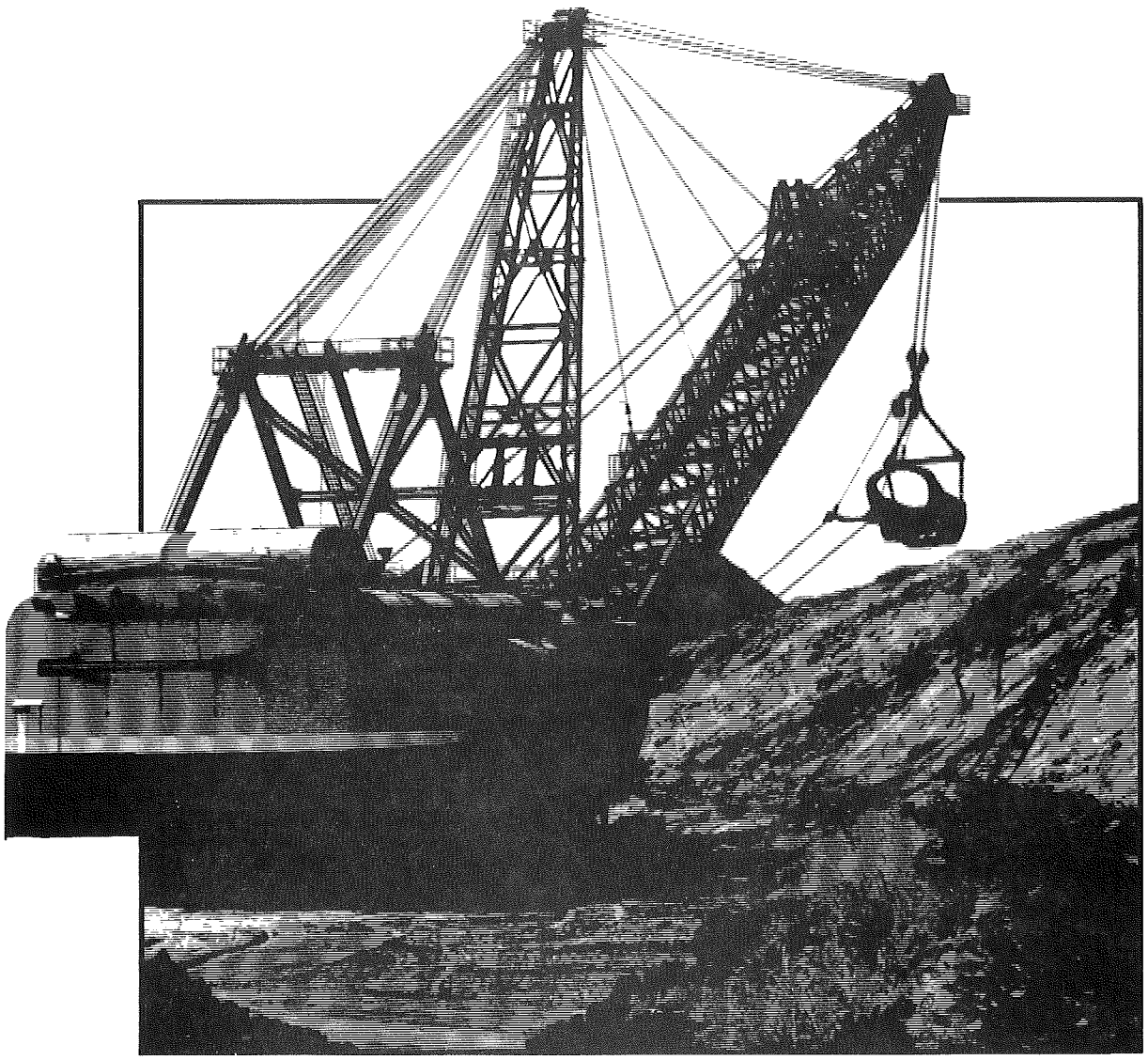
U.S. Department of the Interior
Bureau of Land Management

Casper District Office June 1991

Jacobs Ranch Federal Coal Lease Application Environmental Assessment



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BLM-WY-ES-91-025-4121

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
CASPER DISTRICT OFFICE
1701 EAST E STREET
CASPER, WYOMING 82601

TAKE PRIDE IN AMERICA

3420
WYW117924

JUN 0 4 1991

Dear Reader:

Enclosed is a copy of the environmental assessment (EA) prepared for the Jacobs Ranch coal lease application. A copy of the corresponding technical report for this EA is available from this office upon request. The public comment period for this document is from June 10, 1991 through July 12, 1991. Comments should be addressed to James W. Monroe, BLM Casper District Office, 1701 East 'E' Street, Casper, WY 82601. A public hearing is scheduled for the Jacobs Ranch application at the Holiday Plaza, 2009 South Douglas Highway, Gillette, Wyoming on Monday, June 24, 1991 at 7:00 p.m. In addition, an informal open house will be held from 3:00 to 5:00 p.m. that afternoon at the Holiday Plaza to answer any questions you may have regarding the Jacobs Ranch coal lease application.

Sincerely,

James W. Monroe

District Manager

Enclosure

Draft
Environmental Assessment
of the
Jacobs Ranch Coal Lease Application
for Kerr-McGee Coal Corporation
(Federal Coal Lease Application WYW117924)

EA #WY-061-1-062

Prepared by
Casper District
Bureau of Land Management

Cooperating Agency:
Office of Surface Mininig

June 1991

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VI. Final Environmental Impact Statement, Eastern Powder River Coal Basin of Wyoming Volume V, Part V (DOI).....

VII. Air Quality Permit Application and Impact Analysis for Jacobs Ranch Mine, April 1987.....

1/ These technical reports, submitted in December 1990 by Kerr-McGee refer to this action as a bypass. Subsequently, the action has been referred to as a "coal lease application".

SUMMARY

Kerr-McGee has applied to the BLM for a lease for Federal coal adjacent to Kerr-McGee's existing Jacobs Ranch Mine. This Environmental Assessment has been prepared to assist the BLM to make a decision on the proposed lease, to provide a basis for public review, and to comply with the requirements of the National Environmental Policy Act.

Three alternatives were considered as follows:

Alternative 1 - Proposed Lease Sale To Be Mined With Existing Mining Operation - Preferred Alternative.

Alternative 2 - No Action.

Alternative 3 - Proposed Lease Sale for a New Stand-Alone Mine.

Based upon the minimal short-term environmental impacts actually experienced in mining the similar adjacent existing Jacobs Ranch Mine, there appears to be no environmental basis for selecting the No Action Alternative. Moreover, not leasing this tract would reduce near-term Federal and State royalty and tax revenues and would shorten the period of significant contribution of Jacobs Ranch Mine to the regional economy.

A New Stand-Alone Mine on this tract does not appear feasible because of the high costs associated with starting a new operation and the limited reserve base.

The Preferred Alternative is to conduct the proposed lease sale with the expectation that the coal would be mined as an extension of the existing Jacobs Ranch Mine. This would extend the life of the mine and its positive contribution to the regional economy and the federal and state royalty and tax revenues. The potential economic benefit of this eight year mine life extension (direct, indirect and induced) would be about $1.0 billion. Mining this reserve as part of the existing mine should allow for any potential coal quality problems to be resolved, leading to improved coal resource recovery. Short-term minimal environmental impacts would be incurred, but would be mitigated by the demonstrated successful reclamation practices employed by the existing mine. Acceptable post-mining conditions, including improved pasture and water supply impoundments, are expected on this land surface. Since the land surface in owned by Kerr-McGee, there will be no conflicting surface land use concerns. The post-mining land use will be grazing and wildlife habitat which is the same as the pre-mining land use.

ENVIRONMENTAL ASSESSMENT
of the
JACOBS RANCH COAL LEASE APPLICATION
FOR KERR-MCGEE COAL CORPORATION
(Federal Coal Lease Application WYW117924)
June 1991

I. PURPOSE AND NEED FOR THE ACTION

A. PURPOSE

The Powder River Basin Coal Region was decertified as a Federal coal production region in 1990 due to a general lack of industry interest in new competitive Federal coal leasing and the condition of the coal market. Decertification allows leasing to take place on a lease-by-application (LBA) basis. LBAs can be submitted in a coal producing region where an emergency need for unleased coal deposits is demonstrated or in areas outside coal production regions. When the Regional Coal Team decertified the Powder River Basin this allowed BLM to accept and consider LBA proposals without the emergency need requirement. In decertifying the Powder River Basin, the Regional Coal Team restricted the LBA process to lease maintenance tracts which would continue or extend the producing life of an existing mine. Applications involving a new mine start or expanding existing mine facilities will require consideration on a case by case basis by the Regional Coal Team. The Bureau of Land Management (BLM) must complete three actions for an LBA to be processed. They are a planning and environmental review, geologic review and economic review of the proposed lease area. It is a competitive leasing process and requires a public hearing for each LBA.

Prior to the RCT decertification, Kerr-McGee Coal Corporation filed an application for an Emergency Bypass coal lease for Federal coal adjacent to their existing Jacobs Ranch Mine. This application was feasible under the regulations which exiested prior to decertification. The emergency bypass regulations fall under the general system for leasing by application, but require limitations on the amount of coal reserves, production rate, and timing for development. Since the RCT decertification, this application is being processed as a Maintenance Tract under the current Lease by Application regulations consistent with the draft Powder River Basin Regional Coal Team decertification guidelines. This Environmental Assessment (EA) has been prepared to assist the BLM to make a decision on the proposed lease, to provide a basis for public review, and to comply with the requirements of the National Environmental Policy Act.

Figure 1 is a map showing the location of the area which is about fifty miles southeast of Gillette, Wyoming.

B. NEED

On October 2, 1989, Kerr-McGee filed an application with the BLM for a coal lease on federal coal reserves located north of and adjacent to Kerr-McGee's existing Jacobs Ranch Mine. The application was amended on January 16, 1990, to add forty acres to accommodate an appropriate mine path. The application was further amended on July 13, 1990, at the suggestion of BLM staff, to add additional coal based upon information developed in the geologic report.

This application was made pursuant to the provisions of 43 CFR 3425.1 as an Emergency Bypass Lease prior to decertification of the Powder River Basin coal region. While the application was pending, the Powder River Basin was decertified and in August 1990 the BLM amended the status from an Emergency Bypass Lease to a Bypass application. After subsequent review the application was determined to meet the lease-by- application qualifications and it is being processed as a production maintenance tract. If leased, the estimated 132 million tons of recoverable coal reserves would allow the level of production at Jacobs Ranch Mine to be maintained for a longer period of time providing additional royalty, rent, and tax revenues to the Federal and State governments. If not leased, the reserves would be bypassed and may never be developed. Potential government revenues would not be realized.

The proposed lease contains approximately 1,709 acres of Federal coal in Campbell County, Wyoming. Figure 2 is a map showing the location of the proposed lease relative to the adjacent Federal lease held by Kerr-McGee (i.e. the existing Jacobs Ranch Mine). The surface of the proposed lease area is owned by Jacobs Land and Livestock Company, a wholly owned subsidiary of Kerr-McGee Corporation. The proposed lease would be mined as part of the existing operations at Jacobs Ranch Mine. After mining, the land would be reclaimed for livestock grazing as is the current practice for Jacobs Ranch Mine where over 1500 acres have been reclaimed.

The legal description of the proposed coal lease lands is as follows:

T. 44 N., R. 70 W.
Sec. 33: Lots 1-3, 6-11, 14-16
Sec. 34: Lots 1-16
Sec. 35: Lots 2-15
Campbell County, Wyoming

TOTAL 1708.62 acres

This legal description conforms to that area designated by the BLM in their Geologic Report (Pitman, 1990).

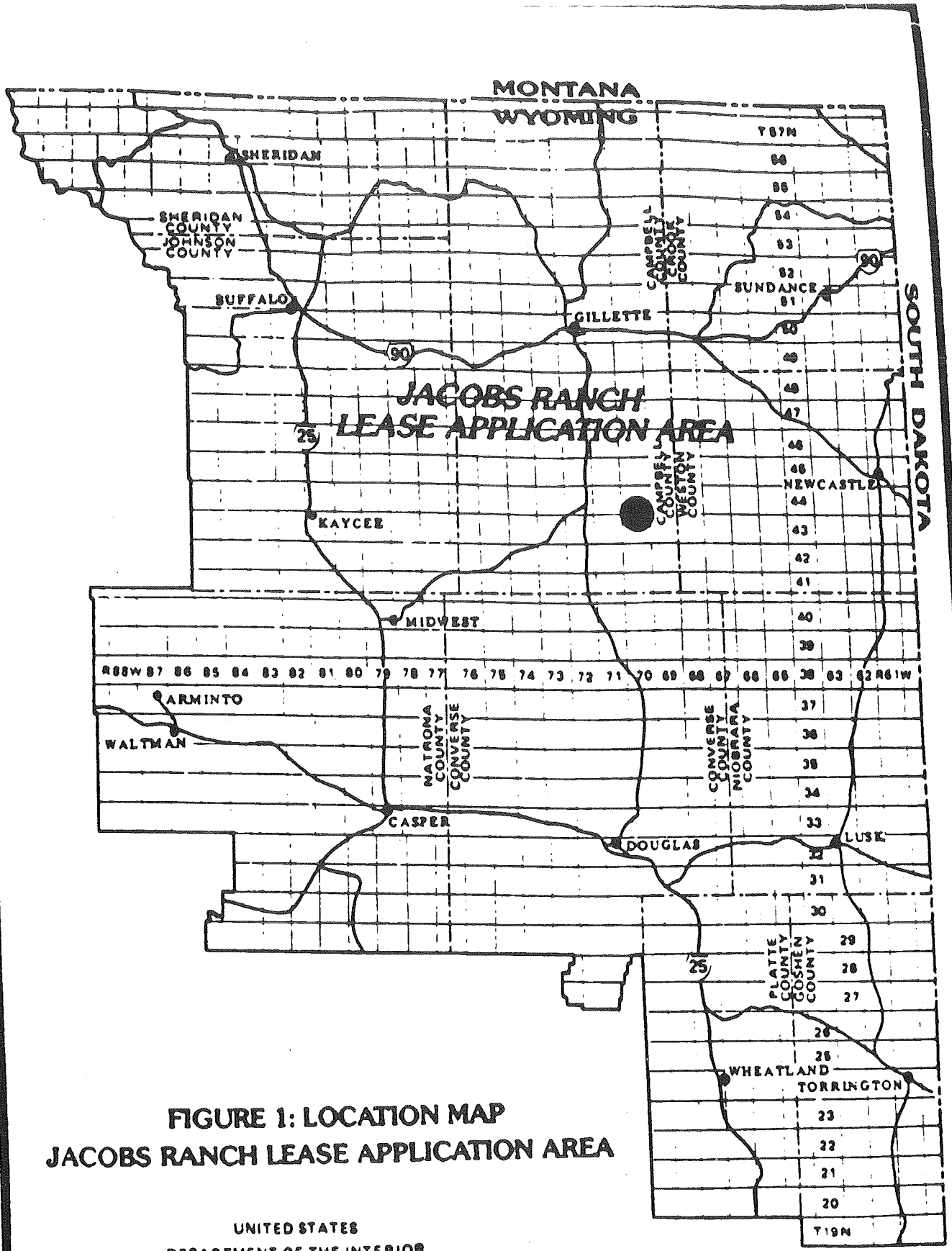
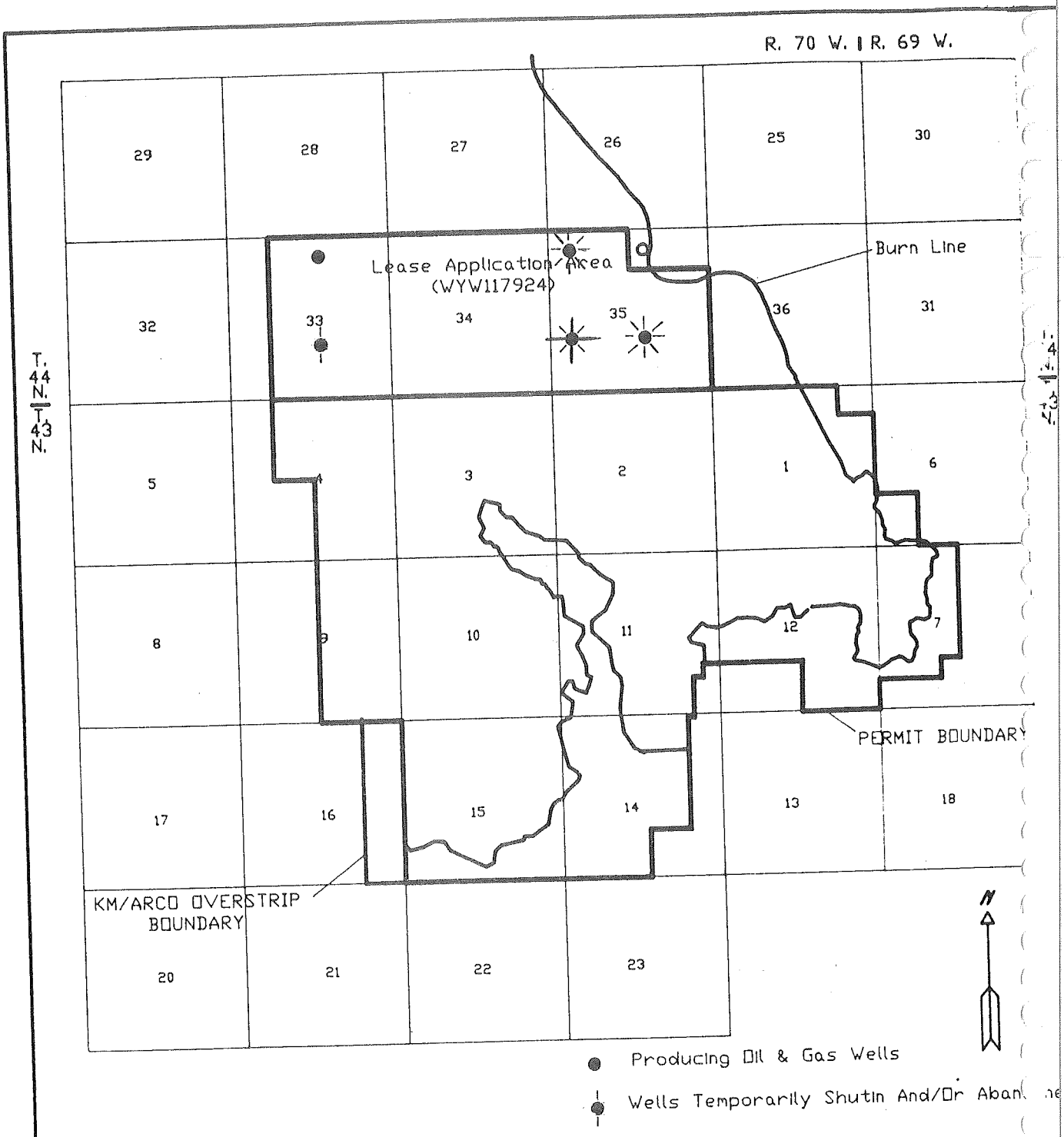


FIGURE 1: LOCATION MAP
JACOBS RANCH LEASE APPLICATION AREA

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Casper District Wyoming

Figure 2



OIL AND GAS WELLS WITHIN
PROPOSED LEASE AREA

C. AUTHORIZING ACTIONS

The coal lease application was submitted and will be processed and evaluated under the following authorities: Mineral Leasing Act of 1920 as amended; Federal Coal Leasing Amendments Act of 1976 (FCLAA); the Federal Land Policy and Management Act of 1976 (FLPMA); Surface Mining Control and Reclamation Act of 1977 (SMCRA); Multiple-Use Sustained Yield Act of 1960; and the National Environmental Policy Act of 1969 (NEPA).

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) gives the Office of Surface Mining Reclamation and Enforcement (OSM) primary responsibility to administer programs that regulate surface coal mining operations and the surface effects of underground coal mining operations. In November 1980, pursuant to Section 503 of SMCRA, the Wyoming Department of Environmental Quality (DEQ) developed, and the Secretary of Interior approved, a permanent program authorizing Wyoming DEQ to regulate surface coal mining operations and surface effects of underground mining on non-Federal lands within the State of Wyoming. In January 1987, pursuant to Section 523(c) of SMCRA, Wyoming DEQ entered into a cooperative agreement with the Secretary of the Interior authorizing Wyoming DEQ to regulate surface coal mining operations and surface effects of underground mining on Federal lands within the State.

Pursuant to the cooperative agreement, Federal coal lease holders in Wyoming must submit permit application packages (PAP) to OSM and Wyoming DEQ for proposed mining and reclamation operations on Federal lands in the State. Wyoming DEQ reviews the PAP 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 State permanent program. If it does comply, Wyoming DEQ issues the applicant a permit to conduct coal mining operations. OSM, the Bureau of Land Management (BLM), the Forest Service (FS), and other Federal agencies review the PAP to ensure that it complies with the terms of the coal lease, the Mineral Leasing Act of 1920, the National Environmental Policy Act of 1969, and other Federal laws and their attendant regulations. OSM recommends approval, approval with conditions, or disapproval of the mining plan to the Assistant Secretary, Land and Minerals Management. Before the mining plan can be approved, the BLM and the surface managing agency (in this case BLM) must concur with this recommendation.

Wyoming DEQ 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 and FS have authority in those emergency situations where Wyoming DEQ or OSM inspectors cannot act before significant environmental harm or damage occurs.

The lease application will be processed under the procedures set forth under Federal Regulations 43 CFR 3425, Leasing on Application.

D. CONFORMANCE WITH LAND USE PLANS

The Buffalo Resource Area completed its Resource Management Plan (RMP) in 1985 and the leasing of this tract would be in conformance with the RMP as well as Appendix F of the U.S. Forest Service Final Environmental Impact Statement for the Medicine Bow National Forest and Thunder Basin National Grassland Land and Resource Management Plan. Leasing of this tract would pose no conflict with the coal unsuitability criteria. The following criteria were reassessed by investigation in April of 1991 in accordance with 43 CFR 3461.3 and 43 CFR 3461.5:

Criterion 1 - Lands are unsuitable if in a National Park System, National Wildlife Refuge System, ... National Forest, and Federal lands in incorporated cities, towns and villages.

The lands being considered are all private surface and are not part of an incorporated city, town or village and are not included in any of the national systems listed.

Criterion 2 - Lands are unsuitable if they are within rights-of-ways or easements, surface leases for residential, commercial, industrial or other public purposes, or are on federally owned surface.

The lands considered are all private surface.

Criterion 3 - Lands are unsuitable if affected by Section 522(e)(4)&(5) of the Surface Mining Control and Reclamation Act of 1977 to include within 100 feet of the outside line of a right-of-way for a public road, within 100 feet of a cemetery, 300 feet of a public building, school, church, community park, or occupied dwelling.

There are no right-of-ways for public roads, cemeteries, public buildings, schools, churches, community parks or occupied dwellings in the proposed lease area.

Criterion 4 - Federal lands designated as wilderness study areas will be considered unsuitable.

The lands are not part of a wilderness study area and are all private surface lands.

Criterion 5 - Scenic Federal lands designated by visual resource management analysis as Class I shall be considered unsuitable.

None of the considered lands are a Class I designation.

Criterion 6 - Federal lands are considered unsuitable if they are permitted by the surface management agency as being used for scientific studies involving food, fiber production, natural resources, or technology demonstrations.

The considered lands are not part of any scientific study involving the above-mentioned topics.

Criterion 7 - Lands shall be considered unsuitable if included in a National Register of Historic Places.

The lands are not included in the National Register of Historic Places.

Criterion 8 - Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.

These areas or landmarks do not exist on the considered lands.

Criterion 9 - Federally designated critical habitat for listed T&E species or proposed critical habitat

There is no critical habitat federally designated for listed or proposed threatened and endangered species in the area.

Criterion 10 - State designated critical or essential habitat for state listed animal or plant species

There is no critical or essential habitat designated by the state for listed or proposed state species in the area.

Criterion 11 - Bald or golden eagle nest or site on federal lands with an active buffer zone

There are no bald or golden eagle nests or sites on federal lands that would be impacted by the lease proposal.

Criterion 12 - Bald or golden eagle roost or concentration area on federal lands

There are no bald or golden eagle roost or concentration areas on federal lands that would be impacted by mining in the proposed lease area.

Criterion 13 - Falcon (excluding Kestrel) cliff nesting site with an active buffer zone

No falcon nests have been discovered and no potential nesting habitat exists within or near the lease area.

Criterion 14 - Priority habitat for species of high federal interest (i.e. Migratory birds)

Several species of high federal interest occur near the proposed lease area. The ferruginous hawk nests discussed in the Raptor section, the long-billed curlew, and canvasback duck discussed in the Endangered Species and Migratory Birds of High Federal Interest section indicate that these areas are not priority habitats for these species and that mining is not expected to cause an adverse impact to the habitat or these species.

Criterion 15 - Priority habitat for species of high State interest or priority species

Several species of high state interest have been discusses in the Raptor section, and in the Endangered Species and Migratory Birds of High Federal Interest section. The analysis indicates that while some species have been noted in the area, the lease area provides no priority habitat for any of these species except for long-billed curlews. These birds use water-filled playas during migration periods, but only if the spring has been wet enough to collect sufficient water. There is no priority habitat designated by the state within the lease or study area.

Criterion 16 - Federal lands in riverine, coastal and special floodplains where mining could not be undertaken without substantial threat of loss to life or property are considered unsuitable for all or stipulated methods of coal mining.

The considered lands are not part of coastal, riverine, or special floodplains an the lands are all private surface.

Criterion 17 - Federal lands committed as municipal watersheds shall be considered unsuitable.

The lands considered are not within municipal watersheds.

Criterion 18 - Federal lands with National Resource Waters as identified by states in their water quality management plans shall be unsuitable.

The lands considered are not part of identified National Resource Waters.

Criterion 19 - Federal lands are unsuitable if identified as alluvial valley floors (AVF) according to the definition in 43 CFR 3400.05-(5).

BLM's preliminary determination is that these lands are not within an AVF nor will the mining of these lands affect any adjoining AVF.

Criterior 20 - Federal lands shall be considered unsuitable after consultation with the state or affected Indian tribe or are identified in land use plans where coal mining would adversely affect the value which the criterion would protect.

The considered lands are not part of any area that is to be protected as specified by the state or affected Indian tribe, or in land use plans.

E. BACKGROUND INFORMATION

The proposed lease area is within a region which has been evaluated by several Federal environmental analyses which describe the existing and affected environment. The relevant BLM publications which are on file at both the Casper and Cheyenne BLM offices are as follows:

- Final Environmental Impact Statement Eastern Powder River Coal Basin of Wyoming. Washington, D.C. 1979.

- Amendment to Wyoming Land Use Decisions: Eastern Powder River Basin Area Management Framework Plan: Gillette Review Area. Casper, Wyoming 1980.

- Powder River Region Coal Final Environmental Impact Statement, Casper Wyoming, BLM Casper District Office, 1981

- Powder River Coal Regional Tract Summaries. Cheyenne, Wyoming 1983.

- Draft Environmental Impact Statement for Round II Coal Lease Sale in the Powder River Region. Casper, Wyoming, 1984.

- Buffalo Resource Area, Resource Management Plan (RMP), October 5, 1985.

- Coal Bed Methane Environmental Assessment, Eastern Campbell County and Western Johnson Counties, Wyoming WY-061-0-EA064, Casper BLM, March 1990 (for part of the socioeconomic data).

- Environmental Assessment for Exchange of Coal Leases in Campbell County, Wyoming (I-90 Exchange WY-061-4-201), Casper BLM, November 1984.

- Final Environmental Impact Statement for the Medicine Bow National Forest and Thunder Basin National Grassland Land and Resource Management Plan, U.S. Forest Service, November 1985

The affected environment also is described in great detail in the Jacobs Ranch Mine and Reclamation Plan (15 Volumes), Permit number 271-T2 which was approved for another 5 year term of mining by the Wyoming Department of Environmental Quality Land Quality Division on August 30, 1989. Moreover, detailed environmental baseline information for the I-90 area and the proposed lease area has been gathered by various consultants to comply with the Wyoming Department of Environmental Quality, Land Quality Division, (WDEQ-LQD) requirements for a mine plan submittal. This information includes land use, climatology, geology, soils, vegetation, groundwater and surface water hydrology, archaeology, paleontology and history, air quality and wildlife.

These studies have revealed that the following elements of the human environment are either not present in the study area or will not be affected: Areas of Critical Environmental Concern (ACEC), prime or unique farmlands, floodplains, wetlands or riparian areas, wild or scenic rivers, wilderness, or Native American religious concerns. In the event that any of the above items are identified during mining activities, lease stipulations and permit provisions require that appropriate protection and/or mitigation measures be implemented.

The area is substantially similar to the adjacent Jacobs Ranch Mine for which detailed site-specific environmental data have been collected and environmental assessments have been prepared by Kerr-McGee to secure the necessary mining permits. The requirement for the Resource Recovery and Protection Plan was satisfied by the

approved Surface Mining Control and Reclamation Act (SMCRA) mine permit for the Jacobs Ranch Mine. The mine permit was approved on February 26, 1986 and authorization was given by the Secretary of Interior to continue operations on March 11, 1986. These permits and assessments have been previously reviewed in detail and approved by BLM as providing an adequate environmental assessment and employing appropriate environmental reclamation measures. The effectiveness of the reclamation program at the Jacobs Ranch Mine has been recognized by a national award from the Secretary of the Interior through the Office of Surface Mining for ten years of successful cost-effective reclamation (1988 Award for Excellence in Surface Mine Reclamation).

In anticipation of filing the lease application detailed environmental data has also been collected by consultants for Kerr-McGee for the proposed lease area and an adjacent buffer area. These baseline studies include a Class III Cultural Resource inventory completed by James M. Welch of Frontier Archaeology and soil, vegetation and wildlife inventories completed by Jim Orpet of Intermountain Resources. TRC Environmental Consultants completed the Air Resources Studies and Kerr-McGee Corporate Hydrology completed the hydrology and geology. These technical reports are available for review as a separate volume.

F. PUBLIC PARTICIPATION

On June 13, 1990 BLM published a Public Notice in the Federal Register (55 FR 23986-7) concerning this coal lease application along with several other coal lease applications. No comments were received by BLM regarding Kerr-McGee's application.

Preliminary scoping for developing the initial draft EA was based upon the issues considered in the numerous environmental analyses and detailed mine permits prepared for the region. Additional scoping was provided by six scoping meetings in May 1991 that were held in Cheyenne and Gillette, Wyoming. Additional review and coordination with State and Federal agencies was also done.

II. ALTERNATIVES

A. Alternative 1 - PROPOSED LEASE SALE - TO BE MINED WITH EXISTING MINING OPERATION - PREFERRED ALTERNATIVE.

With this alternative, the tract would be offered for competitive leasing subject to standard and special lease stipulations. The boundaries of the tract would be consistent with the tract configuration designated in the Kerr-McGee lease application as amended and as recommended in the approved BLM geologic report. These recommendations have been evaluated and approved by the BLM.

If Kerr-McGee acquired the lease, the lease would be mined as part of the existing Jacobs Ranch Mining operation. A new Mine and Reclamation plan would be developed to show a logical mining sequence from both pits into the acquired lease. Based on the location and movement of the existing pits, it is estimated that coal removal within the acquired lease area would begin in the pit 2 area in approximately four years. Topsoil removal would begin in approximately 1994.

The additional coal would allow the current annual level of production of 16.8 million tons to be maintained for approximately 8 years longer than would be possible under the current mine situation. This would mean that the mine would continue operating until 2012 instead of 2004 as currently anticipated. The total economic impact to the area from the 21 years of mine operation would reach $2.53 billion, up $966 million from the No Action Alternative.

B. Alternative 2 - NO ACTION

With this alternative, the coal lease application would be denied and the tract would not be offered for sale at this time. This would result in the postponement of future annual royalty revenues of approximately $8.4 million to the Federal government, of which $4.2 million would go to the State of Wyoming. These economic delays would continue on down to the individual communities. Under this alternative, after 2004 there would be a loss of about 365 permanent jobs and related income when the adjacent Jacobs Ranch Mine is depleted. This alternative would also result in the postponement of impacts resulting from mining until such time as the coal was offered. If the coal was never offered or the coal reserves were to become economically unrecoverable due to future changes in the coal industry, the economic value of the coal resource would be irretrievably lost.

C. Alternative 3 - PROPOSED LEASE SALE FOR A NEW STAND-ALONE MINE

Since the lease-by-application process is a competitive leasing process, it is possible that a party other than Kerr-McGee could acquire the coal lease. However, the tract is positioned such that it could not be practically mined as an extension of another party's active mining operations. Thus, if leased by another party, a new stand-alone mine would be required. The number of mining operations in the Powder River Basin portion of Montana and Wyoming is presently 25, which includes the Clovis Point Mine that is currently idle. Table 1 shows that the combined design capacity of these mines is over 318 million tons per year. The 1990 total production of 200 million tons is less than 63% of capacity. This has resulted in an oversupply condition for the Basin that is reflected by coal prices that have declined and continue to be very weak.

The average price of coal sold in Campbell County, Wyoming declined from a peak of $9.88 per ton FOB mine site in 1982 to only $6.92 per ton in 1989 (U.S. Department of Energy, Energy Information Administration 1990). The average coal price reflects a composite of historic contract prices that have escalated over time, new contract sales and open market (spot) coal sales. In the mid 1980's spot coal prices had dropped to levels as low as $3.00 per ton. More recently, spot coal prices have ranged from $3.70 to $4.60 per ton for 8,400 to 8,800 Btu per pound coal at the mine mouth (McGraw Hill 1991).

These low prices show that the large scale mining operations are able to produce incremental coal at very low costs. In addition, most of the mines in the Basin have been in operation for a number of years and have already recovered all or a major portion of their up front

TABLE 1

POWDER RIVER BASIN MINE SUPPLY CAPABILITY

Mine Name	Mine Status	Mine Location	Design Capacity (1,000 Tons)	1989 Coal Production (1,000 Tons)	1990 Coal Production (1,000 Tons)	Full Capacity Less 1990 Production
Absaloka	Operating	Montana	15,000	1,070	4,498	10,502
Big Sky	Operating	Montana	4,600	3,715	3,603	997
Colstrip	Operating	Montana	16,000	13,679	12,968	3,032
Decker (East & West)	Operating	Montana	16,000	9,850	9,277	6,723
Spring Creek	Operating	Montana	7,000	5,979	7,133	(133)
Subtotal-Montana			**58,600**	**34,293**	**37,479**	**21,121**
Antelope	Operating	Wyoming	12,000	3,541	5,212	6,788
Belle Ayr	Operating	Wyoming	16,000	13,600	15,528	472
Big Horn	Operating	Wyoming	4,500	106	134	4,366
Black Thunder	Operating	Wyoming	30,000	29,537	27,919	2,081
Buckskin	Operating	Wyoming	8,000	7,694	7,695	305
Caballo	Operating	Wyoming	24,000	12,856	14,313	9,687
Caballo Rojo	Operating	Wyoming	15,000	8,369	8,567	6,433
Clovis Point	Idled	Wyoming	4,200	0	0	4,200
Coal Creek	Operating	Wyoming	12,000	139	140	11,860
Cordero	Operating	Wyoming	24,000	12,602	12,923	11,077
Dave Johnston	Operating	Wyoming	3,700	2,575	2,679	1,021
Dry Fork	Operating	Wyoming	15,000	0	815	14,185
Eagle Butte	Operating	Wyoming	26,000	13,567	15,396	10,604
Fort Union	Operating	Wyoming	1,200	42	39	1,161
Jacobs Ranch	Operating	Wyoming	18,000	14,662	16,725	1,275
North Antelope	Operating	Wyoming	6,100	6,909	8,242	(2,142)
Rawhide	Operating	Wyoming	24,000	10,629	11,442	12,558
Rochelle	Operating	Wyoming	11,000	10,893	12,030	(1,030)
Wyodak	Operating	Wyoming	5,000	2,348	2,908	2,092
Subtotal-Wyoming			**259,700**	**150,069**	**162,707**	**96,993**
Total			**318,300**	**184,362**	**200,186**	**118,114**

Source: BXG, Incorporated 1989.
State of Wyoming, Inspector of Mines 1970-1990.
State of Montana, Department of Natural Resources and Corporate Tax 1970-1990.

capital investment in the mine. Therefore, these mines can sell coal near their cash cost of production and still return a profit. This situation is especially true for mines that have long term coal supply agreements in place that will pay for all or a major portion of the fixed costs of operating the mine.

Given the current market situation for mines in the Basin, it would be extremely difficult for a new mine to start production on the Jacobs Ranch Lease by Application Tract and effectively compete with existing Powder River Basin mines for new coal sales. The proposed tract contains only 132 million tons of reserves, so the peak production rate of the mine would only be 4.5 to 5.5 million tons per year for a 25 or 30 year mine life. This is a small mine compared to most of the mines shown in Table 1. Therefore, it would be doubtful that a new mine would achieve the economies of scale needed to compete with other larger mines in the Basin. Moreover, a new mine would need to pay an acceptable rate of return on capital investment for the mining operation. Each ton of coal sold from a new mine would need to pay all of the costs associated with producing the coal and provide a sufficient return on capital investment. As a result, the minimum selling price of coal required for a new mining operation would be much higher than existing mining operations.

The ownership pattern for the proposed lease tract also increases the cost of developing a stand-alone mining operation on this property as compared to developing the tract as an extension of the Jacobs Ranch Mine. Kerr-McGee Coal Corporation currently owns the surface acreage of the tract, which would have to be acquired by another mine operator before a new mining operation could be developed.

In addition, development of a stand-alone mine would require the construction of new surface facilities including: offices, shop facilities, warehouses, coal processing facilities, coal loadout, railroad spur, etc. that would not be required if the tract was developed as an extension of the existing Jacobs Ranch Mine. These facilities may cost $100 million or more and would certainly increase the breakeven cost of a new mining operation. As discussed previously, higher breakeven costs result in a new mine being less competitive than other existing mines. Therefore, a new mining operation on the proposed lease would likely not be competitive enough to obtain new coal sales, given the current coal market conditions in the Basin. As a result, it is unlikely that a new stand-alone mine would be economically justified for a prudent investor.

Potential site-specific and cumulative impacts of a stand-alone mine would be greater than if the existing Jacobs Ranch mine operations were extended. These impacts would include new facilities, increased dust, increased road travel and an influx of new jobs rather than extending the term of existing jobs. For reasons brought forth in this discussion, this alternative will not be analyzed further.

III. ENVIRONMENTAL IMPACTS

A. INTRODUCTION

The proposed lease area is located north of and adjacent to the existing Kerr-McGee Jacobs Ranch Mine as shown on Figures 1 and 2.

The mine is about 52 miles southeast of Gillette Wyoming and eleven miles east of Wright, Wyoming. Access to the mine is provided by Wyoming Highway 450.

Jacobs Ranch Mine is a surface coal mine owned and operated by Kerr-McGee Coal Corporation of Oklahoma City, Oklahoma. Coal is mined by a truck/shovel operation which utilizes haul trucks and power mining shovels to remove the overburden and coal. Coal production occurs from two active mine pits to enable blending of the coal to meet customer quality requirements and to comply with BLM lease requirements for maximum economic recovery of the coal resource. Existing facilities at the mine include crushing, storage, loading, administrative, and equipment maintenance facilities. Railroad access is provided for unit trains operated by the Burlington Northern Railroad and by the Chicago Northwestern Railroad. Both rail and highway access are shared with the Black Thunder Mine owned by ARCO located to the south of the highway. Mining activities at Jacobs Ranch Mine are progressing toward the north whereas mining activities at Black Thunder Mine are progressing toward the south.

The mine permit for Jacobs Ranch Mine was received on March 19, 1975 and commercial operations commenced in February, 1978. The mine production capacity is in the range of 18 to 25 million tons per year. The surface lands in the existing mine permit area are mostly owned by Jacobs Land and Livestock Corporation (a Kerr-McGee subsidiary). There is some federal land managed by the U.S. Forest Service but it is less than 640 acres. As shown in Figure 3, all of the surface of the proposed lease area is owned by Kerr-McGee. The coal reserves are leased by Kerr-McGee from the U.S. Government (BLM) and the Reno family heirs and part is owned in fee by Kerr-McGee Coal as shown in Figure 4. During the life of the existing mine, some 4,700 acres will be affected including areas for road and rail access.

Historically, the open rangeland has been used for livestock grazing and incidental wildlife habitat. These uses are continuing on inactive and reclaimed portions of the mine area. To date over 1500 acres have been reclaimed with over 250 acres returned to livestock use. Thus, Jacobs Ranch Mine is operated as an integrated mining and ranching activity. The Jacobs Ranch, which existed before mining began, is continuing its ranching operations with only temporary interruptions as mining occupies part of the area. As mining progresses, the land is returned to cattle ranching with improved forage and improved water wells and stock ponds which were developed to support the mine operation.

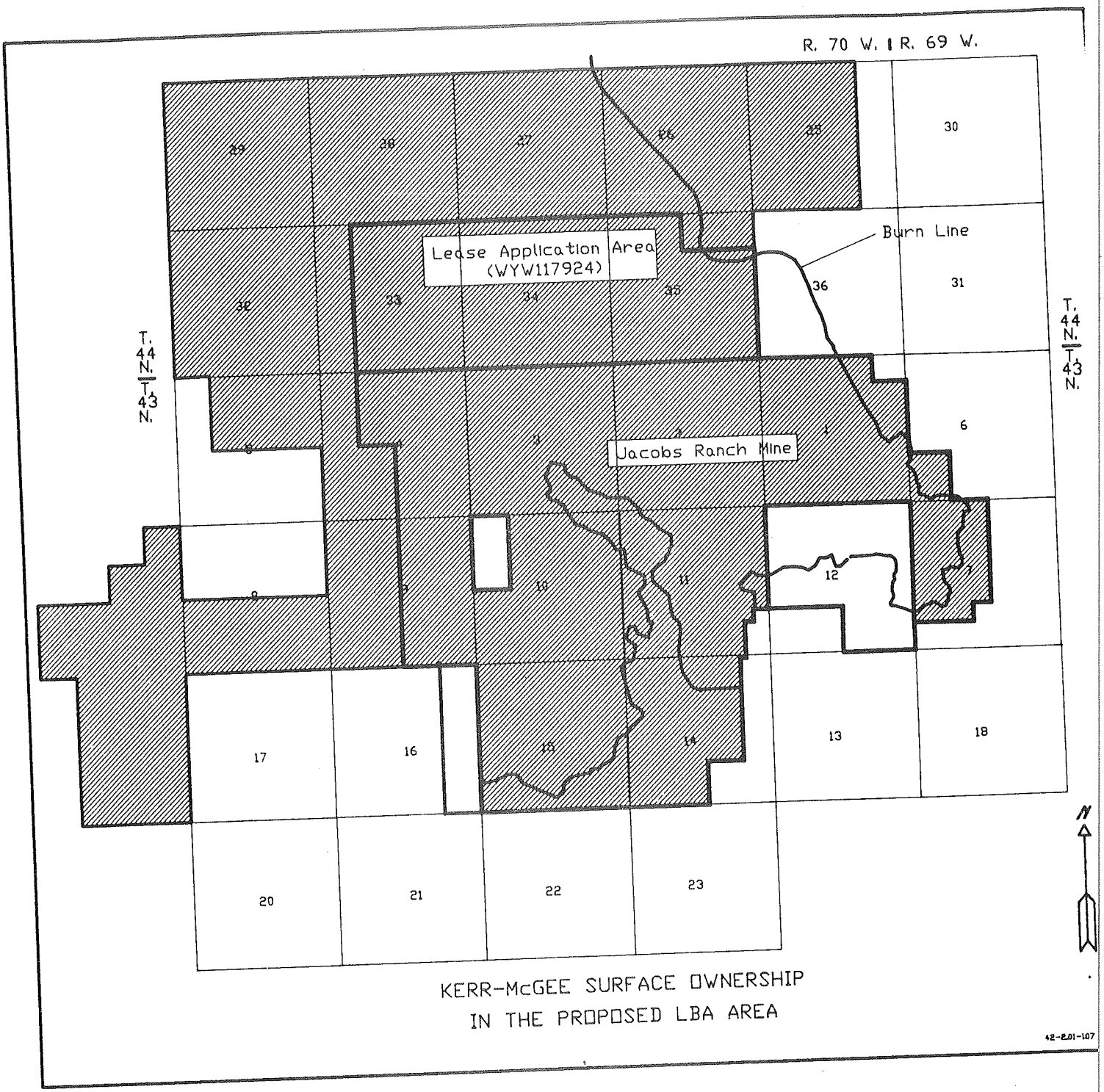
The proposed lease area is similar in all respects to the existing Jacobs Ranch Mine. If leased, it would be mined following the same practices and requirements employed for the existing mine.

C. PREFERRED ALTERNATIVE

1. GEOLOGY AND TOPOGRAPHY

Under the preferred alternative, the Jacobs Ranch Mine would mine the coal in conjunction with its existing operation. Production

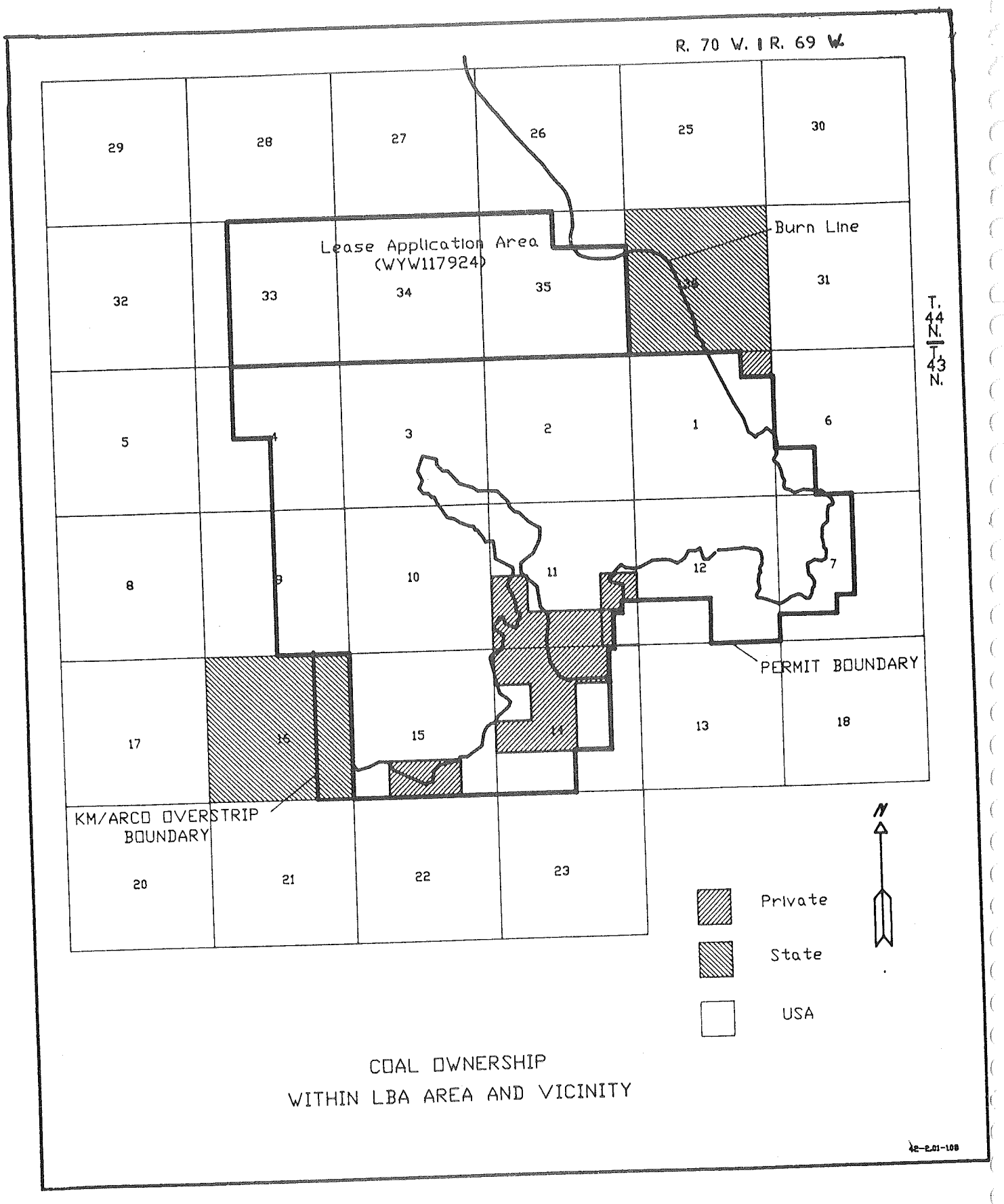
Figure 3



KERR-McGEE SURFACE OWNERSHIP
IN THE PROPOSED LBA AREA

42-2.01-107

Figure 4



COAL OWNERSHIP
WITHIN LBA AREA AND VICINITY

from the mine would be extended as would any site-specific and/or cumulative environmental impacts.

The lands in the lease application are located in the Great Plains physiographic province, Powder River Basin. The Powder River Basin is an asymmetrical basin of sedimentary rocks up to 18,000 feet thick. It is bounded by the Bighorn Uplift and Casper Arch on the west, the Laramie Uplift on the south, the Hartville and Black Hills Uplifts on the east, and the Miles City Arch on the north. The strata dip more steeply in the west from the Bighorn Uplift and Casper Arch and more gently in the east and north from the Black Hills Uplift and the Miles City Arch.

The lands are near the upper reaches of tributaries in the Cheyenne River in the uplands between the Cheyenne River drainage and the Belle Fourche River drainage. The topography consists of broad valleys and broadly rounded, gently rolling hills. There are occasional playas and a few scarp breaks.

Elevations range from approximately 4,680 feet at the southern part of the lands, near Shipley Draw to approximately 4,850 feet on the north. A few hills have elevations of 4,900 feet. Gradients range from nearly level to about 5%. The general slope is to the south toward North Prong Little Thunder Creek. The steeper slopes are along Shipley Draw. The rest of the lands are weakly dissected.

Coal in the lease application area averages 50 feet thick. This includes the three seams of the Wyodak coal formation. Overburden cover ranges from 65 to 135 feet. The recovery is estimated to be 90%. Typical coal characteristics include: 8,600 Btu/lb.; 29% moisture; 0.5% sulfur; 5.5% ash.

Mining and reclamation would change the topography and cause physical changes to the geology. Changes to the topography would result from the removal of the coal seams and the bulking nature in backfilling of the overburden. The overburden would be graded to restore drainage through the area. The landform of the reclaimed area would be generally similar in appearance to the pre-mining area, but would be more uniform. The area would have flatter slopes which would reduce the rate of runoff and erosion.

Mining and backfilling would be accomplished contemporaneously by a truck and shovel operation utilizing haul trucks and power mining shovels. Based upon the past 15 years of mining at the existing adjacent mine, subsidence of reclaimed areas would be minimal.

The removal of the coal resource will not significantly change the geologic features of the land. The geologic report developed by the BLM (Pitman, 1990) for the proposed lease area estimated 161,216,376 tons of in-place coal. Of this amount Kerr-McGee estimates that approximately 132,680,200 tons of coal will be recoverable with a 90% recovery rate and excluding unecomonic coal.

Based on actual mining operations, Kerr-McGee has determined the economic minable limits of the lower Wyodak coal seam. This line has been referred to by both Kerr-McGee and the BLM as the "zero net revenue line". In the eastern portion of the lease area the Lower Wyodak seam dips to the east. Due to the increased interburden incremental stripping ratio it has been estimated that 10,000,000 tons of coal will not be mined. For the past several years the Jacobs Ranch Mine with BLM approval has not been mining the lower Wyodak seam where it has been determined to be uneconomical. This procedure would be continued on the proposed lease area.

Mining this reserve in conjunction with the existing operations would allow potential coal quality problems to be accommodated to facilitate maximum economic recovery of the available proposed coal reserve.

The removal of these coal seams represents an irreversible and irretrievable commitment of the coal resources. The coal will be employed by electric utility customers to meet the national electrical energy needs. Government revenues will be generated for use by the Federal and State governments.

2. SOILS

During October 1989 a site-specific, order 1 Soil Survey was completed for the proposed lease area. (Jacobs Ranch Mine, Mine Permit Application, Vol. VII, D-7F). Only one new soil was identified during the mapping of the proposed lease area. This soil was the Olney Clay Loam, Clayey Surface Variant. The soil survey indicates that the major types and relative amounts of soils are similar to those on the existing adjacent mine. They include the following:

- Olney Clay Loam: Deep and moderately deep, nearly level to moderately sloping, well-drained soils forming calcareous shales and sandstones of the Wasatch Formation. (4% of area)

- Ulm Clay Loam: Deep to very deep, moderate to slow permeability, well-drained soils occurring in upland drainageways and broad stream terraces. (29% of area)

- Aeric Haplaquepts: Shallow to moderately shallow, nearly level with poor to very poor drainage, occurring in playa areas. This soil is not suitable for reclamation. (9% of area)

- Bidman Clay Loam: Moderately deep to deep, slowly to very slowly permeable and fine textured soils occurring on nearly level to undulating uplands and broad upland drainageways. (9% of area)

- Rauzi Sandy Loam: Moderately deep to deep with little slope, well-drained with moderate to moderately rapid permeability, occurs on upland ridges and is susceptible to wind erosion. (15% of area)

- Renohill Loam: Shallow to moderately deep on nearly level slopes, well-drained, slow permeability soils occurs in upland areas in swales, broad drainageways and on lower sideslopes. (19% of area)

The remaining 15% of the area is composed of Olney Sandy Loam, Pugsley Sandy Loam, Samsil Clay Loam, Shingle Rock Outcrop-Samsil Complex, Samsil-Shingle-Worf Complex, Terry Sandy Loam, and disturbed areas.

Stripping of all soil horizons suitable for salvage as topsoil would allow for an average replacement depth of 3.2 feet over the proposed lease area (Jacobs Ranch Mine, Mine Permit Application, Sept. 1989, Vol. VII, D-7F). Adjusting this volume using stripping depths identified by Kerr-McGee and accepted by the State of Wyoming, Department of Environmental Quality, (Jacobs Ranch Mine, Mine Permit Application, Jan. 1981, Vol. VII, D-7E) an average replacement depth of 1.7 feet (20 in.) would still be available to meet topsoil replacement goals of 16 to 22 inches.

As mining progresses into an area, the topsoil is stripped. The topsoil is then directly backhauled and placed on the backfill, or is stockpiled for future use. Topsoil that is placed on the backfill by direct backhauling, or taken from the stockpiles, will be graded, disked and planted with an approved seed mix. Stockpiling topsoil decreases organic matter content, disrupts nutrient cycles, increases bulk density, upsets the carbon-nitrogen ratio and negatively affects the mycorrhizal response in the stored materials. Freshly spread topsoil is easily eroded, and must be stabilized by vegetation or other means soon after it is spread. (U.S.D.A. Nov, 1984).

Vegetative cover and production studies conducted on the Jacobs Ranch Mine Permit Area (Jacobs Ranch Mine, Mine Permit Application, Vol. VII, D-7, Exhibits 2,3,4) indicate the reclamation practices employed on the lease area have provided reclamation with both increased plant cover and higher productivity of forage for livestock than adjacent native rangelands. However, species diversity on the reclaimed land was lower than native rangeland, and the invasion of native species from adjacent native rangeland has been very slow.

Topsoil from the proposed lease area would be subject to temporary disturbance, but given the increase in total plant cover and higher production of livestock forage on the reclaimed areas, no significant site-specific or cumulative soil impacts are likely.

3. VEGETATION

Site-specific studies (Jacobs Ranch Mine, Mine Permit Application, Vol. VII, D-8J) indicate the vegetation on the proposed lease area is similar to that on the existing adjacent mine. There are four native and two improved vegetation types in the proposed lease area. The Big Sagebrush Shrubland, Upland Grassland, Bottomland Grassland and Playa are the native vegetation types. Crested

wheat and improved rangeland grasses are the improved vegetation types which make up approximately 25% of the area. The native vegetation types are predominantly open range herbaceous vegetation types with numerous shrubs. Herbaceous productivity ranges from 500 to 1,200 pounds (when shrubs are included) per acre, depending upon soil types.

The most widespread and abundant vegetation type in the proposed lease area is the mixed grass/sagebrush. Sagebrush covers approximately 31% while grasses cover approximately 29% of the proposed lease area. This vegetation type is interspersed with small areas of upland grasses, mixed grass/sagebrush and playas. The mixed grass/sagebrush is not restricted to any slope or aspect, rather it tends to occur throughout the more gently rolling topography.

Twenty-five percent of the area in the western portion of the lease application area has been part of an experimental range improvement program in the past in which crested wheat and improved pasture grass was planted. Due to lack of moisture this practice was not considered successful and was not continued.

Vegetation in the lease area would be disrupted at a rate of approximately 100-200 acres per year. Over the life of the lease, approximately 1,708 acres would be temporarily disturbed. Normally the period of temporary disturbance is only four to five years before grazing can be resumed on the reclaimed surface.

According to the Soil Conservation Service estimates for the Southern Powder River Basin, the temporary loss of Animal Unit Months (AUMs) would range from 100 to 250 AUMs. This assumes about 500 acres are disturbed during a given time period. This could temporarily reduce maximum potential grazing herd size by 20 to 50 cows. However, practical grazing intensity is less than this maximum value.

Vegetation studies conducted on the Jacobs Ranch Mine from 1984 to 1986 (Jacobs Ranch Mine, Mine Permit Application, Vol. VII, D7, Exhibit 4) investigated reclamation success. The study found that overall plant cover and forage production for livestock on the reclaimed areas was higher than that found on the native site. However, the reclaimed sites had lower perennial plant cover and significantly greater annual plant cover than the native rangeland. The study also concludes that species diversity on reclaimed land was lower than the native rangeland, and the invasion of native species from adjacent native rangeland has been very slow. In addition, very few shrubs and succulent species have been reestablished on the reclaimed areas. Revegetation has been almost exclusively grass and forbs.

A reclamation success study on the W3 area during 1988, 1989, and 1990 compared the permanently reclaimed areas on Jacobs Ranch Mine with the Upland Grass Control Area (Kerr-McGee Coal Corp., Jacobs Ranch Mine, W3 Area 1988, 1989, and 1990, Nov., 1990). The data shows that the reclaimed area is dominated by species which were

seeded on the area, primarily Thickspike Wheatgrass and Western Wheatgrass. The upland grassland control was also dominated by perennial grass species, with major plants including Western Wheatgrass, Blue Grama, Needle and Thread, and Prairie Junegrass. Other perennial plant species were also common, with Prickly Pear Cactus dominating them.

Total vegetative cover was greater on the control area in 1988 and 1990. Vegetative forage production for livestock on the W3 area was greater than the control area in 1989 and 1990. Diversity and variety of vegetation represented in the control area was higher in 1988 and 1989. The reclaimed area was slightly higher in 1990. Species represented on the reclaimed area are all perennial and annual grasses and forbs, whereas the control had more perennial forbs, as well as grasslike, shrub and succulent species.

Reclamation experience at the Jacobs Ranch Mine seems to indicate that mined areas can be successfully revegetated, with potentially higher forage production for livestock than the native rangelands. Species diversity on the reclaimed lands will be lower than the native areas.

4. WATER RESOURCES

Groundwater

Groundwater in the shallow aquifers (coal and overburden) which would be affected by mining is hard and highly mineralized. The major chemical constituents of this water are sulfate, calcium and magnesium with total dissolved solids ranging from 1000 to 4000 milligrams per liter. Within six miles of the proposed mining activity, well permits have been issued by the State of Wyoming with primary use specified as domestic (11), irrigation (1), and stock (45), as well as some 498 other wells (primarily monitoring and industrial).

The availability of water from the shallow aquifers (less than 200 feet deep) is limited and often difficult to locate because of the discontinuity and heterogeneity of the coal and overlying strata as aquifers. Yields from the wells less than 200 feet in depth and within six miles of the proposed mine range from less than one to 500 gallons per minute. Depths to the static water table range from less than 10 feet to more than 220 feet.

Water suitable for most uses is available from the deeper aquifers that will not be affected by mining.

In 1988 the U.S.G.S., in cooperation with the Wyoming Department of Environmental Quality and the U.S. Office of Surface Mining, did an analysis and prepared the report "Cumulative Potential Hydrologic Impacts of Surface Coal Mining in the Eastern Powder River Structural Basin, Northeastern Wyoming" (CHIA). This analysis addressed the cumulative effects of all current (at that time, 1987) and anticipated surface coal mining on the hydrologic system in the eastern Powder River Basin. The following points were taken from that report:

- Mining will not substantially change groundwater recharge rates and mechanisms in the area. Post-mining recharge, movement, and discharge of water in the overburden and coal aquifers will not be substantially different from pre-mining conditions.

- Water level declines in the overburden due to coal mining are limited in extent and duration due to the generally discontinuous nature and limited hydraulic connection of the sandstone lenses that make up the primary sources of water within the overburden.

- Significant (5 feet or more) water level declines in and within one half mile of the proposed mine can be expected in the overburden. Water level declines in the coal aquifer could be significant from four and up to eight miles (worst case) from the mine pit. The extent of the observed water level declines has been less (only approximately 3/4 mile at Jacobs Ranch) than predicted by the models in environmental assessments prepared before the beginning of the extensive mine development.

- Mining will initially degrade groundwater quality in the areas of mining. This will be expressed as an increase in total dissolved solids, including sulfate, nitrate, and possibly selenium and chromium. The quality should, however, remain within the State standards for livestock use. The quality of the water in the coal spoils should improve with time and approach pre-mine levels.

In addition to the data presented in CHIA, each of the mines is required to monitor the impacts of their operations. The CHIA conclusions have been confirmed by ten years of monitoring at Jacobs Ranch Mine. An annual report of these monitoring activities and data is prepared by the Gillette Area Groundwater Monitoring Organization (GAGMO). This report is reviewed by the BLM as well as several other regulatory agencies, including the Wyoming State Engineer's Office. Groundwater is temporarily disrupted in the active mine pit areas, but groundwater recharge after reclamation has allowed water levels to recover to near pre-mining levels in about five years. Backfill well water quality has remained similar to pre-mining conditions which is suitable for livestock use. As stated in CHIA: "Postmining recharge, movement, and discharge of groundwater in the Wasatch aquifer and Wyodak coal aquifer will probably not be substantially different from pre-mining 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 the mine areas through the spoil aquifer to the undisturbed Wasatch aquifer and Wyodak coal aquifer to the west." .

The proposed lease area is geologically and hydrologically similar to the existing mine with similar recharge and discharge characteristics. It is anticipated that groundwater behavior in the proposed lease area will be similar to that of the existing mine.

Surface Water

The western portion of the proposed lease area (Section 33 and the western part of Section 34) lies within the North Prong watershed, which is part of the Cheyenne River system. The surface waters within Section 34 drain internally into a closed basin. Runoff from areas surrounding the basin flows into playas and dissipates, mainly through evaporation. Surface waters in Section 35 drain northerly into the Black Thunder Creek drainage basin, which is also part of the Cheyenne River System of the Missouri River drainage. The streams within the proposed lease area are ephemeral, and streamflow results only from rainstorms and melting snow. (See Geologic Report, Pitman, 1990).

The impacts of mining to the surface water resources are insignificant. Any increased sediment during mining will be contained within the lease area by sediment control structures in accordance with mining regulations. This potential impact will be temporary in nature. Once the area is reclaimed and the drainage areas are restored and revegetated, sediment yield will be similar to pre-mining conditions or possibly less due to the flatter reclaimed slopes.

Potential Alluvial Valley Floors

Intermountain Resources of Laramie, Wyoming completed the soils inventory in the area during October 1989 and confirmed the lack of any potential alluvial valley floors (AVFs). This is consistent with the expectations considering the upland topography of the site. Any AVF determination would be made by the State.

5. SURFACE OWNERSHIP AND USE OF LAND

The surface estate on the lands on the proposed lease area is owned in fee by Jacobs Land and Livestock, a wholly owned subsidiary of Kerr-McGee Corporation. Therefore there should be no conflicting surface owner land use concerns. The land is currently used for livestock grazing and wildlife use. During the past three years, the land has been dormant with no domestic grazing. During 1990, the area was used for a yearling calf operation and it is anticipated that this type of ranching operation will continue at least every other year.

Impacts to the ranching use of the land would be a temporary removal of a portion of the land from active ranching. Assuming 500 acres are disturbed at any given time, the temporary loss of Animal Unit Months (AUMs) would range from 100 to 250 AUMs. This could reduce maximum potential grazing herd size by 20 to 50 cows. This would not affect the existing ranching operation since

reclaimed lands from the adjacent mine are being added to the potential grazing acreage each year.

There are five oil and gas wells within the proposed lease area which are marginal producers. These are shown on Figure 2 and are located as follows:

Section 33: NWNE, HSU #52-31, M & K Oil Company.
Fee well, CA NW 478, producing oil

NWSE, HSU, #61-11, M & K Oil Company.
WYW4734, shut-in oil

Section 35: NWNW, #3 Jacobs, DCD, Inc.
Fee well, producing oil & gas

NWSE, #1 Jacobs, Maxim Drilling
Fee well, producing oil & gas

NWSW, #2 Jacobs "F", Presidio
Fee well, TA'd oil & gas

A study is presently underway to determine the effect that these wells will have on the potential mining operation. Depending on the value of the wells and the economic trade-offs, the wells could either be bought outright or could be temporarily plugged and restored when mining has been completed. Under the Federal Land Policy and Management Act of 1976, multiple use and concomitant development of natural resources are governed by the Department of Interior (DOI). DOI guidelines have been developed to govern this type of situation. Moreover, the leased lands are managed according to the RMP land use plans. The coal lessee will coordinate the development of an agreement with the oil and gas lessees to facilitate maximization of the mineral resources.

There are no occupied dwellings in the area, and no lands are used for cultivated agriculture.

6. WILDLIFE

Wildlife surveys have been conducted, as required by the existing mine permit, on the existing mine and a two mile buffer, which includes the proposed lease area, for more than ten consecutive years. The majority of these surveys have been conducted by Intermountain Resources, an independent consulting firm in Laramie, Wyoming. Wildlife resources monitored over the last decade include (in the following general categories) big game, raptors, upland game birds, endangered species and migratory birds of high federal interest, and other wildlife species, including prairie dog towns. The area surveyed included the permit area, and a two mile perimeter referred to as the study area (which includes the proposed lease area addressed by this EA).

In the proposed lease area, sagebrush accounts for 31% of the area, while grasses cover about 29%. This vegetation type is interspersed with small areas of upland grasses, mixed grass and sagebrush, and playa habitat. The vegetation provides very good winter (and yearlong) habitat for a variety of wildlife, with herbaceous productivity ranging from 500 to 1200 pounds (when shrubs are present) per acre depending on soil type. It is anticipated that if the lease application is approved, the additional 1708 acres would be disturbed at a rate of 100 to 200 acres per year, and it is assumed that about 500 acres would be disturbed during any given time period.

Reclamation and mitigation efforts have included a mixture of grasses, forbs, and shrubs as approved by WDEQ-LQD. However, among the shrubs seeded, only four-winged saltbush seedings have shown any promise, and sagebrush seedings have exhibited an overall poor response.

Big Game

There is no critical big game habitat for pronghorn, mule deer, or elk, identified by the Wyoming Game & Fish Department (WG&FD), or the BLM. The annual wildlife monitoring report for the Jacobs Ranch Mine is forwarded to and reviewed by the WG&FD. Winter, spring, and early summer ground surveys have been conducted on the study area yearly since 1981. Aerial surveys for mule deer have also been conducted since 1981, and data have been presented depicting animals per square mile using both the one mile buffer and the two mile buffer.

Pronghorn Antelope

Pronghorn antelope are the most abundant and most evident big game animal on the Jacobs Ranch Mine study area. Pronghorn winter numbers have ranged from 125 to 236 on the permit area and from 125 to 448 on the survey area. Spring and summer numbers have been lower because of dispersion to suitable summer range, and have ranged from 51 to 136 on the permit area in the spring and from 96 to 173 in the summer. Numbers documented on the study area in spring ranged from 134 to 280 and in summer from 167 to 294. As noted, winter populations are consistently higher than spring or early summer numbers, with a general increase in observed numbers throughout the decade of the 1980s. Whether this increase can be attributed to the mining activities is not known, but antelope populations throughout the Powder River Basin have shown a general upward trend over the past decade. However, the existence of high quality forage on reclaimed areas, the overall scarcity of mammalian predators in the area, and the relative hunting-free nature of the area may be causing the local populations to be attracted to the area or cause them to remain longer in the area than they normally would.

Subtle changes in pronghorn distributions have been observed over the last several years. Their winter distribution has changed due to the mining of Burning Coal Draw where they spent considerable time wintering prior to mining. Now antelope are concentrating more in the north, east and southeast portions of the permit and adjacent areas during the winter. Antelope are also spending considerably more time on reclaimed areas during the early summer. Similar distribution changes are anticipated as mining progresses and antelope adapt and adjust to mining activities and the development of additional reclaimed areas.

Mule Deer

Mule deer are considerably less abundant on the permit and study areas than are pronghorn. They are probably more abundant than the yearly numbers suggest mainly because they are so difficult to count, but their numbers are still considered low. Although forage is relatively abundant for mule deer, there is very little adequate cover within or adjacent to the mine permit/study area. This species has been generally most common in rough rocky areas and on reclaimed sites. Mule deer and mule deer habitat are more abundant to the east of the mine in the Rochelle Hills area.

Mule deer numbers have remained relatively low due to the available habitat. Winter numbers on the permit have ranged from 0 to a high of 21, while numbers on the survey area have ranged from 3 to 56. Spring and summer numbers on the permit and on the survey area have also fluctuated over the years. They are as follows:

Spring	Low	High
Survey Area	0	41
Permit Area	0	29

Summer	Low	High
Survey Area	1	17
Permit Area	0	7

Elk

A small herd of elk inhabit the Rochelle Hills east of the Jacobs Ranch Mine permit area. In the past, these elk did not normally venture onto the permit area but frequented areas within two miles to the east. During the past several years, as many as 40 to 60 animals have frequented the permit area on a seasonal basis. These elk are most common on the area from winter through early summer. Areas of preferred use are reclaimed sites. In late June 1990, seven bull elk remained on newly reclaimed areas continuously, because food, water (in the form of small ponds), and cover in the draws and drainages were available. As with the pronghorn populations, it is not known whether the increase in elk numbers is a result of the reclamation effort at the mine or whether the numbers reflect a general increasing elk population throughout the Powder River Basin (the 1990 hunting season for elk in area 113, the Rochelle Hills elk hunt area, was the first

season since before 1979 that this area has been open, and this area will again be closed for the 1991 hunting season).

Raptors

Several species of raptors are monitored yearly throughout the permit and study areas. Golden eagles, ferruginous hawks, red-tailed hawks, Swainson's hawks, burrowing owls, and long-eared owls are known to have nested within the study area. Prairie falcons and kestrels have been observed within the study area, but habitat for nesting does not occur here. Records have been kept on all known raptor nests within the study area since 1980. Many of the various nest sites found throughout the study area are alternate nest sites within one breeding territory for a species and other nests are located on marginally suitable sites.

In 1990, only six nest sites monitored within the area were active. Two golden eagle nests were active, one in a deciduous tree, and the other, a man-made nest in a pine tree. Together they fledged 3 young eagles. Three active ferruginous hawk nests failed to fledge any birds in 1990. Also, the first record of a long-eared owl nesting within the study area was established, but the number of young was not determined.

Other raptors observed during wildlife monitoring surveys include the bald eagle, marsh hawk, rough-legged hawk, American kestrel, prairie falcon, red-tailed hawk, short-eared owl, and turkey vulture.

Ferruginous hawks are common summer residents of the Powder River Basin, as well as the study area. The proposed lease area contains no nesting habitat. This area is mostly flat to gently rolling with no rock outcrops, no juniper trees, and no other suitable habitat for ferruginous hawk nesting. There is a nest located in the northwest of section 36, Township 44 North, Range 70 West, which may be impacted by coal mining activity which will take place in section 35 of that same township and range. This nest was active in 1990, as noted above, but failed to fledge any young. If mining were to take place, this nest could be affected, and its use could be abandoned until reclamation was completed. However, because of the other alternate nests in this nesting territory, future nesting attempts will probably take place at one of the alternate nests.

Under a raptor mitigation and monitoring plan, approved by the U.S. Fish & Wildlife Service, three ferruginous hawk nests were built on rock platforms, three on reclamation rock piles, and two on natural scoria piles in 1989. These nests were built as mitigation for three inactive nests removed by mining in 1983, and one inactive nest site removed in 1989. To date, none of the man-made nests have been used by a ferruginous hawk pair.

Bald eagles are common winter residents of the area, roosting in a number of roost sites in the Rochelle Hills. There is no roosting habitat in the proposed area, but this area may currently be used for foraging and hunting in the winter. It is not anticipated that mining activity in the proposed area will significantly impact the winter activities of the endangered bald eagle.

Golden eagles are common yearlong residents of the area, but there is no recorded nesting activity and no suitable nesting habitat in the proposed area. Nesting territories may overlap this area, but all known and monitored nesting occurs in other parts of the permit/study area. Kerr-McGee, in cooperation and consultation with the U.S. Fish & Wildlife Service, moved a golden eagle nest in 1981. This was done to allow mining to continue and to maintain the active status of the nest. This nest was active from 1981 through 1984, and fledged two young in 1990. An alternate nest in the territory was used in 1988 and 1989. The alternate nest is again active this year (1991) and judging from the history of use, the moved nest will likely be used again in future years.

Prairie falcons are occasionally seen but no nesting habitat exists in the proposed area.

Burrowing owls nest to the south of the permit area, and have not been noted in the proposed area. The first noted burrowing owl nesting activity within the study area was in 1986, and three nests have been monitored since then. However, no birds were recorded nesting in 1990.

One red-tailed hawk nest was active in 1981 and 1982, but the nest subsequently blew out of the tree it was located in. This site has been inactive from 1983 through 1990.

Two Swainson's hawk nests are located within the study area, one was active from 1981 through 1985 and inactive from 1986 through 1990, and the other nest active in 1988 and 1989, but also inactive in 1990.

Within the Raptor Mitigation and Monitoring Plan, developed for the study area by Intermountain Resources, and approved by the U.S. Fish & Wildlife Service, there are plans to build additional raptor nests, to put up dead snags for perching and eventual nesting platforms, planting trees to mitigate for mature windbreak trees on an old homestead within the proposed area, erecting American kestrel nest boxes on snags, and installing artificial burrowing owl burrows to replace existing burrowing owl nests being mined through.

There are potential negative impacts to raptors due to mining. However, because of the behavioral characteristic of these birds to use alternate nests within a territory, the loss of a nest due to mining activities can be mitigated (to an extent) through the use of man-made nests. Although the birds have not demonstrated a desire to use the man-made nests in the past two years, there is every reason to believe that from experience in other areas of

Wyoming, they will become accustomed to these nests and use them in the future. The nests are being monitored by the BLM.

Upland Game Birds

Two species of upland game birds have been recorded during the years of wildlife monitoring within the study area. These species are the mourning dove and the sage grouse, both of which are common residents of the area.

Three sage grouse strutting grounds are located within two miles of the permit area. They were identified during wildlife baseline inventories and subsequent monitoring studies, and yearly surveys have been conducted. These data indicate that the strutting ground in Section 6, T.43N., R.70W., has been active every year since inventory and monitoring efforts were initiated. The strutting ground in Section 36, T.44N., R.69W. was active from 1981 through 1985, when it appears to have been abandoned (except for 3 males noted on April 15, 1988). The strutting ground in Section 26, T.44N., R.70W., was first discovered in 1985, the same year that the strutting ground in section 36 became inactive. A fourth strutting ground was discovered in 1990 in Section 20, T.44N., R.70W., when the study area was extended to cover a two mile buffer. This lek may have been active for some time according to the manager of the Kerr-McGee Land and Livestock Company.

The data show that the peak year was in 1985 when a total of 54 individual males were counted. The numbers declined in 1983 mainly as a result of severe winter and spring storms and have declined somewhat further during subsequent years. Data also indicate that there may be a movement of birds from the original two leks to the new lek which was discovered in 1985. The new lek is further away from mining activities and is typified by bottom-land grassland interspersed with big sagebrush. This lek provides more cover for strutting birds than the other two leks. The fourth lek, first recorded in 1990, may also become more important as mining activity increases. Much of the area is grassland and provides very little in the way of secure nesting cover for sage grouse.

Mourning doves are abundant on the study area during summer months. They are most common on reclaimed areas and adjacent to water during these times. The number of mourning doves frequenting the area appears to be increasing in conjunction with the increase in amount of newly seeded areas.

The wild turkey is common along Little Thunder Creek and the Rochelle Hills east of the mine but they have not ventured onto the permit area until 1988. A small flock of turkeys was observed feeding on reclaimed areas in 1988 and 1989, but was not observed in 1990.

Sharp-tailed grouse were first observed on the study area during February, 1989. A total of three birds were observed one mile east of the permit area in scoria hills. Vegetation was dominated mainly by grasses. These birds were not observed in 1990.

Mining the proposed lease area should have no lasting significant effect on upland game birds in the area. While the leks closest to the mining activity (in Section 6, T.43N., R.69W., and Sections 26 and 36, T.44N., R.70W.) may exhibit a reduction of breeding activity because of mining, breeding activity at the newly recorded lek in Section 20, T.44N., R.70W. may exhibit an increase. Nesting activity should not be significantly impacted by the loss of habitat in the proposed area because suitable nesting habitat is not abundant here. Most of the nesting habitat is to the east and north of the breeding complexes. Mining activity will probably displace the small flock of turkeys that have used the area, but this will be a temporary effect of mining, and with reclamation, the opportunity for attracting these birds will increase. Mourning doves will continue to use the area in the summer and will continue to use the reclaimed areas. Mining is not expected to significantly impact this species. Sharp-tailed grouse have used the scoria hills area east of the permit area, but not on the permit itself. Mining is not anticipated to have an impact on this upland game bird.

Endangered Species and Migratory Birds of High Federal Interest

The bald eagle, which is a federally listed endangered species, has been observed on the permit area during winter months. This species is a common winter resident, foraging on the plains and roosting in the Rochelle Hills area east of the permit boundary. The roost area is located in Section 32, T.44 N., R.69W. and was first observed in 1987. In 1988, nine bald eagles were found using the roost site, in 1989 only four bald eagles were observed there, and in 1990, ten eagles were counted. The presence of bald eagles in the area is dependent on the severity of the winter, and the condition of the roost site(s) in the Rochelle Hills, and is not significantly impacted by mining activity. Foraging activity can range over hundreds of square miles available to the birds.

Three species of high federal interest were observed during 1990 and earlier years. They are the ferruginous hawk, golden eagle, and the prairie falcon. These species are all raptors and have been discussed earlier under the Raptor section. In addition, long-billed curlews and canvasback ducks have been periodically observed during the migratory period. The long-billed curlews have been observed in playa habitat within the coal lease application area in particularly wet years, but have been absent during dry springs. Canvasback ducks have been noted on stock ponds or reservoirs south of the southwest portion of the permit area during migration.

Other Wyoming birds of high federal interest which have not been observed during any survey period are the merlin, osprey, plovers, and Lewis's woodpecker.

Habitat for the endangered black-footed ferret consists primarily of prairie dog towns. No prairie dog towns exist within the permit area, but several occur adjacent to the area, south of the permit boundary. The prairie dog town in the SW 1/4 of Section 6, T.43N., R.69W. was first noted in 1987 and consisted of only 12 burrows and two live prairie dogs. No activity was observed at this small town in 1989 or 1990. This town is located over one mile from any other prairie dog town and is not considered suitable habitat for ferrets. No black-footed ferrets have been documented in these areas during baseline surveys. Correspondence with the Wyoming Game & Fish Department revealed that a black-footed ferret team from their department surveyed the large prairie dog town south of the permit area on January 30, 1987. At that time biologists from several agencies surveyed about 400 acres and found no sign of ferrets.

It is not anticipated that mining in the proposed area would impact any threatened or endangered species, or any species of high federal interest.

Other Species

Numerous other wildlife species were observed during the 1990 wildlife monitoring. Six of these species were not recorded during previous surveys. They include the grasshopper mouse, pied-billed grebe, bufflehead, common tern, long-eared owl, and downy woodpecker. The grasshopper mouse was encountered during small mammal trapping by the University of Wyoming and the downy woodpecker was found in ponderosa pine habitat east of the permit area. The long-eared owl was discussed in the Raptor portion of this report. The other species of birds associated with water, which was abundant on the study area due to above normal precipitation. Playas which had not held any appreciable water in seven years were full. This resulted in an abundance of waterfowl on the study area and some waterfowl production was recorded.

There is currently a two to three year study being conducted by the Cooperative Wildlife Research Unit at the University of Wyoming, which is intended to evaluate the wildlife associated with reclaimed surfaces on active coal mines in the Powder River Basin. The preliminary survey work is being conducted on the Jacobs Ranch Mine and the initial report has been completed and it addresses the relationship between native and reclaimed habitats as reflected by the presence (or absence) of small mammals and breeding birds. This study should help to demonstrate the effectiveness of the reclamation on coal mines in the Powder River Basin.

7. CULTURAL RESOURCES

Two cultural inventories have been conducted within the proposed lease tract: Frontier Archaeology (Welch and Nash 1988) surveyed a strip 900 feet wide along the south township line in T. 44 N., R. 70 W., Sections 33, 34 and 35; and Frontier Archaeology (Welch and Rosenberg 1990) surveyed the N1/2 and N1/2 S1/2 of the three

sections (Sections 33, 34 and 35). This leaves a discrepancy of a narrow strip of unsurveyed ground approximately 500 feet wide, by the length of the tract, or approximately 3 miles. This discrepancy is apparently the result of the 1988 survey unit having been inventoried as a buffer to the existing Jacobs Ranch Mine, while the more recent survey was conducted along legal subdivisions. Prior to issuance of the mine permit, it will be necessary to inventory the unsurveyed portion to Class III inventory standards. A Class III survey is a professionally conducted, intensive inventory of a target area, designed to locate all cultural properties which have surface and exposed profile indications. Cultural properties are recorded, and sufficient information collected on them, to allow evaluation of National Register significance by the managing federal agency in consultation with the State Historic Preservation Officer (SHPO). A total of seven cultural properties or sites are presently recorded in the proposed lease tract: 2 prehistoric lithic sites, 3 historic homesteads, one stock camp and one historic dump. None of the known properties is presently considered eligible for the National Register. While no eligible properties are known to occur, consultation with the SHPO cannot be completed until the unsurveyed strip has been inventoried.

After completion of the inventory and the final inventory report, the BLM in consultation with the Wyoming State Historic Preservation Office, will make final eligibility and effect determinations for all sites located within the inventory area. If any sites are found to be eligible for the National Register of Historic Places and cannot be avoided, then appropriate mitigation measures will be developed and implemented in accordance with 36 CFR 800 and other appropriate guidelines. The BLM has reviewed and concurs with the content and findings contained in the technical report.

8. VISUAL RESOURCES

For management purposes, the BLM conducts an inventory that evaluates visual resources on all land under its jurisdiction. Once inventoried, these lands are classified into various management classes. These classification ratings range from 1 to 5 as follows:

1. Class 1 - Natural ecologic changes and very limited management activity is allowed. Any contrast (activity) within this class must not attract attention.

2. Class 2 - Changes in any of the basic elements (form, line, color, texture) caused by an activity should not be evident in the landscape.

3. Class 3 - Contrasts to the basic elements caused by an activity are evident but should remain subordinate to the existing landscape.

4. Class 4 - Activity attracts attention and is a dominant feature of the landscape in terms of scale.

5. Class 5 - This classification is applied to areas where the natural character of the landscape has been disturbed to a point where rehabilitation is needed to bring it up to the level of one of the other four classifications.

When development is proposed, the degree of contrast between the proposed activity and the existing landscape is measured. This is called a contrast rating. In this process, various factors such as form, line, color, texture variety, contrast and lighting are evaluated.

The proposed lease area is remote and relatively inaccessible. It does not contain any unique or notable visual resources. The lands in the proposed area are generally classified as VRM Class 4 with some Class 5 within the eastern portion of the tract. Mining activity would not encounter any visual classification that would prohibit or restrict surface coal mining. Contrast would remain virtually unchanged.

The need to remove overburden, stockpile it, extract coal and construct facilities requires a major modification of landforms in coal lease areas. These impacts are already occurring extensively as a result of several surface mining operations. The additional cumulative increment, when compared to the general visual classification adjacent to the mines, is negligible. The duration of this impact varies from one to several years. However, stringent reclamation guidelines require that these lands be restored back to their pre-mine character to the extent practicable.

9. NOISE

An individual's judgement of the loudness of a noise correlates well with the A-weighted sound level (dBA) system of measurement. The A-weighted sound level, or A-scale, has been used extensively in the U.S. for the measurement of community and transportation noises. Table 2 relates A-scale decibel readings to equivalent sounds of daily life. The existing noise sources in the proposed lease area are wind, coal mining activities and limited agricultural activities. From these sources, the current noise level is estimated to be in the range of 30 to 45 decibels, depending on time of day and location. Mining in the immediate area will increase the noise level to a range of 85 to 95 decibels where actual operations are occurring.

There have been no notable off-site noise impacts from the existing operations. The proposed lease is also more remote from public access than the existing operations. The nearest residence is about 3/4 mile from the proposed lease area and is owned by the Jacobs Ranch, a Kerr-McGee subsidiary which operates the agricultural portion of the business on the undeveloped and

TABLE 2

How it Feels	Equivalent Sounds	Decibels	Equivalent Sounds	How It Sounds
Near permanent damage level from short exposures	*50 hp. siren (100 ft.)*		*Jackhammer*	**135dB(A)** Approx. 64 times as loud as 75dB(A)
	Jet engine (75 ft.)	130	*Chainsaw*	
	Turbo-fan jet at takeoff power (100 ft.)		*Firecracker (15 ft.)*	
Pain to ears		120	*Rock and roll band*	**125dB(A)** Approx. 32 times as loud as 75 dB(A)
	Scraper-loader		*Unmuffled motorbike (2-3 ft.)*	**115dB(A)** Approx. 16 times as loud as 75dB(A)
Uncomfortably loud		110		
			Car horn	
Discomfort threshold	*Jet fly over (1,000 ft.)*		*Unmuffled cycle (25 ft.)*	**105dB(A)** Approx. 8 times as loud as 75dB(A)
	Noisy newspaper press	100		
Very loud	*Air compressor (20 ft.)*		*Garbage trucks and city buses*	**95dB(A)** Approx. 4 times as loud as 75dB(A)
Conversation stops	*Power lawnmower*	90		
	Steady flow of freeway traffic		*Diesel truck (25 ft.)*	
Intolerable for phone use	*10-HP outboard motor*		*Garbage disposal*	**85dB(A)** Approx. 2 times as loud as 75dB(A)
	Automatic dishwasher	80	*Food blender*	
Extra auditory physiological effects	*Vacuum cleaner*		*Muffled jet ski (50 ft.)*	**75dB(A)**
		70	*Passenger car, 65 mph. (25 ft.)*	
	Window air conditioner outside at 2 ft.		*Busy downtown area*	
	Window air conditioner in room	60		
Quiet	*Occasional private auto at 100 ft.*		*Normal conversation*	**55dB(A)** Approx. 1/4 as loud as 75dB(A)
		50		
Sleep interference	*Quiet home during evening hours*			**45dB(A)** Approx. 1/8 as loud as 75dB(A)
	Bird calls	40		
	Library			**35dB(A)** Approx. 1/16 as loud as 75dB(A)
	Soft whisper 5 ft.	30		
		20	*In a quiet house at midnight.*	
	Leaves rustling	10		

Danger to hearing

Very quiet

Decibel levels of sounds you're most likely to encounter in A-scale numbers.

Adopted From ABC's of Our Noise Codes, published by Citizens Against Noise, Honolulu, Hawaii.

reclaimed mine land. The next nearest residence is several miles away. The Wyoming DEQ Land Quality Division mine permit regulates blasting noise and vibration from a mine within 1/2 mile of the mine permit boundary. Thus, it is unlikely that noise impacts at the nearest public access or neighbor would be significant. Potential onsite noise impacts to workers are regulated by MSHA. Since no workers will be housed at the mine site, compliance with the work-related hearing conservation programs of MSHA is sufficient to insure impacts to workers on the proposed lease area will be minimized.

10. CLIMATE AND AIR QUALITY

The climate of this area is dry continental temperate. The temperatures can be extreme both in summer and winter, though winters are somewhat milder than higher elevation areas of the state. The maximum temperature recorded in Gillette was 103°F. The minimum temperature was -33°F. Average temperature is a cool 45°F. The average annual precipitation is 15.6 inches with 48% occurring during the months of April, May and June. Only about 15% of the precipitation occurs as snow.

The air quality of the area is generally good with average annual particulate concentrations of 15 micrograms per cubic meter (ug/m^3) (average annual geometric mean for total suspended particulates, TSP). The Jacobs Ranch Mine was cited once for an exceedence of the particulate standard in 1989 at a monitor near the active mining area. This elevated particulate level was resolved by increased emhpasis on the road watering program at the mine. More detailed descriptions of the climate (SAI, 1980) and air quality (PEDCO, 1983) of the area have been produced for the BLM as well as those contained in the Buffalo Resource Area Resource Management Plan. The air quality standards which apply to coal mining are listed in Table 3. The large areas of disturbed land, crushing and loading of coal, and blasting associated with mining, all produce dust which make the particulate standards the most important for regulation of this industry. The current particulate standards in Wyoming are for an annual average of 50 ug/m^3 and 24-hour average of 150 ug/m^3 both for particulate matter 10 micrometers and less in diameter (PM10) and a 24-hour average of 150 ug/m^3 for TSP. The 24-hour standards are not to be exceeded more than once per year. The various motor vehicles used in mining and transport of coal and people also produce carbon monoxide, nitrogen oxides, sulfur dioxide and by secondary processes, ozone, though these are seldom at a level to cause regulatory concerns for a single mine.

The preferred alternative for this action is the sale of a coal lease for continuation of an existing mining operation. It is expected that the development of this lease will be as an extension to the productive life of the existing mine. In this case, the mining will continue in the original pit at approximately the current rate, the pit will just be continued into the new area. This preferred alternative is also in contrast

TABLE 3
CRITERIA AIR POLLUTANT STANDARDS FOR WYOMING

Pollutant	Averaging Period	Wyoming Standard (ug/m3)	National Standard (ug/m3)
TSP	24-hour	150	---
PM-10	24-hour	150	150
	annual	50	50
NO_2	annual	100	100
O_2	1-hour	160	235
SO_2	3-hour	1,300	---
	24-hour	260	365
	annual	60	80
CO	1-hour	40,000	40,000
	8-hour	10,000	10,000

Standards not to be exceeded more than once per year.

to providing more area to the existing mine so that it can produce more coal over the same expected lifetime, thus greatly increasing the mining rate.

In the near term, the sale and development of this lease according to the preferred alternative is expected to produce only minor changes in air quality compared to alternative developments, though it would have greater impact than the no action alternative. In the long term, this development could extend the period of air quality impacts over a longer duration than the other development alternatives.

At the current mining rate of 16.8 million tons of coal per year, particulate monitoring has shown that air quality standards in 1990 for the Jacobs Ranch Mine including the recent I-90 expansion area have not been exceeded. For operating mines, compliance with these standards at the mine permit boundary (i.e. the ambient air) is required by the Air Quality Permit issued by the Wyoming Department of Environmental Quality, Air Quality Division (WDEQ/AQD), under the oversight authority of the federal Environmental Protection Agency (EPA). The highest annual PM10 measurement relatively near an active mining area was 22 ug/m^3 (compared to the standard of 50 ug/m^3). The highest 24-hour TSP concentration was 122 ug/m^3 (compared to the standard of 150 ug/m^3). This station, which has been designated by the Wyoming DEQ with the concurrence of Kerr-McGee, as the official monitoring site, is actually located well inside the mine permit area and relatively near active mining activities. There is a backup monitoring station for TSP located nearer to the permit boundary about a half mile to the southeast. The maximum daily value at this monitor was only 67 ug/m^3. These monitoring results indicate that continued mining at the current rate on the existing mine is in compliance with the air quality standards. The rapid decrease of TSP from 122 to 67 within half a mile indicates a considerable margin for compliance with the air quality standards for TSP at the permit boundary. While PM10 would not be expected to drop off as rapidly, it is already well below the standard because of the smaller proportion of small-sized particles produced by mining activities. Previous modeling described in a report by TRC Environmental Consultants, Inc., completed on April 1, 1987 and amended on January 21, 1988, indicated the mine should be in compliance with the annual TSP standard for up to 25 million tons per year of coal production. These standards are maintained by the implementation of Best Available Control Technology for dust control. This includes baghouses for the coal crushing facility and extensive watering of haul roads, plus use of chemical dust supressants. While the existing coal mine has an impact on air quality, by maintaining emissions and ambient concentrations well within the standards, these impacts are considered acceptable.

The Air Quality Permit would have to be modified to authorize expansion of mining to the proposed lease area. The analysis of emissions for this permit modification should be similar to the

previous analysis for the existing mining activities since the scope and magnitude of operations would be substantially the same. According to the BLM Geologic Report for the proposed lease, the average stripping ratio is 2.46 cubic yards per ton of coal compared to 2.65 for the existing mine. The average coal thickness is 54.5 feet compared to 56 feet for the existing mine. The haul distance from the proposed lease to the crusher is a maximum of 5 miles compared to a maximum of 4 miles for the existing operations. Thus, the sources of emissions are of nearly the same magnitude for the current and the proposed mining operations. The only source of emissions which is substantially different is the haul road distance. With the same distance to the permit boundary, the modeling results should give essentially the same ambient concentrations. The actual modeling results for the new Air Quality Permit will probably vary somewhat since the model used in the past (Climatological Dispersion Model - Wyoming) is no longer accepted by the EPA for regulatory purposes and another model will be used (Industrial Source Complex). Modeling will also be required to address the PM10 standard which did not exist when the previous permit was issued. The WDEQ/AQD has indicated that from their recent modeling the evidence is that coal mine operations which have been shown to meet the TSP standards with the previous model will meet the PM10 standards using the currently accepted model.

Cumulative impacts between this proposed mine extension and other existing and proposed mines should actually be less than the cumulative impacts for the current Jacobs Ranch Mine and its neighboring developments. This is because the direction of development for both Jacobs Ranch (north) and its nearest neighbor, Black Thunder Mine (south and west), will increase the distance between their operations. From the previous modeling for TSP, at the current separation of approximately 5 miles, there is very little overlap of the areas within a concentration contour of 1 ug/m^3 (the EPA designated level of significance) from these two mines. The emission rate for PM10 is much less than for the larger particles. However, the smaller particles do not fall out of the air as quickly. In light of this knowledge, and the observed concentrations at the particulate monitoring stations, it is unlikely that the modeling for the air quality permit will indicate greater cumulative impacts for PM10 for this new area than the previously determined TSP impacts from the existing mine. Other mines and proposed developments are even more remote.

11. HAZARDOUS MATERIAL MANAGEMENT

All hazardous materials generated on the proposed lease area would be handled in accordance with current regulations.

12. TRANSPORTATION FACILITIES

Wyoming Highway 450 and a spur of the Burlington Northern Railroad are approximately four miles southwest from the application area. Highway 450 provides access to Wyoming Highway 59, eleven miles to the west. Highway 450 was constructed and upgraded during the

late 1970s to State of Wyoming standards to better serve as access for the coal industry. The Jacobs Ranch Mine and the Black Thunder Mine funded the initial upgrading of this highway and are currently the major users.

There are no existing public roads within the tract which would be impacted by mining activities. The preferred alternative would not result in an increase in rail traffic from the Powder River Basin.

13. SOCIOECONOMICS

The proposed lease area lies in Campbell County within the Powder River Basin in northeastern Wyoming. Major Campbell County communities include Wright, located approximately 15 miles to the west of the lease area, and Gillette, located approximately 58 miles to the north.

Gillette is the county seat for Campbell County. It is the major trade center, and the largest community within the affected area of the proposed coal lease property. It is the community within the region that is most likely to attract new area residents due to its current population level and resulting services and shopping amenities which exceed those of lesser populated communities within communting distance to the proposed lease area. It had a population of 17,635 in 1990, according to the 1990 Census, relative to a 1990 population for Campbell, County of 29,370. Campbell County ranked 6th in population among state counties in 1990. Local planners are projecting Campbell County population to rise to almost 31,000 by 1995. Wright is a smaller community of about 1,236 people.

With a total area of 4,756 square miles, Campbell County's population density was almost 6.2 persons per sq. mile in 1990, compared to an average of about 4.7 persons per sq. mile for the state. The 1990 Census placed the state's population at 453,588 in 1990.

According to the 1990 Census, Campbell Co. contained 11,538 housing units that year and Gillette 7,078. Vacant housing in Gillette is estimated to total about 549 units, excluding boarding and bunk house vacancies. (See Table 4) The overall vacancy rate is about 8%. New workers entering the area in response to any growth in the local mining sector would probably find more vacant housing in Gillette than in other surrounding communities. Current available housing in the affected area, including Newcastle, should be sufficient to accommodate over 900 additional workers, should mining activity expand.

Campbell County's economy is based largely upon coal mining, petroleum development and extraction, energy production (specifically power generation), and agriculture. Campbell County's 1989 mineral assessment equalled $1.1 billion. The 1989 state total was $3.44 billion. Coal valuation in 1989 totaled $1.17 billion for the state and $744.29 million for Campbell

TABLE 4 5/20/9

HOUSING AVAILABILITY: GILLETTE, WYOMING, 1990

UNIT	OCCUPANCY NO.	VACANCY NO.	% VACA RATE
Single Family (single homes)	3,272	188	6
Single Family Attached (townhs/duplex)	914	78	9
Multiple Family (rentals)	1,487	201	14
Mobile Homes	882	82	9
Total	6,555	549	3

Source: Gillette Housing Development-Planning, 5/17/91
Note: Boarding and bunk house vacancies are unknown.

County. Thus, Campbell County represented about 32% of the state's total mineral valuation, and almost 64% of the state's total coal valuation.

The 1989 oil production in the county was valued at over $428.84 million, compared to state output of almost $1.66 billion, or almost 26% of the state total. The 1989 gas output in Campbell County was valued at almost $26.11 million, which is almost 3.4% of the $771.21 million valuation for the entire state's 1989 production.

Campbell County produced about 136 million tons of coal in 1988, 144 million in 1989, and 155 million tons in 1990. This output equaled about 83% to 84% of the state's total coal output in those years. State output rose from 164 million tons in 1988 to 184 million tons in 1990. Most of the state's increase occurred in the Powder River Basin. The Jacobs Ranch Mine of the Kerr-McGee Coal Corp. produced over 14.53 million tons of surface coal in 1988, almost 14.66 million tons in 1989, and over 16.72 million tons of coal in 1990. See coal production and forecasts for selected years on Table 5.

There were 2100 producing oil/gas wells in Campbell Co. in 1989. Oil production in Campbell County totaled between 25 million and 25.5 million Bbls. in 1988 and 1989. Gas production in the county totaled over 22.4 MMCF in 1988 and over 19.8 MMCF in 1989. Estimates place the County's gas production at 28 MMCF in 1990. By comparison, the state produced a total of about 111.21 million Bbls of oil in 1988 and 100.35 million Bbls in 1989. It produced over 471.36 MMCF of gas in 1988 and 621.50 MMCF in 1989.

Employment in Wyoming's coal mining industry totaled 4,809 in 1988 and 4,897 in 1989. State employment in the oil/gas sector reached 9,900 in 1989. The latest county employment data specified in this report is for 1988 and it indicates that the total mining sector of Campbell County employed about 4,666 full and part-time employees in 1988. The Jacobs Ranch Mine employed 371 persons in 1988 and 366 in 1989, according to Wyoming Geo-Notes No. 26. The Office of the State Inspector of Mines indicates that Wyoming's coal mining sector employed 4623 persons in 1990 of which Campbell County employed 2590. The Jacobs Ranch Mine employed 367 employees in 1990.

The Wyoming Income and Employment Report, Nov. 1990, shows that the County's agriculture sector employed between 600 and 750 in 1988. Total employment in the County in 1988 was 17,242.

Labor force data for selected years are presented in Table 6.

Personal income in Campbell County totaled almost $473.36 million in 1987 and $489.57 million in 1988. This represented a 6.06% decrease from 1986 and a 3.42% increase from 1987 to 1988. State personal income for those years totaled about $6.28 billion and $6.58 billion, respectively, which is a 2.70% decrease and a 4.78% increase from the previous years. In 1989 state income rose to

TABLE 5

COAL PRODUCTION: HISTORIC AND PROJECTED 5/17/9

YEAR	WYOMING million tons	CAMPBELL CO. million tons
1988	163.6	135.7
1989	171.1	143.8
1990	184.0	154.7
1991	187.6	157.4
1992	196.4	164.8
1993	205.0	172.4
1994	214.0	181.1
1995	223.4	150.1

Source: The Geological Survey of Wyoming, Laramie, Dick Jones, Interview with Bill McNally on 5/16/91.

TABLE 6 5/17/91

LABOR FORCE FOR SELECTED YEARS: WYOMING PLUS CAMPBELL & WESTON COUNTIES

YEAR	WYOMING no.	CAMPBELL no.	WESTON no.
1980	235,000 1/	14,430 1/	3,242 1/
1985	250,000 1/	18,592 1/	3,532 1/
1990	246,000 2/	16,504 2/	3,299 2/

Sources:

1 Employment Security Commission of Wy., "Wyoming Labor Force", Research & Analysis, 3/1989, Casper

2 Wyoming Dept. of Employment, "Wyoming 1990 Laus Estimates", 2/2/91, Casper.

over $6.88 billion, a 4.64% increase over 1988. (The percentages are calculated on the non-rounded data base by the State of Wyoming.) In Campbell County, income earned from all mining (including oil extraction) totaled over $193.70 million in 1987 and almost $204.75 million in 1988. Earnings in the County's agriculture sector was between $5 million and $6 million in both 1987 and 1988.

By comparison, earnings by place of work for the state totaled almost $4.59 billion in 1987, $4.76 billion in 1988, and $4.87 billion in 1989. Earnings from coal mining amounted to about $238.57 million in 1987, $251.02 million in 1988, and $257.15 million in 1989. Earned income from oil and gas extraction state wide was about $319.17 million in 1987, $333.72 million in 1988, and $318.52 in 1989. The state's agricultural sector produced earnings of over $100 million in 1987, over $124 million in 1988, and between $66 million and $67 million in 1989.

The state's per capita income averaged $12,868 in 1987 and $13,641 in 1988. In these same years, Campbell County per capita income averaged $14,123 and $14,927, respectively.

See a listing of local disbursements in Table 7.

In 1990, school district 1 in Gillette employed about 439 full time classroom teachers, had a 1990 fall enrollment of 7,759 pupils, which resulted in a pupil/teacher ratio of 17.67. According to the Wyoming Dept. of Education, this pupil/teacher ratio is good. The state is striving to have average pupil/teacher ratios in the state at about 15/1 to 16/1. The Dept. also indicated that Gillette has the finances to accommodate additional students that might result from mine expansion in the area. This district had 15 elementary, 5 junior high and middle schools, and 3 high schools in 1990.

According to "Uniform Crime Reporting", 1989, by the Office of the Attorney General, State of Wyoming, Campbell County employed 73 law enforcement officers. Of these, 35 worked in Gillette.

The 1990/91 Wyoming Medical Facilities Directory indicated that Gillette has a 119 bed/20 bassinet hospital. It also has an 8 bed capacity boarding home and a 152 bed nursing & convalescent home.

The Gillette fire department employed 9 firefighters who were assisted by 50 volunteers in 1990. The department estimates that by 1995 it will employ only 7 firefighters who will be assisted by 50 volunteers.

Gillette's water capacity was 9.0 million gallons per day (MGPD) and its sewage capacity 2.3 (MGPD) in 1990. By 1995, these capacities are projected to increase to 10 (MGPD) and 3.85 (MGPD), respectively.

TABLE 7

5/17/91

LOCAL DISBURSEMENTS: CAMPBELL CO. & GILLETTE 1/

YEARS	CAMPBELL 1000 $	GILLETTE 1000 $	SCHOOL DIST. 1000 $
1980		15,721.0	35,885.2
1985		30,415.0	62,261.0
1990	158,639.9	29,717.0	59,715.9
1995	133,973.4	33,000.0	62,700.0

1/ Figures for 1980, 1985, and 1990 are actual expenditures as reported by local entities. Includes debt servicing.

Source: Kerr-McGee version of EA.

Weston County lies just east of the lease area and its countyseat of Newcastle is located in a communiting distance of about 55 miles east of the lease area. It has a population of about 3,003. According to Weston County Development in Newcastle, this community has 3,641 housing units of which 373 are vacant. See Table 8.

Weston County has only about 8,388 people and is 15th in the state relative to population. It has 3.48 persons per square mile. Weston County developed on coal, cattle and the railroad. It had an oil boom in the 1920's and 1950's and another up surge in the 1970's, but the drop in oil prices in the 1980's resulted in an economic down turn and out migration of population in the late 1980's.

In 1989, oil production in Weston County totaled 1.41 million Bbls from 1,592 wells. This represented about 1.6% of the state's total oil production. The value of this output was estimated at $26.7 million. Gas production that year totaled 1.5 MCF, valued at $2.9 million. The total value of all minerals produced in 1989 was $30.2 million.

In 1990, Weston County had a labor force of 3,299. During 1990, employment averaged 3,115 with an unemployment rate of 5% to 6%.. In 1988, total earned income within the county amounted to $38.2 million with mining as the leading indutry, followed by services and transportation/utilities. In 1987, per capita personal income totaled $12,413, rising to $13,917 in 1988.

With regard to education, Weston has a total of 7 schools; 4 are locate in Newcastle and 3 in Upton. There are about 109 full time teachers employed by the county (76 are in Newcastle). The pupil/teacher ratio is 14.44 in Newscastle and 11.45 in Upton. This would indicate that the schools are well within the pupil/teacher ratios that the state of Wyoming desires. See above statement on this in Campbell County discussion.

Newcastle has a 28 bed/6 bassinet capacity hospital, one 27 bed boarding home, and a 41 bed nursing home.

According to "Uniform Crime Reporting, Crime In Wyoming, January through December 1989", Weston County employed 16 police officers in 1989. Eight of these were in Newcastle.

The area being considered in this EA, like many other areas of the state, suffered from the decline in energy demand during the 1980's; therefore, it is not expanding as rapidly as had been projected earlier by various state planners. However, the above information would indicate that Campbell County experienced an upward movement in mining activity and related earnings in the late 1980's and that both Campbell and Weston Counties were above the state average in per capita income. It can be assumed that any increase in the demand for the area's energy related resources will further the area's economic growth.

TABLE 8

5/22/91

HOUSING AVAILABILITY: NEWCASTLE, WYOMING, 1990

UNIT	OCCUPANCY NO.	VACANCY NO.	% VACANCY RATE
Single Family (single homes)	2,376	144	6
Single Family Attached (townhs/duplex)	2	0	0
Multiple Family (rentals)	481	109	23
Mobile Homes	739	108	15
Senior Housing	43	12	28
Total	3,641	373	10

Sources: Jan. 1991, Wyoming Div. Of Economic and Community Development, Chey
Weston County Development, Newcastle, Wy., Donna Bunch, Interview 5

If Kerr-McGee acquired the proposed coal lease, the lease would be mined as part of the existing Jacobs Ranch mining operation. A new Mine and Reclamation Plan would be developed to show a logical mining sequence from both pits into the newly acquired lease. Coal from the 3 leases would be blended as required to meet coal quality needs for given contracts, and Kerr-McGee estimates that the total volume of coal mined each year from the Jacobs Ranch Mine would average about 16.8 million tons. This is the volume currently being produced annually by the mine.

The additional lease would enable the Jacobs Ranch Mine to continue this level of production for approximately 8 years longer than would be possible under the current mine situation. This means that the mine would continue operating until 2012 unstead of 2004 as expected under the No Action Alternative. Kerr-McGee estimates that coal from the new lease would start to be incorporated into its annual production within 2 years after receiving the lease.

If granted, the new lease would add close to 132.7 million tons of recoverable coal to the Jacobs Ranch Mine operation. The price of long-term contracted coal is estimated at $4.00 per ton over the life of the mine. Therefore, under Alternative 1, Jacobs Ranch Mine would yield about $67.2 million in coal output annually, the same as with the No Action Alternative. However, over the 21 years of mine life the total revenue from coal produced would be $1.41 billion, up about $536.4 million from the value under the No Action Alternative. Applying an economic minerals multiplier of 1.796 to these output values, the annual total economic impacts (direct, indirect and induced) to the local area would be $120.7 million, the same as the No Action Alternative. The total economic impact to the area from the 21 years of mine operation would reach $2.53 billion, up about $966 million from the No Action Alternative.

Annual employment by the Jacobs Ranch Mine under this alternative will continue to average about 365 to 375, resulting in annual wages to mine employees of between $16.42 and $16.65 million per year, the same as under the No Action Alternative. However, over the 21 year life of the mine under this alternative, direct wages would total between $345 million and $350 million. This is over $130 million more in wages than under Alternative 2. These expenditures are already included in the total economic impacts specified above for this alternative and should not be considered additional to them.

The level of mine operations under this alternative would not create any boomtown effects because annual output, as well as labor and wage levels, is not expected to change from current levels. Only the life of the Jacobs Ranch Mine would change under this alternative, expanding by 8 years.

After the mine reserves are exhausted in 2012, there would be the same annual economic losses to the employees and the affected area as specified under Alternative 2. The difference would be that

these losses came 8 years later after producing 8 additional years of related income, royalties, disbursements and taxes.

14. CUMULATIVE IMPACTS SUMMARY

Under the Preferred Alternative, most of the impacts encountered will be restricted to the area applied for. Most impacts will be short-term in nature and will be mitigated wherever possible. Past reclamation practices at the adjacent mine have been successful in restoring vegetation as well as grazing and wildlife habitat to pre-mining conditions. Topographic elevations will permanently change as a result of the removal of the coal seam. The reclaimed landform will be similar in appearance to the pre-mining area. Even though there are five other mines in the general area (Figure 5) the cumulative impacts to air quality, noise, wildlife, and groundwater are not expected to change from the existing situation. This is because there will be no increase in coal production, which equates to no increase in surface disturbance. Also, reclamation will proceed at approximately the same rate which means that wildlife habitat and aquifers will be restored at about the same rate they are removed, hence there will be no net loss.

D. No Action Alternative.

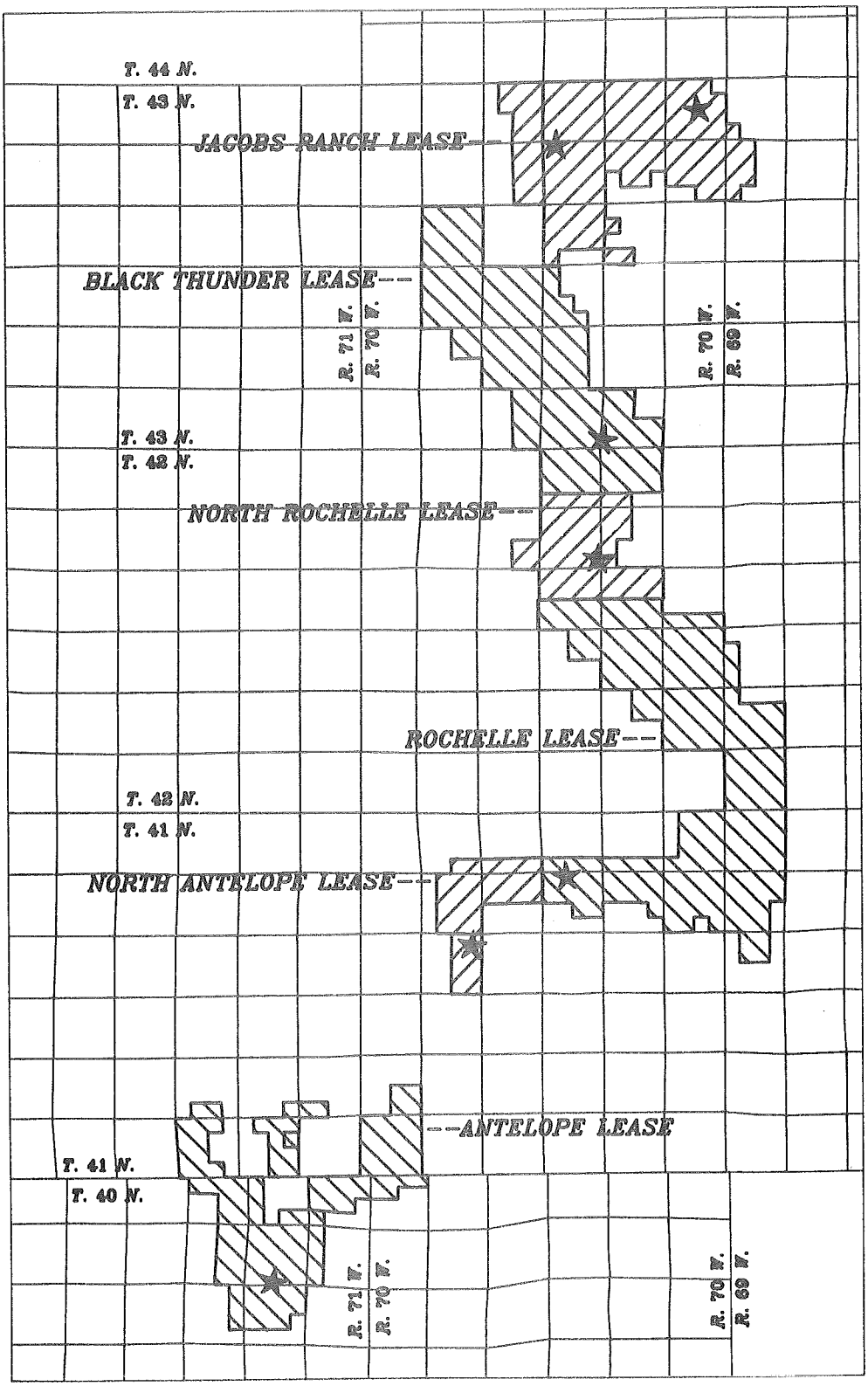
Under this alternative, the Jacobs Ranch Mine operation would remain within the boundary of its present 2 leases. Production would continue at current levels of about 16.8 million tons of coal per year until the recoverable reserves are exhausted in 2004.

The price of long-term contracted coal is estimated to average about $4.00 per ton for the term of this analysis. At this price, annual production will yield about $67.2 million in direct annual coal revenues and about $873.6 million of direct revenue over the remaining 13 years. Applying an average economic multiplier for minerals of 1.796 (provided by the Extension Service, University of Wyoming) to the $67.2 million of annual direct revenues, reveals total economic impacts (direct, indirect and induced) to the area from this level of coal sales of about $120.7 million per year, and about $1.57 billion over the 13 year life of the mine.

Of the total gross value of coal output received by mines from coal sales, 1/8th is returned to the Federal Government in royalties. Of this 1/8th, the State of Wyoming receives 50%. Of this 50%, the cities and towns receive 7.5%. Therefore, for every $67.8 million per year of coal sales from the Jacobs Ranch Mine, $8.4 million is returned to the Federal Government in royalties. The Federal Government distributes $4.2 million back to the State which, in turn, gives $315,000 back to local cities and towns in the coal producing area.

Ad valorem and severance taxes are also paid by the mine to the State of Wyoming, but these do not return to the local area as such. Revenues from sales and use taxes related to coal output are realized by the State. Some of these revenues are redistributed to the local

CURRENT MINE FEDERAL LEASE BOUNDARIES



SCALE 1: 175000.

★ APPROXIMATE CURRENT MINE PIT LOCATIONS

MINES>MOSS-LB>M.EA.LB.JR
NANCY06958 15:43
06/03/91

FIGURE 5

6/ 3/91 15:38:10

communities, with the amounts of these redistributions being determined by state laws and policies.

Annual employment by the Jacobs Ranch Mine under this alternative will continue to average about 365 to 375 per year. Annual wages per employee are reported to be about $45,000. Applying this to total annual employment results in total wages paid by the mine operation of between $16.43 million and $16.65 million per year. Over the 13 year life of the mine this would amount to between $214 million and $216 million in total wages. These wage expenditures are included in the total economic impacts specified above, and should not be considered additional to them.

Under this alternative, after 2004 there would be a loss of about 365 permanent jobs and related income, a decrease in royalty payments received by the Federal Government, a loss in the related disbursements to county and local entities, and a reduction in sales and use taxes related to coal production from the Jacobs Ranch Mine. There would also be a negative impact on the housing market in the commuting area and on the indirect and induced economic benefits to the local business community that result from the current Jacobs Ranch Mine operation.

If there is expansion to other mineral related operations in the affected area, including oil and gas production during the years prior to or subsequent to the mine closure, this may help to mitigate these potential impacts. The potential for oil and gas development exists in Crook and Campbell Counties. However, this expansion is speculative at the present time.

IV. MITIGATION MEASURES AND RESIDUAL IMPACTS

If the proposed lease is developed, approximately 132 million tons of coal would be irretrievably and irreversibly lost as a resource for future generations. This loss would be mitigated by the Federal and State government revenues generated for present day citizens and by the beneficial use of the coal by electric utilities to meet current national energy needs. Moreover, the amount of the coal resource involved is very small compared to the remaining available coal resources in Wyoming and in the nation.

Considering the demonstrated successful reclamation experience at the adjacent Jacobs Ranch Mine, short-term minimal environmental impacts would be incurred during mining, but long-term post-mining improvements such as improved pasture and water impoundments would be developed. The topography would be permanently flatter and more uniform. The geology would permanently be modified by removal of the coal and mining of the overburden; however, current evidence indicates this may improve groundwater availability to some extent. These aspects do not represent significant concerns relative to irretrievable and irreversible commitments of resources.

PERSONS OR AGENCIES CONSULTED

A. BUREAU OF LAND MANAGEMENT

Mike Karbs	Associate District Manager,
Don Whyde	Assistant District Manager,
Glen Nebeker	Planning/Environmental Coordinator
Jude Carino B.J. Earle Ray Leicht	Archeologists
Barbara Pitman Nancy Doelger	Geologists
Larry Apple Dave Roberts	Wildlife Biologists
Pat Moore Jon Johnson	Realty Specialists
Carl Santmyer Bill McNally Roy Allen John Young	Economists
Joe Meyer Cliff Fanning	Soils Scientists
Mike Brogan	Hydrologist
Mike Sestak	Air Quality Specialist
Suzanne Mehlhoff	Petroleum Engineer
Gene Jonart	Coal Coordinator
Vern Rulli	Mining Engineer

B. KERR-MCGEE COAL CORPORATION

J. Clement Burdick

John W. Coleman

C. TECHNICAL CONSULTANTS

Steven Lower Kerr-McGee Corporate Hydrology	Hydrology, Geology
James Welch Frontier Archaeology	Cultural Resources
Jim Orpet Intermountain Resources	Soils, Vegetation and Wildlife
Clifford F. Cole TRC Environmental Consultants	Air Resources

REFERENCES

Boulder Exploration Group

1989: "Powder River Basin Coal Supply and Demand 1990 Update", BXG Incorporated, Boulder, Colorado, November 1989

Bureau of Land Management

1979: "Final Environmental Impact Statement Eastern Powder River Coal Basin of Wyoming." Washington, D.C. 1979.

1980: "Amendment to Wyoming Land Use Decisions: Eastern Powder River Basin Area Management Framework Plan: Gillette Review Area." Casper, Wyoming, 1980.

1981: "Powder River Region Coal Final Environmental Impact Statement." Casper Wyoming, BLM Casper District Office, 1981

1983: "Powder River Coal Regional Tract Summaries." Cheyenne, Wyoming, 1983.

1983: "Affected Environment: Technical Report on Air Quality in the Powder River Coal Region," PEDCo Environmental Inc. for Bureau of Land Management, Casper, WY, 1983.

1984: "Draft Environmental Impact Statement for Round II Coal Lease Sale in the Powder River Region." Casper, Wyoming, 1984.

1984: "Environmental Assessment for Exchange of Coal Leases in Campbell County, Wyoming (I-90 Exchange WY-061-4-201)". Casper BLM, November, 1984.

1985: "Buffalo Resource Area, Resource Management Plan (RMP)", October 5, 1985.

1990: "Coal Bed Methane Environmental Assessment, Eastern Campbell County and Western Johnson Counties, Wyoming WY-061-0-EA064", Casper BLM, March 1990 (for part of the socioeconomic data).

1990: "Geologic Report of the Jacobs Ranch Lease Application Area," by Barbara A. Pitman, Bureau of Land Management, Casper, WY, 1990.

Bureau of Census

1989-90: "Current Population Reports, Population Estimates and Projections Series P-25, No. 150, State Population and Household Estimates," by Edwin Byerly, U.S. Dept. of Commerce, July 1989.

Frontier Archaeology

1990: "Class III Cultural Resource Survey for Bypass Lease and Buffer Area for Kerr-McGee Coal Corporation," by James Welch, Frontier Archaeology, Worland, WY, 1990.

Intermountain Resources

1989: "Soils Inventory, Bypass Lease and Buffer Area for Kerr-McGee Coal Corporation," by Jim Orpet, Intermountain Resources, Laramie, WY, 1989.

1989: "Vegetation Inventory, Bypass Lease and Buffer Area for Kerr-McGee Coal Corporation," by Jim Orpet, Intermountain Resources, Laramie, WY, 1989.

1990: "Annual Wildlife Monitoring Report - Jacobs Ranch Mine - Kerr-McGee Coal Corporation," by Jim Orpet, Intermountain Resources, Laramie, WY, July 1990.

1990: "Kerr-McGee Coal Corporation - Jacobs Ranch Mine - W3 Area 1988, 1989 and 1990 - Reclamation Success Study", Intermountain Resources, Laramie, Wyoming, November 1990

Kerr-McGee Coal Corporation

1989: "Jacobs Ranch Mine Permit" issued by Wyoming Department of Environmental Quality - Land Quality Division to Kerr-McGee Coal Corporation, 15 Volumes including Mine and Reclamation Plan with Supporting Appendices, 1989.

McGraw Hill Incorporated

1991 "Coal Week", Volume 17, November 16, 1991; April 22, 1991

State of Montana

1970-1990: "Department of Natural Resources and Corporate Tax 1970-1990", Coal Severance Tax and Resource Indemnity Trust Tax Quarterly Returns, State of Montana, Billings, Montana

State of Wyoming

1970-1990: "State Inspector of Mines 1970-1990", Annual Reports of the State Inspector of Mines, Office of the State Inspector of Mines, Rock Springs, Wyoming

1984-89: "Campbell County Treasurers Abstract Statement 1984-1989," Office of State Examiner.

1989: "Wyoming Oil and Gas 1989," Wyoming Oil and Gas Conservation Commission, Casper, WY, 1989.

1989: "Wyoming Annual Planning Report Fiscal Year 1989" by Michael J. Paris, Wyoming Employment Security Commission, 1989.

1989: "City of Gillette, Wyoming, 1989-90, Land Use Inventory, Volume I, Housing and Demographic Estimates," by David R. Spencer, Thomas O. Langston, and Barbara Brose, State Department of Community Development, 1989. 05/17/91 interview

1989: "Wyoming Data Handbook, 1989", Wyoming Department of Administration and Fiscal Control, Division of Research and Statistics, 1989

1989: "Statistical Report Seris No. 1, 1989 School District Propoerty Valuations, Mill Levies and Bonded Debt", Wyoming State Department of Eduaction, Cheyenne, Wyoming

1989: "Uniform Crime Reporting, 1989, Crime in Wyoming, January through December 1989", State of Wyoming, Office of the Attorney General

1990: "The Wyoming Income and Employment Report, Nov. 1990", Department of Administration, November 1990

1990-91: "Wyoming Medical Facilities Directory", Wyoming Division of Health and Medical Services, Cheyenne, Wyoming

1990: "Wyoming 1990 LAUS Estimate", Wyoming Department of Employment, Casper, Wyoming

1990: "Statistical Report Series No. 2-1990, School Districts Fall Report of Staff, Teacher/Pupil/Schools and Enrollments", Wyoming State Department of Education, Cheyenne, Wyoming, 1990

State of Wyoming (cont.)

1990: "Wyoming 1989 Mineral and Energy Yearbook," by Dale S. Hoffman and Angie, LaBor, Wyoming Economic Development and Stabilization Department, Cheyenne, WY, May, 1990.

1991: "Wyoming 1990 LAUS Estimate", Wyoming Department of Employment, February 1991

1991: Wyoming Division of Economic and Community Development, Cheyenne, Wyoming, January 1991

TRC Environmental Consultants, Inc.

1987: "Air Quality Permit Application and Impact Analysis for Jacobs Ranch Mine," by Clifford F. Cole, TRC Environmental Consultants, Englewood, CO, April, 1987.

1988: "Addendum to Air Quality Permit Application and Impact Analysis," by Clifford F. Cole, TRC Environmental Consultants, Englewood, CO, January, 1988.

U.S. Department of Commerce

1978: "The Noise of Mobile Machines Used in Surface Coal Mines: Operator Exposure, Source Diagnosis, Potential Noise Control Treatments", Bolt Beranek and Newman, Inc., Cambridge, Massachusettes, August 1978

1990: "1990 Census", Department of Commerce/ Bureau of the Census

U.S. Department of Energy

1990: "Energy Information Administration, 1990", Coal Production 1982-1989 issues, DOE/EIA-0018(89) and previous issues

U.S. Forest Service

1984: "Reclaiming Disturbed Lands", Darrell Brown, Richard G. Hallman, Missoula, Montana, November 1984

1985: "Final Environmental Impact Statement for the Medicine Bow National Forest and Thunder Basin National Grassland Land and Resource Management Plan - Appendix F", Laramie, Wyoming, November 1985

U.S. Geological Survey

1988: "Cumulative Potential Hydrologic Impacts of Surface Coal Mining in the Eastern Powder Rive Structural Basin - Northeastern, Wyoming," by Lawrence J. Martin, David L. Naftz, H. W. Lowham, and J. G. Rankl, U.S. Geological Survey, Water Resources Investigations Report 88-4046. Prepared in cooperation with Wyoming Department of Environmental Quality and U.S. Office of Surface Mining. Cheyenne, WY, 1988.

Geological Survey of Wyoming

1990: "Wyoming Geo-Notes No. 26", Geological Survey of Wyoming, Laramie, Wyoming 1990

1991: 05/16/91 interview, Dick Jones, Laramie, Wyoming

University of Wyoming

1991: 05/22/91 interview, Bret Moline, Extension Service, Agriculture Department

Weston County

1991: 05/22/91 interview, Donna Bunch, Weston County Development