that under 40 CFR 52.21(c)-Ambient Air Increments , the EPA does have an established increment for PM10 which applies for both an annual arithmetic mean and a 24-hr standard. Also, Table 3.3 needs to be revised to list the EPA's PM10 increment. Additionally, in Table 3.3, the units for Maximum Allowable Increment are incorrect. Revise the units from (ug/m2) to (ug/m3). A footnote should be added to the Table to state the origin of the information.

6. On page 3-11, the last paragraph before section 3.6 WATER RESOURCES. states, "The historical record of TSP emissions demonstrates the increased mining activity has not exceeded the allowable increments (Figure 3.5)." This sentence is unclear since Figure 3.5 discusses particulate concentrations (ug/m3) and the above sentence discusses TSP emmissions (i.e. tons/yr). Also, the PSD increment is based on air dispersion modeling results and not on monitored results.

Recommend that this sentence be deleted or clarified to discuss air dispersion modeling results. In addition, Section 3.5 should discuss what the current permitting scenario is for the North Rochelle mine. If there is a current PSD permit for the mine, will a new/amended PSD permit be required for the LBA tract?

7. On page 4-22, the fourth paragraph starting with, "Figure 4.2 is from the Black Thunder....". Do the modeled PM10 concentrations include background levels as shown in Figure 3.5? If these PM10 concentrations are annual average concentrations, then this should be stated in the paragraph and in the title to figure 4.2 (Typical Modeled PM10 Annual Average Concentrations...). What modeling analyses have been completed to show compliance with the PM10 24-hr average standard as listed in table 3.2?

2

REPLY TO ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

November 20, 1996

Planning Division

NOV 26 1996

ED		RPEM	
ABD		MALA	
OEA		OSS	
BEO		CF	
LAW		LEAD Plng.	

922

Mr. Alan R. Pierson, State Director
U.S. Department of the Interior
Bureau of Land Management
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003-1828

Dear Mr Pierson:

We have reviewed the Draft Environmental Impact Statement for the North Rochelle Coal Lease Application in Campbell County, Wyoming, reference Federal Coal Lease Application WYW127221.

We have no comments on the proposed coal lease.

Thank you for the opportunity to review this proposal. Please contact Ms. Jeanette Conley of our staff at (402) 221-3133 for questions or comments.

Sincerely,

Candace M. Thomas
Chief, Environmental Analysis Branch
Planning Division

BUREAU OF LAND MANAGEMENT
96 NOV 26 AM 10 00
RECEIVED
CHEYENNE, WYOMING

3

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
215 NORTH 17TH STREET
OMAHA, NEBRASKA 68102-4978

REPLY TO ATTENTION OF

December 3, 1996

95 DEC -6 PM 2:02

Wyoming Regulatory Office
2232 Dell Range Blvd., Suite 210
Cheyenne, Wyoming 82009

Ms. Nancy Doelger
Bureau of Land Management
Casper District Office
1701 East "E" Street
Casper, Wyoming 82601

Dear Ms. Doelger:

This is in response to your agency's November 7, 1996 scoping notice requesting comments on North Rochelle Coal Mine's proposed expansion.

A review of the provided information indicates that waters of the U.S., including wetlands, may be impacted by the mine's operations. This triggers the need for authorization of the project in accordance with Section 404 of the Clean Water Act. The Corps has established a Nationwide Permit for surface coal mining activities. Under that permit, the applicant is required to conduct a detailed wetland delineation and identification of all waters of the U.S. contained in the mine permit area. They have previously accomplished this task for the existing mine. That delineation must be accomplished in accordance with the 1987 Corps of Engineers Delineation Manual. I have enclosed a copy of the permit's fact sheet for your information.

If you have any questions concerning this matter, please contact Chandler Peter at (307) 772-2300. Your file number is 199540006.

Sincerely,

Matthew A. Bilodeau
Program Manager
Wyoming Regulatory Office

Enclosure

Fact Sheet #21

33 CFR Section 330.6 Nationwide Permits

(b) Authorized Activities:

(21) Surface Coal Mining Activities. Activities associated with surface coal mining activities provided they are authorized by the Department of the Interior, Office of Surface Mining, or by states with approved programs under Title V of the Surface Mining Control and Reclamation Act of 1977 and provided the permittee notifies the district engineer in accordance with "Notification" general condition. For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. (Sections 10 and 404)

(c) General Conditions: The following general conditions, where applicable, must be complied with for the Nationwide Permit authorization to remain valid:

(1) Navigation. No activity may cause more than a minimal adverse effect on navigation.

(2) Proper maintenance. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety.

(3) Erosion and siltation controls. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.

(4) Aquatic life movements. No activity may substantially disrupt the movement of those species of aquatic life indigenous to the waterbody, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water.

(5) Equipment. Heavy equipment working in wetlands must be placed on mats or other measures must be taken to minimize soil disturbance.

(6) Regional and case-by-case conditions. The activity must comply with any regional conditions which may have been added by the division engineer and any case specific conditions added by the Corps.

(7) Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

(8) Endangered Species. No activity is authorized under any Nationwide Permit which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the district engineer if any listed species or critical habitat might be affected or is in the vicinity of the project and shall not begin work on the activity until notified by the district engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Information on the location of threatened and endangered species and their critical habitat can be obtained from the U. S. Fish and Wildlife Service and National Marine Fisheries Service.

(9) Historic properties. No activity which may affect Historic properties listed, or eligible for listing, in the National Register of Historic Places is authorized, until the district engineer has complied with the provisions of 33 CFR 325, appendix C. The prospective permittee must notify the district engineer if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin the activity until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historical Preservation Office and the National Register of Historic Places.

SECTION 404 ONLY CONDITIONS

In addition to the General Conditions, the following conditions apply only to activities that involve the discharge of dredged or fill material and must be followed in order for authorization by the nationwide permits to be valid:

(1) Water Supply Intakes. No discharge of dredged or fill material may occur in the proximity of a public water supply intake except where the discharge is for repair of the public water supply intake structures or adjacent bank stabilization.

(2) Suitable material. No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.) and material discharged must be free from toxic pollutants in toxic amounts.

(3) Mitigation. Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site), unless the district engineer has approved a compensation mitigation plan for the specific regulated activity.

(4) Spawning areas. Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable.

(5) Obstruction of high flows. To the maximum extent practicable, discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters).

(6) Adverse impacts from impoundments. If the discharge creates an impoundment of water, adverse impacts on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable.

(7) Waterfowl breeding areas. Discharges into breeding areas for migratory waterfowl must be avoided to the maximum extent practicable.

(8) Removal of temporary fills. Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

4

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Reston, Virginia 22092

In Reply Refer To:
Mail Stop 423

JAN 13 1997

MEMORANDUM

To: Nancy Doelger, Minerals Environmental Specialist

From: James F. Devine
Senior Advisor for Science Applications

Subject: Review of Draft Environmental Impact Statement for the North Rochelle Coal Lease Application, as applied for by Bluegrass Coal Development Company (Federal Coal Lease Application WYW127221), Campbell County, Wyoming

As requested by the Bureau of Land Management, the U.S. Geological Survey has reviewed the subject draft environmental impact statement (EIS) and offers the following comment:

The EIS should explain the significance of a "five foot drawdown" (page 4-26). Is this a regulatory standard?

Copy to: District Chief, Water Resources Division, Wyoming

5

97 JAN 13 PM 2:11

STATE OF WYOMING
OFFICE OF THE GOVERNOR

JIM GERINGER
GOVERNOR

STATE CAPITOL BUILDING
CHEYENNE, WY 82002

January 10, 1997

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

Dear Ms. Doelger:

On behalf of the State of Wyoming, please be advised that we have reviewed the Draft Environmental Impact Statement for the North Rochelle Coal Lease Application. In accordance with our own comment period given to all affected state agencies, I have attached comments from the Geological Survey, the State Historic Preservation Office, and the Game and Fish Department for your review. I trust you will give them due consideration.

Thank you for the opportunity to comment.

Sincerely,

for Paul R. Kruse
Assistant Director
Office of Federal Land Policy

PK:jh
Enclosures

INTERNET GOVERNOR@MISN.STATE.WY.US • TELEPHONE [illegible] • FAX [illegible]

6

DIVISION DIRECTOR
Karyl Denison Robb, Ph. D.

WYOMING

DIVISION OF CULTURAL RESOURCES

State Historic Preservation Office
6101 Yellowstone Road
Cheyenne, WY 82002

(307) 777-7697
FAX (307) 777-6421

96 NOV 18 PM 1:58

November 14, 1996

Ms. Nancy Doelger
Casper District Office
Bureau of Land Management
1701 East "E" Street
Casper, WY 82601

RE: Draft Environmental Impact Statement for the North Rochelle Coal Lease Application (Federal coal Lease Application WYW127221); SHPO #0991RLB001

Dear Ms. Doelger:

Richard Currit of our staff has received information concerning the aforementioned impact statement. Thank you for allowing us the opportunity to comment.

Management of cultural resources on application projects is conducted in accordance with Section 106 of the National Historic Preservation Act and Advisory Council regulations 36 CFR Part 800. These regulations call for survey, evaluation and protection of significant historic and archeological sites prior to any disturbance. Provided the Bureau of Land Management (BLM) follows the procedures established in the regulations, we have no objections to the project. Specific comments on the project's effect on cultural resource sites will be provided to the BLM when we review the cultural resource documentation called for in 36 CFR Part 800.

Please refer to SHPO project control number #0991RLB001 on any future correspondence dealing with this project. If you have any questions contact Richard Currit at 307-777-5497 or Judy Wolf, Deputy SHPO, at 307-777-6311.

Sincerely,

for John T. Keck
State Historic Preservation Officer

JTK:RLC:jh

THE STATE OF WYOMING
Jim Geringer, *Governor*

DEPARTMENT OF COMMERCE
Gene Bryan, *Director*

7

WYOMING
GAME AND FISH DEPARTMENT

Jim Geringer, Governor — John Baughman, Director

December 23, 1996

WER 6016.01
Bureau of Land Management
Casper District Office
Draft Environmental Assessment
North Rochelle Coal Lease Application as Applied for by Bluegrass Coal Development Company (Federal Coal Lease Application WYW127221)
SIN: 96-068
Campbell County

WYOMING STATE CLEARINGHOUSE
OFFICE OF FEDERAL LAND POLICY
ATTN: JULIE HAMILTON
HERSCHLER BUILDING, 3W
CHEYENNE, WY 82002

Dear Ms. Hamilton:

The staff of the Wyoming Game and Fish Department has reviewed the draft environmental impact statement for the North Rochelle Coal Lease Application as applied for by Bluegrass Coal Development Company. We offer the following comments.

The Draft Environmental Impact Statement has adequately addressed potential and actual environmental impacts relative to wildlife resources. Numerous mitigation measures required by state and federal statutes will assure these impacts are entirely or partially mitigated for most wildlife species. We have no other comments relative to this proposal.

Thank you for the opportunity to comment.

Sincerely,

BILL WICHERS
DEPUTY DIRECTOR

BW:TC:as
cc: USFWS

Headquarters: 5400 Bishop Boulevard, Cheyenne, WY 82006-0001
FAX (307) 777-4610

8

WYOMING STATE GEOLOGICAL SURVEY
BOX 3008, UNIVERSITY STATION • LARAMIE, WYOMING 82071-3008
(307) 766-2286 • FAX 307-766-2605 • E-MAIL wsgs@wsgs.uwyo.edu
STATE GEOLOGIST • Gary B. Glass

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PUBLICATIONS Editor: Richard W. Jones

December 6, 1996

MEMORANDUM

TO: Julie Hamilton, Wyoming State Clearinghouse

FROM: Gary B. Glass, P.G., State Geologist

SUBJECT: Draft Environmental Impact Statement for the North Rochelle Coal Lease-by-application (State Identifier #96-068)

We have reviewed this draft environmental impact statement and have the following comments:

We can support either the proposed action or the BLM's amended version called Alternative A. The leasing of this tract could be very important to the mine life of either the North Rochelle or the Black Thunder coal mines. Because it is adjacent to both mines, there is likely to be keen interest in the tract, which should help assure that fair market value is received.

1 In the Mineral Resources section on page 3-3; however, the average analysis of the lower split of the Wyodak-Anderson coal bed is incorrectly attributed to an article by Glass and Jones in the 1991 Field Conference Guidebook of the Wyoming Geological Association. While we cannot dispute the correctness of the analysis that is given, it did not come from that reference.

It is also more correct to note that this average coal analysis is at least partially on an as-received basis (i.e., all but the moisture content). Also, the term "volatiles" should be "volatile matter", and the term "carbon" has to be "fixed carbon". The latter correction is more important because the use of "carbon" refers to an ultimate analysis of coal. With the exception of the moisture and sulfur contents, this average analysis is part of a proximate analysis, not an ultimate analysis. Because the reported moisture content is not as high as it would have been for this average proximate analysis, we assume it may be an equilibrium moisture as noted in the text. The sulfur content may be part of an ultimate analysis, or more likely it was run as a separate analysis.

2 The document identifies possible conflicts with deeper oil and gas development that might occur on the tract, although there are currently no APDs in the area. The document states that 52% of the oil and gas rights are privately owned, while all of the coal rights are Federal. We could find no clear discussion of how potential conflicts between mining and oil and gas exploration would be handled, considering this mixed mineral ownership.

If you have questions on our comments, please direct coal-related questions to me and oil and gas-related questions to Rod DeBruin.

Serving Wyoming Since 1933

9

POWDER RIVER BASIN RESOURCE COUNCIL
23 North Scott • Sheridan, WY 82801 • (307) 672-5809
P.O. Box 1178 • Douglas, WY 82633 • (307) 358-5002

January 10, 1997

Fax Transmission

97 JAN 13 PM 2:04

Bureau of Land Management
Ms. Nancy Doelger
1701 East E Street
Casper, WY 82601

RE: Comments on the Draft EIS for the North Rochelle Coal Lease

Dear Ms. Doelger,

The Powder River Basin Resource Council would like to submit the following comments regarding the impacts of the proposed North Rochelle coal lease and the cumulative impacts of all development in the Powder River Basin.

PRBRC realizes the important role coal plays in our economy and we support the responsible development of these public reserves as long as it is carried out with proper planning, in accordance with
1 the law, involves the public and mitigation practices are fully implemented. We are concerned that mitigation efforts have not been fully explored or documented in this EIS and that the EIS understates some of these impacts in certain places in the document. These is also no discussion in the document regarding proposed coal power plants at this mine and an adjacent mine. These proposals will also impact the area and must be considered in the final document. Finally, we realize from this document we will be sacrificing water quality, habitat diversity and cultural resources in order to develop this coal. Who decides whether this is a legitimate trade off? We also question whether it is in the best interest of the public to lease coal when prices are at or near an all time low.

Environmental Consequences:

2 On page 4-1 the document states: "Advances in reclamation technology and mitigation measures have become standard industry practice." Could you please explain in more detail what technology and mitigation measures you are referring to?

On page 4-2 you define moderate impact as one that would produce a modest change to the quality of the human environment and a significant impact as one that would result in a substantial change in the quality of the human environment. The document goes on to discuss several impacts some moderate and some that we would deem significant yet, these impacts are never defined as significant. Why not? Following are specific examples:

Groundwater:

3 Under the Groundwater section you state that the proposed lease would extend the duration of the drawdown in the coal aquifer for 11 years. You state that it may take as long as 100 years for the water level in the spoil aquifer to reach premining levels. Studies indicate that the establishment of water quality to premining conditions would take much longer, more than 11,000 years according to a study at the Rochelle Mine. Again, in residual impacts section you reiterate that the coal aquifer will be permanently removed, that it would take an estimated 100 years for the water in the overburden to reach premining levels and the reduction in water quality would be longterm? (11,000 years)

3 Given these facts how can you state on pages 2-17 through 2-19 that the impacts to water resources will be moderate over the shorterm, longterm and permanently? One hundred years is at least three generations and 11,000 years is not even conceivable in human time. These are significant impacts and should be recognized as such.

4 The document also notes that a total of 282 wells would be impacted, 50 of which are noncoal related wells. According to the document these wells will be impacted by direct removal or indirectly by water level drawdown. You state these wells would be replaced according to Wyoming regulations and SMCRA. Could you please provide more details about how this will be conducted? Who has the burden of proof? How long will it take? etc.

5 In many instances the EIS places mitigation in the hands of other agencies. For example, the document says the Wyoming DEQ would develop mitigation plans for water resources, specifically, what detailed mitigation plans would be developed by the WDEQ?

6 Under the Cumulative impacts section the document states, "The proximity of the coal bed methane development to the coal mines creates the potential for overlapping impacts to groundwater." This statement completely ignores the fact that there already have been overlapping impacts and overlapping impacts are anticipated. The document also fails to analyze these impacts. This is a major deficiency in the document and must be corrected.

7 What will be done when there are conflicting claims about whether coalbed methane or coal mining caused the impact to a water well? How will this be handled and the issue mitigated?

8 Regarding cumulative groundwater impacts the BLM refers to the Cumulative Hydrologic Impact Assessment (CHIA) update that is currently going on and states that results of this study are not available. The EIS then fails to address the cumulative impacts and again puts this responsibility off on the Wyoming DEQ. The document also fails to analyze the cumulative impacts of proposed power plants in the area. The CHIA update must be included in the EIS analysis.

Cultural Resources & Native American Concerns:

9 The document states that five prehistoric and historic sites have been recorded in the lease tract and that these sites are not presently considered eligible for inclusion in the National Register of Historic places. You also state that consultation with the State Historic Preservation Office is required for concurrence. When will this be done? Will this be addressed in the final EIS? The document also states that no mitigation measures are recommended for Native American Concerns beyond what is required by state and federal law. What are these requirements? Please list them.

10 This same statement regarding no mitigation beyond what is required by state and federal law is also made regarding visual resources, noise, transportation and socioeconomic impacts. What are the mitigation requirements? Please list these also.

Wildlife:

11 The document states that habitat for various species would be displaced and in some cases the diversity of species after mining would be much less due to mining. Given these statements, the cumulative impacts to several species will be significant. The mitigation section defines several measures to minimize impacts, however many of these measures are not being implemented. For example, reclamation at most mines in the Powder River Basin is far behind, further extending the time and amount of habitat available and affected. There is also extensive and ongoing discussions on whether the industry is required to plant a diverse mixture of grasses. There is no discussion in the EIS about these facts. Why not?

Residual Impacts

12 Residual Impacts are listed as unavoidable impacts that cannot be mitigated and would remain following mining and reclamation. According to the EIS these include: a reduction in water quality, a permanent loss of habitat diversity and the loss of cultural resource sites. Based on these statements and the fact that these impacts are more or less permanent, why are they listed on Tables 2.4 through 2.7 as moderate or negligible.

These are significant impacts and should be shown as such. It is a distortion to list them as moderate when there are long lasting "residual impacts". Also, please include a better explanation about why these impacts are unavoidable and cannot be mitigated.

We look forward to you addressing our concerns in the final EIS.

Sincerely,

Bob Strayer
PRBRC Chair

10

BIGHORN AUDUBON SOCIETY

97 JAN 10 PM 1:18

P.O. Box 535 Sheridan, WY 82801

December 28, 1996

Bureau of Land Management
Casper District Office
Attn: Nancy Doelger
1701 East "E" Street
Casper, WY 82601

Dear Nancy:

Thank you for the opportunity to comment on the Executive Summary Draft EIS for North Rochelle Coal Lease Application

Bighorn Audubon Society is a chapter of the National Audubon Society, a non profit organization working to protect wildlife and wild lands, ensure clean air and water, and conserve energy.

In our local chapter, we are concerned about endangered, threatened and sensitive species of plants and animals, birds and the ecosystems in which they thrive (especially neotropical migratory birds), riparian areas, wetlands, old growth forest, and recycling. We often focus on education and enjoyment of birds and nature through discussions, field trips, projects, volunteer efforts, chapter programs and by keeping in touch with current affairs on the public lands in our membership area.

We appreciate your efforts to recognize impacts to resources on this draft EIS. It is important to the public to know what trade offs are made when we allow mining or any other activity to occur on public lands.

1 We request that the coal companies who want to mine this area employ a biologist and/or ecologist or a reputable company to assist them with high quality reclamation work.

We have concerns about how this mine will affect neotropical migratory bird habitat, raptor habitat and grouse habitat. As you may have heard, National Audubon Society has published a "WatchList" of bird species that are declining nation-wide because of habitat fragmentation and decimation. Enclosed is the WatchList for your information.

North Rochelle Coal Lease EIS Comments Page Two

2 We have no objection to removing the coal, but we do request that the overburden and vegetation be replaced as it was before the mining began (excluding non-native vegetation) to assure that bird and wildlife habitat is as diverse and productive as pre-mining conditions. We recommend that the company remove first the top six inches of topsoil to a reserved place to be reapplied on top when the mining activity is completed. This fertile top six inches should not be mixed with other soil from a lower depth. We ask you to do all you can to work with the Wyoming Game and Fish or any other organization to obtain this result.

3 One other concern is wetland mitigation. It is our understanding that when human activities on public lands remove a wetland, then another wetland must be created or designated to replace it. This is crucial to bird habitat, especially in our dry climate. New made wetlands are not as viable as wetlands that have existed for years, because it takes years for the dynamic processes that occur in a wetland to enrich the soil enabling it to provide for the diversity of life that is the inherent value of a wetland. In short, it is not acceptable for a new made wetland to be a mud hole with weeds around it. Every effort should be made to ensure that a mitigation wetland become a viable living, working, wetland in as short a time as possible. Again, do all you can to work with the Wyoming Game and Fish or any other organization to obtain this result.

We hope our comments are helpful. We look forward to hearing from you. Thanks again for the opportunity to comment.

Sincerely,

Carol Hett

Carol Hett, President

Enclosure: WatchList

11 BURLINGTON RESOURCES

MID-CONTINENT DIVISION

97 JAN 13 PM 1:49

January 8, 1997 VIA FAX

Ms. Nancy Doelger
Bureau of Land Management
Casper District Office
1701 East "E" Street
Casper, Wyoming 82601

RE: Draft Environmental Impact Statement
North Rochelle Coal Lease Application WYW127221
Campbell County, Wyoming

Dear Ms. Doelger:

Burlington Resources Oil and Gas Company ("BR"), previously known as Meridian Oil Inc., appreciates the opportunity for involvement in the public participation process on the proposed subject draft environmental impact statement (DEIS).

BR is the largest independent (non-integrated) oil and gas company in the United States in terms of total domestic proved equivalent reserves. Those reserves were estimated at 6.7 TCFE on December 31, 1995. We are the lessee of approximately ten percent of the federal leases held by production and operate approximately ten percent of all wells located on federal oil and gas leases.

BR is currently the operator of numerous wells and lessee of a vast amount of acreage located near the North Rochelle Coal Lease and within the Powder River Basin. Specifically, BR's Porcupine Field is located within townships 42 through 43 and range 71, Campbell County. We ask that you consider our existing facilities; wellsites, flowlines, access roads, etc., as well as our leased acreage, throughout the NEPA process for the DEIS for the North Rochelle Coal Lease Application.

BR certainly endorses opportunities for energy and mineral exploration and production operations of various kinds, however, this may prove to be a case of conflicting resource values. Please consider the potential for damage to the recovery of existing developed hydrocarbon and future reserves when planning for the coal extraction in the North Rochelle Coal Lease Area.

Again, we appreciate the opportunity for comment and we look forward to hearing from you.

Sincerely,

Eileen Danni Dey
Regulatory Compliance Supervisor

3300 N "A" St., Bldg. 6, 79705-5406, P.O. Box 51810, Midland, Texas 79710-1810, Telephone 915-688-6800

RESPONSES TO COMMENTS RECEIVED ON NORTH ROCHELLE DEIS

Letter 1: Environmental Protection Agency, Denver Colorado

The comments received from the EPA on the North Rochelle Draft Environmental Impact Statement provide an important perspective to BLM on the adequacy of the document. Revisions have been made to the draft document in response to the EPA's comments. It is important to note, however, that some of the topics included in the EPA's comments are not addressed in detail in this document because they are the responsibility of other state and federal agencies, and they will be addressed prior to mining, during the permitting process. The mining plan described in the draft and final EIS is based on general mining practices in the Powder River Basin and at the North Rochelle Mine, and is speculative at this time. Surface coal mining is an established industry in the Powder River Basin, and much information has been collected on the natural resource characteristics of the area, on the impacts of mining in this area, and on what types of mitigation are most effective. In the NEPA analyses at the leasing stage, the BLM and Forest Service assume that all regulatory requirements will be enforced as they are now, regardless of which agency has responsibility for them; and that the mining practices that have been successfully utilized to monitor and mitigate environmental impacts and reclaim the area after mining will continue to be used. During the leasing impact analysis, we try to identify shortcomings in the existing mitigation procedures, or potentially unusual or unique characteristics of the proposed tracts that might require special mitigation measures if the tracts are leased or might even preclude leasing. After a tract is leased, when a mining permit amendment that includes detailed plans for mining that tract is submitted for approval, mitigation and monitoring can be designed to comply with the regulatory requirements at that time, based on an actual mining proposal. The mine will be required to comply with all current air quality regulations before their mining plan amendment is approved and the public will have opportunity to comment during this permitting process.

Responses to detailed comments by the EPA:

1. Distance scales have been added to figures as suggested.

2. The text has been modified. The sentence was intended to point out that the specific procedures included in the existing groundwater mitigation plans have adequately mitigated impacts.

3. TSP concentrations are annual geometric-averaged 24-hour concentrations of TSP and PM_{10} concentrations are annual arithmetic-averaged PM_{10} concentrations. The text has been modified to indicate this.

Figure 3.5 of the DEIS is Figure 3.6 of the FEIS. The title has been changed as recommended.

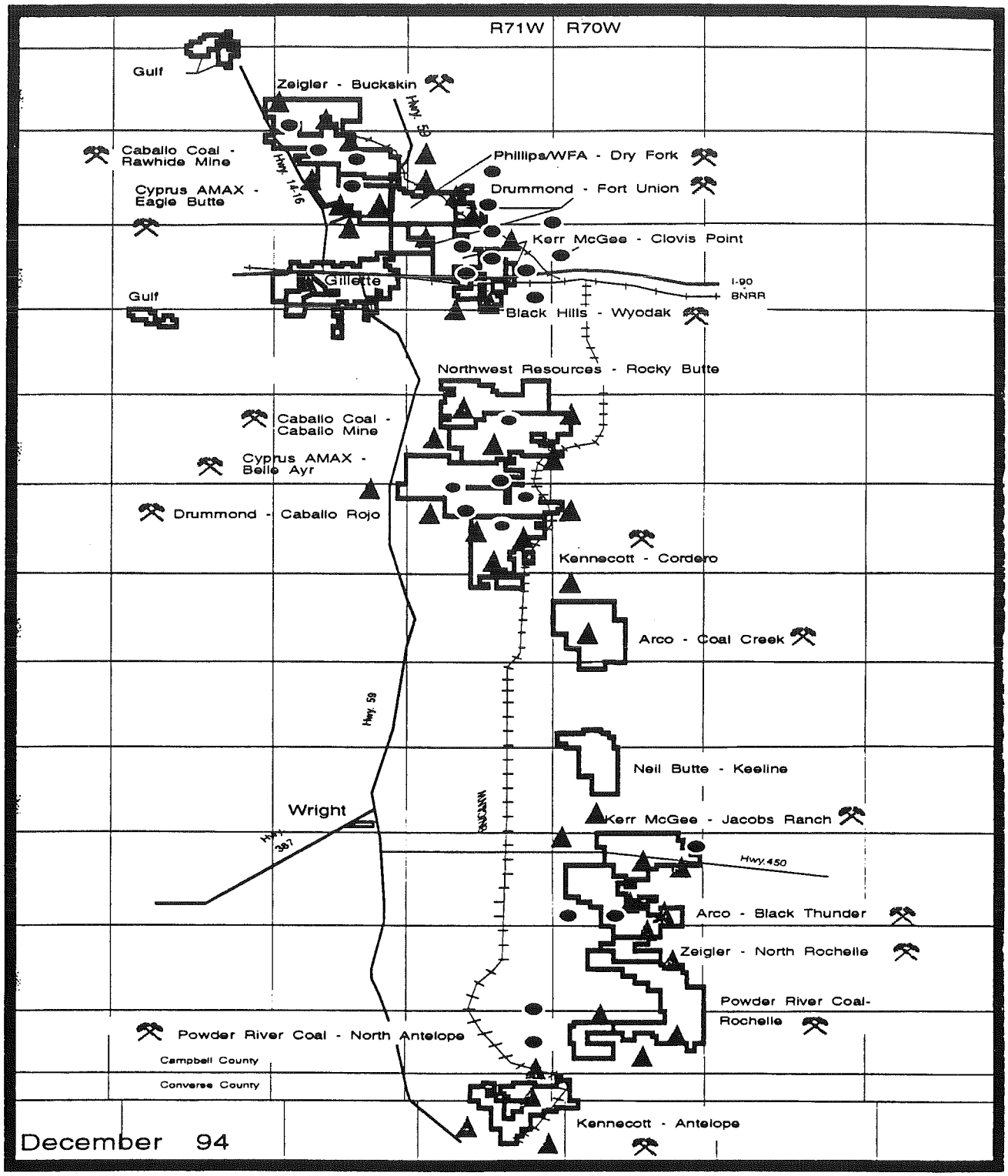
4. A summary of wind data and other meteorological information about the project area is included in Section 3.1 of the draft and final EIS. A wind rose for this area is included as figure 3.2 in the FEIS.

Mine operators must comply with EPA and Wyoming Department of Environmental Quality, Air Quality Division (WDEQ/AQD) monitoring and reporting requirements. Placement of air quality monitors is determined by WDEQ/AQD and the mines. A map showing the location of air quality monitors at the Powder River Basin mines in December 1994, is included with this response.

5. The regulations concerning PSD increment have changed since the draft EIS was written. The final EIS has been revised to reflect the changes.

6. The last paragraph of Section 3.5 has been revised to reflect the EPA's comment. The North Rochelle Mine currently has an approved air quality permit to mine the existing lease. If they acquire the LBA tract, they will have to amend this permit to include the LBA tract prior to mining the tract. This is discussed in Section 4.1.4.

7. The title of Table 4.2 has been changed to reflect your comment.



AIR QUALITY MONITORING SITES

INACTIVE SITE

ACTIVE SITE

ACTIVE MINE

Letters 2 and 3: Department of the Army, Corps of Engineers, Omaha, Nebraska and Cheyenne, Wyoming

Army Corps of Engineer's review of the coal leasing documents, including the North Rochelle draft EIS, also provides BLM with an important perspective on the adequacy of the documents. As you indicated in your comment letter, the North Rochelle Mine has conducted a detailed wetland delineation and identification of waters of the U.S. for the area within their existing mine permit. If they acquire the LBA tract, they will be required to extend this analysis onto the LBA tract prior to mining it, during the mining permit amendment process.

Letter 4: U.S. Geological Survey, Reston Virginia

Determination of the extent of the five-foot drawdown contour is required as part of Wyoming Department of Environmental Quality's mine permitting process (WDEQ/LQD Guideline No. 8 - Hydrology, P. IV, B, 1). This has been clarified in the final EIS.

Letter 5: State of Wyoming, Office of the Governor

The involvement of the state of Wyoming is important to the BLM's federal coal leasing process. Revisions have been made to the final EIS in response to comments made by state agencies.

Letter 6: State of Wyoming, Division of Cultural Resources

As indicated in Appendix D of the draft and final EIS, both the BLM and the Forest Service attach special stipulations to all federal coal leases that require the lessee to conduct Class III cultural surveys on currently uninventoried parts of federal leases prior to surface disturbing activities. These stipulations require the lessee to report any cultural resource discovered as a result of surface operations. Also, as indicated in Section 4.1.12 of the EIS, formal SHPO consultation will be required to determine eligibility of all sites located within the LBA tract for inclusion on the National Register of Historic Places prior to mining. These provisions are intended to ensure that the regulatory requirements are met. Please advise the BLM and the Forest Service if you have any concerns with the current procedures.

Letter 7: State of Wyoming, Game and Fish Department

The comments of the Wyoming Game and Fish Department on previous coal leasing NEPA documents have improved the analysis of wildlife impacts in those documents. Please advise the BLM and the Forest Service in the future if there are additional wildlife issues that need to be addressed.

Letter 8: State of Wyoming, Geologic Survey

1. The coal quality information provided in Section 3.3, under Mineral Resources (on page 3-3 of the draft EIS) has been changed in the final EIS to a direct citation from a more recent reference.

2. A discussion of how potential conflicts between oil and gas development and coal mining was included in Section 2.1 of the draft EIS (page 2-6, first column), and this discussion has been expanded in the final EIS. In general, the process relies on good faith negotiations between the oil and gas and coal lessees. This is a very complicated issue, however, and the negotiation process is not always successful. Please contact Nancy Doelger at the Casper District Office of the BLM if you would like to discuss this issue further, as the state's interest is sometimes involved in terms of state income that may be lost if the negotiations are not successful.

Letter 9: Powder River Basin Resource Council

1. Comment 1a: "We are concerned that mitigation efforts have not been fully explored or documented in the EIS and that the EIS understates some of these impacts in certain places in the document."

Response: Many of the requirements of SMCRA (administered by the Office of Surface Mining Reclamation and Enforcement) and state laws regulating surface coal mining (regulated by the Wyoming Department of Environmental Quality) are intended to ensure that surface coal mining impacts are mitigated. Mitigation and monitoring measures that are required by these and other regulations are considered to be part of the Proposed Action and the alternatives. The mitigation practices that are used have been developed during the past 15+ years of mining in the Powder River Basin. Some of these practices are described in the "Handbook of Western Reclamation Techniques", a publication that was supported in part by the Abandoned Coal Mine Lands Research Program at the University of Wyoming, as well as the Office of Surface Mining and some of the Powder River Basin Mines. Copies of this publication are available for viewing at the BLM Offices in Casper, Cheyenne, and Buffalo. Mine-specific measures are developed during the mining permit process, when specific mining plans are proposed. These mine-specific mitigation plans are described in detail in the mining permit document for each mine.

If shortcomings in current mitigation practices are identified that cannot be mitigated within the range of authority of SMCRA or state law, BLM develops mitigation measures that are designed to address the shortcomings, describes them in the leasing EAs and EISs, and includes them as stipulations on the leases when they are issued. No shortcomings in current mitigation practices that need to be addressed by BLM have been identified in the case of the North Rochelle LBA tract.

Comment 1b: "There is also no discussion in the document regarding proposed coal power plants at this mine and an adjacent mine."
Response: These projects were proposed after the preparation of the DEIS, but they have been included in the FEIS.

Comment 1c: "Finally, we realize from this document we will be sacrificing water quality, habitat diversity and culture resources in order to develop this coal. Who decides whether this is a legitimate trade off? We also question whether it is in the best interest of the public to lease coal when prices are at or near an all time low."
Response: NEPA regulations require that the impacts of a federal action be evaluated and disclosed before a decision is made to approve or disapprove that action, and that the public has the ability to comment on the action. The North Rochelle draft and final EIS's describe the following impacts of surface coal mining if the LBA tract is leased, mined, and reclaimed: water on the 1,400-acre LBA tract will be available for premining uses although there will be long term changes in water quality and quantity; there will be reduced habitat diversity on the 1,400-acre LBA tract (primarily reduced sagebrush density)and also potentially reduced carrying capacity; and that data will be recovered if significant cultural properties are found on the LBA tract and cannot be avoided. The decision to lease the federal coal in the LBA tract will be made by the authorized officer of the BLM, after review of the North Rochelle DEIS, FEIS, and public comments. BLM has the responsibility and regulatory authority to require that the government receive fair market value for the coal, and that is carefully evaluated during the leasing process. BLM does not have the regulatory authority to limit coal supply in order to manipulate the market to obtain higher prices for federal coal. It also should be pointed out that higher prices for Wyoming coal would benefit the coal companies, the state of Wyoming and the Federal government, but they would also probably lead to higher electricity prices for consumers in many parts of the country, since 97% of the coal that is mined in Wyoming is used for power generation.

2. The statement regarding advances in reclamation technology and mitigation measures is a general one. Examples are discussed later in chapter 4 of the DEIS, and include building sedimentation structures to trap eroded soil and serve as a replacement for stock ponds for waterfowl use (see sections 4.1.3, 4.1.5, and 4.1.9), revegetation of topsoil and overburden stockpiles to reduce wind erosion (see section 4.1.3), testing of overburden unsuitability and placement of unsuitable overburden to minimize adverse impacts (see Section 4.3.2), monitoring of revegetation growth and application of appropriate soil amendments (see Section 4.3.3), use of fabric filtration or wet scrubbing of coal storage silo and conveyor vents to mitigate generation of particulates (see Section 4.3.4), and creation of depressions and rockpiles on reclaimed areas with special planting procedures to add topographic and vegetation community diversity(see Sections 4.3.8 and 4.3.9). These procedures are explained in more detail in the mining permit documents for each mine. As indicated in response 1A, a discussion of reclamation

techniques used in the Powder River Basin can also be found in the "Handbook of Western Reclamation Techniques."

3. The Groundwater discussion in Section 4.1.5 of the DEIS states the following:

Page 4-6, 1st column, 1st full paragraph:

> "..., it may take as long as 100 years for the water level in the entire spoil aquifer to reach premining levels. However, based on the backfill monitoring data that is currently available, it is likely that by the time surface reclamation is completed and the LBA tract is restored to rangeland, sufficient saturated material would be present to supply a stock well, particularly in the areas that were first mined."

Page 4-6, 1st column, 2nd full paragraph:

> "TDS in the spoil water on the mined LBA tract may increase from the premining range of 800-3,900 mg/liter to a postmining range of 1,500-5,000 mg/liter. However, the postmining TDS concentrations would still be suitable for anticipated postmining land use (livestock water)."

Page 4-6, 2nd column, top paragraph:

> "This study (i.e., the study at the Rochelle Mine) indicated that this process (i.e., dissolving all of the newly exposed minerals and restoring premining water quality in the entire mined and reclaimed area) would take more than 11,000 years for the entire mined out area, although premining water quality would be reached along the edges of the mined out area more quickly and would gradually move in toward the center."

In other words, although it may take 100's or even 1,000's of years to return every pore volume of the mined-out and reclaimed 1,400 acres under consideration for leasing in this tract to equilibrium premining conditions, the impact to the human environment is not expected to be significant because water of quantity and quality suitable for premining human uses should be available by the time the mined-out area is restored to rangeland. This conclusion is supported by the data that has been collected from the monitoring wells completed in the backfill, which is summarized on pages 4-26 and 4-30 of the DEIS in the cumulative impact discussion in Section 4.5.5. Furthermore, The 1,400-acre LBA tract is not a significantly large part of the basin, and adding it to the area to be mined does not represent a significant change to the already permitted activity in the basin.

4. The document indicates that there are 282 water wells within 3 miles of the LBA tract; and that 50 of these wells are non-coal wells, of which one is permitted for domestic use, 15 are permitted for stock use, and the remainder (34) are USFS or Water Resources Institute monitoring wells. It further states that the majority of those wells will likely be impacted by mining at the North Rochelle and adjacent mines.

Water rights impacted by mining operations are covered in W.S. 35-11-416, Protection of the surface owner of the Wyoming Environmental Quality Act, and Chapter 4, Section 2(w) of WDEQ's Coal Rules and Regulation states that "The operator shall...assure the protection or replacement of water rights.." SMCRA addresses this issue in 30 CFR 816.41(h), Water rights and replacement. Wells that are likely to be impacted by a particular mine or group of mines are identified in advance through required modeling to predict the extent of water drawdown in the coal and overburden aquifers. Actual impacts to the wells, and the validity of the modeling are evaluated by the required monitoring. The modeling and monitoring data are the proof that wells must be replaced in accordance with the regulations because they have been impacted by surface coal mining.

5. SMCRA and Wyoming State Law both include regulations requiring mitigation of surface coal mining impacts, and they are administered by other agencies. The required mitigation measures are considered to be part of the proposed action. They are developed during the mining permit process, when specific mining plans are submitted to WDEQ for approval, and they are described in the mining permit documents. Please refer also to the response to Letter 1 from the Environmental Protection Agency, and the response to item #1a of your letter for additional discussion related to this comment.

6. The North Rochelle FEIS has been revised to include the map from the 15-year GAGMO report (Figure 4.4), which shows the area of overlapping groundwater impacts related to coal and coal bed methane development, and a discussion of the overlapping impacts. The area of overlapping impacts is west of the middle group of mines (located south of Gillette, see Figure 4.4 in the FEIS). There are currently no coal bed methane wells in proximity to the North Rochelle LBA tract, none are currently proposed and there are no anticipated overlapping groundwater impacts as a result of existing coal bed methane development, and mining the LBA tract. The impacts of projected coal bed methane development south of Gillette, which may result in coal bed development near the North Rochelle Mine in three to five years, are being evaluated by BLM in an EIS at this time. BLM requires coal bed methane operators to drill monitoring wells as part of the federal well approval process. If an actual federal coal bed methane drilling proposal is received adjacent to the North Rochelle Mine, mitigation and monitoring requirements specific to that proposal will be determined at that time.

7. Data from the coal bed methane monitoring wells combined with the data from the existing mine monitoring wells will be used to identify the source of impact to water wells. If the impact is related to surface coal mining, mitigation will be handled as described above in response 4. The pending South Gillette EIS will describe mitigation for impacts related to coal bed methane development. That mitigation will draw on the agreements and procedures that have already been developed in areas where coal bed methane development has already occurred. In areas of overlap, the responsibility for mitigation will probably have to be shared.

8. On page 4-5, the DEIS states: "Mining of the LBA tract should not increase the areal extent of current and anticipated drawdowns in the coal aquifer (see Section 4.5.5) because the LBA tract does not extend the area of coal removal farther west than the existing West Black Thunder lease and the rate of production is not anticipated to increase beyond that already permitted, but it would extend the duration of the drawdown for 11 years." This is the anticipated cumulative impact, because it reflects all anticipated mining in the area. The WDEQ has the responsibility to enforce the regulations that require mitigation of the impacts of surface coal mining in Wyoming. The impacts of the proposed power plants are discussed in the FEIS, however, that information was not available when the DEIS was prepared. The EIS analysis is required to use and is using the best data that is currently available.

9. Management of cultural resources on this project will be conducted in accordance with Section 106 of the National Historic Preservation Act and Advisory Council regulations 36 CFR Part 800, which call for survey, evaluation, and protection of significant historic and archaeological sites prior to disturbance. In accordance with those regulations, the entire tract will be surveyed, and consultation with the SHPO for concurrence with the eligibility of the five historic/prehistoric sites that are known to be on the LBA tract, and any others discovered in future surveys will be accomplished prior to any disturbance of those sites. The result of the consultation is not addressed in the FEIS because consultation has not occurred, however, SHPO concurrence is mandated by law prior to disturbance of the sites, and failure to comply with these requirements results in fines.

As stated in Section 3.14 of the DEIS and the FEIS, Native American consultation is conducted during the review periods for the DEIS and FEIS. This is required under the legislation cited above. Certified letters with copies of the DEIS were sent to potentially affected tribes requesting their comments concerning any religious or cultural areas within or near the LBA tract, and this process will be repeated with the FEIS. If any sites are identified, there will be consultation with the affected tribe to determine how to handle the area of concern. To date, no sites or areas of religious or cultural interest have been identified as being affected by this project.

10. Mitigation that is required by regulation and is administered by other agencies is considered to be part of the proposed action, as stated previously in responses 1 and 4, above. The mitigation requirements are described in the applicable federal and state regulations and the mitigation plans are included in the mining permit document for each mine. Examples of some of these mitigation requirements are included in leasing impact analyses such as the North Rochelle DEIS and FEIS to illustrate the extent of mitigation that is required by the regulations in the case of surface coal mining.

11. The DEIS states that "many species of wildlife would be displaced to other areas" (Section 4.1.9), and that "alterations in the topography and vegetative cover, particularly the reduction in sagebrush density, would cause a decrease in carrying capacity and diversity on the LBA tract after mining and reclamation." Although final reclamation has proceeded more slowly than predicted by the BLM in the previously prepared regional EISs, wildlife monitoring data at the mines do not indicate that this has impacted the wildlife populations in the vicinity of the mines more significantly than was predicted in the regional EISs.

There are ongoing discussions as to what an ideal seed mix is for revegetating reclaimed mine lands and to what extent the shrub component should be replaced. The final seed mixture that is planted, however, is and will continue to be subject to the approval of the WDEQ, and will be reviewed by other agencies (for example, Forest Service on surface lands they manage) prior to that approval.

The EIS also recognizes that replacement of native-grass-shrublands with cultivated crops has also impacted wildlife (Section 4.5.9), and that most of the lands in the proposed project area are privately owned (Section 4.5.11). Once reclamation/revegetation on these lands has met the standards set by WDEQ, they will return to private ownership. At that time, the private landowner will have the right to manage vegetative cover on these lands according to his/her needs.

12. As stated previously (see responses to PRBRC's comments 1, 3, 7, 8, and 10): If the tract is mined, water quality and quantity would be reduced, but water that is suitable for premining will still be available; habitat diversity would be reduced but not permanently lost; and information from cultural sites would be recovered if they cannot be avoided. And, the action being considered in this EIS would affect 1,400 acres; it would not significantly change the impacts that will occur as a result of already approved actions, and it would not result in an increase in impacts over what was predicted in the previously prepared regional coal leasing EISs.

Response to Letter 10 from the Bighorn Audubon Society

1. Reclamation procedures are regulated by the Wyoming Department of Environmental Quality, Land Quality Division (WDEQ/LQD). These procedures are addressed in detail in the mining and reclamation permit. The coal lessee must obtain approval of their mining and reclamation plan prior to any mining disturbance. The mining and reclamation permit approval process includes a public notice and a 60-day public comment period.

2. The reclamation procedures required by WDEQ/LQD include topsoil salvage for subsequent use in reclamation and the use of an approved seed mixture for revegetation.

Topsoil thicknesses are variable, and the thickness of the topsoil layer that is salvaged is varied accordingly. A description of the process of topsoil identification, removal and stockpiling is included in the "Handbook of Western Reclamation Techniques", a publication that was supported in part by the Abandoned Coal Mine Lands Research Program at the University of Wyoming, as well as the Office of Surface Mining and some of the Powder River Basin Mines. Copies of this publication are available for viewing at the BLM Offices in Casper, Cheyenne, and Buffalo.

The seed mixture to be used is included in the mining and reclamation permit, which is reviewed by the Forest Service and the US Fish and Wildlife Service, among others, prior to WDEQ approval.

3. Prior to mining, a detailed wetland inventory and a wetland mitigation plan would be required as part of the mining permit process. The U.S. Army Corps of Engineers must review and approve the mitigation plan prior to disturbance.

These processes are not described in the Executive Summary, but there is more information in the DEIS and FEIS documents (general reclamation practices are described in Section 2.1 and wetlands are discussed in Sections 3.8 and 4.1.7).

Response to Letter 11 from Burlington Resources:

As indicated in the DEIS and FEIS, there are no existing wells or rights-of-way for oil and gas pipelines on the LBA tract (Section 2.1). In the event that oil and gas resources are developed on the tract prior to mining, BLM policy is to encourage negotiation and resolution of those conflicts between the conflicting parties.