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BLM Task Force 130

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KRCRA SURFACE/SUBSURFACE OWNERSHIP PATTERNS

Summary

This report is the result of the efforts of BLM's Coal Task Group 130, covering the surface/subsurface ownership patterns within Known Recoverable Coal Resource Areas.

According to 43 CFR 3525.1(b)(3)(ii), "no lands may be included in a proposed [competitive coal lease] tract unless the lands have been included in a known recoverable coal resource area (KRCRA)." Therefore, any new leasing would take place within these areas as defined by the USGS and as officially recorded on BLM's coal plats, maintained in the respective BLM State Offices.

A KRCRA is defined as an area classified by the USGS for coal leasing and containing technically recoverable coal. Criteria for minimum coal thickness, maximum coal depth, and the areal extension of drill hole and outcrop information are defined specifically for each KRCRA. In some instances the limits of KRCRAs are based on administrative boundaries such as Indian Reservations and other large areas of non-Federal coal. Since KRCRAs are established for administration of the Mineral Leasing Act of 1920 as amended, presence of some federally-owned coal is required; however, non-Federal ownership is possible, and in fact dominant in some KRCRAs.

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WATER SUPPLY SUBSURFACE OWNERSHIP PATTERNS

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## KRCRA SURFACE/SUBSURFACE OWNERSHIP PATTERNS

The following tabbed sections present the surface/subsurface ownership patterns for 40 KRCRAs by state. No data are presented for the Bull Mountains KRCRA, Montana, because the BLM color quad used for surface and mineral ownership is still under preparation as of the date of this report.

Each KRCRA report is made up of:

1. A summary table showing acreages within the KRCRA by the various surface/subsurface ownership categories. (Table 1 for each KRCRA.)
2. A discussion of location and physical features of the KRCRA.
3. A discussion of major block groupings of ownership patterns.
4. A discussion of existing and planned coal development and of the coal resource.
5. A discussion of assumptions and references used in the preparation of the KRCRA report.
6. A table summarizing the surface/subsurface ownership by each township within the KRCRA. (Table 2 for each KRCRA.)

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## KRCRA SURFACE/SUBSURFACE OWNERSHIP PATTERNS

The general procedure used to calculate the acreages shown in Tables 1 and 2 for each KRCRA was:

1. Obtain the KRCRA boundary from the USGS.
2. Plot this boundary on the appropriate BLM surface-minerals quadrangles (BLM colorquads: 1/2 inch equals 1 mile).
3. Count the surface/subsurface acreages.
4. Tally the total KRCRA acreage and compare this tally to the acreage reported by the USGS.
5. Check for errors as necessary.

Note that the total KRCRA acreage reported on Tables 1 and 2 for each KRCRA does not agree with the acreage reported by the USGS. This difference is due to this study's general assumption of 640 acres per section. The USGS acreage is based on exact acreages shown on the BLM coal plats. In all cases this error is less than 4 percent.

While the data presented in Tables 1 and 2 for each KRCRA are useful in the aggregate, they do not show the size of any contiguous block of any category. This information is critical to the formulation of any leasing policy based on a class of surface ownership.

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## KRCRA SURFACE/SUBSURFACE OWNERSHIP PATTERNS

To fill this gap, each set of color quads was perused for the number and size of contiguous blocks within the major surface/subsurface categories. This information is reported in each KRCRA narrative under the heading Ownership Patterns. Note that these discussions do not reflect acreages under Federal coal lease and Preference Right Lease Application (PRLA), nor have any blocks been examined in light of any unsuitability criteria.

The discussion presented on existing and proposed coal development within each KRCRA is based largely on information gathered by the National Coal Association. These data are published in an analysis titled "Study of New Mine Additions and Major Expansion Plans of the Coal Industry and the Potential for Future Coal Production" dated November 1977. The extent to which these mine expansions are a function of Federal action could not be determined. It was determined, however, that the NCA data was incomplete, i.e., some mine expansion plans were not shown.

The discussion of the coal resource generally includes the number, thickness, and coal rank of major coal seams or zones within the KRCRA. When a KRCRA is established, the USGS normally does not make estimates of the amount of coal reserves and/or resources within the KRCRA. Control (i.e., closely spaced drill hole and outcrop data) generally does not exist to allow for such quantitative estimates. Such control would be necessary in order to account for changing seam thickness and coal quality which can





## KRCRA SURFACE/SUBSURFACE OWNERSHIP PATTERNS

vary greatly over relatively short distances. The completion of the USGS CRO/CDP mapping program will fill this gap to a large extent.

The coal development and resources section of each KRCRA narrative reports the number and acreage of Federal coal leases and PRLAs. The issued lease data is based on a 1973-1974 survey and may change upon the receipt of the recent Departmental lease questionnaires.

Table A, immediately following presents a summary of the surface/subsurface acreages within each of 40 KRCRAs. Note that acreages of unique but insignificant ownership categories have been accumulated in the appropriate major categories. Note that copies of section-by-section tally sheets are available on request. All requests for this section detail should be directed to BLM's Office of Coal Management.

A set of one-half inch to the mile overlays showing the boundaries of the KRCRAs are under preparation and can be obtained through BLM's Office of Coal Management, beginning in June, 1978.



Table A  
KRCRA OWNERSHIP SUMMARY

KRCRA UNIT	P.D. SURFACE/ FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FED COAL	L.U. SURFACE <sup>2</sup> / FED COAL	L.U. SURFACE NON-FED COAL	FED W/DRAWAL FED <sup>3</sup> / COAL	FED W/DRAWAL NON-FED COAL	INDIAN LANDS <sup>2</sup> / FED COAL	INDIAN LANDS NON-FED COAL	GRAND TOTAL
<b>COLORADO</b>															
✓ Cimarron Ridge	3,120		10,400	4,920			2,000				80				20,520
✓ Danforth Hills	46,850	2,560	101,230	16,970							640				172,600
✓ Denver Basin			94,800	348,980	1,200	28,560					640				474,180
✓ Durango	27,750	120	58,150	70,680	2,910	20,780	53,610	3,140			480			1,120	239,740
✓ East Cortez	1,720		400	6,160		1,440									9,720
✓ Lower White River	152,320	40	13,200	4,700		3,840					2,920				177,020
McCallum	18,400	240	5,040	15,120	2,640	4,640					800				46,880
Nucla	1,880			3,080							120				5,080
✓ Paonia-Somerseset	31,560	80	65,640	22,690			94,980				600				215,550
✓ Yampa	36,970	3,640	269,300	101,675	640	40,990	2,060	640			10,965	120			467,000
<b>MONTANA</b>															
Bull Mountains															
✓ Burns Cr.-13 Mile Cr.	400	320	98,640	120,480	3,440	15,360									238,640
✓ Circle	5,680		181,240	225,760	3,360	25,160									441,200
Knowlton	120	1,460	1,840	8,280		1,680			6,000	760					20,140
Lame Jones Creek	1,640		6,320	25,320		3,240			5,720	520					42,760
Pine Hills	1,040		6,200	10,120		600									17,960
✓ Powder River Basin	193,430	60	1,046,895	443,560	21,190	107,980	434,515	3,120			2,470	1,840		1,120	2,256,180
✓ Sidney	17,800	480	103,660	159,660		3,800					18,160				303,560
✓ Wibaux Beach	4,200		96,680	70,600	80	2,280									173,840
<b>NORTH DAKOTA</b>															
✓ Bowman-Gascoyne			74,910	131,680	2,120	2,240	2,890								283,560
✓ Dickinson			80,440	310,520	320	2,240			50,490	17,710	240	1,280			398,960
✓ Knife River	640		322,600	802,890	600	27,960			4,440	1,000					1,163,040
✓ New England-Mott	40		186,970	346,680	160	9,040					3,740	4,610			564,820
✓ Ribbe			880	15,040		120			20,650	1,280					16,040
✓ Velva			3,200	17,600		120									20,920
✓ Williston-Avoca	120		42,160	18,840	440	2,880					300	290			64,030



Table A  
KRCRA OWNERSHIP SUMMARY (Cont'd)

KRCRA UNIT	P.D. SURFACE/ FEO COAL	P.D. SURFACE NON-FEO COAL	PRIVATE SURFACE FEO COAL	PRIVATE SURFACE NON-FEO COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FEO COAL	F.S. SURFACE NON-FED COAL	L.U. SURFACE <sup>2/</sup> FEO COAL	L.U. SURFACE NON-FEO COAL	FED W/DRAWAL FED <sup>3/</sup> COAL	FEO W/DRAWAL NON-FEO COAL	INDIAN LANDS <sup>4/</sup> FED COAL	INDIAN LANDS NON-FEO COAL	GRAND TOTAL
NEW MEXICO															
✓La Ventana	172,840	3,420	39,380	8,200	4,960	16,240					320	80	24,720	22,640	325,840
✓San Juan	1,007,140	23,500	165,200	89,940	19,320	115,960	7,040		32,960	80	6,900	200	269,600	74,960	1,835,350
✓Tsaya	5,320		40	240		6,200			55,480	320			39,420	34,100	85,520
UTAH															
✓Alton-Kanab	48,040	1,160	27,380	11,450	280	2,680	25,040								116,030
✓Book Cliffs	42,440	280	39,540	38,960	1,600	6,560									129,320
✓Henry Mountains	34,540			40		5,480					400				40,460
✓Kaiparowits Plateau	397,760	2,520	1,780	1,160	80	46,320	71,600	200			10,760	400			532,550
✓Wasatch Plateau	12,120		36,640	47,320	2,720	5,360	192,650	840							297,650
WYOMING															
Grass Creek	360		320	720		120									1,520
Hanna-Carbon Basin	85,493	160	6,454	116,367	760	7,343					6,649				223,226
✓Kemmerer	105,260		18,053	125,751	1,163	14,004					2,331				265,552
✓Powder River Basin	390,901	1,831	2,767,827	276,606	24,418	365,119	55,986	5,040	57,307	29,243	11,060				3,955,338
✓Rawlins (Little Snake River)	49,863	40	16,155	48,761	480	5,280	160				3,050	40			123,829
Red Desert	453,267	640	7,834	309,076	80	12,040					880				783,817
Rock Springs	430,487	120	7,739	312,905	249	18,467					4,973				774,940
TOTAL	3,781,511	42,671	6,005,137	4,689,501	99,010	950,833	942,531	12,980	233,047	50,913	71,318	8,860	333,740	133,940	17,355,992

1/ Includes BLM administered lands.

2/ Includes both USFS and BLM administered lands.

3/ Includes all Federal withdrawals regardless of agency or type except Indian withdrawals (see 4/).

4/ Includes Indian withdrawals.





Table 1

## CIMMARON RIDGE KRCRA, COLORADO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	3,120	15.20
Private	Federal	10,400	50.68
Private	Non-Federal	4,920	23.98
Forest Service	Federal	2,000	9.75
Public Water Reserve	Federal	<u>80</u>	<u>.39</u>
TOTAL		20,520	100.00



## CIMARRON RIDGE KRCRA, COLORADO

### Location and Physical Features

Cimarron Ridge is a small leasing area in the extreme north end of the San Juan mountains at the junction of Gunnison, Ouray and Montrose counties in Colorado. The largest nearby town is Montrose (population 6,500) about 20 miles to the northwest.

Cimarron Ridge, also known as Tongue Mesa, is a prominent topographic ridge with elevations ranging from about 9,000 to 11,500 feet. Storm King Mountain is a prominent landmark in the area and lies in the middle of the KRCRA. The area contains numerous small lakes and ponds, many of which are on privately owned surface underlain by Federal coal.

The area is bounded on the south by the Uncompahgre National Forest and a detached portion includes part of the Forest.

To the southwest of the main unit, a State Wildlife Area of about 1,700 acres is located with its nearest point a mile from the KRCRA.

Blue Mesa Reservoir is located about 20 air miles northeast of the KRCRA. Silver Jack Reservoir is located about 4 miles to the southeast of the KRCRA. It covers roughly 500 acres and is within a Reclamation Withdrawal.



## CIMARRON RIDGE KRCRA, COLORADO

The KRCRA area itself contains only seasonal roads, but an all weather road runs north-south along its eastern border. This road leads to U.S. 50 about 6 or 7 miles northeast of the KRCRA. U.S. 50 runs east to Gunnison, about 60 miles east, and to Montrose, about 20 miles northwest. Montrose is also served by the Denver and Rio Grande Western Railroad.

### Ownership Patterns

Within the KRCRA, 76 percent of the coal is federally owned, while only 25 percent of the surface is federally owned, of which 15 percent is BLM managed, and 10 percent is Forest Service. The Federal surface/Federal coal falls within three contiguous areas. Within the main unit of the KRCRA are two BLM surface/Federal coal areas of about 1,600 and 1,500 acres. The former includes the slopes and peak of Storm King Mountain, and the latter surrounds two privately owned lakes (private surface and private coal), and also includes about 80 acres of public water reserve around another small lake. Much of the rest of this unit is private surface/Federal coal interspersed by areas of complete private ownership. A small band of Forest Service ownership totalling about 300 acres also lies along the southern boundary of this unit.





## CIMARRON RIDGE KRCRA, COLORADO

The southern unit of the KRCRA is largely Forest Service with areas of private surface/private coal. The Forest Service/Federal coal is all contiguous in this unit and totals about 1,800 acres, which also includes two small lakes.

### Coal Development and Resources

Coal was first produced from the Cimarron Ridge KRCRA in the late 1800s, but no production has been recorded since 1948. There are two PRLAs covering 3,560 acres in the KRCRA and six issued leases covering about 12,000 acres in or near the KRCRA.

There are two or three subbituminous coal beds ranging in thickness from 28 to 40 feet. All beds are less than 3,000 feet deep and dip slightly to the northeast.



CIMARRON RIDGE KRCRA, COLORADO

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Colorado Coal Land Evaluation Committee,  
USGS, May 1, 1975

Boundary Source: KRCRA Summary Report, dated to September 1977, USGS  
Bureau of Land Management Surface-Minerals Management Quad, Colorado

SW-9, Silver Jack Reservoir (April 1975)



Table 2  
TOWNSHIP SUMMARY  
CIMMARON RIDGE KRCRA

T.	R.	P. D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	F. S. SURFACE FED COAL	PUBLIC WATER RESERVE FED COAL	TOTAL							
47N	6W		240	440			680							
46N	7W		120	1,120	2,000		3,240							
47N	7W	3,120	8,600	2,840		80	14,640							
48N	7W		1,440	520			1,960							
TOTAL:		3,120	10,400	4,920	2,000	80	20,520							





Table 1

DANFORTH HILLS KRCRA, COLORADO  
Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	46,850	27.14
Public Domain	Non-Federal	2,560	1.48
Private	Federal	101,230	58.65
Private	Non-Federal	16,970	9.83
State	Non-Federal	4,350	2.52
Federal Withdrawal	Federal	200	.12
Public Water Reserve	Federal	440	.26
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TOTAL		172,600	100.00



## DANFORTH HILLS KRCRA, COLORADO

### Location and Physical Features

The Danforth Hills coal field is located in Moffat and Rio Blanco Counties in northwestern Colorado. The area is sparsely populated but the town of Meeker (population 1,600, 1970 census) lies within 1 mile of the southern boundary. Meeker has been affected to some degree by the development of the oil shale tracts C-a and C-b and stands to become a major oil shale "boom town" if development proceeds.

The nearest larger town is Craig (population 4,200, 1970 census - current estimates run about 7,000 for the town) about 15 road miles to the north of the KRCRA. Craig is already considered an energy "boom town" as a result of coal mining in the area (primarily within the Yampa KRCRA) and construction of a major coal-fired generating station just south of town.

The Danforth Hills are a semi-arid topographic upland of moderately high relief with elevations ranging from 6,300 feet to about 8,750. The extreme southern end of the KRCRA includes a portion of the White River. Other drainages are minor tributaries of the White River or of the Yampa River, which lies several miles to the north.



## DANFORTH HILLS KRCRA, COLORADO

The area has good highway access via State Highway 13 which runs north-south through the middle of the KRCRA to Craig in the north where it connects to U.S. 40 running east-west, and south about 40 miles to Rifle where it connects with I-70. Nearest rail access is at Craig where a spur of the Denver and Rio Grande Western runs east from Craig.

### Ownership Patterns

While 86 percent of the coal is under Federal ownership, only 27 percent of the surface is federally owned. Except for areas along State Highway 13 and through Coyote Basin in the western edge of the KRCRA, the Federal coal ownership is consistently well-blocked. The Federal surface/Federal coal covers a much smaller area but is fairly well-blocked in several areas. Blocks of 4,000 acres, 1,900 and 2,600 acres occur immediately north and west of Meeker along the southern boundary. Other blocks are as follows: 3,600 acres along the eastern boundary, 4,200 acres, 4,600 acres which include several scattered public water reserves, and 1,200 and 1,300 acres in the northwestern thumb.

### Coal Development and Resources

Coal has been produced from the KRCRA since before 1900. Currently there is one strip mine in the KRCRA that produces 1.5 million tons per year. It will most likely expand production to 3 million tons per year



DANFORTH HILLS KRCRA, COLORADO

in 1979. A 25-mile spur of the Denver and Rio Grande Western Railroad from Craig, Colorado to the mine site is in the advanced stages of Federal approvals. There is also one previously producing underground mine which may reopen in the near future.

Within the KRCRA there are ten issued Federal coal leases covering about 13,000 acres and five PRLAs covering 12,000 acres.

There are several minable coal seams present. Individual thicknesses range to 20 feet or more. The beds are locally known to dip relatively steeply.





DANFORTH HILLS KRCRA, COLORADO

Acreeges as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Colorado Coal Land Evaluation Committee,  
USGS, Dec. 21, 1973.

Boundary Source: Branch of Resource Evaluation, Conservation  
Division, USGS National Center, Reston, VA.

Bureau of Land Management Surface-Minerals Management Quad, Colorado.  
NW-8, Maybell (1974)  
NW-9, Craig (1974)  
NW-14, Meeker (March 1976)



Table 2  
TOWNSHIP SUMMARY  
DANFORTH HILLS KRCRA

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	FED AGY PROTECT WDL	PUBLIC H <sub>2</sub> O RES	TOTAL				
T1N	R92W	4,400	2,560	2,240						9,200				
T2N	R92W			960						960				
T2N	R92W	560		2,640	160					3,360				
T2N	R93W	2,450		14,280	1,110					17,840				
"	"	920		2,720	200					3,840				
T2N	R94W	5,560		9,380	3,700					18,640				
"	"	1,320		1,120						2,440				
T2N	R95W	240		440	760					1,440				
T2N	R95W	80		760	1,040			200		2,080				
T3N	R92W	2,280		4,040	400					6,720				
T3N	R92W	3,040		960						4,000				
T3N	R93W	6,140		14,620	1,600		640			23,000				
T3N	R94W	5,400		11,040	120		640		280	17,480				
T3N	R95W	3,980		8,980	3,400		600		160	17,120				
T4N	R92W			80						80				
T4N	R92W	160		1,640	240					2,040				
T4N	R93W	1,640		4,680	600		480			7,400				
T4N	R94W	2,800		11,290	1,480		1,150			16,720				
T4N	R95W	3,560		2,520	500		320			6,900				
T4N	R96W	1,080		2,320	1,180					4,580				
T5N	R94W			80						80				
T5N	R96W	1,240		4,440	480		520			6,680				
TOTAL:		46,850	2,560	101,230	16,970		4,350	200	440	172,600				



Table 1

## DENVER BASIN KRCRA, COLORADO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Private	Federal	94,800	19.99
Private	Non-Federal	348,980	73.60
State	Federal	1,200	.25
State	Non-Federal	28,560	6.02
Military Reservation	Federal	<u>640</u>	<u>.14</u>
TOTAL		474,180	100.00



## DENVER BASIN KRCRA, COLORADO

### Location and Physical Features

The Denver Basin KRCRA is located in parts of Adams, Arapahoe, Elbert, El Paso, Morgan, and Weld Counties, east of the central and northern foothills of Colorado. Major communities near the area are Colorado Springs, Greeley and Denver and its suburbs. The main streams in the area have only small flows of water, but their sand and gravel substream deposits have unconfined ground water important for agricultural purposes.

Topography is mostly gentling rolling plains with elevations ranging from 5,000 to 6,500 feet. Rainfall is about 12 to 30 inches per year. Natural vegetation includes high plains grasses, yucca, and prickly pear cactus, with cottonwoods and willows along stream beds.

Transportation within the area is relatively good. Interstate 25 runs north-south along the western edge of the area, and I-70 runs east-west through the central portion. I-76 runs northeast from Denver to Nebraska. Several state highways run east-west through the area. A line of the Union Pacific Railroad runs east-west to Denver, then north to Wyoming. A line of the Burlington-Northern runs parallel to I-76. The Santa Fe Railroad runs a line south from Denver to New Mexico.





## DENVER BASIN KRCRA, COLORADO

### Ownership Patterns

The Denver Basin KRCRA is made up of 50 separate parcels, the largest covering about 90,000 acres, and the smallest about 640 acres.

By far, the dominant ownership category within the KRCRA is private surface/non-Federal coal, covering about three-quarters of the area. The largest block of this category covers about 35,000 acres. Two other blocks cover about 16,000 acres apiece.

The second largest category is private surface/Federal coal, accounting for about 20 percent of the area. The two largest blocks cover about 10,000 acres each.

There are 50 plus blocks of state surface/non-Federal coal scattered throughout the area. The largest covers about 6,500 acres. Most of the other blocks are 640 acres or less.

With the exception of 640 acres of military reservation, there is no Federal surface within the KRCRA.



## DENVER BASIN KRCRA, COLORADO

### Coal Development and Resources

Coal was first produced from the area in the late 1800s, but there is no current production. There are four Federal coal leases within the KRCRA covering about 2,700 acres. There are 11 PRLAs covering about 19,600 acres.

Coal occurs within the Laramie and Denver Formations. Within the Laramie (lower) zone the coal is subbituminous C and is present generally in three beds 2 to 5 feet thick. There are local occurrences of up to 10 very thin beds.

Within the Denver (upper) Formation there are generally three to five beds of lignite. The lignite beds range in thickness from a few inches to several feet. The principal lignite beds occur in a 70 mile long, 25 to 35 mile wide area from east of Denver to east of Colorado Springs.



DENVER BASIN KRCRA, COLORADO

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

References -

- Narrative: Colorado Coal Land Leasing Minutes, USGS.  
April 22, 1977.
- Boundary: Map attached to Colorado Coal Land Leasing Minutes.
- Base Maps: BLM Surface-Minerals Management Quads, Colorado
- NE - 6 Greeley (1974)  
NE - 7 Fort Morgan (November 1974)



DENVER BASIN KRCRA, COLORADO

- NE - 11 Denver (November 1974)
- NE - 12 Prospect Valley (1974)
- NE - 16 Littleton (November 1974)
- NE - 17 Deer Trail (November 1974)
- NE - 21 Monument (November 1974)
- NE - 22 Calhan (November 1974)
- SE - 1 Colorado Springs (November 1974)
- SE - 2 Rush (November 1974)





Table 2  
TOWNSHIP SUMMARY  
DENVER BASIN KRCRA

T.	R.	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	MILITARY RESERVA-TION FED COAL	TOTAL							
105	58W	1,760	4,960	160			6,880							
95	"	1,640	2,360				4,000							
85	"	2,680	5,200	320	1,240		9,440							
75	"	2,560	3,320				5,880							
125	59W	3,320	2,360		320		6,000							
115	"	400	3,000				3,400							
105	"	2,240	8,960		1,200		12,400							
95	"	1,600	5,960		1,440		9,000							
85	"	880	6,440	320	160		7,800							
75	"	80	3,840				3,920							
65	"	1,000	2,080				3,080							
55	"	2,600	3,000				5,600							
45	"	3,200	6,240		480		9,920							
145	60W	280	2,160				2,440							
135	"	880	2,400				3,280							
125	"	240	280				520							
115	"	1,720	5,640		80		7,440							
105	"	200	3,120		560		3,880							
95	"		640				640							
85	"		640				640							
75	"		2,160				2,160							
55	"		6,760				6,760							
45	"		3,520				3,520							
15	"	520	1,160				1,680							
1N	"	1,720	1,600				3,320							
145	61W	6,520	1,520		1,280		9,320							
135	"	3,520	3,000		640		7,160							
125	"				480		480							
115	"	8,840	8,560		40		17,440							
105	"	1,680	11,400	80			13,160							
95	"	5,280	7,040		440		12,760							
85	"	1,080	4,240				5,320							
75	"	640	920				1,560							
65	"	160	2,200		160		2,520							



Table 2  
TOWNSHIP SUMMARY  
DENVER BASIN KRCRA

T.	R.	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	MILITARY RESERVA-TION FED COAL	TOTAL							
5S	61W		3,920				3,920							
1S	"		680				3,360							
1N	"	1,080	5,880		640		7,600							
2N	"		2,000				2,000							
3N	"		1,960		240		2,200							
15S	62W	80	80		1,240		1,400							
14S	"	2,560	280		1,680		4,520							
13S	"	1,320	280				1,600							
12S	"	40	1,760		320		2,120							
11S	"		4,640				4,640							
10S	"	200	7,360		920		8,480							
9S	"	5,200	12,600		320		18,120							
8S	"	560	5,080		120		5,760							
7S	"	3,160	12,120		320		15,600							
6S	"	3,040	8,800				11,840							
1N	"		5,080		320		5,400							
2N	"	80	3,760		1,840		5,680							
3N	"	40	520		1,560		2,120							
15S	63W	2,120	3,400		240		5,760							
14S	"		600		520		1,120							
7S	"		560				560							
6S	"	320	3,840				4,160							
5S	"	5,760	8,480	320	160		14,720							
4S	"	2,120	5,600				7,720							
3S	"		320				320							
1N	"		5,840				5,840							
2N	"	280	10,400		40		10,720							
3N	"		320		320		640							
14S	64W	200	1,880				2,080							
5S	"	2,520	6,760		7,080	320	16,680							
4S	"	1,760	19,040			320	21,120							
3S	"	800	9,120		320		10,240							
1N	"		4,120				4,120							
2N	"		8,960		680		9,640							



Table 2  
TOWNSHIP SUMMARY  
DENVER BASIN KRCRA

T.	R.	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	MILITARY RESERVATION FED COAL	TOTAL							
3N	64W		5,280		840		6,120							
4N	"		2,400				2,400							
4S	65W	720	9,860				10,580							
3S	"	640	14,240				14,880							
1N	66W	1,040	8,640		160		9,840							
1N	67W	320	9,280		160		9,760							
2N	"	840	3,680				4,520							
1N	68W	80	880				960							
	TOTAL:	94,800	348,980	1,200	28,560	640	474,180							



Table 1  
 DURANGO KRCRA, COLORADO  
Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	27,750	11.62
Public Domain	Non-Federal	120	.05
Private	Federal	58,150	24.36
Private	Non-Federal	70,680	29.61
State	Non-Federal	13,160	5.51
Forest Service	Federal	53,610	22.46
Forest Service	Non-Federal	3,140	1.31
Protective Withdrawal (BLM)	Federal	360	.15
Indian	Non-Federal	1,120	.47
USBR Withdrawal	Federal	120	.05
State Wildlife	Federal	2,910	1.22
State Wildlife	Non-Federal	7,620	3.19
TOTAL		238,740	100.00





## DURANGO KRCRA, COLORADO

### Location and Physical Features

The Durango Coal leasing area is located in Archuleta, LaPlata and Montezuma Counties in southwestern Colorado. It is bounded by Mesa Verde National Park on the west and the Southern Ute Indian Reservation along its entire southern edge. The San Juan National Forest lies immediately north of the KRCRA, except in the western one-quarter of the KRCRA, which includes a large area of National Forest.

The city of Durango (population 10,000) lies along the north-central border of the KRCRA at an elevation of 6,500 feet. No other towns over 1,000 population are in the immediate area.

The area lies along the southern slopes of the San Juan range from which numerous rivers and streams flow south through the KRCRA. These include the Animas River which also flows through Durango. Other rivers passing from north to south through the coal leasing area includes the LaPlata, Los Pinos and Piedra Rivers.

The area is served by U.S. 160 which runs east and west and U.S. 550 running north-south through Durango.



## DURANGO KRCRA, COLORADO

### Ownership Patterns

The largest ownership categories are private surface/non-Federal coal, 30 percent, private surface/Federal coal, 24 percent, Forest Service/Federal coal, 22 percent. Federal land administered by BLM with Federal coal only makes up about 12 percent of the KRCRA. It is, however, fairly well blocked, particularly near the western boundary. This includes blocks of about 3,300 acres, 5,200 acres, 2,000 acres, 1,600, and 1,700 acres. The latter three areas are technically contiguous but are connected in places by only 40-acre parcels. In other areas away from the western boundary, there are three large blocks of Public Domain/Federal coal, each of about 1,000 acres.

The National Forest ownership is very well blocked in the eastern quarter of the coal leasing area. Most of the 53,000 acres of Forest Service surface/Federal coal are contiguous, although some areas include scattered private surface and or coal, especially along the Piedra River and along Beaver Creek.

This KRCRA also contains two large blocks of state ownership south and west of Durango. The 10,000-plus acres of state wildlife lands (with Federal and non-Federal coal combined) are primarily in one contiguous area just southwest of Durango. Also, a little further



## DURANGO KRCRA, COLORADO

west of Durango is located a state-operated Agricultural Experiment Station covering 5,700 acres.

### Coal Development and Resources

Coal was produced from many small mines in the KRCRA around 1900, but only one small underground mine is still operating, from which the coal is used for domestic and steam generation purposes. There are no PRLAs with the KRCRA and only one 160 acre Federal coal lease.

The coal is high volatile bituminous in rank, and occurs in several beds in the Menefee and Fruitland Formations. Most of the beds in the Menefee Formation are 3 to 6 feet thick. Some of this coal near Durango may be of coking quality. The Fruitland Formation contains at least three thick coal zones, the thickest of which has a local exposure of 80 feet of thin coal beds separated with thin partings.



DURANGO KRCRA, COLORADO

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Colorado Coal Land Evaluation Committee,  
USGS, Dec. 2, 1974.

Boundary source: KRCRA Summary Report, dated to September, 1977.  
Bureau of Land Management Surface-Minerals Management Quad, Colorado.

SW - 20, Durango (November 1974)

SW - 21, Vallecito Reservoir (1974)

SW - 27, Ignacio (November)





Table 2  
TOWNSHIP SUMMARY  
DURANGO KRCRA

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FEO COAL	PRIVATE SURFACE NON-FEO COAL	STATE SURFACE NON-FEO COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FED COAL	PROTECT. W/DRAWALS FED COAL	INDIAN NON-FED COAL	USBR W/DRAWAL FED COAL	STATE WILDLIFE NON-FED COAL	STATE WILDLIFE FED COAL	TOTAL
34N	4W			280	680		3,640	240	160	160				5,160
34N	5W			920	1,000		14,280	2,200		960				19,360
34-1/2N	"			300	520	320	3,700	420	160					5,420
35N	"			700	600		1,790							3,090
34N	6W			2,160			18,000							20,160
34-1/2N	"			1,240	2,640		5,720							9,600
35N	"			1,360	6,440		6,400	280	40					14,520
34-1/2N	7W	760		3,320	5,520									9,600
35N	"	1,680		5,800	7,920	1,240								16,640
34-1/2N	8W	1,080		3,840	4,680									9,600
35N	"	2,720		8,300	7,100	1,280								19,400
34N	9W	900		660	4,380							720	640	7,300
34-1/2N	"	280		160	1,220							580		2,240
35N	"	820		2,180	4,280	640						560	160	8,640
34N	10W	80		760	2,760							2,720	400	6,720
35N	"	810		2,260	7,420							3,040	1,710	15,240
34N	11W			1,680	560	4,480								6,720
35N	"	1,180		5,790	8,400	2,520								17,890
34N	12W	320		5,000	1,280						120			6,720
35N	"	2,680		8,960	2,800	1,080								15,520
36N	"							80						80
34N	13W	4,000		1,200	40									5,240
35N	"	9,240	120	1,280	320	640								11,600
36N	"	240			120	640								1,000
34N	14W	200												200
35N	"	760				320								1,080
TOTAL:		27,750	120	58,150	70,680	13,160	53,610	3,140	360	1,120	120	7,620	2,910	238,740



Table 1

## EAST CORTEZ KRCRA, COLORADO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	1,720	17.70
Private	Federal	400	4.12
Private	Non-Federal	6,160	63.37
State	Non-Federal	1,440	14.81
		<hr/>	<hr/>
TOTAL		9,720	100.00



## EAST CORTEZ KRCRA, COLORADO

### Location and Physical Features

The East Cortez coal leasing area is located in Montezuma County in southwestern Colorado. It includes about 14 square miles in one area immediately east of Cortez (population 6,000) and another area of less than 2 square miles about 4-1/2 miles northwest of Cortez.

The coal area is at an elevation of about 6,500 feet and has an annual precipitation of about 16 inches. It is drained by small tributaries of the Dolores River which passes about 4 miles to the north.

It is served by Federal highways 160 and 666 connecting east to Durango and west to Utah, southwest into Arizona and south to New Mexico. The area has no railroad service.

The larger block of the KRCRA east of Cortez is a little over 1 mile north of Mesa Verde National Park.

### Ownership Patterns

Sixty-three percent of the area is private surface and non-Federal coal. This category includes the entire smaller unit of the KRCRA northwest of Cortez. The larger unit east of Cortez contains one major block of Federal surface/Federal coal comprising about 1,500 acres. The area



## EAST CORTEZ KRCRA, COLORADO

also contains a significant block of state land of about 1,450 acres. A few scattered tracts of private surface/Federal coal remain, but the bulk of the rest of the area is private surface/non-Federal coal.

### Coal Development and Resources

The East Cortez KRCRA has no currently producing mines and only sporadic production in the past. There are no PRLAs or Federal coal leases within the KRCRA.

The area contains high volatile, low sulfur bituminous coal. One seam, 11 feet thick, has been noted in the small area northwest of Cortez. In the main area east of Cortez there are several thin seams and one main seam of an average thickness of 4 feet, ranging up to 9 feet. All the coal is at relatively shallow depth, substantially less than the 3,000-foot depth limit for KRCRAs.





EAST CORTEZ KRCRA, COLORADO

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Colorado coal Land Evaluation Committee,  
USGS, 3-1-75.

Boundary Source: KRCRA Summary Report dated to September 1977, USGS.

Bureau of Land Management Surface-Minerals Management Quad, Colorado.

SW-19, Cortez (May 1975)







Table 1

NUCLA KRCRA, COLORADO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	1,880	37.01
Private	Non-Federal	3,080	60.63
USBR Withdrawal	— Federal	120	2.36
		<hr/>	<hr/>
TOTAL		5,080	100.00



## NUCLA KRCRA, COLORADO

### Location and Physical Features

The Nucla KRCRA is small, covering approximately 5,000 acres in Montrose County in southwestern Colorado. The area is divided into three tracts which are northwest, southwest and southeast of the small town of Nucla (population 950) and are all within 3 miles of the town. The town of Naturita (population 800) is a few miles south of the area. As the name Nucla implies, the KRCRA is in a major uranium area where a great deal of exploration and significant production are now occurring. The nearest larger town is Grand Junction (population 20,000) about 100 miles by road to the north.

Two of the tracts border the San Miguel River, and one includes a small area of Reclamation withdrawal along the river.

The area is at an altitude of about 5,800 feet and has an average annual precipitation of 15 inches.

It is served by State Highways including 141 going north to Grand Junction (100 miles) and south connecting with U.S. 666 leading to Cortez (population 6,000) about 100 miles south. Two other east-west State Highways lead into Utah and east to U.S. 550 and Montrose (about 90 miles) with a population of 6,500.





## NUCLA KRCRA, COLORADO

### Ownership Patterns

Land and minerals ownership within the KRCRA is either completely private, 61 percent, or completely public, 39 percent, including 2 percent Reclamation withdrawal. The public land is well blocked except in the southeastern tract when it is divided by private land into 40 to 120 acre blocks. The southeastern tract includes a block of 880 acres and the northern tract a block of 640 acres.

### Coal Development and Resources

There are no PRLAs or issued Federal coal leases within the Nucla KRCRA. There is one existing strip mine which produces approximately 100,000 tons per year for local domestic uses and for a relatively small local power plant.

The coal which defines the KRCRA is high-volatile bituminous and is located in three beds in the Dakota sandstone. The total thickness of the three beds ranges from 8 to 14 feet.



NUCLA KRCRA, COLORADO

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Colorado Coal Land Evaluation Committee, USGS,  
4-25-75.

Boundary Source: KRCRA Summary Report, dated September 1977, USGS.

Bureau of Land Management Surface-Minerals Management Quad, Colorado.

SW-7, Uravan (April 1975)







Table 1

## PAONIA-SOMERSET KRCRA, COLORADO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	31,560	14.64
Public Domain	Non-Federal	80	.04
Private	Federal	65,640	30.45
Private	Non-Federal	22,690	10.53
Forest Service	Federal	94,980	44.06
USBR Withdrawal	Federal	560	.26
Public Water Reserve	Federal	40	.02
		<hr/>	<hr/>
TOTAL		215,550	100.00





## PAONIA-SOMERSET KRCRA, COLORADO

### Location and Physical Features

The Paonia Somerset KRCRA is located in Delta and Gunnison Counties in west central Colorado. Its western portions are about 6 miles north of the town of Delta (population 3,700) and its eastern portions are about 1 to 2 miles north and west of Paonia (population 1,200). These towns lie along the North Fork of the Gunnison River which passes through the northeastern part of the KRCRA. Paonia Reservoir is built along the river and is partially within this northeastern portion of the KRCRA.

The nearest larger cities are Montrose (population 6,500) about 60 miles by road southwest and Grand Junction (population 20,000) about 70 miles by road northwest.

The KRCRA lies partially in the slopes of Grand Mesa and on a large flat-top mountain, and includes portions of the Grand Mesa National Forest which covers the Mesa. On the eastern end, the KRCRA also includes a substantial portion of the Gunnison National Forest where it borders in part on the West Elk Wilderness. From the BLM color quad maps alone it appears that some of the adjoining area is also roadless.

State Highways 92 and 135 combine to traverse the valley of the North Fork of the Gunnison from Delta to Paonia and eventually north to



## PAONIA-SOMERSET KRCRA, COLORADO

Glenwood Springs. A spur of the Denver and Rio Grande Western Railroad also follows the valley from Delta to a point several miles northeast of Paonia where it ends.

### Ownership Patterns

The KRCRA includes large blocks of National Forest on its northern and eastern boundaries. The largest contiguous block is in the Gunnison National Forest on the eastern end of the KRCRA and includes over 30,000 acres.

Outside of the National Forest the public land/Federal coal blocks are much smaller. Although one contiguous area totals about 80,000 acres, it is convoluted and is connected in several spots by 40 or 80 acre parcels and completely surrounds an area of private surface/Federal coal. Realistically, this area separates into about five separate blocks. In addition, there are blocks of 4,000, 3,000, 1,800 and 1,800 acres of public lands/Federal coal scattered along its southern edge.

There are much larger blocks of non-Federal surface/Federal coal, although these, too, are interspersed with small parcels of non-Federal minerals in the western portion of the KRCRA near Cedaredge.



## PAONIA-SOMERSET KRCRA, COLORADO

### Coal Development and Resources

Coal has been produced from the area of the KRCRA since 1900. Currently there are four active underground mines within the KRCRA near the towns of Paonia and Somerset. These mines produced close to 2 million tons in 1976 for steam metallurgical, and local domestic uses. There are no PRLAs within the KRCRA. There are 27 issued Federal coal leases in or near the KRCRA covering about 22,000 acres. There are at least two new underground mines proposed for development in the KRCRA.

The KRCRA is defined by three to six bituminous coal beds above the Rollins sandstone which outcrops on the south-facing slopes of Grand Mesa. The coal beds dip approximately 3 degrees to the north; the northern KRCRA border represents a 3,000 foot depth of these beds. The coal beds each range in thickness from 4 to 15 feet. While most of the coal within the KRCRA is accessible only by underground methods, limited amounts may be strippable on the southern edge of the western extension of the KRCRA.



PAONIA-SOMERSET KRCRA, COLORADO

Acreages as Computed are from the Following Sources:

1. Status Inventory, Branch of Records and Data Management, Wyoming State Office.
2. Adjustments for partial sections included within the KRCRA boundaries were based on the assumption that each section represents 640 and contained sixteen 40 acre tracts. Sections significantly large or smaller than 640 acres were adjusted to reflect the approximate difference.

Reference:

Narrative: Minutes of Colorado Coal Land Evaluation Committee, USGS,  
10-31-73.

Boundary Source - Area Geologist, Central Rocky Mountain Area, U.S.G.S.

Bureau of Land Management Surface-Mineral Management Quad, Colorado

SW - 2, Delta (1974)

SW - 3 Crawford (1974)

NW - 26, Collbran (November 1974)

NW - 27, Paonia Reservoir (1974)





Table 2  
TOWNSHIP SUMMARY  
PAONIA-SOMERSET KRCRA

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	REC. WITHDRAWAL SURFACE FED COAL	PUBLIC WATER RESERVE	TOTAL						
13S	89W	2,400		5,060	1,160	14,640	560		23,820						
14S	"			350	160	13,250			13,760						
15S	"				160	5,200			5,360						
12S	90W			2,040		5,080			7,120						
13S	"	4,740		3,000	5,140	9,880			22,760						
14S	"	120			2,670	7,760			10,550						
12S	91W	240		4,550	1,710	10,300			16,800						
13S	"	7,220		4,330	2,560				14,110						
12S	92W					7,440			7,440						
13S	"	4,720	80	13,160	360			40	18,360						
12S	93W			160		8,120			8,280						
13S	"	4,720		9,960	440				15,120						
12S	94W	1,020		7,840	1,980	710			11,550						
13S	"	1,560		3,920	3,880				9,360						
12S	95W	240		4,520	40	4,160			8,960						
13S	"	2,900		5,820	2,200				10,920						
12S	96W					760			760						
13S	"	1,560		930	230	7,680			10,400						
14S	"	120							120						
TOTAL:		31,560	80	65,640	22,690	94,980	560	40	215,550						



Table 1  
YAMPA KRCRA, COLORADO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	36,970	7.91
Public Domain	Non-Federal	3,640	.78
Private	Federal	269,300	57.60
Private	Non-Federal	101,675	21.75
State	Federal	640	.14
State	Non-Federal	40,990	8.77
Forest Service	Federal	2,600	.55
Forest Service	Non-Federal	640	.14
USBR Withdrawal	Federal	10,865	2.32
USBR Withdrawal	Non-Federal	120	.02
Public Water Reserve	Federal	<u>100</u>	<u>.02</u>
TOTAL		467,540	100.00



## YAMPA KRCRA, COLORADO

### Location and Physical Features

The Yampa coal leasing area is located in Routt and Moffat Counties in northwestern Colorado. The town of Craig (1970 census - population 4,200) is surrounded by several units of the KRCRA, but is not actually within the boundary. The ski resort town of Steamboat Springs is about 8 miles east of the eastern border of the KRCRA. Hayden (1970 population about 800) is located between Craig and Steamboat Springs and has a large coal-fired generating plant. The town of Oak Creek (population 500) is located near the southwestern border.

The KRCRA is made up of many noncontiguous units. The Yampa River flows east to west between and through these units along the entire KRCRA and includes several sections of Reclamation withdrawn lands.

The coal area is also traversed in part by the Williams Fork River which joins the Yampa southwest of Craig.

The climate of most of the entire area is semi-arid with an average annual precipitation at Hayden of 16 inches. The area is entirely on the high plains and plateaus of northwestern Colorado with altitudes ranging from 6,000 to 9,000 feet. Some parts of the area are fairly rugged.



## YAMPA KRCRA, COLORADO

Transportation is very good in the area. The Denver and Rio Grande Western Railroad traverses the eastern part of the coal field. It terminates at Craig, which is the most westerly terminus of the line. U.S. 40 passes east and west the length of the coal area following the Yampa much of the way. Colorado 13 runs north and south from Baggs, Wyoming, through Craig to Meeker and eventually to Rifle.

The town of Craig has been called an energy "boom town" for several years as a result of expansion of mining activity and construction of major coal-fired generating facilities in both Craig and Hayden, 18 miles to the east. Current population estimates run around 7,000. This may have declined somewhat in the last year as construction of the power plant is nearing completion.

### Ownership Patterns

About 68 percent of the coal ownership is Federal, but only about 8 percent is underneath Federal surface ownership. The Federal surface/Federal coal ownership is scattered throughout with the only sizable contiguous blocks occurring along the southern boundary. The largest of these is about 3,000 acres. The only others larger than 1,000 acres are about 1,600 acres and about 1,500 acres.





## YAMPA KRCRA, COLORADO

In the southwestern portion along the Yampa River, Reclamation withdrawal makes up a contiguous block of Federal ownership/Federal coal of about 10,000 acres, although some of it follows tributaries in narrow bands.

The largest blocks of surface/coal consistent ownership are state owned areas, many of which are under lease. The largest block of state ownership is about 12,000 acres.

The 58 percent of private surface/Federal coal is the largest individual category and is well blocked in many areas.

### Coal Development and Resources

Coal has been produced from the area of the Yampa KRCRA since the late 1800s. Currently there are six coal operations with annual production of about 6.1 million tons. Another 6 million annual tons is proposed. Production is by both strip and underground methods. There are no PRLAs within the KRCRA. There are 29 Federal coal leases covering 27,250 acres.

Most of the commercially important coal lies in several beds in the Iles and Williams Fork formations. Individual beds range in thickness from 4 to 11 feet. The coal is subbituminous to bituminous in rank.



YAMPA KRCRA, COLORADO

Acreeges as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Colorado Coal Land Evaluation Committee,  
USGS, 12-13-73, revised 4/21/77.

Boundary Source: Area Geologist, Central Rocky Mountain Area, USGS  
Bureau of Land Management Surface-Minerals Management Quad, Colorado.

NW-2, Great Divide (1974)

NW-3, Slater (1974)

NW-4, Hahns Peak (1974)

NW-8, Maybell (1974)

NW-9, Craig (1974)

NW-10, Steamboat Springs (1974)



Table 2  
TOWNSHIP SUMMARY  
YAMPA KRCRA

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FED COAL	PUBLIC WATER RESERVE COAL	USBR W/DRAWAL FED COAL	USBR W/DRAWAL NON-FED COAL	TOTAL		
3N	85W				40								40		
4N	"	80			3,460								3,540		
5N	"	550		1,800	3,300								5,730		
3N	86W	520	80	1,640	1,320								3,560		
4N	"	2,560		9,360	4,240								16,160		
5N	"	680		8,660	7,780			5,920					23,040		
6N	"	40		2,240	4,200			3,280					9,760		
7N	"			1,280									1,280		
8N	"	500		540	1,840								2,880		
9N	"			270	2,010			2,560					4,840		
4N	87W	880		3,150	210								4,240		
5N	"	660		8,710	5,490	320		5,880					21,060		
6N	"	40		6,800	9,800	320		640					17,640		
7N	"	1,180		5,120	6,840			800			40		13,940		
8N	"	800		5,160	6,720			840					13,520		
9N	"				160				40	640			840		
4N	88W	800		3,200	40								4,040		
5N	"	1,610		10,790	9,140						20		21,560		
6N	"			2,700	4,280			2,000					8,980		
7N	"			960	240			840					2,040		
4N	89W	370		600	50								1,020		
5N	"	2,610		16,850	1,000			660					21,120		
6N	"	40		2,880	2,390			4,290					9,600		
7N	"	40		2,480	320								2,840		
8N	"	200		10,440	560			640					11,840		
3N	90W	80		1,960									2,040		
4N	"	200		7,700	320								8,220		
5N	"	3,080		10,280	40			640					14,120		
6N	"			14,600	3,800						80		18,400		
7N	"	440		7,540	1,360								9,340		
8N	"	760	600	10,080				2,000					13,440		



Table 2  
TOWNSHIP SUMMARY  
YAMPA KRCRA (Cont'd)

T.	R.	P.O. SURFACE FED COAL	P.O. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FED COAL	PUBLIC WATER RESERVE COAL	USBR W/DRAWAL FED COAL	USBR W/DRAWAL NON-FED COAL	TOTAL		
4N	91W	1,710		5,590	160		200						7,660		
5N	"	2,440		6,760	1,330								10,580		
6N	"	40		5,360	7,800		8,560				50		21,960		
7N	"			2,980	200						200		3,180		
8N	"	240		6,800			920						7,960		
5N	92W	3,400		4,250	1,260		640				4,170		13,720		
6N	"	520	640	17,590	1,465						945		21,160		
7N	"	320	340	9,610	1,490								11,760		
8N	"	1,280	300	9,160	80								10,820		
5N	93W	680									1,440		2,120		
6N	"	1,150	520	9,250	960		800				4,020	120	16,820		
7N	"	1,000	640	12,480	4,200		160						18,480		
8N	"	2,110	520	9,400	1,260								13,290		
6N	94W	160		160									320		
7N	"	2,040		6,040	440		640						9,160		
8N	"	1,160		6,080			640						7,880		
TOTAL:		36,970	3,640	269,300	101,675	640	40,990	2,600	640	100	10,865	120	467,540		





## WARRIOR BASIN KRCRA, ALABAMA

Note: The precise boundary for this KRCRA is currently under study by the USGS; therefore only summary information regarding ownership patterns is available at this time.

### Location and Physical Features

The Warrior Basin KRCRA will be located in northern Alabama in parts of Walker, Tuscaloosa, Fayette, and Jefferson counties. The area lies west of Birmingham and north of Tuscaloosa. The area is drained by the Black Warrior River and its tributaries, flowing to the southwest. Transportation is well established in the area with several railroads, U.S. and state highways, and county roads crossing through the area. Interstate 65 runs north-south east of the area through Birmingham. I-20 and I-59 run southwest from Birmingham through Tuscaloosa. The topography is rolling hills and mountains characteristic of Appalachia. The vegetation consists of hardwoods and conifers. The largest bodies of water are Lake Tuscaloosa, a few miles north of Tuscaloosa, and impoundments on the Black Warrior River. The northwestern portion of Talladega National Forest lies about 10 miles south of Tuscaloosa.

### Ownership Patterns

The following discussion is based on an examination of three 1:100,000 BLM Surface-Minerals Management Quads for the area of the Warrior Basin KRCRA, without the boundary of the KRCRA plotted on the Quads.



## WARRIOR BASIN KRCRA, ALABAMA

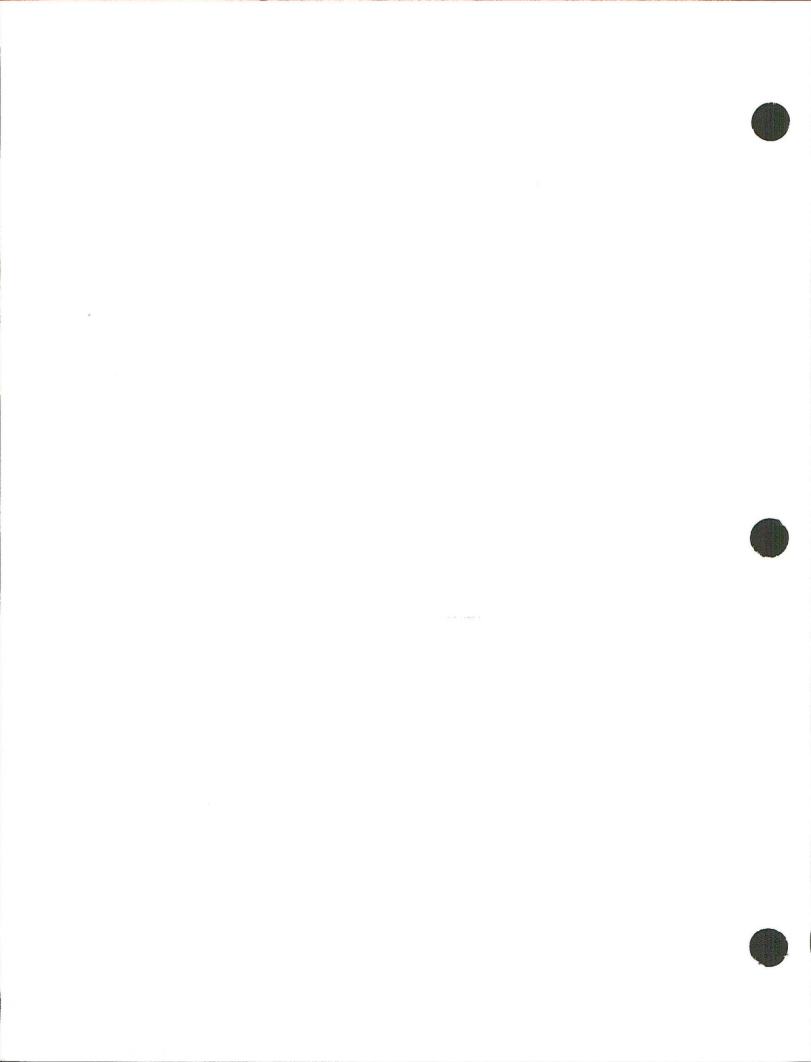
The dominant ownership pattern is private surface/non-Federal coal, occurring in essentially one large contiguous block covering the vast majority of the approximate area of the KRCRA. The second largest category is private surface/Federal coal, occurring in about 100 blocks, the four largest of which cover about 7,000, 5,100, 4,800, and 4,500 acres.

The third largest is state surface/non-Federal coal, occurring in about 100 blocks, the largest two of which cover about 1,200 acres.

With the exception of about six blocks of Corps of Engineers withdrawal along the Black Warrior River, there is no Federal surface within the approximate area of the KRCRA.

### Coal Development and Resources

Currently there are 102 surface mines with combined annual production of about 10.4 million tons and 16 underground mines with annual production of 7.1 million tons. Underground production may expand to 24.5 million tons by 1985 from 31 mines. Production from strip mines may reach 15.4 million tons by 1985 from 108 operations. There is one Federal lease in the area covering 2,388 acres. There are no PRLAs.



## WARRIOR BASIN KRCRA, ALABAMA

The important coals occur in six zones within the Pottsville Formation. Twenty-five seams have been identified, with average thicknesses ranging from 8 to 39 inches. Partings between seams within zones range from 15 to 83 feet and partings between zones range from 56 to 270 feet. The coals rank generally as medium to high ash, low sulfur, high volatile A bituminous.



Table 1

## BURNS CREEK-13 MILE KRCRA, MONTANA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	400	.17
Public Domain	Non-Federal	320	.13
Private	Federal	98,640	41.33
Private	Non-Federal	120,480	50.49
State	Federal	3,440	1.44
State	Non-Federal	15,360	6.44
		<hr/>	<hr/>
TOTAL		238,640	100.00





## BURNS CREEK-13 MILE KRCRA, MONTANA

### Location and Physical Features

The Burns Creek-Thirteen Mile Creek KRCRA is located in Dawson and Richland Counties in eastern Montana. Its northeast corner is about 12 miles southwest of Sidney, Montana (population 4,500). The area extends about 30 miles east-west and about 20 miles north-south.

State Highway 16 parallels the eastern border and State Highway 200 parallels the northern border. The Burlington-Northern parallels Highway 16 and is about 4 miles to the east. Spur lines exist along the northern border along Highway 200 and about 20 miles to the southwest.

The area is drained by minor tributaries of the Yellowstone River, which is paralleled by Highway 16 and the Burlington-Northern along the eastern border. The most significant tributary is Burns Creek which runs through the middle of the KRCRA.

The Fox Lake State Waterfowl Project is located just north of the area.

### Ownership Patterns

The area is 92 percent private surface, with 41 percent underlain by Federal coal. Most of the remainder is state surface. Federal



## BURNS CREEK-13 MILE KRCRA, MONTANA

surface ownership at 17 hundredths of a percent is negligible. The largest block of Federal surface/Federal coal is 200 acres.

The ownership pattern is a checkerboard pattern of alternating sections of private surface/Federal coal and private surface/non-Federal coal. The normal state sections 16 and 36 are the most significant interruptions to this pattern.

### Coal Development and Resource

There is one operating strip mine producing 300 thousand tons of lignite annually which is burned in an electric generating plant 20 miles away. Approximately 30 percent of the coal is mined from a Federal lease. There are three Federal leases covering 6,056 acres and one PRLA covering 3,676 acres in the KRCRA.

The coal bearing Fort Union Formation underlies the area. The KRCRA is based upon the Pust bed which ranges from 10 to 35 feet thick. Reserves for the entire area are approximately 4 billion tons. Coal from the Pust bed tested at 6,760 BTUs as received with 0.6 percent sulfur.



BURNS CREEK-13 MILE KRCRA, MONTANA

Acreeages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Montana Coal Land Evaluation Committee, USGS,  
1-29-78.

Boundary Source: KRCRA Summary Report dated to September 1977, USGS.

Bureau of Land Management Surface-Mineral Management Quad, Montana.

NE-31, Richey (Nov. 1974)

NE-32, Savage (Jan. 1975)



Table 2  
TOWNSHIP SUMMARY  
BURNS CREEK-13 MILE KRCRA

T.	R.	P.O. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	TOTAL							
21N	52E			360	1,000		40	1,400							
20N	53E			6,640	7,400		920	14,960							
21N	"			9,120	11,160		640	20,920							
22N	"			2,360	2,680		640	5,680							
19N	54E				120			120							
20N	"			5,880	7,760		1,120	14,760							
21N	"			10,240	11,680		1,120	23,040							
22N	"			4,880	7,960		1,000	13,920							
19N	55E	80		5,080	5,640		640	11,440							
20N	"	280		9,120	11,360	680	1,600	23,040							
21N	"			9,080	10,880	1,120	1,080	22,160							
22N	"			2,000	2,840		400	5,840							
18N	56E				160			160							
19N	"	40		3,560	4,840	760	560	9,760							
20N	"			7,480	8,440	160	720	16,800							
21N	"			8,440	8,640	80	2,000	19,160							
19N	57E			400	120			520							
20N	"		320	5,680	8,200		640	14,920							
21N	"			4,960	5,680	640	1,280	12,560							
20N	58E			1,320	1,200			2,520							
21N	"			1,440	2,640		880	4,960							
TOTAL:		400	320	98,640	120,480	3,440	15,360	238,640							





Table 1

CIRCLE KRCRA, MONTANA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	5,680	1.29
Private	Federal	181,240	41.08
Private	Non-Federal	225,760	51.17
State	Federal	3,360	.76
State	Non-Federal	<u>25,160</u>	<u>5.70</u>
TOTAL		441,200	100.00



Table 1

KNOWLTON KRCRA, MONTANA  
Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	120	.60
Public Domain	Non-Federal	1,460	7.25
Private	Federal	1,840	9.14
Private	Non-Federal	8,280	41.11
State	Non-Federal	1,680	8.34
L.U. (BLM)	Federal	6,000	29.79
L.U. (BLM)	Non-Federal	760	3.77
		<hr/>	<hr/>
TOTAL		20,140	100.00



## KNOWLTON KRCRA, MONTANA

### Location and Physical Features

The Knowlton KRCRA is a small leasing area of 20,000 acres located about 45 miles east of Miles City (population 9,300) in Custer County, Montana.

The area is accessible by U.S. Highway 12 which runs east and west about 2 miles to the north. The Burlington-Northern and the Chicago, Milwaukee, St. Paul and Pacific Railways serve Miles City. The latter line also serves the town of Ismay, 13 miles northeast.

Only intermittent streams drain the area. The nearest reliable source of water is the Yellowstone River, 30 miles to the northwest.

### Ownership Patterns

The largest ownership category is private surface/non-Federal coal, at 41 percent. The Federal Government owns 39 percent of the coal but owns only about 30 percent of the surface above those areas. Most of that surface is Bankhead Jones lands, which comprise the largest contiguous block of Federal surface/Federal coal at 3,500 acres.

Several areas of Federal surface exist without Federal ownership of the coal.



## KNOWLTON KRCRA, MONTANA

### Coal Development and Resources

No known development of the deposit has taken place in the past. There are no Federal leases or PRLA's in the KRCRA.

The coal-bearing Fort Union Formation of Paleocene age underlies the area. The area boundary is based upon the Doming bed found in the lower part of the Tongue River member of that formation. In the Knowlton locality the Doming bed is composed of three benches; the upper bench averages 28 feet in thickness, the middle and lower benches average 8.5 feet and 10 feet respectively. The coal, classified by rank, is lignite A.





KNOWLTON KRCRA, MONTANA

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Montana Coal Land Evaluation Committee, USGS,  
3-3-75.

Boundary Source: KRCRA Summary Report, dated to September 1977, USGS.

Bureau of Land Management Surface-Mineral Management Quad, Montana.

SE-15, Mizpah (April 1975)



Table 2  
TOWNSHIP SUMMARY  
KNOWLTON KRCRA

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE NON-FED COAL	L.U. SURFACE BLM FED COAL	L.U. SURFACE BLM NON-FED COAL	TOTAL						
6N	53E	120	1,300	440	640		600		3,100						
7N	"			240	1,320	640	40		2,240						
6N	54E		160	640	560	400	1,040	760	3,560						
7N	"			520	5,760	640	4,320		11,240						
	TOTAL:	120	1,460	1,840	8,280	1,680	6,000	760	20,140						



Table 1  
LAME JONES CREEK KRCRA, MONTANA  
Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	1,640	3.83
Private	Federal	6,320	14.78
Private	Non-Federal	25,320	59.21
State	Non-Federal	3,240	7.58
LU (BLM)	Federal	5,720	13.38
LU (BLM)	Non-Federal	<u>520</u>	<u>1.22</u>
TOTAL		42,760	100.00



## LAME JONES CREEK KRCRA, MONTANA

### Location and Physical Features

The Lame Jones Creek KRCRA is located in Fallon County in southeastern Montana along the North Dakota border. The nearest community is Baker (1970 population, 2,584) about 10 miles northeast of the KRCRA. The area is drained by Lame Jones Creek, a tributary of O'Fallon Creek which in turn is a tributary of the Yellowstone River. State Highway 7 runs north-south along the eastern edge of the area, passing through Baker and on to Wibaux. The Milwaukee, St. Paul and Pacific Railroad runs east-west through Baker. The topography is characterized by broad grass-covered valleys and steep-sided buttes.

### Ownership Patterns

The dominant ownership category is private surface/non-Federal coal, covering about 60 percent of the KRCRA. There are 26 blocks in this category, the largest of which is about 9,000 acres. The second largest is about 2,800.

The second largest category is private surface/Federal coal covering about 15 percent of the area. There are 18 blocks, the largest of which is 880 acres; four blocks cover 640. The remainder are all less than 640 acres.

The third largest category is Bankhead-Jones (L.U.) surface/Federal coal covering about 13 percent of the area. There are 12 blocks in this





LAME JONES CREEK KRCRA, MONTANA

category, the largest of which is about 1,760 acres. There are no other blocks in this category greater than 640 acres.

There are six blocks of public domain/Federal coal, the largest of which is 640 acres.

Coal Development and Resources

There has been no commercial development of coal within the area, and there are no identified plans for future development. There are no Federal leases or PRLAs.

The KRCRA is based on the Lames Jones Creek coal bed within the Fort Union Formation. The bed ranges in thickness from 0 to 14 feet and ranks as lignite.



LAME JONES CREEK KRCRA, MONTANA

Acreeges as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the areaage indicated.
4. References

Narrative: Montana Coal Land Leasing Minutes, USGS, May 31, 1977.

Source of Boundary: Map attached to Montana Coal Land Leasing Minutes.

Bureau of Land Management Surface Mineral Management Quad, Montana.

SE-16, Baker (1974)



Table 2  
TOWNSHIP SUMMARY  
LAME JONES KRCRA, MONTANA

T.	R.	P.D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE NON-FED COAL	L.U. SURFACE BLM FED COAL	L.U. SURFACE BLM NON-FED COAL	TOTAL							
6N	56E		440			400		840							
5N	57E		2,080	2,880		160		5,120							
6N	"	1,480	3,640	8,440	1,280	2,080	40	16,960							
7N	"			2,640	600	400		3,640							
5N	58E	80		6,320	920	920	320	8,560							
6N	"	80	160	3,880	440	1,760	160	6,480							
5N	59E			1,120				1,120							
6N	"			40				40							
TOTAL:		1,640	6,320	25,320	3,240	5,720	520	42,760							



Table 1

## PINE HILLS KRCRA, MONTANA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	1,040	5.79
Private	Federal	6,200	34.52
Private	Non-Federal	10,120	56.35
State	Non-Federal	600	3.34
TOTAL		17,960	100.00





## PINE HILLS KRCRA, MONTANA

### Location and Physical Features

The Pine Hills KRCRA is located in Custer County, Montana and is about 14 miles east of Miles City (population 4,500). It is a small area of about 18,000 acres. It is about 8 to 10 miles east of Old Fort Keogh, now an Agricultural Experiment Station.

The area is accessible by I-94 to Miles City and U.S. 12 which runs through the northern part of the KRCRA. Numerous secondary roads provide access to the area. In addition, the Burlington-Northern and the Chicago, Milwaukee, St. Paul and Pacific Railroads serve Miles City nearby.

The closest reliable source of surface water is the Yellowstone River, about 13 miles northwest of the area. The KRCRA itself is drained by Cottonwood and Mill Creeks, which are both intermittent in character.

### Ownership Patterns

The Federal Government owns about 40 percent of the coal rights in this KRCRA but only about 6 percent of the surface. The largest blocks of Federal coal ownership are 640 acres, while the blocks of Federal surface/Federal coal are no more than 200 acres.



## PINE HILLS KRCRA, MONTANA

Burlington-Northern owns the coal rights to most of the old-numbered sections, but has conveyed most of the surface.

### Coal Development and Resources

Coal has been mined on a small scale in the past for local use. There is no production at present. There are no PRLAs or Federal leases in the KRCRA.

The Pine Hills KRCRA is based upon the Doming bed in the lower part of the Tongue River member of the Fort Union Formation of Paleocene Age. The Doming bed is composed of two benches separated by a 5 foot parting. Only the lower bench, which ranges in thickness from 16 to 24 feet, was considered as a basis for the KRCRA boundary. The coal, classified by rank, is lignite A. The total reserve base of the lower Doming bench has been estimated at 279,960,000 tons under less than 150 feet of overburden.



PINE HILLS KRCRA, MONTANA

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the Quads as "other" is assumed as no coal reserved to the government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Montana Coal Land Evaluation Committee, USGS,  
2-12-75.

Boundary Source - KRCRA Summary Report, dated to September 1977, USGS.

Bureau of Land Management Surface-Minerals Management Quad, Montana.

SE - 6, Miles City (January 1975)

SE - 7, Terry (January 1975)

SE - 14, Fort Keogh (1974)

SE - 15, Mizpah (April 1975)









Table 1

## POWDER RIVER BASIN KRCRA, MONTANA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	193,430	8.57
Public Domain	Non-Federal	60	<.01
Private	Federal	1,046,895	46.40
Private	Non-Federal	443,560	19.66
State	Federal	21,190	.94
State	Non-Federal	107,980	4.79
Forest Service	Federal	434,515	19.26
Forest Service	Non-Federal	3,120	.14
Indian	Non-Federal	1,120	.05
Public Water Reserve	Federal	1,230	.05
Public Water Reserve	Non-Federal	80	<.01
USBR Withdrawal	Federal	1,240	.06
USBR Withdrawal	Non-Federal	1,760	.08
TOTAL		2,256,180	100.00



## POWDER RIVER BASIN KRCRA, MONTANA

### Location and Physical Features

The Powder River Basin KRCRA in southeastern Montana includes parts of Big Horn, Yellowstone, Custer, Powder River, Rosebud and Treasure Counties. The area includes over 2-1/4 million acres, stretching over 60 miles north-south and 90 miles east-west. It runs from the Wyoming border on the south to about 15 miles south of I-94 on the north, from about 20 miles east of Hardin and I-90 on the west to U.S. 312 and to Powder River on the east. It excludes the Northern Cheyenne Indian Reservation and includes over 400,000 acres of Custer National Forest. (See further discussion under ownership patterns)

Towns in the area over 1,000 population as of the 1970 census are as follows: Miles City, 1,300, about 30 miles north of the KRCRA border, Hardin, 2,700, about 20 miles west of the area, Forsyth, 1,900, about 25 miles north along I-94 and Sheridan, Wyoming, 10,300, about 15 miles south. Within the KRCRA are several smaller communities including Colstrip, Ashland, Birney and others.

In addition to I-90 on the west and south and I-94 on the north, the area is served by U.S. 212 which roughly bisects the area running east and west and U.S. 312 running north-south along its eastern boundary.



## POWDER RIVER BASIN KRCRA, MONTANA

The area is also served by several railroads including the Burlington-Northern, the Chicago, Milwaukee, and St. Paul and Pacific Railroads which pass through Miles City and parallel I-94 and the Yellowstone River. In addition, a branch line of the Burlington-Northern extends from Forsyth to Colstrip where it ends immediately outside of the KRCRA boundary. Another spur line extends from Wyoming into the KRCRA to Decker, and another is under construction to serve the Westmoreland Resources mine in the far northwestern corner of the area.

The KRCRA is drained by the Powder River which passes through the southwestern part of the area and the Tongue River, which passes through and along the western border, and other tributaries of the Yellowstone. The Tongue River Reservoir is located in the southwestern corner of the area.

Topography is generally rolling, however, many areas are broken by buttes, ridges, and deeply incised valleys.

### Ownership Patterns

Overall, the KRCRA contains about 76 percent Federal coal ownership, of which 28 percent is also federally owned surface. Of this 28 percent, 19 is Custer National Forest, which is the largest contiguous Federal



## POWDER RIVER BASIN KRCRA, MONTANA

surface ownership block at over 400,000 acres. The Surface Mining Control and Reclamation Act of 1977 (Section 522(e)(2)(B)) prohibits surface mining within the Custer National Forest, however.

Except for the Custer National Forest, the northern half of the KRCRA is primarily railroad checkerboard patterns, where private surface/Federal coal alternates with private surface/non-Federal coal. A few scattered 640s of Federal surface/Federal coal exist but only in the checkerboard pattern in the northern half.

In the southern half of the KRCRA, the predominant ownership category is private surface/Federal coal. The majority of the over 1,000,000 acres in this category are in the southern half, where they are separated only by occasional private coal ownership parcels, state sections 16 and 36 and occasional areas of Federal surface/Federal coal. There are some significant contiguous blocks of Federal surface/Federal coal in this area including blocks of about 15,000; 10,000; 5,000; 5,000 and several between 2,000 and 5,000. From the color quads alone, it appears possible that the two larger blocks may have roadless areas of 5,000 acres or more in size.

### Coal Development and Resources

Numerous small "truck" mines have been operated throughout the years since the late 1800s to supply the needs of ranches and local communities.





## POWDER RIVER BASIN KRCRA, MONTANA

Several large mines in the area supplied coal for railroad use prior to the phasing out of coal-fired steam locomotives. Recent developments in the area are the result of the demand for low sulfur coal to fuel steam electric generating plants.

Presently, there are four operating mines. Total annual production for the four mines was 26 million tons in 1976. Six additional mines are projected to be operating by 1985. Total annual production from the ten mines is expected to be 85 million tons by 1985. All of the existing and planned mines will use stripping methods.

There are 11 Federal leases covering 30,000 acres and no PRLAs in the KRCRA.

The Fort Union Formation contains most of the coal in the Powder River Basin, Montana. The thickest coal beds (as much as 80 feet thick) are present in the southwestern part of the area. However, coal beds on the order of 30 to 50 feet thick are common. Fort Union coal beds are sub-bituminous C and lignite A in rank.



POWDER RIVER BASIN KRCRA, MONTANA

Acreeges as Computed are Based on the Following Assumptions

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Montana Coal Land Evaluation Committee,  
USGS, 8-24-73.

Boundary source: Montana Mineral Land Evaluation Committee, USGS.

Bureau of Land Management Surface-Mineral Management Quad, Montana

SE-12, Custer (April 1975)

SE-13, Forsyth (1974)



POWDER RIVER BASIN KRCRA, MONTANA

SE-14, Fort Keogh (1974)

SE-20, Hardin (1974)

SE-21, Colstrip (1974)

SE-22, Ashland (1974)

SE-23, Powderville (1974)

SE-30, Birney (1974)

SE-31, Sonnette (1974)

SE-32, Broadus (1974)

SE-39, Decker (1974)

SE-40, Quietus (1974)

SE-41, Bedolle (1974)













Table 2  
TOWNSHIP SUMMARY  
POWDER RIVER BASIN KRCRA (Cont'd)

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FED COAL	INDIAN LANDS PRIVATE MIN.	PUBLIC WATER RESERVE FED COAL	PUBLIC WATER RESERVE NON-FED COAL	USBR W/DRAWAL FED COAL	USBR W/DRAWAL NON-FED COAL	TOTAL
1S	44E			3,040	3,720										
2S	"			280	880			240							7,000
3S	"	600		1,720	2,240			240							1,400
4S	"	1,280		2,260	4,680			640							5,200
5S	"			1,000	70			480	11,420						20,120
6S	"			820	460				21,970						23,040
7S	"	160		10,610					20,860						22,140
8S	"	670		24,290	160			1,280	11,310						22,080
9S	"	3,020		20,390		1,790		1,600							26,400
1N	"	320		760	1,840			520							26,800
2N	"			3,440	4,280			40							3,440
3N	"	400		2,160	2,840			120							7,760
4N	"			360	680			40							5,520
1S	45E	640		6,880	7,880										1,080
2S	"	320		3,500	3,360			3,040							18,440
3S	"		40	5,980	7,520			15,100	1,680						23,960
4S	"			5,980	7,520			1,280	6,580						21,400
5S	"	2,160		5,840	9,040			1,280	2,880	160					21,360
6S	"			5,040	5,880			1,280	10,760						23,040
7S	"			30					23,040		80				23,080
8S	"			2,050					20,790						22,840
9S	"	2,560		20,640	160			1,120							24,480
1N	"	2,560		20,800				1,600							24,480
3N	"	4,240		2,560	8,440			1,280							24,960
3N	"	400		120	360			200							16,520
4N	"	520		80	600										1,080
1S	46E			1,600	2,920										1,200
2S	"			3,130				2,000	13,280	1,280					21,080
3S	"			3,550					19,920						23,760
4S	"	60		1,800	130				20,450						24,000
5S	"			2,895	280				21,050						23,040
6S	"	80		2,320	2,600				18,985						22,160
7S	"			1,490	720				17,480						22,480
									20,190						22,400







Table 2  
TOWNSHIP SUMMARY  
POWDER RIVER BASIN KRCRA (Cont'd)

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FED COAL	INDIAN LANDS PRIVATE MIN.	PUBLIC WATER RESERVE FED COAL	PUBLIC WATER RESERVE NON-FED COAL	USBR W/DRAWAL FED COAL	USBR W/DRAWAL NON-FED COAL	TOTAL
6S	49E	4,640		16,600			720								21,960
7S	"	6,880		5,880	480										13,240
8S	"	9,880		10,720	1,040		1,280								22,920
9S	"	5,800		15,960			1,280								23,040
1N	"			1,280	11,201										2,400
3N	"				80										80
1S	50E			2,280	2,480										4,760
2S	"			3,920	4,040		440								8,400
3S	"	120		3,160	3,280	160									6,720
4S	"	1,560		13,400	320		160								15,440
5S	"	8,520		6,680			640								15,840
6S	"	3,800		1,680			80								5,560
7S	"	2,360		11,920			1,040								15,320
8S	"	5,400		15,960			1,280								22,640
9S	"	3,120		19,360		1,280									23,760
7S	51E	970		6,340											7,310
8S	"	600		6,040			640								7,280
9S	"	1,160		2,000											3,160
TOTAL:		193,430	60	1,046,895	443,560	21,190	107,980	434,515	3,120	1,120	1,230	80	1,240	1,760	2,256,180





Table 1

SIDNEY KRCRA, MONTANA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	17,800	5.86
Public Domain	Non-Federal	480	.16
Private	Federal	103,660	34.15
Private	Non-Federal	159,660	52.60
State	Federal	3,800	1.25
State	Non-Federal	18,160	5.98
TOTAL		303,560	100.00



## SIDNEY KRCRA, MONTANA

### Location and Physical Features

The Sidney KRCRA is located in Richland, Dawson and Wibaux counties in Montana. It adjoins the Wibaux-Beach KRCRA on its southern border. The area itself is about 40 miles in a north-south direction, and averages 8 to 10 miles wide.

The town of Sidney (population 4,500) is located in the northern portion, and the towns of Wibaux, Montana (population 600) and Beach, North Dakota (population 1,400) are a few miles to the south.

State Highway 18 and the Burlington-Northern Railroad run through the Yellowstone River valley, which crosses the northern end of the KRCRA, and then roughly parallel its eastern boundary.

In addition, I-94 is just a few miles south of Wibaux, and is the main line of the Burlington-Northern.

The area is drained by the Yellowstone River which crosses the northern portion of the area. Minor tributaries flow into the Yellowstone from the west through the KRCRA.



## SIDNEY KRCRA, MONTANA

### Ownership Patterns

Most of the area is made up of railroad checkerboard pattern land, with the surface of most of the Federal sections having been conveyed at some time in the past. Thus, the largest blocks of Federal surface/Federal coal are 640 acres and many are smaller. The largest blocks of private surface/Federal coal are 640 acres. In the vicinity of Sidney, and in some places near the Yellowstone River, are much larger contiguous blocks of private surface/private coal.

State lands are scattered primarily in sections 16 and 36.

### Coal Development and Resources

A small amount of lignite for local use was produced from strip mines in the area. There are no existing or planned mines in the area. There are no Federal leases or PRLAs in the KRCRA.

The KRCRA boundary is based on the G and H lignite beds within the Tongue River member of the Fort Union Formation. The thickness of the G bed ranges from 4 to 23 feet and averages 10.5 feet in thickness. It is correlative to the Sears bed of the Girard lignite field located north of the KRCRA and with the Elvino bed of the Rickey-Lambert field located northwest of the KRCRA.



SIDNEY KRCRA, MONTANA

The H bed varies from 2 to 15 feet and averages 6 feet in thickness. The H bed is correlative to the Pust bed of the Rickey-Lambert lignite field.

There are no analyses of the G and H beds within the KRCRA.





SIDNEY KRCRA, MONTANA

Acreeges as Computed are from the following Source:

1. Status Inventory, Branch of Records and Data Management, Wyoming State Office.
2. Adjustments for partial sections included within the KRCRA boundaries were based on the assumption that each section measurements 640 and contained sixteen 40 acre tracts. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.

Reference:

Narrative: Minutes of Montana coal Land Evaluation Committee,  
USGS, 1-3-77.

Boundary Source - KRCRA Summary Report, dated to September 1977, USGS

Bureau of Land Management Surface-Mineral Management Quads, Montana.

NE-24, Sidney (April 1975)

NE-32, Savage (January 1975)

NE-40, Wibaux (1974)



Table 2  
TOWNSHIP SUMMARY  
SIDNEY KRCRA

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	TOTAL						
17N	57E			80	40			120						
18N	"				280		160	440						
16N	58E				120			120						
17N	"	440		5,360	7,360		1,280	14,440						
18N	"	1,040	480	4,360	6,120	320	640	12,960						
19N	"	1,240		640	2,360		600	4,840						
20N	"	200			680		360	1,240						
21N	"	40		1,040	2,880		640	4,600						
22N	"	240		3,920	6,880		480	11,520						
23N	"			1,120	2,080		640	3,840						
16N	59E	240		2,960	4,480	640		8,320						
17N	"	640		9,520	11,520	80	1,280	23,040						
18N	"	1,440		8,000	10,240	800	2,560	23,040						
19N	"	2,760		5,200	9,400	1,400	2,560	21,320						
20N	"	3,960		6,240	11,440		1,280	22,920						
21N	"	1,920		7,960	11,200	160	1,280	22,520						
22N	"	360		5,880	16,080	80	640	23,040						
23N	"	40		2,400	12,200	160	560	15,360						
16N	60E	80		5,040	5,760		640	11,520						
17N	"			6,880	7,680	160	640	15,360						
18N	"	40		7,000	7,680		640	15,360						
19N	"	800		6,400	7,520		640	15,360						
20N	"	80		6,960	7,680		640	15,360						
21N	"	560		2,840	3,320			6,720						
22N	"	1,120		1,760	2,880			5,760						
23N	"	520		1,820	1,620			3,960						
16N	61E	40		280	160			480						
TOTAL:		17,800	480	103,660	159,660	3,800	18,160	303,560						



Table 1

## WIBAUX-BEACH KRCRA, MONTANA AND NORTH DAKOTA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Non-Federal	4,200	3.39
Private	Federal	46,680	37.69
Private	Non-Federal	70,600	57.01
State	Federal	80	.07
State	Non-Federal	<u>2,280</u>	<u>1.84</u>
TOTAL		123,840	100.00



## WIBAUX-BEACH KRCRA, MONTANA AND NORTH DAKOTA

### Location and Physical Features

This leasing area is located within Wibaux County, Montana and Golden Valley County, North Dakota. The town of Wibaux, Montana (population 600) is on the western border of the leasing area, and the town of Beach, North Dakota (population 1,400) is within the east-central portion of the area. The area itself is about 25 miles along a north-south axis, and about 10 to 12 miles wide.

Interstate 94 running east-west roughly bisects the area, running through both Wibaux and Beach.

Railroad access is available through the main line of the Burlington-Northern, which follows approximately the same alignment through the KRCRA as I-94. A spur of this line extends south from Beach through the southwestern corner of the KRCRA to Golvo, North Dakota.

The area is between the Yellowstone and Little Missouri Rivers and is drained by minor tributaries to those which are about 20 miles north-west and 15 miles southwest, respectively.

The Lame Steer National Wildlife Refuge is about 2 miles west of the KRCRA and includes about 800 acres around a small reservoir.





## WIBAUX-BEACH KRCRA, MONTANA AND NORTH DAKOTA

### Ownership Patterns

The area is primarily railroad checkerboard pattern land, with sections alternating between private surface/non-Federal coal and private surface/Federal coal. In many of the Federal coal sections only a portion of the section still has Federal coal. In some areas, several adjacent sections are entirely private. This occurs primarily along the eastern border near Beach.

There is no Federal surface within the leasing area.

Sections 16 and 36 represent the usual scattered state sections.

### Coal Development and Resources

To date there has been no major development of the "C" lignite bed of the Wibaux-Beach area. A few small mines have been operated in past years to supply local needs. None of these mines are currently producing. There are no Federal leases or PRLAs within the area. There are plans for a 10 to 12 million ton per year mine and gasification plant to be located on the Montana side in the mid-1980s.



WIBAUX-BEACH KRCRA, MONTANA AND NORTH DAKOTA

The Tongue River member of the Fort Union Formation contains multiple coal beds throughout an interval of several hundred feet. Only the "C" bed was used as the basis for the KRCRA. The western boundary of the area is the outcrop of the "C" bed. The southern extent is limited by lack of data south of the Golvo area. The KRCRA is terminated to the north where the "C" bed becomes too thin. The eastern boundary is delineated by the limitation of data.

The "C" bed ranges in thickness from 4 feet to 40 feet within the area.



WIBAUX-BEACH KRCRA, MONTANA AND NORTH DAKOTA

Acres as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Montana Coal Land Evaluation Committee, USGS,  
11-2-73.

Boundary Source: KRCRA Summary Report, dated to September 1977, USGS.  
Bureau of Land Management Surface-Mineral Management Quad, Montana  
and North Dakota

NE-40, Wibaux (1974) Montana

SE-8, Plevna (1974) Montana

SW-1, Medora (Sept. 1977) North Dakota

SW-7, Amidon (Sept. 1977) North Dakota









Table 1

## LA VENTANA KRCRA, NEW MEXICO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	171,320	52.58
Public Domain	Non-Federal	3,180	.98
Private	Federal	39,380	12.09
Private	Non-Federal	8,200	2.52
State	Federal	4,960	1.52
State	Non-Federal	16,240	4.98
LU (BLM)	Federal	32,960	10.11
LU (BLM)	Non-Federal	80	.02
Indian Lands	Federal	20,560	6.31
Indian Lands	Non-Federal	22,640	6.95
Public Water Reserve	Federal	320	.10
Public Water Reserve	Non-Federal	80	.02
BLM Administered	Federal	1,520	.47
BLM Administered	Non-Federal	240	.07
Indian Withdrawal	Federal	<u>4,160</u>	<u>1.28</u>
TOTAL		325,840	100.00



## LA VENTANA KRCRA, NEW MEXICO

### Location and Physical Features

The La Ventana KRCRA is located in parts of eastern McKinley and western Sandoval counties in northwestern New Mexico. The nearest major communities are Grants, 50 miles to the southwest, Albuquerque, 50 miles to the southeast, and Santa Fe, 70 miles to the east. Mesa,uesta, and canyon topography dominate the eastern edge of the KRCRA, and undulating grasslands with broad washes are common in the western parts. The Rio Puerco runs along the eastern edge of the KRCRA. Interstate 40 runs east-west through Grants and Albuquerque. Interstate 25 runs north-south through Santa Fe and Albuquerque. State Highway 44 runs north-south through the eastern part of the KRCRA. The nearest railroad is the Atchinson, Topeka, and Santa Fe, about 40 miles southeast of the KRCRA at Bernalillo. The Santa Fe National Forest lies due east of the KRCRA, and a portion of Chaco Canyon National Monument is about 15 miles northwest of the area. The Jemez Indian Reservation lies immediately southeast of the area.

### Ownership Patterns

The dominant ownership category in the KRCRA is public domain/ Federal coal, covering about 53 percent of the area. There are a few very large blocks in this category, one of which exceeds 60,000 acres.



## LA VENTANA KRCRA, NEW MEXICO

The second largest category is private surface/Federal coal, the largest block of which covers about 7,400 acres.

Bankhead-Jones (L.U.) surface/Federal coal is the third largest category, with about 15 blocks covering about 10 percent of the area. The three largest blocks in this category are concentrated in the northern part of the KRCRA, covering about 14,700, 7,000 and 3,200 acres.

### Coal Development and Resources

Coal was first mined from the area in the 1920s but there is no current production. No plans for future development could be identified. There are no PRLAs.

The KRCRA is defined by subbituminous C coal in the Allison and Cleary coal members of the Menefee Formation. In both members the coal is lenticular. Within the Allison (upper) Member the coal is commonly 3 to 9 feet thick and has been measured at 19 feet. Within the Cleary Coal (lower) Member, the coal occurs in two beds, or more feet thick.



LA VENTANA KRCRA, NEW MEXICO

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

References -

- Narrative: New Mexico Coal Land Leasing Minutes, USGS,  
April 21, 1977.
- Boundary: Map attached to New Mexico Coal Land Leasing Minutes.
- Base Maps: BLM Surface-Minerals Management Quads, New Mexico.





LA VENTANA KRCRA, NEW MEXICO

NW - 14 Cuba (no date)

NW - 18 Ignacio Sanchez (no date)

NW - 19 Jemez (no date)



Table 2  
TOWNSHIP SUMMARY  
LA VENTANA KRCRA, NEW MEXICO

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	L.U. SURFACE BLM FED COAL	L.U. SURFACE BLM NON-FED COAL	INDIAN LANDS FED COAL	INDIAN LANDS NON-FED COAL	PUBLIC WATER RESERVE FED COAL	PUBLIC WATER RESERVE NON-FED COAL	BLM ADMIN- ISTERED FED COAL	BLM ADMIN- ISTERED NON-FED COAL	INDIAN WITH- DRAWAL FED COAL	TOTAL
18N	1W	600								480							1,080
19N	"	9,240		2,560			480										12,280
20N	"	5,820	260	5,440	3,120	600	680	480	80								16,480
17N	2W	4,640	1,680		40		680	1,600						240	240		8,880
18N	"	6,480	80	7,680	240	3,080	640										19,720
19N	"	7,600		4,120			1,920	9,360									23,000
20N	"	7,440		4,400	320		1,360	9,520									23,040
16N	3W	1,400		80													1,480
17N	"	17,960	40	800		640	1,520	800		320							22,080
18N	"	15,180		3,220			640	640		3,360							23,040
19N	"	11,240		2,680		640		4,640		1,120	800						21,120
20N	"	1,120		2,400				4,160									7,680
16N	4W	6,080		960			480	960		160							8,640
17N	"	14,080	480	2,400			1,920	640		3,520							23,040
18N	"	9,000	320				800			4,120	8,800						23,040
19N	"	8,720	320							160	4,160						13,360
16N	5W	15,200		2,000	480			160				320	80				18,240
17N	"	3,520		160			1,280			2,320	5,200					4,160	16,640
18N	"	18,560			160		1,920			2,080	320						23,040
19N	"	5,040			640		640			2,920	3,200						12,440
16N	6W	1,280		480	3,200		640										5,600
17N	"	1,120					640				160						1,920
TOTAL:		171,320	3,180	39,380	8,200	4,960	16,240	32,960	80	20,560	22,640	320	80	1,520	240	4,160	325,840



Table 1

## SAN JUAN KRCRA, NEW MEXICO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	1,007,140	54.86
Public Domain	Non-Federal	23,500	1.28
Private	Federal	165,200	9.00
Private	Non-Federal	89,940	4.90
State	Federal	19,320	1.05
State	Non-Federal	115,960	6.32
Forest Service	Federal	7,040	.38
LU Surface (BLM)	Federal	55,480	3.02
LU Surface (BLM)	Non-Federal	320	.02
Indian Surface	Federal	189,820	10.34
Indian Surface	Non-Federal	47,360	2.58
Indian Withdrawal	Federal	80,280	4.37
Indian Withdrawal	Non-Federal	27,600	1.50
Reclamation Withdrawal	Non-Federal	6,220	.34
National Monument	Federal	280	.02
Power Site Withdrawal	Non-Federal	400	.02
TOTAL		1,835,860	100.00



## SAN JUAN KRCRA, NEW MEXICO

### Location and Physical Features

The San Juan KRCRA covers a large area of over 1,800,000 acres in northwestern New Mexico, including parts of San Juan, McKinley, Rio Arriba and Sandoval Counties. It is bounded on the west by the Navajo Indian Reservation and along part of its eastern border by the Jicarilla Apache Reservation. A small noncontiguous unit of the KRCRA east of the main unit occupies a part of the Santa Fe National Forest. A small part of the northern boundary is the Colorado State line.

Farmington, population 22,500, Aztec, population 3,400, and Bloomfield, population 1,000, New Mexico, are located in the northwestern part of the KRCRA and are the only towns over 1,000 population. The southeastern border is about 80 miles northwest of Albuquerque.

The closest railroad to the area is the main line of the Santa Fe located about 60 miles south of the southern border of the KRCRA. Interstate 40 follows approximately the same route as the Santa Fe R.R. and is therefore about the same distance south.

New Mexico State Highway 44 traverses the KRCRA from Farmington in the northwest to Cuba, population 400, in the southeast and in to Albuquerque. U.S. 550 runs from Shiprock in the Navajo Reservation,





## SAN JUAN KRCRA, NEW MEXICO

through Farmington and north to Durango, Colorado. U.S. 64 traverses the northern portion of the KRCRA from east to west.

The only major drainages are in the northwest and northern portions of the KRCRA, which is also where the bulk of the population is located. These include the San Juan River which flows from the northeast through Farmington and on west. A portion of the KRCRA along the northeast border includes part of the large Navajo Lake, a reservoir on the San Juan River. Other major drainages flowing out of the San Juan Mountains to the north include the Animas and La Plata Rivers which join the San Juan near Farmington. The majority of the rest of the KRCRA is drained by minor intermittent streams and washes which flow primarily north to the San Juan River.

### Ownership Patterns

The largest ownership category in this KRCRA is Public Domain surface/Federal coal, which comprises most of the area at 55 percent. This category is well blocked throughout all but the northwestern region near Farmington and Aztec, and along the western border, where Indian lands and withdrawals predominate. Various categories of Indian lands surface and/or coal and withdrawals make up about 19 percent. This category is in fact somewhat larger since the color quads do not entirely reflect a recent (1977) withdrawal of over 120,000 acres for the Navajo Indian Tribe irrigation



## SAN JUAN KRCRA, NEW MEXICO

project. (See Federal Register of August 31, 1977 regarding details of this withdrawal.) A perusal of the affected townships and sections shows, however, that most of this withdrawal is already shown as some form of Indian withdrawal on the color quads even though they were dated December 1976. It does appear to withdraw some additional public lands; however, no attempt was made to adjust the figures for this withdrawal.

The KRCRA also includes scattered state owned sections, usually numbers 2, 16, 32, and 36.

In addition, the KRCRA includes a block of Bankhead Jones lands of about 55,000 acres in the southeast corner. These lands are nearly all contiguous but are separated by numerous other ownerships, including state, Indian, private and public lands.

A small detached unit of the KRCRA includes about 7,000 acres of contiguous National Forest land. (Although this is shown on the color quad as non-Federal coal, it was determined that this was an error in preparation of the maps.)

### Coal Development and Resources

Archeological evidence indicates that coal was mined from the area of the KRCRA as early as 1300 A.D. by the Anasazi Indians. Currently,



SAN JUAN KRCRA, NEW MEXICO

there are three strip mines operating at an annual capacity of about 8.6 million tons. At least one new mine is proposed; annual capacity of the four mines may reach 20 million tons by 1983. The Santa Fe Railroad has proposed a new spur from their east-west mainline northward into the KRCRA.

There are 25 Federal coal leases near or within the KRCRA covering about 41,000 acres. There are 28 PRLAs covering about 78,000 acres.

The commercially important coal within the KRCRA lies in the Fruitland Formation and is subbituminous to bituminous in rank. There are several beds with an aggregate thickness greater than 70 feet in places. One bed ranges up to 40 feet in thickness.



SAN JUAN KRCRA, NEW MEXICO

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

References:

Narrative: Minutes of New Mexico Coal Land Evaluation Committee,  
USGS, 4-15-75.

Boundary Source: Branch of Resource Evaluation, Conservation  
Division, USGS National Center, Reston, VA.

Federal Register, Vol. 42, No. 169, Wednesday, August 31, 1977.

Bureau of Land Management Surface-Mineral Management Quad, New Mexico.

NW-1, Shiprock (Dec. 1974)

NW-2, Farmington (Dec. 1976)





SAN JUAN KRCRA, NEW MEXICO

NW-3, Navajo Dam (Dec. 1976)

NW-7, Blanco Trading Post (Dec. 1976)

NW-8, Nageezi (Dec. 1974)

NW-9, Lindrith (Feb. 1975)

NW-12, Pueblo Bonito (Dec. 1976)

NW-13, Pueblo Pintado (Apr. 1977)

NW-14, Cuba (Apr. 1977)







Table 2  
TOWNSHIP SUMMARY  
SAN JUAN KRCRA (Cont'd)

T.	R.	P. D. SURFACE FED COAL	P. D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F. S. SURFACE FED COAL	L. U. SURFACE BLM FED COAL	L. U. SURFACE BLM NON-FED COAL	INDIAN SURFACE FED COAL	INDIAN SURFACE NON-FED COAL	INDIAN W/DRAWAL FED COAL	INDIAN W/DRAWAL NON-FED COAL	RECLAM- ATION W/DRAWAL NON-FED COAL	NATIONAL MONUMENT FED COAL	POWER SITE W/DRAWAL NON-FED COAL	TOTAL
29N	7W	2,360		40			640											3,040
30N	"	1,440		440	80	400	120											6,400
20N	8W	280													3,920	240		2,120
21N	"	5,320	1,280			3,800	1,280				600	4,720	1,000					21,920
22N	"	16,160	320	480			960				2,800		2,080	640				23,040
23N	"	16,800		160			800				5,280							23,040
24N	"	15,120		1,840			3,680				2,400							23,040
25N	"	17,600		1,120			2,560				1,760							23,040
26N	"	17,520		1,360			2,560				1,600							23,040
27N	"	18,880		640			2,560				960							23,040
28N	"	14,680		2,120														16,800
29N	"	10,360		160			1,440								560			12,520
30N	"	9,580		1,360	1,520		1,280			320					1,540			15,680
21N	9W		80									10,400						10,400
22N	"	16,960	960		640		160				3,680	640						23,040
23N	"	10,760					1,120				10,720	440						23,040
24N	"	16,160		1,280			1,280				4,320							23,040
25N	"	16,520		1,160			2,560				2,720	80						23,040
26N	"	18,560		1,760			2,560				160							23,040
27N	"	17,120		160			2,400				3,200	160						23,040
28N	"	14,240		1,280			640				640							16,800
29N	"	15,320		880	4,240		1,600								40			22,080
30N	"	12,480	400	960	1,320		1,160											16,320
21N	10W										320							320
22N	"	14,280	640				440				2,040	760						18,160
23N	"	16,160	640		640		1,280				4,320							23,040
24N	"	15,680	1,280	1,280			1,280				3,520							23,040
25N	"	13,740		820			1,760				6,560	160						23,040
26N	"	18,880		1,440	160		2,560											23,040
27N	"	21,360		1,000	40		640											23,040
28N	"	16,520		160			120											16,800
29N	"	12,280		3,880	5,080		1,520										280	23,040









Table 2  
TOWNSHIP SUMMARY

## SAN JUAN KRCRA (Cont'd)

T.	R.	P.O. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	L.U. SURFACE BLM FED COAL	L.U. SURFACE BLM NON-FED COAL	INDIAN SURFACE FED COAL	INDIAN SURFACE NON-FED COAL	INDIAN W/DRAWAL FED COAL	INDIAN W/DRAWAL NON-FED COAL	RECLAM- ATION W/DRAWAL NON-FED COAL	NATIONAL MONUMENT FED COAL	POWER SITE W/DRAWAL NON-FED COAL	TOTAL
31N	13W	9,880		3,360	6,440		1,880											21,560
32N	"	2,680		2,440	1,800		680											7,600
29N	14W	1,380		5,640	1,560		1,020											9,600
30N	"	17,950		2,520			2,560											23,040
29N	15W	200		1,400	4,200		440											6,240
30N	"	8,200	1,200	5,320	1,600		1,680											18,000
TOTAL:		1,007,140	23,500	165,200	89,940	19,320	115,960	7,040	55,480	320	189,820	47,360	80,280	27,600	6,220	280	400	1,835,860



Table 1

## TSAYA KRCRA, NEW MEXICO

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	5,320	6.22
Private	Federal	40	.05
Private	Non-Federal	240	.28
State	Non-Federal	6,200	7.25
Indian	Federal	39,420	46.10
Indian	Non-Federal	12,820	14.99
Indian Withdrawal	Non-Federal	21,280	24.88
N.P.S.	Non-Federal	<u>200</u>	<u>.23</u>
TOTAL		85,520	100.00



## TSAYA KRCRA, NEW MEXICO

### Location and Physical Features

The Tsaya KRCRA is located in southern San Juan County in northwestern New Mexico, just east of the Navajo Indian Reservation. The nearest major city is Farmington, about 55 miles to the north. Interstate 40 lies about the same distance to the south. The KRCRA is serviced only by light-duty and unimproved dirt roads. The nearest railroad is the Atchinson, Topeka, and Santa Fe, paralleling the east-west route of I-40. The topography is characterized by gentling rolling, to hilly plains dissected by the northwest flowing Chaco River and its tributaries. The main portion of Chaco Canyon National Monument is immediately east of the KRCRA.

### Ownership Patterns

The largest ownership category is Indian surface/Federal coal, covering about 46 percent of the area. The largest block is about 15,000 acres in a convoluted pattern. A second block in this category at the northern end of the KRCRA, covers about 3,200 acres.

The second largest category is Indian withdrawal/non-Federal coal covering about 25 percent of the area in a checkerboard pattern. Indian lands with non-Federal coal is the third largest category at 15 percent, also scattered in a checkerboard pattern.



## TSAYA KRCRA, NEW MEXICO

There are 11 blocks of public domain/Federal coal concentrated at the northern end of the KRCRA. The two largest blocks cover 1,640 and 1,540 acres. No other blocks exceed 640 acres.

### Coal Development and Resources

— There are no current coal mining operations in the area, but there are abandoned underground mines. No plans for new development could be identified. There are no Federal coal leases or PRLAs with the area.

The KRCRA is defined by coal in the lower and upper parts of the Menefee Formation. The beds appear to be discontinuous and relatively variable in thickness.

The coal in the lower part of the Menefee is 1,500 to 2,500 feet below the surface and range in thickness from 1 to 7 feet.

Within the upper part of the Menefee, there are two coal zones, ranking subbituminous A or B. The coals in the lower zone are 2 to 10 feet thick. Within the upper zone, the coal occurs in a broad northwest trending lens along the north side of the Chaco River. Along the outcrop the coal is 2 to 6 feet thick, but thins to northeast. Much of this bed is 150 feet or less below the surface.





TSAYA KRCRA, NEW MEXICO

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.
4. References:

Narrative: New Mexico Coal Land Leasing Minutes, USGS,  
September 7, 1977.

Boundary: Map attached to New Mexico Coal Land Leasing Minutes.

Base Maps: BLM Surface-Mineral Management Quads, New Mexico

NW - 7 Blanco Trading Post (no date)

NW - 12 Pueblo Bonito (no date)



Table 2  
TOWNSHIP SUMMARY  
TSAYA KRCRA, NEW MEXICO

T.	R.	P.D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE NON-FED COAL	INDIAN SURFACE FED COAL	INDIAN SURFACE NON-FED COAL	INDIAN W/DRAWAL NON-FED COAL	NPS MONUMENT NON-FED COAL	TOTAL				
22N	11K	240				160		480		880				
21N	12W				1,080	7,040	8,320		200	16,640				
22N	"	2,320		120	640	8,920	480	7,400		19,880				
23N	"	1,000								1,000				
21N	13W		40	120	1,600	6,160	1,880	6,240		15,880				
22N	"	80			1,920	12,740	1,180	6,720		22,800				
23N	"	1,680			960	4,400	960	440		8,440				
TOTAL:		5,320	40	240	6,200	39,420	12,820	21,280	200	85,520				



Table 1

## BOWMAN-GASCOYNE KRCRA, NORTH DAKOTA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Private	Federal	74,910	25.96
Private	Non-Federal	131,680	45.63
State	Federal	2,120	.74
State	Non-Federal	7,240	2.51
Forest Service	Federal	2,890	1.00
L.U. (BLM)	Federal	50,490	17.50
L.U. (BLM)	Non-Federal	17,710	6.14
USFWS	Federal	240	.08
USFWS	Non-Federal	1,280	.44
		<hr/>	<hr/>
TOTAL		288,560	100.00



## BOWMAN-GASCOYNE KRCRA, NORTH DAKOTA

### Location and Physical Features

The Bowman-Gascoyne KRCRA is located within Slope, Bowman, Adams, Golden Valley and Billings Counties.

It is about 288,000 acres in three units. The town of Bowman (population about 2,000) is about 3 miles south of the southern border.

In the southern unit of the KRCRA, the Chicago, Milwaukee, St. Paul and Pacific Railroad and U.S. Highway 12 run east-west through the boundary. U.S. Highway 85 runs north-south through part of the largest unit north of Bowman.

The Burlington-Northern and I-90 run east-west about 8 miles north of the northwest boundary.

The Little Missouri River flows through the northern part of the main unit and the remainder of the drainage is tributary to it. The area near the Little Missouri is one of badlands topography. The rest of the area is primarily gently rolling grass covered hills interspersed with small valleys of perennial or intermittent streams.





## BOWMAN-GASCOYNE KRCRA, NORTH DAKOTA

### Ownership Patterns

The Federal Government owns about 45 percent of the coal and about 19 percent of the surface. Most of the Federal surface is Bankhead Jones L.U. lands. The area is within the Little Missouri Grasslands and the L.U. lands are managed by the Forest Service.

Parts of the area are checkerboard pattern with sections alternating between private surface/non-Federal coal and private surface/Federal coal, but the L.U. lands break up the pattern in some areas which ownership in other areas is entirely private (surface and coal) for several contiguous sections. Quite a number of the L.U. sections are Federal surface only.

The largest block of Federal surface/Federal coal is in the northern part and is about 6,400 acres. Another is about 5,000 acres in the central portion.

The area also includes 1,400 acres of Stewart Lake National Wildlife Refuge.



## BOWMAN-GASCOYNE KRCRA, NORTH DAKOTA

### Coal Development and Resources

Over the years numerous small mines have been operated to meet local needs. There is one active strip mine having annual production of 3.1 million tons. There are two Federal leases covering 2,120 acres and no PRLAs in the KRCRA.

The KRCRA is underlain by the Fort Union Formation which contains several lignite beds in the Tongue River Member. The Harmon and Hansen beds were used in delineating the KRCRA. The combined thickness of the Harmon and Hansen beds ranges up to 55 feet north of Bowman.



BOWMAN-GASCOYNE KRCRA, NORTH DAKOTA

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of North Dakota Coal Land Evaluation Committee,  
USGS, 7-12-76.

Boundary Source: North Dakota Mineral Land Evaluation Committee, USGS.  
Bureau of Land Management Surface-Minerals Management Quad, North Dakota.

SW-7, Amidon (Sept. 1977)

SW-13, Bowman (May 1975)

SW-14, Hettinger (Dec. 1974)



Table 2  
TOWNSHIP SUMMARY  
BOWMAN-GASCOYNE KRCRA

T.	R.	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	L.U. SURFACE 8LM FED COAL	L.U. SURFACE 8LM NON-FED COAL	USFWS REFUGE FED COAL	USFWS REFUGE NON-FED COAL	TOTAL				
130N	98W	1,720	5,120								6,840				
131N	"	1,760	6,320								8,080				
130N	99W	480	600								1,080				
131N	"	4,000	13,280								17,280				
130N	100W	80	680								760				
131N	"	2,400	9,600		120						12,120				
132N	"	2,880	9,640								12,520				
133N	"	1,120	1,440								2,560				
132N	101W	800	2,880								3,680				
133N	"	6,560	10,200		480				160	800	18,200				
134N	"	5,040	6,000		640		1,920				13,600				
135N	"	3,800	6,120								9,920				
136N	"	720	1,760			80	1,280	320			4,160				
137N	"	1,500	1,730				1,330	1,120			5,680				
138N	"	320					960				1,280				
133N	102W	2,920	4,440		360		840	320	80	480	9,440				
134N	"	5,120	6,040		800		1,600	1,080			14,640				
135N	"	4,280	6,800	120	640		2,760	840			15,440				
136N	"	4,510	2,720		800	390	8,840	280			17,540				
137N	"	1,220	2,120		840	860	6,890	8,480			20,410				
138N	"	2,230	5,410	160		1,080	3,010	2,190			14,080				
134N	103W	2,000	1,240		280		1,880	1,320			6,720				
135N	"	3,800	4,320	160	640	80	4,560	1,760			15,320				
136N	"	6,930	9,360		640		1,320				18,250				
137N	"	2,240	2,400	1,560		40	7,800				14,040				
138N	"	280	1,120	120	640	80	240				2,480				
134N	104W	200	1,400				760				2,360				
135N	"	2,880	4,580		360		3,460				11,280				
136N	"	3,120	4,360			280	1,040				8,800				
TOTAL:		74,910	131,680	2,120	7,240	2,890	50,490	17,710	240	1,280	288,560				





Table 1

KNIFE RIVER KRCRA, NORTH DAKOTA  
Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	640	.05
Private	Federal	322,600	27.74
Private	Non-Federal	802,890	69.03
State	Federal	600	.05
State	Non-Federal	27,960	2.41
Misc. Withdrawal	Federal	2,420	.21
Misc. Withdrawal	Non-Federal	2,850	.25
USFWS (Refuge)	Federal	1,320	.11
USFWS (Refuge)	Non-Federal	1,760	.15
		<hr/>	<hr/>
TOTAL		1,163,040	100.00



## KNIFE RIVER KRCRA, NORTH DAKOTA

### Location and Physical Features

The Knife River KRCRA is located within Mercer, Oliver, Dunn and McClean counties, North Dakota. It is bordered on the north by the Fort Berthold Indian Reservation and by Lake Sakakawea, a large reservoir on the Missouri River, which forms part of the eastern boundary as well.

The KRCRA covers an area of 85 miles east-west and about 30 miles north-south totaling over 1,160,000 acres.

Dickinson (population 12,000) and Hebron (1,100) are about 25 and 20 miles south of the southern KRCRA boundary and lie along I-94. Within the immediate coal leasing area, Beulah (1,300) and Hazen (1,200) are the largest towns.

The Burlington-Northern Railroad and State Highway 200 run east-west through the area, and State Highways 8, 22, 49 and 31 trend north-south across it.

The area is drained by the Knife River and other tributaries of the Missouri River, both north and east of the KRCRA.

The Lake Ilo National Wildlife Refuge is within the western portion of the area and covers about 3,000 acres around and including Lake Ilo.



## KNIFE RIVER KRCRA, NORTH DAKOTA

The topography is generally gently rolling grass-covered surface typical of the northern Great Plains. Major streams and glacial meltwater have carved local relief of several hundred feet.

### Ownership Patterns

The predominant ownership is private surface/non-Federal coal at 69 percent. The Federal Government retains about 28 percent of the coal rights but only .05 percent or 640 acres are Federal surface, not counting the National Wildlife Refuge.

The ownership pattern is primarily checkerboard type with sections alternating between private surface/Federal coal and private surface/non-Federal coal. Many of the Federal coal sections retain the Federal coal in only portions of the sections, and in some, it has been conveyed in entirety. This is especially true in the northwest portion of the leasing area, where very little Federal coal ownership remains. No blocks of Federal coal are found anywhere larger than 1,280 acres. The largest area of Federal surface/Federal coal is 320 acres.

State sections are 16 and 36 in parts of the area, but are wholly or partially missing in other areas.



## KNIFE RIVER KRCRA, NORTH DAKOTA

On the north, the boundary includes some State Game lands along the Sakakawea Reservoir.

### Coal Development and Resources

Mining, both underground and surface, has taken place since the early 1900s. Past mining has been to meet local needs. At present, there are four large surface mines in the area. Their annual production is approximately 10.5 million tons. Expected 1985 production from the existing and planned mines is 25 million tons.

There are eight leases covering 9,363 acres and no PRLAs in the KRCRA.

The KRCRA is based upon the Heart Butte and Beulah-Zap lignite beds, both of which are in the Fort Union Formation.





KNIFE RIVER KRCRA, NORTH DAKOTA

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of North Dakota Coal Land Evaluation Committee,  
USGS, 5-3-76.

Boundary Source: North Dakota Mineral Land Evaluation Committee, USGS.

Bureau of Land Management Surface-Minerals Management Quad, N. Dakota

NW-20, Killdeer (September 1977)

NW-21, Berthold (February 1975)

NW-22, Garrison (December 1974)

SW-2, Dickinson (September 1977)

SW-3, Hebron (January 1975)

SW-4, Center (December 1974)



Table 2  
TOWNSHIP SUMMARY  
KNIFE RIVER KRCRA

T.	R.	P. D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	MISC. W/DRAWAL FED COAL	MISC. W/DRAWAL NON-FED COAL	USFWS REFUGE FED COAL	USFWS REFUGE NON-FED COAL	TOTAL				
146N	81W		160	1,880							2,040				
145N	82W		160	9,320		80					9,560				
146N	"		640	22,000							22,640				
147N	"			800		80					880				
141N	83W		680	5,400		320					6,400				
142N	"		1,120	5,800	160						7,080				
143N	"		560	1,840	280						2,680				
144N	"		200	2,760							2,960				
145N	"		600	19,280							19,880				
146N	"		200	8,200		640					9,040				
141N	84W		1,280	15,080		320					16,680				
142N	"		5,280	17,440		320					23,040				
143N	"		4,200	13,240		80					17,520				
144N	"		1,440	5,000							6,440				
145N	"		120	3,160		360					3,640				
146N	"			520			80				600				
147N	"										80				
141N	85W		1,760	10,560		640		80			12,960				
142N	"		4,440	18,120	160	320					23,040				
143N	"		4,320	18,720							23,040				
144N	"		1,840	11,120		400					13,360				
145N	"		880	13,640							14,520				
146N	"		1,400	20,680							22,080				
147N	"		320	3,120				320			3,760				
142N	86W		3,880	15,000		320					19,200				
143N	"		5,680	17,200		160					23,040				
144N	"		3,560	9,720							13,280				
145N	"		2,800	19,600		480					22,880				
146N	"		1,080	21,320			480				22,880				
147N	"			1,640			240	880			2,760				
141N	87W		1,200	2,640							3,840				
142N	"		6,600	12,920		320					19,840				
143N	"		5,240	17,640		160					23,040				



Table 2  
TOWNSHIP SUMMARY  
KNIFE RIVER KRCRA

T.	R.	P.D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	MISC. W/ORAWAL FEO COAL	MISC. W/ORAWAL NON-FEO COAL	USFWS REFUGE FEO COAL	USFWS REFUGE NON-FED COAL	TOTAL			
144N	87W		4,800	17,120		160					22,080			
145N	"		1,920	21,120		160					23,040			
146N	"		320	14,680			160				15,160			
141N	88W		720	2,480							3,200			
142N	"		5,360	10,960		480					16,800			
143N	"		6,600	15,480		960					23,040			
144N	"		8,480	13,600		960					23,040			
145N	"		7,120	14,640		800					22,560			
146N	"		3,280	7,500			80	100			10,960			
142N	89W		640	1,440							2,080			
143N	"	40	5,360	12,040		2,240					19,680			
144N	"		9,080	12,680		1,280					23,040			
145N	"		7,640	15,080		320					23,040			
146N	"		5,920	8,080		800					14,800			
143N	90W		4,320	6,800		240					11,360			
144N	"		7,560	15,000		480					23,040			
145N	"		9,320	13,240		480					23,040			
146N	"		6,400	10,400		320					17,120			
142N	91W		1,840	2,320							4,160			
143N	"		7,360	11,320		640					19,320			
144N	"		9,040	13,840		160					23,040			
145N	"		8,640	13,760		640					23,040			
146N	"		6,440	8,120		1,280					15,840			
142N	92W		3,120	6,760		320					10,200			
143N	"		8,320	14,720							23,040			
144N	"		8,320	14,720							23,040			
145N	"		9,080	13,320		640					23,040			
146N	"		5,920	7,200		160					13,280			
142N	93W		40	120							160			
143N	"		7,840	11,000		640					19,480			
144N	"		7,960	14,600		480					23,040			
145N	"		8,520	14,520							23,040			



Table 2  
TOWNSHIP SUMMARY  
KNIFE RIVER KRCRA

T.	R.	P.D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	MISC. W/DRAWAL FED COAL	MISC. W/DRAWAL NON-FED COAL	USFWS REFUGE FED COAL	USFWS REFUGE NON-FED COAL	TOTAL			
146N	93W		10,080	11,920		960		80			23,040			
147N	"		860	1,160			40	540			2,600			
143N	94W		3,800	5,000							8,800			
144N	"		7,880	13,120		960			160	160	22,280			
145N	94W		7,640	12,240		480			1,160	1,520	23,040			
146N	"		9,760	12,000		1,280					23,040			
147N	"	320	3,000	4,550		640	980	570			10,060			
143N	95W		1,800	2,040							3,840			
144N	"		7,320	9,000		960				80	17,360			
145N	"		6,160	8,880		960					16,000			
146N	"		6,240	8,800		960					16,000			
147N	"	280	9,140	10,160		1,280	360	280			21,500			
TOTAL:		640	322,600	802,890	600	27,960	2,420	2,850	1,320	1,760	1,163,040			





Table 1

NEW ENGLAND-MOTT KRCRA, NORTH DAKOTA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	40	0.01
Private	Federal	185,970	32.98
Private	Non-Federal	346,680	61.49
State	Federal	160	0.03
State	Non-Federal	9,040	1.60
L.U. (USFS)	Federal	20,650	3.66
L.U. (USFS)	Non-Federal	<u>1,280</u>	<u>0.23</u>
TOTAL		563,820	100.00



## NEW ENGLAND-MOTT KRCRA, NORTH DAKOTA

### Location and Physical Features

The New England-Mott KRCRA is located in Billings, Stark, Slope, Hettinger, and Adams Counties in southwestern North Dakota. The largest communities within the area are New England (1970 population, 906) in the western part of the KRCRA, and Mott (1970 population, 1,368) in the eastern part. Dickinson (1970 population, 12,405) lies 25 miles north of New England. The topography consists of gently rolling prairie interrupted by boulder-covered ridges, clinker-covered buttes, and stream valleys. The area is drained by the Cannonball River which flows east to the Missouri River.

State Highway 22 runs north from New England to I-94 at Dickinson and south to U.S. Highway 12. State Highway 8 runs north through Mott to I-94 and south U.S. Highway 12. State Highway 21 runs east-west between New England and Mott. A spur of the Burlington-Northern Railroad terminates in Mott. A spur of the Chicago, Milwaukee, St. Paul and Pacific Railroad roughly parallels the Burlington-Northern, but continues westward to New England.

### Ownership Patterns

The dominant ownership pattern within the KRCRA is railroad checker-board with alternating sections of private surface/Federal coal and private



## NEW ENGLAND-MOTT KRCRA, NORTH DAKOTA

surface/non-Federal coal. There is one block of private surface/Federal coal covering about 3,000 acres west of New England. There is one convoluted block of private surface/non-Federal coal in the central part of the KRCRA covering about 25,000 acres. Two other large blocks in this category cover 15,000 and 12,000 acres and lie, respectively, in the north-central and southeast parts of the KRCRA.

There are about 25 blocks of Bankhead-Jones (L.U.) surface/Federal coal in the western portion of the KRCRA. The three largest blocks in this category cover about 6,000, 2,500, and 2,400 acres.

There are about 22 blocks of state surface/non-Federal coal scattered throughout the KRCRA. None of these blocks cover more than 640 acres.

### Coal Development and Resources

Coal has been produced sporadically from the area for local consumption, but currently there are no operations, and none have been identified for future development. There is one Federal coal lease in or near the KRCRA covering about 2,900 acres. There are no PRLAs.

The KRCRA is defined by eight lignite coal beds within the Fort Union Formation. Beds are overlain by 800 feet or less of overburden.



## NEW ENGLAND-MOTT KRCRA, NORTH DAKOTA

The lowest important lignite bed in the Fort Union Formation is the Hansen. This bed is very erratic, both in thickness and occurrence. In the southeast portion of the KRCRA, the Hansen bed may occur as several splits. The bed varies from 2 to 11.5 feet thick. In the central part of the KRCRA, the Hansen bed is either very thin or absent. This bed thickens to the northwest to as much as 16 feet and is found as one single bed.

Approximately 50 feet above the Hansen is the Harmon, which is the most continuous and correlative bed in the KRCRA. To the southeast the Harmon may have multiple splits or may occur as a single bed 8 to 10 feet thick. To the northwest the bed has fewer splits, attains a maximum thickness of 25 feet, and has an average thickness of 10.4 feet.

In the northwestern part of the KRCRA the Harmon bed is overlain by the Nomad bed. The thickness of the Nomad varies from 3 to 12 feet and averages 5.5 feet.

The Garner Creek bed overlies the Harmon by 90 feet in the central area and 200 feet in the northwest part of the KRCRA. This bed is believed to occur near the Mott area, also. The bed occurs as multiple splits in the central area and as a single bed in the northwest, attaining an average of 8.6 feet in thickness.





NEW ENGLAND-MOTT KRCRA, NORTH DAKOTA

In the central area of the KRCRA the Coal Bank Creek bed lies an average of 178 feet above the Harmon; in the northwest it lies 104 feet above the Garner Creek and 320 feet above the Harmon. The Coal Bank Creek bed averages 7.6 feet thick except the central part of the KRCRA where it averages 9.2 feet thick.

The HT Butte bed overlies the Coal Bank Creek bed by as much as 100 feet and as little as 3 feet, with an average interburden interval of approximately 50 feet. The bed averages 6 feet thick over the total area.

Overlying the HT Butte bed is the Fryburg bed. The interburden averages 69 feet and the coal averages 7.4 feet in thickness.

The Heart River bed overlies the Fryburg bed by an average of 50 feet of interburden and averages 6.7 feet thick.



NEW ENGLAND-MOTT KRCRA, NORTH DAKOTA

Acreeges as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.
4. References:

Narrative: North Dakota Coal Land Leasing Minutes, USGS, July 15, 1977.

Boundary: Map attached to North Dakota Coal Land Leasing Minutes.

BLM Surface-Minerals Management Quads, North Dakota:

- SW-7 Amidon (September 1977)
- SW-8 New England (September 1977)
- SW-9 Heart (February 1975)
- SW-14 Hettinger (December 1974)
- SW-15 Mott (December 1974)



Table 2  
TOWNSHIP SUMMARY  
NEW ENGLAND-MOTT KRCRA, NORTH DAKOTA

T.	R.	P.D. SURFACE FEO COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FEO COAL	STATE SURFACE NON-FED COAL	L.U. SURFACE F.S. FEO COAL	L.U. SURFACE F.S. NON-FED COAL	TOTAL					
131N	91W		120	520					640					
132N	"		1,480	4,600					6,080					
133N	"		1,160	1,760					2,920					
130N	92W		600	1,400					2,000					
131N	"		4,480	8,320					12,800					
132N	"		4,340	11,460					15,800					
133N	"		3,040	4,640					7,680					
130N	"		480	520					1,000					
131N	93W	40	4,240	10,400		560			15,240					
132N	"		5,040	10,960					16,000					
133N	"		1,160	2,360					3,520					
131N	94W		560	1,280					1,840					
132N	"		3,240	6,880					10,120					
133N	"		4,640	7,200					11,840					
134N	"		5,000	13,080		1,760			19,840					
135N	"		1,240	2,600					3,840					
132N	95W		480	800					1,280					
133N	"		5,600	8,640					14,240					
134N	"		6,600	16,280		160			23,040					
135N	"		3,520	8,480					12,000					
137N	"		2,880	11,840					14,720					
133N	96W		960	960					1,920					
134N	"		5,760	11,520		160			17,440					
135N	"		5,160	16,920		960			23,040					
136N	"		2,720	3,680					6,400					
137N	"		7,520	14,560		320			22,400					
134N	97W		5,960	8,120					14,080					
135N	"		6,400	16,000		640			23,040					
136N	"		9,400	13,480		160			23,040					
137N	"		7,280	12,880		320			20,480					
138N	"		640	1,280					1,920					
134N	98 W		1,440	1,600					3,040					
135N	"		6,720	9,280					16,000					



Table 2  
TOWNSHIP SUMMARY  
NEW ENGLAND-MOTT KRCRA, NORTH DAKOTA

T.	R.	P.D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	L.U. SURFACE F.S. FED COAL	L.U. SURFACE F.S. NON-FED COAL	TOTAL						
136N	98W		9,600	14,040					23,640						
137N	"		9,600	13,280		160			23,040						
138N	"		2,600	4,920		160			7,680						
135N	99W		4,880	8,960					13,840						
136N	"		5,270	11,340		160	6,490		23,260						
137N	"		9,600	12,800		640			23,040						
138N	"		1,280	1,280					2,560						
135N	100W		4,960	6,560					11,520						
136N	"		6,640	10,800		320	5,840	160	23,760						
137N	"		7,520	11,520	160	1,280	2,560		23,040						
138N	"		800	1,120		640	1,280		3,840						
135N	101W		1,280	2,560					3,840						
136N	"		2,080	3,200		640	4,480	1,120	11,520						
TOTAL:		40	185,970	346,680	160	9,040	20,650	1,280	563,820						





Table 1

NIOBE KRCRA, NORTH DAKOTA  
Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Private	Federal	880	5.49
Private	Non-Federal	15,040	93.76
State	Non-Federal	120	.75
		<hr/>	<hr/>
TOTAL		16,040	100.00



## NIOBE KRCRA, NORTH DAKOTA

### Location and Physical Features

The Niobe KRCRA lies in Burke and Ward Counties in northwestern North Dakota. The nearest major city is Minot, 55 miles to the southeast. The Des Lacs Lakes on the Souris River lie 7 miles east of the Niobe KRCRA. The Lostwood National Wildlife Refuge is 2 miles west of the KRCRA. Des Lacs National Wildlife Refuge borders the lakes of the same name.

A spur of the Burlington-Northern Railway passes immediately to the northeast of the KRCRA. U.S. Highway 52 runs northwest to southeast about 7 miles east of the KRCRA. There are no Federal coal leases, PRLAs, or operating mines within the KRCRA.

### Ownership Patterns

There is no public domain within the Niobe KRCRA. Of the six contiguous blocks of Federal coal, the largest is 280 acres.

### Coal Development and Resources

Approximately 142 million tons of lignite in-place coal resources are present within the Niobe and Bonns beds. Of this amount, 122 million tons are under less than 120 feet of overburden.



NIOBE KRCRA, NORTH DAKOTA

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of North Dakota Coal Land Evaluation Committee,  
USGS, 3-5-76.

Boundary Source: KRCRA Summary Report dated to September 1977, USGS.

Bureau of Land Management Surface-Mineral Management Quad, North Dakota.

NW-3, Bow Bells (Feb. 1975)









Table 1

## VELVA KRCRA, NORTH DAKOTA

Summary of Surface-Mineral Ownership

## Ownership Class

<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Private	Federal	3,200	15.30
Private	Non-Federal	17,600	84.13
State	Non-Federal	120	.57
	TOTAL	<u>20,920</u>	<u>100.00</u>



## VELVA KRCRA, NORTH DAKOTA

### Location and Physical Features

The Velva KRCRA is located within Ward and McHenry Counties in north-western North Dakota. It is a small area of only about 21,000 acres and is about 9 miles south of the town of Velva (population 1,200).

The Minneapolis, St. Paul and Sault Ste. Marie (Soo Line) Railroad runs through Velva with a spur to the Velva mine.

There are several small glacial lakes within the KRCRA and the Souris River is located about 7 miles north of the area.

### Ownership Patterns

Ownership is 84 percent private surface/private coal. Fifteen percent is private surface/Federal coal, with the largest block of this category being 640 acres.

About 120 acres of National Wildlife Refuge surrounds two of the small lakes.

No other Federal surface ownership is located within the KRCRA.



## VELVA KRCRA, NORTH DAKOTA

### Coal Development and Resources

Mining began in this area as early as 1901. Since that time, numerous mines have been worked with as many as ten mines producing at one time. Both underground and strip-mining methods have been used. At present, only one strip mine is producing about 340 thousand tons of lignite annually. There is one Federal lease in the mine area covering 40 acres. There are no PRLAs.

The KRCRA is based upon the Coteau lignite bed in the Tongue River Member of the Fort Union Formation. The Coteau bed averages 16 feet in thickness.



## VELVA KRCRA, NORTH DAKOTA

### Coal Development and Resources

Mining began in this area as early as 1901. Since that time, numerous mines have been worked with as many as ten mines producing at one time. Both underground and strip-mining methods have been used. At present, only one strip mine is producing about 340 thousand tons of lignite annually. There is one Federal lease in the mine area covering 40 acres. There are no PRLAs.

The KRCRA is based upon the Coteau lignite bed in the Tongue River Member of the Fort Union Formation. The Coteau bed averages 16 feet in thickness. The lignite resources are estimated to be 600 million tons in this area.





VELVA KRCRA, NORTH DAKOTA

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of North Dakota Coal Land Evaluation Committee,  
USGS, 2-23-77.

Boundary Source: KRCRA Summary Report, dated to September 1977, USGS.

Bureau of Land Management Surface-Minerals Management Quad, North Dakota.

NW-16, Max (May 1975)

NW-17, Drake (May 1975)







Table 1

## WILLISTON-AVOCA KRCRA, NORTH DAKOTA

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	120	.18
Private	Federal	42,160	64.83
Private	Non-Federal	18,840	28.97
State	Federal	440	.68
State	Non-Federal	2,880	4.43
Misc. Withdrawal	Federal	300	.46
Misc. Withdrawal	Non-Federal	290	.45
		<hr/>	<hr/>
TOTAL		65,030	100.00



## WILLISTON-AVOCA KRCRA, NORTH DAKOTA

### Location and Physical Features

The Williston-Avoca KRCRA is about 1 mile east of Williston (population 11,000) in Williams County, North Dakota.

It is a relatively small area of about 65,000 acres, bounded on the south by the Little Missouri River (Lake Sakakawea) and on the west by the Little Muddy River.

The Burlington-Northern Railroad serves Williston and runs through the northern part of the KRCRA. U.S. 85 also passes through Williston from north to south and parallels the western border of the KRCRA for several miles.

The leasing area borders State Wildlife lands along the Muddy River and parts of Lake Sakakawea, and includes small tracts of these in places.

Topography is characterized by broad uplands locally dissected near drainages. Near the Little Missouri River the dissected areas predominate and become badlands.





## WILLISTON-AVOCA KRCRA, NORTH DAKOTA

### Ownership Patterns

64 percent of the coal is federally owned but only 0.2 of a percent (120 acres) of the surface is federally owned.

Since most of the area is private surface/Federal coal, this category is for the most part well blocked into large areas interspersed with occasional private surface/non-Federal coal areas and state sections 16 and 36. Nearly all of the 42,000 plus acres of Federal coal ownership are contiguous at some point.

### Coal Development and Resources

In the past, a number of small mines have operated to meet local needs. There is no production at present. There are two Federal coal leases covering 400 acres and no PRLAs in the KRCRA.

The KRCRA is underlain by the Fort Union Formation which contains lignite beds in the Sentinel Butte and Tongue River members. The "B" (lower) and "C" (upper) beds of the Sentinel Butte member were used in delineating the KRCRA. The "B" bed ranges in thickness from 3 to 12 feet and the "C" bed ranges from 5 to 12 feet thick throughout the area.



WILLISTON-AVOCA KRCRA, NORTH DAKOTA

Acreeges as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of North Dakota Coal Land Evaluation Committee,  
USGS, 11-1-74.

Boundary Source: North Dakota Mineral Land Evaluation Committee, USGS.

Bureau of Land Management Surface-Minerals Management Quad, N. Dakota.

NW-13, Williston (Sept. 1977)

NW-7, Williams (Revised 1974)



Table 2  
TOWNSHIP SUMMARY  
WILLISTON-AVOCA KRCRA

T.	R.	P.D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	MISC W/DRAWAL FED COAL	MISC W/DRAWAL NON-FED COAL	TOTAL					
153N	99W	80	10,760	2,320	360	640	220	40	14,420					
154N	"		4,800	5,280		160			10,240					
155N	"		1,720	2,120					3,840					
153N	100W		7,480	2,320		400	80	130	10,410					
154N	"	40	12,760	3,920		1,040		120	17,880					
155N	"		4,640	2,880	80	640			8,240					
TOTAL:		120	42,160	18,840	440	2,880	300	290	64,030					



Table 1

ALTON-KANAB KRCRA, UTAH

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	48,040	41.40
Public Domain	Non-Federal	1,160	1.00
Private	Federal	27,380	23.60
Private	Non-Federal	11,450	9.87
State	Federal	280	.24
State	Non-Federal	2,680	2.31
Forest Service	Federal	25,040	21.58
		<hr/>	<hr/>
TOTAL		116,030	100.00





## ALTON-KANAB, KRCRA, UTAH

### Location and Physical Features

The Alton-Kanab KRCRA in southern Utah is mostly in west-central Kane County with a small portion in the northeast in Garfield County.

The nearest towns over 1,000 population are Kanab (about 1,400) roughly 22 miles to the south via U.S. 89, and Panguitch (population 1,300) about 30 miles north along U.S. 89.

The coal area lies in a horseshoe shaped bend around the south end of the Paunsagunt Plateau which rises to over 9,000 feet. The coal area elevation generally range from 6,000 to 8,000 feet with some higher. Topography consists of steep cliffs, moderate slopes, and broad benches. Vegetation is mostly pinon-juniper forest on slopes and benches, and sagebrush and sparse grasses on alluvial flats. Climate is semi-arid with annual precipitation ranging from 7 to 20 inches or more, depending on elevation.

The area is bordered on the northeast by Bryce Canyon National Park. It also includes portions of Dixie National Forest in this area.

Drainage consists primarily of small streams and marshes coming off the Paunsagunt Plateau from the north. The Virgin River flows through the most western end of the KRCRA.



## ALTON-KANAB, KRCRA, UTAH

Access to most of the coal field is by unimproved dirt or gravel roads. The nearest major highway is U.S. 89 which follows the Virgin River through the westernmost end of the KRCRA. It goes north to Richfield (about 120 miles) and south to Kanab and into Arizona.

Best railroad access is at Marysvale, about 80 miles north on U.S. 89.

### Ownership Patterns

About 87 percent of the coal is federally owned; and about 63 percent of the surface is federally owned (41 percent BLM and 22 percent Forest Service). Although the private surface categories and scattered throughout, they are most common in the northwestern area.

The Forest Service ownership is in two large blocks of nearly equal sizes of about 12,000 acres each. The BLM surface/Federal coal lands are well-blocked along the southern and eastern boundary. Except for one isolated area of about 4,000 acres along the southwestern border, nearly all of the remaining 44,000 acres is contiguous, but interspersed with occasional private and state parcels so that the Federal surface/Federal coal areas may in some areas be connected by narrow corridors of 40 or 80 acres.



ALTON-KANAB, KRCRA, UTAH

Coal Development and Resources

Coal was first produced from the area around 1930; as of 1976 there were no operating mines. One strip mine is proposed, reaching a scale of 5 million tons per year by 1981. There are 27 Federal coal leases in or near the KRCRA covering about 25,700 acres. There is one PRLA covering 560 acres.

The KRCRA is defined by two coal zones in the Dakota Formation. In western and central portions of the KRCRA, the Smirl (upper) zone ranges in thickness from 4 to 20 feet, averaging 12 feet. In the eastern portions of the KRCRA. The Smirl zone splits to two seams 4-8 feet thick each, separated by 15 feet of sandstone and mudstone.

The Bald Knoll (lower) zone is thickest in the western parts of the KRCRA, averaging 18 feet in thickness. In the central part the zone thins to 5 feet. The zone thickens in the extreme northeastern portions to 6 to 14 feet with some significant partings.



ALTON-KANAB, KRCRA, UTAH

Acreages as Computed are based on the following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the Quads as "other" is assumed as no coal reserved to the government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e. rivers, lakes, reservoirs, etc. has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Utah Coal Land Evaluation Committee, USGS,  
11-22-76..

Boundary Source - KRCRA Summary Report, dated to September 1977,  
USGS.

Bureau of Land Management Surface-Minerals Management Quad, Utah.

SW - 19, Bryce Canyon (January 1975)

SW - 23, Kanab (July 1975)





Table 2  
TOWNSHIP SUMMARY  
ALTON-KANAB KRCRA

T.	R.	P.O. SURFACE FED COAL	P.O. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	TOTAL						
37S	3W	1,000	520		160			640	2,320						
38S	"	1,960							1,960						
37S	4W		640					2,960	3,600						
38S	"	4,560		160				5,680	10,400						
39S	"	8,120		4,560	720		960	4,760	19,120						
40S	"	3,360		1,220	80		320		4,980						
39S	4-1/2W	800		1,960	440		640	2,360	6,200						
40S	"	5,080		440			440		5,960						
38S	5W			2,720	3,200			160	6,080						
39S	"	3,560		7,400	2,440			8,400	21,800						
40S	"	11,000		2,480	1,560				15,040						
38S	6W				440				440						
39S	"	3,000		5,330	1,240		320	80	9,970						
40S	"	4,520							4,520						
40S	7W	1,080		1,110	1,170	280			3,640						
TOTAL:		48,040	1,160	27,380	11,450	280	2,680	25,040	116,030						



Table 1

BOOK CLIFFS KRCRA, UTAH

Summary of Surface-Mineral Ownership

<u>Ownership Class</u>			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	37,640	29.09
Public Domain	Non-Federal	280	.22
Private	Federal	34,540	26.70
Private	Non-Federal	38,960	30.11
State	Federal	1,600	1.24
State	Non-Federal	6,560	5.07
Private (Oil Shale Withdrawal)	Federal	5,000	3.86
Public Domain (Oil Shale Withdrawal)	Federal	4,800	3.71
TOTAL		129,380	100.00



## BOOK CLIFFS KRCRA, UTAH

### Location and Physical Features

The Book Cliffs KRCRA lies in Carbon and Emery Counties in Utah. It forms a long quarter circle from about 3 miles north of Price (population 6,200), curving in a southeasterly direction to about 15 air miles southeast of Price. The town of Halpin (population 2,000) is located adjacent to the Book Cliffs just north of Price. No other towns of over 1,000 population are nearby, although the town of Wellington has a population over 900 and is located just 2 to 3 miles southeast of Price.

The coal area forms the southwest edge of the Uintah Basin and is characterized by ledges, steep cliffs and canyons draining to the Price and Green Rivers which join a few miles from the southeasternmost border of the KRCRA. Coal occurs along the flanks of the Book Cliffs which give the field its name.

Climate in the area is semi-arid to arid with precipitation ranging from 5 to 20 inches depending on elevation.

The Denver and Rio Grande Western Railroad crosses the western part of the area through the Price River Canyon, passes through the town of Price and on southeasterly paralleling the Book Cliffs eventually reaching the town of Green River about 60 miles southeast of Price. A branch line runs to the Sunnyside and Columbia mines in the central part of the Book Cliffs field.



## BOOK CLIFFS KRCRA, UTAH

### Ownership Patterns

About 56 percent of the coal within the KRCRA is Federal, of which 29 percent is beneath Federal surface as well. The ownership within the area are relatively well blocked alternating between generally sizable areas of private surface/private coal, private surface/Federal coal and Federal surface/Federal coal. The largest block of Federal surface/Federal coal is along the southeasterly portion of the quarter-circle and includes about 17,000 acres. A smaller block of about 4,000 acres is located on the northern border straight north of Price. Another of about 2,600 acres is found about 2 miles east of Halpin. A large block of private surface/Federal coal is located about 5 miles northeast of Price and totals about 14,000 acres, with another block of 4,500 acres adjacent.

The private surface/private coal occurs primarily in two large blocks, one near the Sunnyside and Columbia mines, and the other just north of Halpin along the southern border of the KRCRA.

One area of oil shale withdrawal is also within the boundary. It is located just north of the Dragerton-Sunnyside area and includes about 3,800 acres.

Although there is some mixing of the ownership patterns, they are relatively well blocked into contiguous units in the KRCRA.





## BOOK CLIFFS KRCRA, UTAH

### Coal Development and Resources

Coal was first produced from the area of the Book Cliffs KRCRA in the late 1880s. Currently there are several operating underground mines in the area with expansions planned. There are no PRLAs within the KRCRA. There are 33 Federal coal leases covering 38,700 acres.

The KRCRA is defined by several bituminous coal seams in the Blackhawk Formation. The coal in the Sunnyside seams has coking properties. Individual beds range in thickness from a few inches to over 15 feet. In the aggregate the seam may exceed 40 feet in thickness.



BOOK CLIFFS KRCRA, UTAH

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Utah Mineral Land Evaluation Committee,  
USGS, 6-28-74.

Boundary Source - Branch of Resource Evaluation, Conservation Division,  
USGS National Center, Reston, Virginia.

Bureau of Land Management Surface-Minerals Management Quad, Utah.

NE-15, Price (October 1975)

NE-16, Sunnyside (October 1975)

SE-2, Woodside (March 1977)



Table 2  
TOWNSHIP SUMMARY  
BOOK CLIFFS KRCRA

T.	R.	P.O. SURFACE FED COAL	P.O. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	PRIVATE SURFACE OIL SHALE WITHDRAWAL	P.O. SURFACE OIL SHALE WITHDRAWAL	TOTAL				
14S	4W			160	8,680		480	1,360	360	11,040				
15S	"	280	80	600	8,920		1,000	520		11,400				
13S	5W	280		3,320	240	440		2,000	40	6,320				
14S	"	1,600		80	640			1,120	4,000	7,440				
12S	6W	360		1,920	2,080					4,360				
13S	"	1,920		8,640	960					11,520				
12S	7W	40		2,840	760					3,640				
13S	"	520		3,600	840					4,960				
12S	8W	2,800		3,480	2,520			40		8,840				
12S	"			1,640				640		2,280				
13S	"	1,400		960	1,040			640		4,040				
13S	"	2,960	80	1,720	4,600			120		9,480				
12S	9W	5,120	80	2,640	1,240	640		640		10,360				
13S	"	360	40	1,880	6,000					8,280				
16S	14E	6,320		1,060	440	80	2,040			9,940				
17S	"	2,600				320				2,920				
18S	"	200								200				
16S	15E	2,080				120		640	400	3,240				
17S	"	6,480						320		6,800				
18S	"	2,320								2,320				
TOTAL:		37,640	280	34,540	38,960	1,600	6,560	5,000	4,800	129,380				



Table 1

## HENRY MOUNTAINS KRCRA, UTAH

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	34,540	85.37
Private	Non-Federal	40	.10
State	Non-Federal	5,480	13.54
N.P. Service	Federal	400	.99
TOTAL		40,460	100.00





## HENRY MOUNTAINS KRCRA, UTAH

### Location and Physical Features

The Henry Mountains KRCRA is located Wayne and Garfield Counties in south-central Utah. It is made up of one main unit and 12 other noncontiguous smaller units. They are scattered over an area about 17 miles north-south and 12 miles east-west. One unit covers only 80 acres. The small farming community of Cainville, with perhaps 100 residents is located between the northernmost units and the main unit. Hanksville is only slightly larger and lies about 10 miles to the east of the northernmost units. Richfield (population 4,500) is about 90 miles by State Highway 24 to the northwest and Green River (population 1,000) is about 75 miles northeast via the same highway. No other communities of any size are within 100 miles.

A portion of the main unit is bounded by, and overlaps slightly into, Capital Reef National Park. The Henry Mountains lie immediately east of the coal fields.

Access to the coal areas is generally poor. Because of the National Park on the west and south and the Henry Mountains on the east, access is mostly to the north from most of the units. Utah Highway 24 cuts across the northern part of the coal area between the northernmost units and the main units several miles south of the road. Graded or unimproved dirt roads are the only access routes available



## HENRY MOUNTAINS KRCRA, UTAH

to virtually all of the leasing areas. The nearest rail lines are about 20 miles northeast or northwest.

From a cursory examination of the color quads, it appears that some of the leasing units could be located within 5,000 acre or larger roadless areas. In fact, none of them is traversed by a road that is shown as being more than seasonal in use.

The climate is semi-arid in most of the units except locally on the east side where the coal has been raised to higher levels along the flanks of the Henry Mountains. There is only one small permanent stream, Fremont River, which runs between the northernmost units and the main units. Nearby, the Muddy Creek-Dirty Devil Drainage System is 5 or more miles northeast and the Colorado River, now Lake Powell, is about 15 miles southeast. The topography consists mainly of steep slopes and broad benches although the coal leasing strata are generally found on the benches.

### Ownership Patterns

Ownership is almost entirely Federal surface/Federal coal (85 percent) and state surface/non-Federal (probably state) coal (13.5 percent). In this area, sections 2,16, 32 and 36 are usually state sections and these are scattered throughout the units. Only



## HENRY MOUNTAINS KRCRA, UTAH

40 acres of private ownership are shown on the color quads. A small area of about 400 acres of National Park is also within the boundary.

### Coal Development and Resources

The coal in the Henry Mountains region was mined intermittently from 1895 to the 1950s, supplying local ranchers and residents of surrounding towns. No mines are now operating in the area. A 500 thousand ton per year surface mine is in the planning stages.

There are three PRLAs covering 11,360 acres and no existing Federal leases in the KRCRA.

The Henry Mountains Coal Field is a broad, shallow structural basin that is bound on the west by the Waterpocket monocline and on the east by intrusive uplifts of the northern three of the Henry Mountains. No significant quantities of coal are presently known to be on the west or east flanks where the strata dip steeply, and most of the thicker coal beds of the field dip gently ( $1^{\circ}$  to  $5^{\circ}$ ) into the middle of the basin.

The coal bearing formations are the Dakota, and Mancos Shale. The Dakota Formation beds are thin, lenticular, and generally of poor quality owing to the shaley nature of much of this coal or to the relatively high sulfur content (nearly 3 percent).



## HENRY MOUNTAINS KRCRA, UTAH

The Ferrous Member of the Mancos Shale contains coal beds that locally exceed 4 feet in thickness in several parts of the field. However, at no place does it contain more than one coal seam 4 feet or more in thickness. The coals are relatively high in sulfur, 2.8 percent.

The Emery Member of the Mancos Shale contains the thickest and most continuous coal beds in the field. Emery coals are divided into three zones, the middle of which contains the most continuous seams. As much as 10 feet of coal has been reported on the outcrop for the zone in the southern part of the field. Elsewhere along the western and central parts of the field this zone commonly contains 5 to 8 feet thick seams ranging up to 9 feet in thickness. Isopach studies show the axis of greatest thickness of coal trending north-south.





HENRY MOUNTAINS KRCRA, UTAH

Acreeges as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e. rivers, lakes, reservoirs, etc. has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Utah Coal Land Evaluation Committee, USGS,  
12-31-73.

Boundary Source - KRCRA Summary Report, dated to September 1977,  
USGS.



HENRY MOUNTAINS KRCRA, UTAH

Bureau of Land Management Surface-Minerals Management Quads, Utah.

SE - 9, Tooney (March 1975)

SE - 13, Boulder (December 1974)

SE - 14, Hite (February 1975)







Table 1

KAIPAROWITS PLATEAU KRCRA, UTAH  
Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	397,760	74.68
Public Domain	Non-Federal	2,520	.47
Private	Federal	1,780	.33
Private	Non-Federal	1,160	.22
State	Federal	80	.02
State	Non-Federal	46,320	8.70
Forest Service	Federal	71,600	13.44
Forest Service	Non-Federal	200	.04
Public Water Reserve	Federal	80	.02
USBR Withdrawal	Federal	8,640	1.62
USBR Withdrawal	Non-Federal	400	.08
USNPS	Federal	2,040	.38
		<hr/>	<hr/>
TOTAL		532,580	100.00



1



## KAIPAROWITS PLATEAU KRCRA, UTAH

### Location and Physical Features

The Kaiparowits KRCRA is located in the central parts of Garfield and Kane counties in south-central Utah. It occupies an area between Bryce Canyon National Park, which it borders for about a mile on its western edge, to Glen Canyon National Recreation Area, which it borders on the southeasternmost boundary of the KRCRA, and which is included in a small part of the coal area. It also includes portions of the Dixie National Forest on the north.

The only towns in the area are Escalante (population 600) in the north, and Henrieville, Tropic, and Cannonville in the northeast none of which are over 500 population. Those towns are connected by the only paved road in the KRCRA, State Highway 12, which leads through Bryce Canyon National Park to U.S. 89 on the west, and which leads north to State Highway 24 eventually, although it is not paved the entire distance.

Between these two paved highways lies most of the KRCRA. No other roads entering this main body of the coal area are shown on the color quads as all-round year roads. From the color quads alone, it would appear that there is strong likelihood that one or more roadless areas of 5,000 acres or larger will be found.



## KAIPAROWITS PLATEAU KRCRA, UTAH

The nearest rail line is about 80 miles north of Tropic at Marysville, Utah. The Cedar City spur of the Union Pacific is about the same distance to the west.

The topography of the area is made up of alternating rolling plateaus dissected by deep canyons. Most of the area is drained by intermittent streams south to the Colorado River system. A portion of the northwest corner of the coal area drains north into the east fork of the Sevier River.

### Ownership Patterns

Virtually the entire 500,000+ acres fall into these ownership patterns: public domain/Federal coal, Forest Service surface/Federal coal, and state surface/non-Federal (probably state-owned) coal. Private ownership is insignificant in this KRCRA. The Forest Service lands are located along the northern border and total 13 percent or 71,600 acres, nearly all of which is in three contiguous blocks. The state lands totaling about 9 percent or 46,000+ acres are scattered predominately in sections 2, 16, 32, and 36. Nearly everything else is the roughly 400,000 acres of BLM surface/Federal coal.

In addition, a few small areas of Reclamation withdrawal are scattered along the southern boundaries.



## KAIPAROWITS PLATEAU KRCRA, UTAH

### Coal Development and Resources

Coal was first produced from the area of the Kaiparowits KRCRA in the 1880s, but currently there are no active operations. There are 53 Federal coal leases covering approximately 95,000 acres. There are 19 PRLAs covering approximately 57,300 acres.

The KRCRA is principally defined by subbituminous in the John Henry member of the Straight Cliffs Formation. There are several beds over 20 feet in thickness.



KAIPAROWITS PLATEAU KRCRA, UTAH

Acreages as Computed are based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Utah Coal Land Evaluation Committee, USGS,  
4-30-74.

Boundary Source - Branch of Resource Evaluation, Conservation  
Division, USGS National Center, Reston, Va.

Bureau of Land Management Surface-Manuals Management Quad, Utah.

- SE - 16, Escalante (1974)
- SW - 20, Tropic (1974)
- SW - 24, Paria River (1974)
- SE - 17, Escalante River (1974)
- SE - 21, Crossing of the Fathers (1974)





Table 2  
TOWNSHIP SUMMARY  
KAIPARONWITS PLATEAU KRCRA

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FED COAL	PUBLIC WATER RES COAL	USBR W/DRAWAL FED COAL	USBR W/DRAWAL NON-FED COAL	USNPS REC AREA FED COAL	TOTAL
33S	1E							5,840						5,840
34S	"			120	120			19,960						20,400
35S	"	2,200			240	80	120	8,760	200					11,520
36S	"	1,160	40	160	40			6,680						8,080
37S	"	5,960		520			800	2,240						9,520
38S	"	5,540	320				480							6,340
39S	"	640												640
33S	2E							480						480
34S	"	1,760						4,000						5,760
35S	"	6,520			120		1,200							7,840
36S	"	19,240	640				1,920							21,800
37S	"	20,480	640				1,920							23,040
38S	"	19,680					2,400							22,080
39S	"	19,520					2,560							22,080
40S	"	17,600					1,920							19,520
41S	"	8,160					800							8,960
35S	3E	960		40			240							1,240
36S	"	7,000	640											7,640
37S	"	18,680					2,200			40				20,920
38S	"	19,040					2,400							21,440
39S	"	20,480					2,560							23,040
40S	"	19,660		820			2,560							23,040
41S	"	20,720					2,280							23,000
42S	"	9,280					1,240							10,520
43S	"						560				760		720	2,040
37S	4E	1,200					240							1,440
38S	"	13,680					1,920							15,600
39S	"	20,480					2,560							23,040
40S	"	20,480					2,560							23,040
41S	"	20,360			640		1,920							22,920
42S	"	5,600					640				200			6,440



Table 2  
TOWNSHIP SUMMARY  
KAIPAROWITS PLATEAU KRCRA

T.	R.	P. D. SURFACE FED COAL	P. D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F. S. SURFACE FED COAL	F. S. SURFACE NON-FED COAL	PUBLIC WATER RES COAL	USBR W/DRAWAL FEO COAL	USBR W/DRAWAL NON-FEO COAL	USNPS REC AREA FEO COAL	TOTAL
38S	5E	160												160
39S	"	12,400					1,760							14,160
40S	"	18,920					1,920							20,840
41S	"	6,200					640				4,040		600	11,480
42S	"	800									2,680		720	4,200
40S	6E	800												800
36S	1W	7,400					800	2,080						10,280
37S	"	15,120					1,920							17,040
38S	"	1,560					640							2,200
42S	"	3,000	240				40				960	400		4,640
35S	2W							12,800						12,800
36S	"	4,920					600	6,880		40				12,440
36S	3W	400						1,880						2,280
TOTAL:		397,760	2,520	1,780	1,160	80	46,320	71,600	200	80	8,640	400	2,040	532,580



Table 1  
 WASATCH PLATEAU KRCRA, UTAH  
Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	12,120	4.07
Private	Federal	36,640	12.31
Private	Non-Federal	47,320	15.90
State	Federal	2,720	.92
State	Non-Federal	5,360	1.80
Forest Service	Federal	192,650	64.72
Forest Service	Non-Federal	840	.28
		<hr/>	<hr/>
TOTAL		297,650	100.00



## WASATCH PLATEAU KRCRA, UTAH

### Location and Physical Features

The Wasatch Plateau KRCRA is located in parts of Emery, San Pete, Carbon and Sevier counties in the central part of Utah. The area is long and narrow, oriented in a north-south direction. The two main units are less than 7 miles wide and are about 22 miles long. They are separated by a narrow valley of Huntington Creek, through which State Highway 31 travels. A third unit lies southwest of the other two and is about 11 miles north-south and generally 3 to 4 miles wide.

State Highway 10 parallels the KRCRA on the east about 3 to 6 miles away. Most of the nearby towns are located along route 10. They are from north to south: Helper (population 2,000) which lies on the northwestern border of the Book Cliffs KRCRA, Price (population 6,200) also very near the Book Cliffs KRCRA, Huntington, Castle Dale, Orangeville, and Emery, all the latter of which are less than 1,000 in population.

Interstate 70 runs east-west through the extreme southern end of the southernmost unit of the KRCRA. On the north, U.S. 6 runs through Price and around the northern end of the coal area.

The Denver and Rio Grande Western Railroad parallels U.S. 6 and three spur lines extend southerly from the main line. These are part of the Utah Coal Route, operated by the Utah Central Railroad. One line extends from





## WASATCH PLATEAU KRCRA, UTAH

Helpin to Hiawatha, on the northeast border of the KRCRA, another extends into the north central section of the KRCRA, and the third runs down the west side of the plateau well to the west of the coal areas.

Access within the KRCRA is also fairly good, with good roads going up the main canyons into the area. Many of the lesser canyons have gravel or unimproved roads.

The area is located on the eastern edge of the Wasatch Plateau, atop which lies the National Forest and is, in fact, mostly within the Forest boundary.

The coal area is one of rugged topography composed largely of ledges and slopes. Elevations range from about 7,000 feet to over 10,000 feet, with the coal outcropping mostly between 7,000 and 8,000 feet.

The major drainages of the Wasatch Plateau flow mostly southeasterly to the Green and Colorado Rivers. One exception is Pleasant Valley Creek which flows north into the Price River, which eventually flows into the Green.

The climate of the Wasatch Plateau ranges from semiarid in the lower slopes to subalpine at higher elevations. Precipitation varies from 8 to 10 inches below the cliffs on the east side to 40 inches at South Tent Mountain.



## WASATCH PLATEAU KRCRA, UTAH

### Ownership Patterns

The area is largely within the National Forest, thus 65 percent is Forest Service surface/Federal coal. Forest Service ownership is well blocked in both the northern and southern units. The 192,000 acres are divided into three categories with units interspersed with occasional private surface and/or private coal. For the most part, the private areas are also well blocked. One substantial block of private surface/Federal coal is located along the northeast border and includes about 14,000 acres.

Only 12,000 acres is BLM managed Federal surface/Federal coal, and this is scattered in small tracts along the eastern border. The largest of these is about 1,900 acres, with one other totaling about 1,200 acres.

### Coal Development and Resources

Coal has been produced from the area of the Wasatch Plateau KRCRA since 1875. In 1975 there were eight underground mines with annual production of 4 million tons. Production from these and other new mines may triple 1975 levels by 1985.

There are 59 Federal coal leases covering about 62,300 acres within the KRCRA. There are two PRLAs covering about 5,350 acres.



## WASATCH PLATEAU KRCRA, UTAH

The KRCRA is principally defined by several high volatile bituminous coal beds in the Blackhawk Formation. As many as 22 coal beds have been identified by name, many of which are undoubtedly correlated. Some beds are 6 to 10 feet thick while others range from 15 to 30 feet thick. While some coal may be strippable, the majority is accessible only by underground methods.



WASATCH PLATEAU KRCRA, UTAH

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Utah Mineral Land Evaluation Committee, USGS,  
6-3-74.

Boundary Source - KRCRA Summary Report, dated to September 1977, USGS.

Bureau of Land Management Surface-Minerals Management Quad, Utah.

NE-15, Price (October 1975)

SW-8, Salina (October 1975)

SE-1, Castle Dale (1974)

SE-5, Emery (1974)





Table 2  
TOWNSHIP SUMMARY  
WASATCH PLATEAU KRCRA

T.	R.	P.D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FED COAL	TOTAL						
225	3E		400	720			2,560	40	3,720						
235	"			240			760		1,000						
215	4E						7,580		7,580						
225	"		4,880	4,960			13,120		22,960						
235	"			2,000			16,180		18,180						
245	"						4,040		4,040						
205	5E						5,649		5,649						
215	"	480		640			16,720		17,840						
225	"	1,760				240	4,920		6,920						
235	"	120							120						
125	6E		400	800			1,160		2,360						
135	"		40	1,680			9,720		11,440						
145	"		360	3,880			3,720		7,960						
155	"			160			6,590		7,390						
165	"					640	9,620		11,100						
175	"			160	40	1,480	13,620		15,540						
185	"			160		1,720	5,520		5,680						
195	"						960		960						
205	"						2,560		2,560						
215	"	360					3,600		3,960						
125	7E		3,320	6,600					9,920						
135	"	680	10,880	5,720		320			17,600						
145	"		600	880			13,220		14,700						
155	"				760		20,360	200	21,320						
165	"	160	480	4,160	1,280		12,720		18,800						
175	"	1,760	5,280	1,800		160	7,920		16,920						
185	"	1,080					5,640		6,720						
195	"		520				1,520		2,040						
125	8E		1,440		80				1,520						
135	"		5,320	1,880	520	200			10,320						
145	"	2,400	80						80						
155	"	1,160	2,360	4,240	40	560	1,280		9,640						
165	"	1,600	280	6,640		40	1,400	600	10,560						
175	"	560							560						
TOTAL:		12,120	36,640	47,320	2,720	5,360	192,650	840	297,650						



Table 1

## GRASS CREEK KRCRA, WYOMING

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	360	23.68
Private	Federal	320	21.05
Private	Non-Federal	720	47.37
State	Non-Federal	120	7.90
		<hr/>	<hr/>
TOTAL		1,520	100.00



## GRASS CREEK KRCRA, WYOMING

### Location and Physical Features

The Grass Creek KRCRA is a very small, 1,560 acres, area in northwestern Wyoming in Hot Springs County. It is separated into two noncontiguous but nearby units. They are about 14 miles east of the Shoshone National Forest and about 18 miles southeast of the town of Meeteete (population about 450) and a few miles northwest of the community of Grass Creek (population 150). The nearest major highway is Wyoming 120, which is about 5 miles northeast of the KRCRA. It runs northwest to Cody, about 50 miles, and southeast to Thermopolis, about 30 miles.

The KRCRA is drained by Grass Creek which flows through a corner of the western part of the two units in the KRCRA. The other unit is drained by Coalmine Draw, which is tributary to Grass Creek.

### Ownership Patterns

The predominant ownership is private surface and private coal totaling 47 percent. Forty-five percent of the coal is federally owned, but only 24 percent of the surface is Federal. This occurs in blocks of 120 acres, 80 acres, 80 acres, 40 acres and 40 acres. The private surface/Federal coal is in blocks of 120, 80, 40, 40 and 40 acres. The larger two are adjacent to Federal surface/Federal coal areas.



## GRASS CREEK KRCRA, WYOMING

The KRCRA also includes 120 acres of state surface/non-Federal (probably state) coal in a block along the southern border.

The remainder is private surface/private coal, the two largest blocks of which cover 560 acres and 160 acres.

### Coal Development and Resources

Coal has been produced in or near the KRCRA since the early 1900s. One small strip mine was operating in 1976, and may expand production to 700 thousand tons per year by 1980. There are no PRLAs with the KRCRA. There are two small Federal coal leases in or near the KRCRA, covering a total of 200 acres.

The KRCRA is defined by two beds of high volatile bituminous coal in the Fort Union Formation. The upper Mayfield bed averages 20 feet in thickness with a maximum of 33 feet. Overburden over the Mayfield ranges from 0 to 200 feet and averages 80 feet. The lower Gwynn bed averages 17 feet in thickness with a maximum of 43 feet. Overburden, including in places the Mayfield bed, ranges from 0 to 300 feet.





GRASS CREEK KRCRA, WYOMING

Acreages as Computed are Based on the Following Assumptions:

1. Surface-Mineral ownership as depicted on the Bureau of Land Management Quad map series is correct. Any Federal minerals status shown on the quads as "other" is assumed as no coal reserved to the Government.
2. Each section within a township represents 640 acres. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.
3. Water surface acreage, i.e., rivers, lakes, reservoirs, etc., has not been deducted from the acreage indicated.

Reference:

Narrative: Minutes of Wyoming Coal Land Evaluation Committee,  
USGS, 9-27-74, Revised 7-26-76.

Boundary Source: KRCRA Summary Report, dated to September 1977,  
USGS.

Bureau of Land Management Surface-Mineral Management Quad, Wyoming.

NW-14, Meeteetse (Dec. 1974)







Table 1

## HANNA AND CARBON BASINS KRCRA, WYOMING

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	85,493	38.30
Public Domain	Non-Federal	160	.07
Private	Federal	6,454	2.89
Private	Non-Federal	116,367	52.13
State	Federal	760	.34
State	Non-Federal	7,343	3.29
USBR Withdrawal	Federal	<u>6,649</u>	<u>2.98</u>
TOTAL		223,226	100.00



## HANNA AND CARBON BASINS KRCRA, WYOMING

### Location and Physical Features

The Hanna and Carbon KRCRA is located in the northern portion of Carbon county in south-central Wyoming. There are ten separate parcels which comprise the KRCRA. The major communities are Hanna in the central part of the KRCRA, Medicine Bow to the immediate east, and Rawlins 35 miles to the southwest. The topography consists of low rolling hills becoming more rugged at the edges of the basin.

The area is drained by the Medicine Bow River which flows north-westerly into the Seminoe Reservoir on the North Patte River. Northern portions of the KRCRA boundary intersect the area covered by this reservoir.

The area of the KRCRA is served by Interstate 80 which runs east-west about ten miles due south of Hanna. U.S. Highway 30 runs northeast to southwest, passing a mile south of Hanna. The Union Pacific railroad runs east-west through Hanna. There is one several thousand acre power site withdrawal in or adjoining the KRCRA. Generally it follows the shoreline of Seminoe Reservoir.

### Ownership Patterns

The dominant ownership pattern within the KRCRA is railroad checker-board with sections of private surface/non-Federal coal alternating with





## HANNA AND CARBON BASINS KRCRA, WYOMING

Public Domain/Federal coal. This pattern covers over ninety percent of the area. Within the checkerboard are a few sections of Public Domain/non-Federal minerals (probably state minerals), sections of state surface/Federal minerals, and sections of state surface/non-Federal minerals. There are two relatively large contiguous blocks of private surface/non-Federal coal near Hanna, one covering 12,000 acres and the other 10,000 acres. There are only a few blocks of private surface/Federal coal, non greater than 640 acres.

### Coal Development and Resources

Coal has been mined intermittently since before the turn of the century for use by the railroad. With the advent of the diesel locomotives in the 1950's, the use of coal for the railroad declined, resulting in the closing of all railroad mine operations.

In 1976, there were 5 active mines producing approximately 11.4 million tons in the KRCRA.

There are thirteen existing Federal leases covering 22,093 acres. There are no PRLA's. The coal now being mined from the area is sold primarily as power plant full to various power plants in Denver and points east. The coal-bearing formations are the Mesaverde, Medicine Bow, Ferris and Hanna.



## HANNA AND CARBON BASINS KRCRA, WYOMING

The coal beds in the Mesaverde Formation are thin and irregular. At least four coal beds are reported ranging in thickness from 3 to 8 feet. The coal is subbituminous in rank.

The Medicine Bow Formation contains least 15 coal beds three feet or more in thickness of any one bed is about eleven feet. The coal is subbituminous in rank.

The Hanna Formation contains at least 30 coal beds three feet or more in thickness. The thickest bed reported is the Hanna No. 2 bed attaining a thickness of 30 feet. The coals range from subbituminous A to high volatile C bituminous.



HANNA AND CARBON BASINS KRCRA, WYOMING

Acreeges as Computed are from the following Sources:

1. Status Inventory, Branch of Records and Data Management, Wyoming State Office.
2. Adjustments for partial sections included within the KRCRA boundaries were based on the assumption that each section represents 640 acres and contains sixteen 40 acre tracts. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.

Reference:

Narrative: Minutes of Wyoming Coal Land Evaluation Committee,  
USGS, 10-31-73.

Boundary Source - KRCRA Summary Report, dated to September 1977,  
USGS

Bureau of Land Management Surface-Mineral Management Quad, Wyoming.

SE - 8, Shirley Basin (1974)

SE - 14, Hanna Basin (1974)

SE - 15, Medicine Bow (1974)



Table 2  
TOWNSHIP SUMMARY  
HANNA-CARBON KRCRA

T.	R.	P. D. SURFACE FED COAL	P. D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	USBR FED MIN COAL	TOTAL						
20N	79W	46			382				428						
21N	"	2,906		240	4,180		400		7,726						
22N	"	840		400	1,440		560		3,240						
20N	80W	108		180	1,117	120	543		2,068						
21N	"	3,400		1,630	7,677	640	720		14,067						
22N	"	1,560		960	7,850		320		10,690						
23N	"	4,148		364	7,786		640		12,938						
24N	"	360		240	40				640						
21N	81W	1,120			1,346		40		2,506						
22N	"	6,532		40	13,743		80		20,395						
23N	"	9,511			12,165		1,280		22,956						
24N	"	840		960	2,680		640		5,120						
21N	82W	320		200	1,189				1,709						
22N	"	9,283		480	12,522		640		22,925						
23N	"	6,640			6,960				13,600						
24N	"	400		320	880		40		1,640						
22N	83W	8,796			9,201		320		18,317						
23N	"	7,965			8,637		640	154	17,396						
24N	"	4,222		320	4,497			2,075	11,114						
21N	84W	240			80				320						
22N	"	2,398			2,635				5,033						
23N	"	5,578	160	120	2,800		480	2,880	12,018						
24N	"	2,560			1,040			1,360	4,960						
23N	85W	2,600			2,760				5,360						
24N	"	3,120			2,760			180	6,060						
TOTAL:		85,493	160	6,454	116,367	760	7,343	6,649	223,226						

100-100000





Table 1

## KEMMERER KRCRA, WYOMING

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	105,260	39.49
Private	Federal	18,053	6.77
Private	Non-Federal	125,751	47.18
State	Federal	1,163	.44
State	Non-Federal	14,004	5.25
USBR Withdrawal	Federal	2,331	.87
TOTAL		266,562	100.00



## KEMMERER KRCRA, WYOMING

### Location and Physical Features

The Kemmerer KRCRA extends about 70 miles north-south in a 5-10 mile wide band through Lincoln and Uinta counties in southwestern Utah. Evanston is about 10 miles west of the southern extension. The town of Kemmerer lies in the northern end of the KRCRA, and Rock Springs is about 70 miles to the east of the southern end of the KRCRA. The topography consists of broad benches and steep slopes and the climate is semi-arid with annual precipitation between 12 and 16 inches.

Access is relatively good with I-80 running east and west through the southern part of the KRCRA and U.S. 30 running east and west through Kemmerer and then southeast toward Rock Springs. The Union Pacific mainline railroad follows the route of U.S. 30.

The nearest major body of water is Flaming Gorge Reservoir on the north-to-south flowing Green River south of Rock Springs. The Hams Fork and Little Muddy creeks flow west to east through the KRCRA.

The Fossil Butte National Monument lies 5 miles west of the northern extension of the KRCRA. There is a powersite withdrawal of about 2,300 acres on the Hams Fork north of Kemmerer. The surface of the withdrawal is largely Public Domain with minerals reserved to the Government.



## KEMMERER KRCRA, WYOMING

### Ownership Patterns

The dominant ownership pattern within the KRCRA is railroad checker-board with the alternating sections of Public Domain/Federal coal and private surface/non-Federal coal. This pattern covers about 85 percent of the KRCRA.

There is one 20,000 acre contiguous block of Public Domain/Federal coal in the northwestern portion of the KRCRA. A second block of this category of about 5,500 acres lies in the northern portion of the KRCRA, north of the Hams Fork.

The largest contiguous block of private surface/Federal coal is in the extreme northern end of the KRCRA covering about 3,000 acres. A second block of 1,100 acres lies due east of Kemmerer. Several other blocks of 640 acres or less are scattered throughout the checkerboard area.

The largest block of private surface/non-Federal coal is a north-south parcel of about 18,000 acres south of Kemmerer. A second parcel of about 5,500 acres lies west and southwest of Kemmerer.

State school sections are found regularly throughout the KRCRA in sections 16 and 36.



## KEMMERER KRCRA, WYOMING

### Coal Development and Resources

The coal in the Kemmerer region was mined intermittently from about 1893 to the present. There are two active strip mines operating in the Hams Fork region west of Kemmerer. They had a total production of 4.1 million tons in 1976. They currently mine several seams and eventually plan to mine as many as 17 seams. The seams range between 6 and 115 feet thick.

There are ten existing Federal leases covering 11,413 acres and no PRLAs in the KRCRA.

The KRCRA is in a narrow, elongated, partly overturned structural basin that trends northeast to southwest. This basin is bordered on the west by the Absoroka thrust fault, which is responsible for the overturning of some of the sedimentary beds.

The coal bearing formations included in the KRCRA are the Evanston, Frontier and Adaville Formations.

Coal in the Evanston Formation is the subbituminous B to A rank and was mined mainly in the latter part of the 1800s. Although up to five seams occur in the area, only the Alney seam was considered mineable at that time. Development was limited due to the sloping of the coal beds in a north and south direction.





## KEMMERER KRCRA, WYOMING

Coal in the Frontier Formation is found in three zones, the Kemmerer, Willow Creek and Spring Creek. Most mining has been in the Kemmerer zone. The main bed ranges from 5 to 20 feet thick. The rank of the Kemmerer coal is high volatile B bituminous.

The coal in the Adaville Formation is of subbituminous B rank and are the most important seams in the region. That part of the formation overlying the Hillard shale is the most important coal-bearing formation in the Kemmerer-Hams Fork area. It rises sharply above the valley floor and exposes many seams of coal of varying thickness.

Major seams vary in thickness along their outcrops, but at least eight exposed seams have thicknesses of 8 feet or more. The maximum thickness for a single bed is 100 feet. In all seams, splits are encountered that may range from 1 inch of clay to 15 feet of shale.



KEMMERER KRCRA, WYOMING

Acreages as Computed are from the Following Sources:

1. Status Inventory, Branch of Records and Data Management, Wyoming State Office.
2. Adjustments for partial sections included within the KRCRA boundaries were based on the assumption that each section represents 640 acres and contained sixteen 40 acre tracts. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.

Reference:

Narrative: Minutes of Wyoming Coal Land Evaluation Committee,  
USGS, 3-25-74.

Boundary Source - Area Geologist, Central Rocky Mountain Area, USGS.

Bureau of Land Management Surface-Mineral Management Quad, Wyoming.

SW-11, Kemmerer (November 1974)

SW-12, Granger (August 1975)

SW-16, Evanston (1974)

SW-21, La Chapelle Creek (1974)



Table 2  
TOWNSHIP SUMMARY  
KEMMERER KRCRA

T.	R.	P. D. SURFACE FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	FED	TOTAL							
21N	115W	3,732	2,319	877				6,928							
22N	"	3,478	1,120	1,041				5,639							
23N	"	741	320	144				1,205							
18N	116W	1,084		1,384				2,468							
19N	"	2,416		6,209		400		9,025							
20N	"	2,910	80	7,876		640		11,506							
21N	"	7,266	1,909	11,905	484	909	454	22,927							
22N	"	12,658	2,114	5,645	38	1,925	1,877	24,257							
23N	"	1,519	2,983	301				4,803							
16N	117W	1,346		2,304				3,650							
17N	"	8,537		9,864				19,041							
18N	"	8,396	478	12,622		640		22,696							
19N	"	8,243		10,349		1,260		19,852							
20N	"	11,142	1,223	7,410		1,230		21,005							
21N	"	5,840	320	400	641	640		7,841							
22N	"	1,520	80	160		640		2,400							
14N	118W	1,907	400	3,648		40		5,995							
15N	"	5,506	1,720	11,062		640		18,928							
16N	"	8,298	1,277	12,356		1,280		23,211							
17N	"	3,240		3,960		640		7,840							
18N	"	160		400		480		1,040							
20N	"	780		100				880							
13N	119W	521	1,230	4,433		320		6,504							
14N	"	1,699	480	4,381		640		7,200							
15N	"	320		520				840							
16N	"	240		400		480		1,120							
15N	120W	721		2,360				3,081							
16N	"	1,040		3,640				4,680							
TOTAL:		105,260	18,053	125,751	1,163	14,004	2,331	266,562							



Table 1

## POWDER RIVER BASIN KRCRA, WYOMING

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	390,901	9.81
Public Domain	Non-Federal	1,831	.05
Private	Federal	2,767,827	69.45
Private	Non-Federal	276,606	6.94
State	Federal	24,418	.62
State	Non-Federal	365,119	9.16
Forest Service	Federal	55,986	1.41
Forest Service	Non-Federal	5,040	.13
LU (BLM)	Federal	320	< .00
LU (BLM)	Non-Federal	879	.02
LU (FS)	Federal	56,987	1.43
LU (FS)	Non-Federal	28,364	.71
Military Reservation	Federal	5,706	.14
USBR Withdrawal	Federal	3,969	.09
Misc. Withdrawal	Federal	<u>1,385</u>	<u>.04</u>
TOTAL		3,985,338	100.00





## POWDER RIVER BASIN KRCRA, WYOMING

### Location and Physical Features

The Powder River Basin, Wyoming KRCRA is located in Sheridan, Johnson, Campbell, Natrona, Converse, and Niobrara Counties in the north-eastern part of the state. It is by far the largest established KRCRA. Major communities in or near the KRCRA are Sheridan, Buffalo, Gillette, Casper, and Douglas. Major drainages are the Powder River, Belle Fourche River, Little Powder River and the Cheyenne River. All flow north and east. Major reservoirs are the Keyhote 35 miles east of Gillette and the Glendo 15 miles southeast of Douglas. Topography is generally gently rolling grasslands, broken in places by clinker-capped buttes, ridges, deeply incised valleys, and badlands along the Powder River. Climate is semiarid.

Transportation is well established in major corridors. Interstate 25 runs north from Cheyenne to Douglas, then west to Casper. From Casper, I-25 runs north to Buffalo. I-90 runs north from Buffalo to Sheridan and east from Buffalo through Gillette. Gillette and Douglas are connected by 130 miles of State Highway 59.

Both the Burlington-Northern and the Chicago and Northwestern Railroads operate east-west main line rail service in the southern portions of the KRCRA through Casper and Douglas. Burlington-Northern also operates a line east from Gillette and northwest from Gillette to Decker, Montana.



## POWDER RIVER BASIN KRCRA, WYOMING

A spur from this line runs south from Gillette to AMAX's Belle Ayre Mine. This line may be extended further south to Douglas, pending current litigation.

The eastern edge of the Bighorn National Forest lies 15 miles west of the northwestern border of the KRCRA.

### Ownership Patterns

The dominant surface/subsurface ownership pattern within the KRCRA is private surface/Federal coal. This pattern covers 69 percent of the area, and is essentially completely contiguous.

There are more than 50 blocks of public domain/Federal coal within the KRCRA. The largest blocks in this category are in the central portions of the basin, the largest covering approximately 28,000 acres. Others are 22,000, 20,000, 12,000 and 12,000 acres in size. Many of these blocks have been identified by BLM as potential wilderness study areas.

There are 20 plus blocks of Bankhead-Jones (L.U.) surface/Federal coal concentrated in the eastern parts of the KRCRA in southern Campbell and northern Converse counties. The largest of these covers approximately



## POWDER RIVER BASIN KRCRA, WYOMING

16,000 acres. Other large blocks in this category cover 5,800, 4,500, 3,800 and 3,200 acres.

There are 20 plus blocks of Forest Service surface/Federal coal concentrated in the same areas as the Bankhead-Jones category. The largest covers approximately 11,500 acres. Two other large blocks cover about 5,800 and 3,800 acres. Lands in this category and the Bankhead-Jones category are mostly administered by the Forest Service as part of the Thunder Basin National Grasslands.

There are 20 plus blocks of state surface/non-Federal concentrated in the northwestern parts of the KRCRA. The largest covers about 17,300 acres. Others have sizes of 8,300 acres, 6,400, 6,400 and 4,400 acres. The normal state school sections are scattered throughout the KRCRA in sections 16 and 36.

### Coal Development and Resources

Current production from the KRCRA amounts to 30 to 40 million tons per year. Production may reach 130 to 150 million tons per year by 1985. There are 50 Federal coal leases covering about 122,200 acres and 60 PRLAs covering about 96,100 acres within the KRCRA.



## POWDER RIVER BASIN KRCRA, WYOMING

The KRCRA is defined by coals in the Lance, Fort Union, and Wahsatch Formation. In the Lance Formation, coal of sufficient thickness is present only in the southern and southwestern parts of the KRCRA. It averages 5 feet in thickness and is subbituminous B in rank.

The most significant coal occurrences are in the Fort Union and Wahsatch Formations above the Lance. The coal is thickest in the northern end of the KRCRA, thinning to the south. The beds are most persistent in the northern and eastern portions, and are somewhat lenticular in the southern and southwestern sections. The coal is 150 feet or more in thickness in the central portions, at depths of 1,000 feet. In the eastern portions of the KRCRA the coal often exceeds 100 feet in thickness and much is amenable to surface extraction methods. The Wyodak coal zone is of major commercial interest in the eastern parts. The coal is subbituminous C in rank in the eastern portions, with some lignite. The coal in the Fort Union and Wahsatch Formations is subbituminous B or C in the western portions.





POWDER RIVER BASIN KRCRA, WYOMING

Acreeges as Computed are From the Following Sources:

1. Status Inventory, Branch of Records and Data Management, Wyoming State Office.
2. Adjustments for partial sections included within the KRCRA boundaries were based on the assumption that each section represents 640 acres and contained sixteen 40-acre tracts. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.

References:

Narrative: Minutes of Wyoming Coal Land Evaluation Committee, USGS,  
6-27-73, Revised 9-24-75.

Boundary: Map attached to minutes of the Wyoming Coal Land Evaluation Committee, USGS.

Bureau of Land Management Surface-Mineral Management Quads, Wyoming.

NE-1, Burgess Junction (August 1976)

NE-2, Sheridan (1974)

NE-3, Spotted Horse (1974)

NE-4, Rocky Point (1974)



POWDER RIVER BASIN KRCRA, WYOMING

- NE-8, Buffalo (1974)
- NE-9, Echeta (1974)
- NE-10, Gillette (1974)
- NE-15, Pumpkin Creek (1974)
- NE-16, Highlight (1974)
- NE-21, Edgerton (1974)
- NE-22, Teckla (1974)
- NE-23, Alkali Butte (February 1975)
- NE-27, Cole Creek (1974)
- NE-28, Bill (1974)
- NE-29, Lance Creek (February 1975)
- SE-3, Casper (March 1975)
- SE-4, Douglas (May 1975)
- SE-5, Lusk (June 1977)



Table 2  
TOWNSHIP SUMMARY  
POWOER RIVER BASIN KRCRA, WYOMING

T.	R.	P.D. SURFACE FED COAL	P.O. SURFACE NON-FEO COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	F.S. SURFACE FED COAL	F.S. SURFACE NON-FEO COAL	L.U. SURFACE BLM FED COAL	L.U. SURFACE BLM NON-FED COAL	L.U. SURFACE F.S. FED COAL	L.U. SURFACE F.S. NON-FEO COAL	MILITARY RES FED COAL	USBR WITH- ORAWAL FED COAL	MISC WITH- DRAWAL FED COAL	TOTAL
34N	66W			200	360												560
33N	67W			160													160
34N	"			2,800	160												2,960
35N	"	160		2,125													2,285
36N	"	240															240
38N	"			200				880									1,080
39N	"			948			40	520				120					1,628
32N	68W			40													160
33N	"	360		2,406	1,727		120										4,613
34N	"			680	1,000												1,680
35N	"			80				160									240
36N	"	80															80
37N	"	2,117		1,197	159		80					120					3,673
38N	"			2,739	380		640	12,087			879	2,679					19,404
39N	"			10,445	478		760	4,769					400				19,532
32N	69W	40		120	120												280
33N	"	160		760	1,200		320										2,440
36N	"			520	40												560
37N	"	960		5,360	122												6,442
38N	"	7,008			680		1,280	1,924				2,842	3,480				17,214
39N	"			1,840	399		360		5,040			480	160				8,279
40N	"	1,480					240	40				160	280				2,200
41N	"			827				79				519	440				1,855
42N	"			280	200		40	760				2,320	797				4,397
43N	"			480	120		120										720
45N	"	842		3,963	80												4,885
46N	"	4,118		2,762	40												6,920
47N	"	80															120
38N	70W			240			440						520				1,200
40N	"			2,121			640	7,277				1,020	320				11,378
41N	"			5,603			280	3,880				1,960	1,278				13,001
42N	"			7,585			1,280	400				7,878	3,920				21,063



































Table 2  
TOWNSHIP SUMMARY

## POWDER RIVER BASIN KRCRA, WYOMING

T.	R.	P. D. SURFACE FED COAL	P. D. SURFACE NON-FED COAL	PRIVATE SURFACE FED CDAL	PRIVATE SURFACE NON-FED CDAL	STATE SURFACE FED CDAL	STATE SURFACE NON-FED CDAL	F. S. SURFACE FED CDAL	F. S. SURFACE NON-FED CDAL	L. U. SURFACE BLM FED COAL	L. U. SURFACE BLM NON-FED COAL	L. U. SURFACE F. S. FED COAL	L. U. SURFACE F. S. NON-FED COAL	MILITARY RES FED COAL	USBR WITH- DRAWAL FED COAL	MISC WITH- DRAWAL FED COAL	TOTAL
55N	85W	40		879	1,840		1,560										4,319
56N	"			3,271	2,72D		6,038										15,460
57N	"			4,643	6,18D		480							3,431			11,303
58N	240			4,756	696	160	2,240										8,092
58N	86W	63		193													256
TOTAL:		390,901	1,831	2,767,827	276,606	24,418	365,119	55,986	5,040	320	879	56,987	28,364	5,706	3,969	1,385	3,985,338



Table 1  
 Red Desert KRCA, Wyoming  
Summary of Surface-Mineral Ownership

Ownership Class			
Surface	Coal	Acreage	Percent of Total
Public Domain	Federal	453,267	57.83
Public Domain	Non-Federal	640	.08
Private	Federal	7,834	1.00
Private	Non-Federal	309,076	39.43
State	Federal	80	.01
State	Non-Federal	12,040	1.54
Public Water Reserve	Federal	880	.11
TOTAL		783,817	100.00





## RED DESERT KRCRA, WYOMING

### Location and Physical Features

The Red Desert KRCRA is located in northeastern Sweetwater County in south central Wyoming. The nearest major communities are Rawlins, about 20 miles east of the area and Rock Springs, about 35 miles to the west. The KRCRA is within the Great Divide Basin, an area of internal drainage and only intermittent streams and lakes. The topography is characterized by low rolling hills, small basins occupied by playa lakes and dry flats, and small buttes rising 50 to 300 feet above the general terrain. Rainfall is sparse at 10 inches per year, supporting scattered vegetation of sagebrush, greasewood and rabbit brush.

Access to the area is via county roads that run north from Interstate 80 which runs east-west along the southern edge of the KRCRA. The Union-Pacific Railroad runs parallel to I-80.

### Ownership Patterns

The dominant ownership pattern within the KRCRA is railroad checkerboard with alternating sections of Public Domain/Federal coal and private surface/non-Federal coal. This pattern covers about 70 percent of the area in a band across the southern and central parts of the KRCRA.



## RED DESERT KRCRA, WYOMING

There is one large block of Public Domain/Federal coal along the northern portion of the KRCRA. A 2 to 3 mile wide band of sand dunes intersects the western part of this block. There are three blocks of public water reserve/Federal coal in the central part of this block covering 2400, 640, and 320 acres.

In the central part of the checkerboard band there is a block of 24 sections alternating from private surface/non-Federal coal to private surface/Federal coal. In the eastern part of the checkerboard there is a block of 22 sections alternating from Public Domain/Federal coal to Public Domain/non-Federal coal.

There are about 20 blocks of state surface/non-Federal coal scattered throughout the KRCRA, none exceeding 640 acres.

### Coal Development and Resources

There is no current coal production from the KRCRA. No proposals for new coal operations could be identified. There are no Federal coal leases or PRLAs within the area.

The KRCRA is defined by subbituminous coal within the Fort Union and Wahsatch Formations. The coal in the Fort Union Formation is lenticular and occurs in as many as eight beds. Individual beds are 4 to 28 feet thick.



## RED DESERT KRCRA, WYOMING

There are seven major coal zones within the Wahsatch Formation. The stratigraphically lowest zone is the Latham, with two beds of a combined average thickness of 7 feet. Locally these beds reach a thickness of 20 feet.

The Creston Zone, above the Latham, has two major beds, averaging 18 feet in combined thickness and locally reaching 42 feet. Above the Creston is the Hadsell zone with four major beds with a combined average thickness of 4 feet, locally reaching 17 feet.

Above the Hadsell is the Sourdough-Tierney Zone with one major bed averaging 7 feet in thickness. Locally this bed is 12 feet thick. In places, the Sourdough-Tierney coalesces with the next upper zone, the Monument.

Within the Monument Zone there are two major beds which locally reach a combined thickness of 20 feet; elsewhere the average thickness is about 8 feet.

Above the Monument is the Battle Zone with one major bed averaging 8 feet in thickness and locally attaining 21 feet. The Luman Zone lies above the Battle and has two major beds, each with a maximum thickness of about 5 feet.



RED DESERT KRCRA, WYOMING

Uranium occurs throughout the Wahsatch formation coals. It is estimated that 55 million pounds of  $U_3O_8$  at grades greater than 0.003 percent occur in these coals.





RED DESERT KRCRA, WYOMING

Averages as Computed are from the Following Sources

1. Status Inventory, Branch of Records and Data Management, Wyoming State Office.
2. Adjustments for partial sections included within the KRCRA boundaries were based on the assumption that each section represents 640 acres and contained sixteen 40 acre tracts. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.

Reference:

Narrative: Wyoming Coal Land Leasing Minutes, USGS, May 13, 1977.

Boundary: Map attached to Wyoming Coal Land Leasing Minutes.

Base Maps: BLM Surface-Minerals Management Quads, Wyoming.

- SW - 10 Cyclone Rim (1974)
- SW - 14 Superior (January, 1976)
- SW - 15 Wamsutter (1974)
- SW - 19 Bitter Creek (January, 1976)
- SW - 20 Haystack Butte (no date)



Table 2  
TOWNSHIP SUMMARY  
RED DESERT KRCRA, WYOMING

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	PUBLIC WATER RESERVE	TOTAL						
20	92W	3,987			3,567				7,554						
21		12,491			1,760				14,251						
22		4,427			4,698				9,125						
23		680			686				1,366						
20	93	6,181			6,993		640		13,814						
21		13,435			9,596				23,031						
22		11,115			11,111	40			22,266						
23		9,127			7,458		640		17,252						
24		12,737					640		13,377						
19	94	1,203			840				2,043						
20		9,209			9,235				18,444						
21		10,860			11,508		640		23,008						
22		11,485			11,487				22,972						
23		14,651			7,642		640		22,933						
24		12,484			120		200		12,804						
19	95	7,426		5	6,383				13,814						
20		7,883		3,159	10,990	40			22,072						
21		10,882			11,522		640		23,044						
22		11,515			11,518		640		23,673						
23		19,211			3,196		640		23,047						
24		14,968					1,280		16,248						
19	96	6,831		637	7,595				15,063						
20	"	6,757		3,028	11,684		640		22,109						
21		11,566			11,558				23,124						
22		11,657			11,633				23,290						
23	"	21,176			960		1,280		23,416						
24	"	12,931					1,280		15,011						
18	97	1,040		960				800	2,000						
19	97	8,440			9,080		640		18,160						
20		10,5499			11,067				21,616						
21		11,510			11,511				23,021						
22		11,814			11,161				22,975						
23		13,040	640				640		14,320						



Table 2  
TOWNSHIP SUMMARY  
RED DESERT KRCRA, WYOMING

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	PUBLIC WATER RESERVE	TOTAL						
18	98	1,710			1,720				3,430						
19	"	11,425		5	11,465				22,895						
20	98W	10,911			10,949				21,860						
21	"	11,507			11,501				23,008						
22	"	14,787			8,195				22,982						
23	"	11,915					600		12,515						
18	99W	2,231		40	2,633			80	4,984						
19	"	11,121			11,516		360		22,997						
20	"	10,587			10,532				21,119						
21	"	11,510			11,515				23,025						
22	"	11,255			10,624				21,879						
23	"	9,320			120				9,440						
20	100				240				240						
21	"	1,560			1,440				3,000						
22	"	160			40				200						
TOTAL:		453,267	640	7,834	309,076	80	12,040	880	783,817						



Table 1

## ROCK SPRINGS KRCRA, WYOMING

Summary of Surface-Mineral Ownership

Ownership Class			
<u>Surface</u>	<u>Coal</u>	<u>Acreage</u>	<u>Percent of Total</u>
Public Domain	Federal	430,487	55.55
Public Domain	Non-Federal	120	.02
Private	Federal	7,739	1.00
Private	Non-Federal	312,905	40.38
State	Federal	249	.03
State	Non-Federal	18,467	2.38
Public Water Reserve	Federal	<u>4,973</u>	<u>.64</u>
TOTAL		774,940	100.00





## ROCK SPRINGS KRCRA, WYOMING

### Location and Physical Features

The Rock Springs KRCRA is located in central Sweetwater County, Wyoming. It is separated into several units trending generally north-south over a length of about 50 miles. The westernmost unit centers on the town of Rock Springs which has been considered a classic energy boom town. The 1970 population was 12,800 but it is much larger now.

Flaming Gorge Reservoir is several miles southwest of the southwest unit. I-80 passes through the center of the main units from east to west, following the valley of the Bitter River, which is the most prominent stream in the area. It flows into the Green River about 8 miles west of the KRCRA at the town of Green River.

Access is generally very good with I-80 and the Union Pacific Railroad running through the center of the KRCRA from east to west. Several state or county roads provide further access within the KRCRA.

### Ownership Patterns

Centered on the Union Pacific Railroad as it is, the dominant ownership pattern within the KRCRA is railroad checkerboard with sections alternating between Federal surface/Federal coal and private surface/non-Federal coal. Scattered Federal sections retain only surface rights, the minerals



## ROCK SPRINGS KRCRA, WYOMING

having been conveyed in the past. The usual sections 16 and 36 are state school sections. In the vicinity of Rock Springs, the pattern is broken by predominant private ownership of both the surface and the coal.

Outside of the roughly 40 mile wide swath of railroad checkerboard are relatively small areas of well-blocked Federal surface and minerals on both the north and the south ends of the KRCRA. In the south, nearly the entire portion of land outside the checkerboard is contiguous Federal surface/Federal minerals and totals roughly 37,000 acres, broken only by state sections and an area withdrawn as a public water reserve along a small drainage. A part of this area is shown as the Salt Wells Gas Field on the color quads.

In the north, a similar but smaller contiguous block is found of about 15,000 acres, bordering on sand dune areas in the north.

Except for these areas outside the checkerboard area, there are no blocks of contiguous Federal surface/Federal coal larger than 1,280 acres.

### Coal Development and Resources

Coal was first produced from the area of the Rock Springs KRCRA in the 1860s. Coal production peaked in 1945 at 6 million tons, from underground mines, but then declined to only a small fraction of that amount in 1972.

100-100000-100000  
100-100000-100000  
100-100000-100000

100-100000-100000  
100-100000-100000

## ROCK SPRINGS KRCRA, WYOMING

In 1976, two mines produced 3.5 million tons, of which 3.4 million was strip-mined. By 1981 these two mines and two new mines may produce 17.5 million tons, only 1 million tons of which will be mined by underground methods.

There are eight Federal coal leases within the KRCRA covering about 29,000 acres. There are 7 PRLAs covering about 14,000 acres.

The KRCRA is defined by coal in the Mesa Verde Group, the Lance Formation and the undivided Fort Union-Wasatch Formation.

The most important commercial coal beds found in the Mesa Verde group are in the Rock Springs and Almond Formations. The Rock Springs Formation contains at least 12 coal beds ranging from 2.0 - 13.8 feet in thickness. The coals are classified by rank as high-volatile C bituminous. The coals in the Almond Formation average about 4.9 feet in thickness, and the rank ranges from high-volatile C-B bituminous.

In the Lance Formation, the coals are locally known as the Black Buttes Group and average 6.5 feet in thickness. The coals rank as subbituminous B.

In the undivided Fort Union-Wasatch Formation, the coals are locally known as the Black Rock Group and have an average thickness of 6 feet. The coals have a rank of subbituminous A.

1950

1951

1952

1953

1954

1955

1956

1957

ROCK SPRINGS KRCRA, WYOMING

Averages as Computed are from the Following Sources:

1. Status Inventory, Branch of Records and Data Management, Wyoming State Office.
2. Adjustments for partial sections included within the KRCRA boundaries were based on the assumption that each section represents 640 and contained sixteen 40 acre tracts. Sections significantly larger or smaller than 640 acres were adjusted to reflect the approximate difference.

Reference:

Narrative: Minutes of Wyoming Coal Land Evaluation Committee, USGS,  
7-22-74, Rev. 6-8-77.

Boundary Status: Branch of Resource Evaluation, Conservation Division,  
USGS National Center, Reston, Virginia.

Bureau of Land Management Surface-Mineral Management Quad, Wyoming

SW-13, Rock Springs (1974)

SW-14, Superior (January 1976)

SW-18, Green River (1974)

SW-19, Bitter Creek (January 1976)

SW-23, The Glades (1974)

SW-24, Vermillion Creek (1974)





Table 2  
TOWNSHIP SUMMARY  
ROCK SPRINGS KRCRA

T.	R.	P. O. SURFACE FED COAL	P. O. SURFACE NON-FEO COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FEO COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FEO COAL	PUBLIC WATER RESERVE 8LM FED COAL	TOTAL						
20N	99 W	320			440				760						
17N	100M	7,876	6,626						14,502						
18N	"	9,282			11,403		160	400	21,245						
19N	"	6,964			8,594				15,558						
20N	"	8,742			8,327				17,069						
21N	"	6,399			6,111				12,510						
22N	"				280				280						
14N	101W	4,261							4,261						
15N	"	1,749							1,749						
16N	"	1,254			1,150				2,404						
17N	"	9,878			10,156				20,034						
18N	"	2,192			1,277				3,469						
20N	"	1,821			2,069			160	4,050						
21N	"	8,916			8,877				17,793						
22N	"	1,160			1,000				2,160						
14N	102W	6,959				40	360		7,359						
15N	"	12,123		520	1,922		1,280		15,845						
16N	"	6,865			6,918				13,783						
17N	"	1,240			1,200				2,440						
20N	"	560			1,080				1,640						
21N	"	5,511		1,120	9,231		640		16,502						
22N	"	9,514			9,705				19,219						
23N	"	720			960				1,680						
13N	103M	1,910						120	2,030						
14N	"	11,835				80	760	720	13,395						
20N	"	409			489				898						
21N	"	4,788			5,154				9,942						
22N	"	11,488			11,170				22,658						
23N	"	6,528		277	1,556	80	480	320	9,241						
13N	104W	110				10			120						
14N	"	4,570			420		2,241	140	7,371						
18N	"	510			500				1,010						



Table 2  
TOWNSHIP SUMMARY  
ROCK SPRINGS KRCRA

T.	R.	P.D. SURFACE FED COAL	P.D. SURFACE NON-FED COAL	PRIVATE SURFACE FED COAL	PRIVATE SURFACE NON-FED COAL	STATE SURFACE FED COAL	STATE SURFACE NON-FED COAL	PUBLIC WATER RESERVE BLM FED COAL	TOTAL						
19N	104W	759			5,842		80	120	6,801						
20N	"	1,327			5,862				7,189						
21N	"	8,828			10,664				19,492						
22N	"	9,439			7,960				18,039						
23N	"	7,480		160			640		8,440						
15N	105W	1,453	120		1,342		640	160	3,515						
16N	"	2,770			2,539			600	5,389						
17N	"	4,401			4,723			80	9,244						
18N	"	5,772			12,922		684	120	19,378						
19N	"	3,835		1,248	12,217		3,991		21,291						
20N	"	6,068		160	7,419		1,311		14,958						
21N	"	960			880				1,840						
16N	105W	160			480				640						
TOTAL:		209,706	6,746	3,485	182,839	210	13,267	2,940	419,193						

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