RESOURCE SERIES 27

COAL RESOURCES OF THE COLORADO SPRINGS 1/2° X 1° QUADRANGLE, COLORADO

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Introduction

This report and series of maps present the findings of an investigation entitled "Exploratory coal drilling and coring program in the Colorado Springs 1/2° X 1° Quadrangle, Colorado". This program is a cooperative investigation conducted by the Colorado Geological Survey and funded by U.S. Geological Survey Grant No. 14-08-0001-A0086. It is part of a nationwide program sponsored by the U.S. Geological Survey to assess the quality and quantity of the nation's coal resources, as authorized by the Federal Coal Leasing Amendments Act of October 1975.

The primary goal of the investigation is to evaluate the coal resources in the approximately 1900 mi^2 (4900 km^2) Colorado Springs 1/2° X 1° quadrangle. Only about one-third of the quadrangle is underlain by coal. Existing data was thoroughly researched, including drillers' logs and geophysical logs from coal exploration holes, uranium exploration drill holes, water wells, oil and gas wells, and miscellaneous other sources.

Primary data sources included the Colorado State Board of Land Commissioners (logs of coal exploration drill holes drilled on state lands), the Colorado Oil and Gas Conservation Commission (oil and gas well logs), the Colorado Mined Land Reclamation Division (information on holes drilled near abandoned mines), the Colorado Division of Mines (coal mine maps and data) the Colorado Division of Water Resources and U.S. Geological Survey, Water Resources Division (water well information), and private industry (exploratory drill hole data). No drilling was done by the Colorado Geological Survey for this project, however, a brief field investigation was conducted. Information from previous studies was the source of all data. Proprietary information was deleted on the published version of this report.

The Colorado Springs 1/2° X 1° quadrangle is located between latitude 38° 30' and 39°N and longitude 104° and 105°W (see Figure 1). The quadrangle includes most of El Paso County (approximately the southern three-fourths) and small portions of Elbert, Lincoln, Crowley, Pueblo, Fremont and Teller Counties. Only El Paso and Elbert Counties are underlain by coal in this quadrangle.

The Colorado Springs 1/2° X 1° quadrangle lies within the Great Plains physiographic province of the Interior Basin (Fenneman, 1931). The major structural features in the quadrangle are the Denver Basin, which comprises most of the northern half, the Front Range uplift in the west and the Apishapa uplift in the south. The Denver Basin is bounded by the outcrop of the Laramie Formation, which contains the oldest coal beds in the region. Coal beds also occur in the Denver Formation within the quadrangle. A generalized stratigraphic column of rocks from Upper Cretaceous through Eocene in age is presented in Figure 2.

Most of the information obtained from this investigation is presented in map and table form. This text serves as a general introduction and outline for the maps. For a more detailed discussion on the geography and geology of the area the following are recommended: Kirkham and Ladwig (1979) and Romero (1976).

Our nation's expanding energy demand requires that a detailed knowledge of our coal resources be available. The identification and classification of these coal resources provides information that will help to optimize resource recovery, and aid in land use decisions and energy planning.

Laramie Formation Coal Zone

The Laramie Formation coal zone underlies the Denver Basin and reaches a maximum depth of about 2,200 ft (675 m) along the basin axis in the north-central part of the quadrangle. The formation crops out in a roughly semicircular band (see Figure 4). The general stratigraphy of the Laramie Formation in the quadrangle is shown in Figure 3. The stratigraphy of the Laramie Formation coal zone is complex and changes significantly across the quadrangle. These changes in the lithologic characteristics of the coal zone and scarcity of data points in most of the quadrangle make correlation difficult.

The Laramie Formation coal zone was deposited within a delta-plain facies in channels, levees, splays, swamps and lakes (Kirkham and Ladwig, 1979). Coal distribution and stratigraphy in the Laramie Formation coal zone can be interpreted through the use of deltaic sedimentation models. The coals developed primarily in poorly drained swamps in overbank areas adjacent to the channel-margin facies (Weimer, 1973). Areas which don't contain coal were probably channel and channel-margin environments. Sandstones were deposited in channel environments, light gray, massive claystones were deposited in the well-drained swamps, and light-colored silts and clays were deposited on the levees. Peat and dark gray, organic-rich claystone were deposited in the poorly drained swamps in overbank areas and occasionally in abandoned channels. Fine-to medium-grained sandstones were deposited in overbank areas when crevasse splays broke through the levees.

Reliable water well and oil and gas well logs were the only data sources available for most of the quadrangle, especially where depths to the coal zone exceed several hundred feet. Areas of concentrated data exist near the edge of the basin, where there has been extensive coal exploration drilling or mining. Limited exposures of the Laramie Formation coal zone occur within the quadrangle. A few outcrops of the Laramie occur along stream courses including Horse Creek, Black Squirrel Creek, Williams Creek and several unnamed drainages. See Tables 1 and 2 and Plates 1-7 for details on Laramie Formation coal zone data used in this report. Table 3 is an index to data point sources.

Three separate coal beds have been identified by previous authors (Goldman, 1913; Boos, 1950) in the lower portion of the Laramie Formation in the Colorado Springs Coal Field (see Figure 6). In ascending order these coal beds are the A,B, and C coal beds. The A coal bed was the primary bed mined in operations throughout the Colorado Springs Coal Field. It locally splits into two or more beds across the quadrangle. Where two major splits of the A coal bed were identified they have been called the Upper A bed and Lower A bed (see Table 2). The Upper A bed is from 2.5-6 ft (0.8-1.8 m) thick at a depth of less than 100 ft (30 m) within a continuous 400 acre (1.6 km^2) area of the Hanover NW 7.5' Minute quadrangle. No other significant areas were identified with two splits of the A coal bed over 2.5 ft (0.8 m) thick. The Lower A coal bed and the unsplit A coal bed are the principal coal beds of economic thickness and have both been termed the A coal bed for mapping and resource calculation purposes. Since only a 400 acre area has been identified for which the Upper A coal bed is over 2.5 ft thick, this combining of beds will have a insignificant effect on mapping and resource calculations, considering the extent of the area being studied. The A coal bed lies about 50 ft (15 m) above the base of the Laramie Formation and is within 0-30 ft

(0-9 m) above the Laramie-Fox Hills transition zone. In this report the base of the Laramie Formation coal zone is defined as the top of the transition zone. The top of the Laramie-Fox Hills transition zone was chosen as the boundary because of the difficulty in picking the contact between the Laramie Formation and the Fox Hills Formation on geophysical logs. The prominent sandstone at the top of the transition zone is the only readily distinguishable unit with which to define the Laramie Formation coal zone.

The B coal bed is located 10-45 ft (3-14 m) above the A coal bed and generally marks the top of the Laramie Formation coal zone in the quadrangle. Thin unnamed coal beds of little economic significance are commonly found above the B coal bed, and also between the A and B coal beds.

The C coal bed is reported to be thin and lenticular (Goldman, 1913; Boos, 1950). The position of the C bed is not specified because it was not identified by any information available for this report.

Available coal analysis information shows that Laramie Formation coal is highest in apparent rank close to the mountains on the west side of the basin. In the northeastern part of the quadrangle the coal has an apparent rank of lignite A, based on data just outside this quadrangle (Eakins and Ellis, 1986). No analyses are available for the eastern side of the basin between the north quadrangle boundary and an area southwest of the town of Truckton. On the basis of coal rank data surrounding this area the coal on the east side of the basin probably has an apparent rank between lignite A and subbituminous C. Coal analysis information is available from drilling projects conducted in the Hanover NE and Hanover NW Quadrangles. This information reveals that the A coal bed has an apparent rank ranging from subbituminous C to subbituminous B in this area.

As-received analyses are:

	Hanover NE Quad		Hanover NW Quad
	Range	Avg	Avg
Moisture	20-24	22.5	26
Ash	6-13	9.0	7
Volatile Matter	30-41	32.5	31
Fixed Carbon	26-40	35.5	36
Sulfur	0.4-0.6	0.4	0.6
Btu/lb	8300-9500	8700	9000

Detailed analyses from these drilling projects are contained in files of the Colorado State Land Board which have been loaned to the CGS. Analyses for numerous mine samples from the Colorado Springs Coal Field are available in CGS Open File Report 78-9 (Kirkham, 1978b, p. 70-81). These analyses indicate the Laramie Formation coal throughout the coal field is generally subbituminous B, with some samples subbituminous C in rank.

Mining of the Laramie Formation coals in the quadrangle began in 1883 with the opening of the Franceville mine east of the town of Colorado Springs. Eventually about 75 mine entrances were opened and two surface mines were developed in the Colorado Springs Coal Field. Most of the overall 16.1 million tons of coal were produced between 1900 and 1950. No coal mining took

place from 1965 to 1980. The Bacon Strip Mine operated briefly in 1980 and 1981. Almost all of the coal production has been from underground mines in the A coal bed. See CGS Open File Report 78-9 (Kirkham, 1978b, p. 21-29) for details on mining within the quadrangle.

The A coal bed is mapped on plates 8-10. Map contours generated at a scale of 1:24,000 (see Plate 1) have been transferred to plates 8-10. Plate 8 is an isopach map of A coal bed thickness. Note the deficiency of data points for large areas of the quadrangle and concentration of data points in some areas. Plate 9 is a structure map on the top of the A coal bed and plate 10 is an overburden isopach map of the A coal bed. These maps have been used to generate the coal resource estimates.

Within the quadrangle the A coal bed contains about 2.75 billion tons of coal over 2.5 ft (0.8 m) in thickness (see Table 3). Almost 90 percent of the coal is between 2.5-5 ft (0.8-1.5 m) thick. A bed resources at depths less than 200 ft (61 m) total only about 200 million tons, or 7 percent of the overall tonnage. This shallow depth coal is significantly thicker than the overall average; almost 40 percent of the coal is between 5 and 10 ft (1.5 and 3.0 m) thick. See Table 3 for details of coal resource estimates.

Future development of coal in the A coal bed of the Laramie Formation is possible. Several important coal characteristics and mining economics factors would be considered in planning development of the coal. These are coal bed thickness, Btu value, overburden character and thickness, demand for coal, transportation costs, and environmental considerations. Surface mining of coal in the area of the Franceville and Bacon Mines or in other areas with suitable strip ratios may be feasible in the future. Underground mining could be revitalized in many areas of the Colorado Springs Coal Field where coal bed thicknesses and mining conditions are favorable. Commercial or residential development of the surface would be a possible constraint to mining. In-situ gasification, of these resources is unlikely, because the coal probably is too thin and overburden characteristics are not suitable. The primary economic problems with marketing coal from this area are low coal quality and competition from lower cost coal from the Powder River Basin in Wyoming and from elsewhere in the Rocky Mountain Region. The primary competitive advantage for Colorado Springs coal is its proximity to large markets, particulary the city of Colorado Springs and the Denver metropolitan area.

Denver Formation Coal Zone

In this report the formation names used by previous workers, including Scott (1976) have been altered to fit the regional framework of Denver Basin coal. Coal to the north of this quadrangle, in the Castle Rock 1/2° X 1° Quadrangle, is in the Denver Formation (see Bryant, 1981), and the stratigraphically equivalent unit in the Colorado Springs Quadrangle has been called the Dawson Formation by Scott (1976) and others. For consitency of terms in these adjacent 1/2° X 1° quadrangles the name Denver Formation will be used in both reports for the equivalent units.

The general stratigraphy of the Denver Formation in the quadrangle is shown in Figure 2. The depositional environment in which Denver Formation coal was formed is poorly understood. One possible model to explain the development of the coal is that of an anastamosing fluvial system (see Smith and Putnam, 1980). The Denver Formation coal zone contains numerous thin beds of coal that are ranked as lignite. Very little data exists for this coal zone within the quadrangle. Coal beds are generally less than 4 ft (1.2 m) thick, and

most beds are less than 2.5 ft (0.8 m) thick. Isolated areas may contain lignite of sufficient thickness to be mined, but these could not be identified using available data. Some mining has been done in the past, from 7 very small mines. See CGS Open File Report 78-9 (Kirkham, 1978b, p. 70-81) and 79-1 (Boreck and Murray, 1979) for details on previous mining and depletion figures. The general areal extent of the Denver Formation coal zone can be approximated from information contained in Table 1. The Denver Formation coal zone crops out in a roughly semicircular band closer to the basin interior than the Laramie Formation coal zone outcrop.

Denver Formation coal has an apparent rank of lignite A, according to analyses from the Castle Rock quadrangle (Eakins and Ellis, 1986) and one available analysis for the Mosby mine (Kirkham, 1978b). Throughout the Denver Basin these lignites are noted for their numerous clay partings. Some partings are kaolinitic and might be economically extracted, assuming the lignite could be mined.

For information on coal resources in the Denver Formation see Speltz (1976). Speltz calculated resources for beds over 2 ft (0.6 m) thick at depths less than 150 ft (46 m). Water well logs were used as data in the Speltz report, which could lead to large errors in estimation because they are generally inreliable for coal bed interpretation. No resource estimates or mapping have been done in this report for the Denver Formation coal zone due to insufficient data and generally thin coal beds.

Resource Calculations

Coal beds in the Denver Formation and the B and C coal beds in the Laramie Formation are not included in these resource calculations because of insufficient data and/or insufficient coal bed thickness. Coal resources are only calculated for the A coal bed of the Laramie Formation (Table 4). The density of data points for the A coal bed varies tremendously, with most data points concentrated within a narrow band along the outcrop, especially in areas of heavy mining and a few areas of extensive exploratory drilling. Data points are widely-spaced where the depth to the coal zone exceeds several hundred feet. These widely-spaced data points are generally water wells or oil and gas exploration drill holes, for which interpretation of coal bed thicknesses may be inaccurate. Resource estimates in the vicinity of these data points should be considered preliminary.

Depletion from previous mining was considered in estimating resources. See Table 5 and Boreck and Murray (1979) for depletion figures.

Resource estimate categories used are based on USGS Circular 891 (Wood and others, 1983). Some proprietary data was used in this study. Measured and indicated resource reliability categories are combined and considered demonstrated resources in order to preserve the confidentiality of drill hole locations. The reliability categories are determined by the distance of the coal resources from a data point. Demonstrated resources include coal resources calculated within a radius of 0-.75 mi (0-1.2 km) from a data point, inferred resources include coal resources calculated within a radius of .75-3.0 mi (1.2-4.8 km) from a data point, and hypothetical resources include coal resources calculated in the area greater than 3.0 mi (4.8 km) from a data point. The coal resources for the A coal bed of the Laramie Formation are tabulated on table 4 by township and range. For each township, coal resources are tabulated by overburden thickness and coal thickness categories.

Overburden thickness categories used are 0-200 ft, 200-500 ft, 500-1000 ft, 1000-2000 ft, and 2000+ ft. Coal thickness categories used are 2.5-5 ft, 5-10 ft and 10+ ft. The average thickness shown in table 4 is a weighted average. Total coal resources for the A coal bed are about 2.75 billion tons (see table 4). About 194 million tons are below less than 200 feet of overburden.Previous coal resource estimates within the quadrangle were done by Landis (1971) and Speltz (1976). In his report on Colorado coal resources, Landis only estimated coal resources for 9 townships within the Colorado Springs coal field. They are stated to contain about 400 million tons of coal in the A coal bed. The Speltz report gives an estimate of the total identified strippable coal within Colorado. For the Denver Basin these are subdivided only by township and range, and since the quadrangle boundaries are within townships it is not possible to precisely assign his estimates to the quadrangle. Within 8 townships entirely within the quadrangle Speltz estimates about 315 million tons of strippable coal. Five townships had estimates done by both Landis and Speltz. These are shown in the table below, along with estimates from table 4 of this report.

TONNAGE ESTIMATES (MILLION TONS)

TOWNSHIP	RANGE	LANDIS	SPELTZ	EAKINS
T13S	R64W	2.9	37.9	163.7
	R65W	23.1	12.9	166.7
	R66W	133.1	38.9	57.1
T14S	R65W	93.3	22.7	97.3
	R66W	2.5	51.9	17.9

Conclusions

Coal resources in this report are greater than those estimated in previous coal resource studies of the Colorado Springs Quadrangle. This apparent discrepency can be explained in part by the somewhat larger data base used for this study and large areas containing hypothetical coal resources due to the distance of the resources from data points, for which data interpretation is questionable.

The probability of future mining in the quadrangle will depend upon many complex and interrelated factors, some of which lie beyond the scope of this report.

Surface and/or underground mining of Laramie Formation coal will be limited to areas within several miles of the basin margin, most likely form the A coal bed within the Colorado Springs Coal Field. Most of the Laramie Formation coal is too deep or too thin for economical recovery using present methods.

Denver Formation coals are not of sufficient thickness within the quadrangle to be mineable, according to the limited amount of available data. Additional subsurface data may reveal isolated areas of minable lignite beds. The development potential for Denver Foramtion coals is very low.

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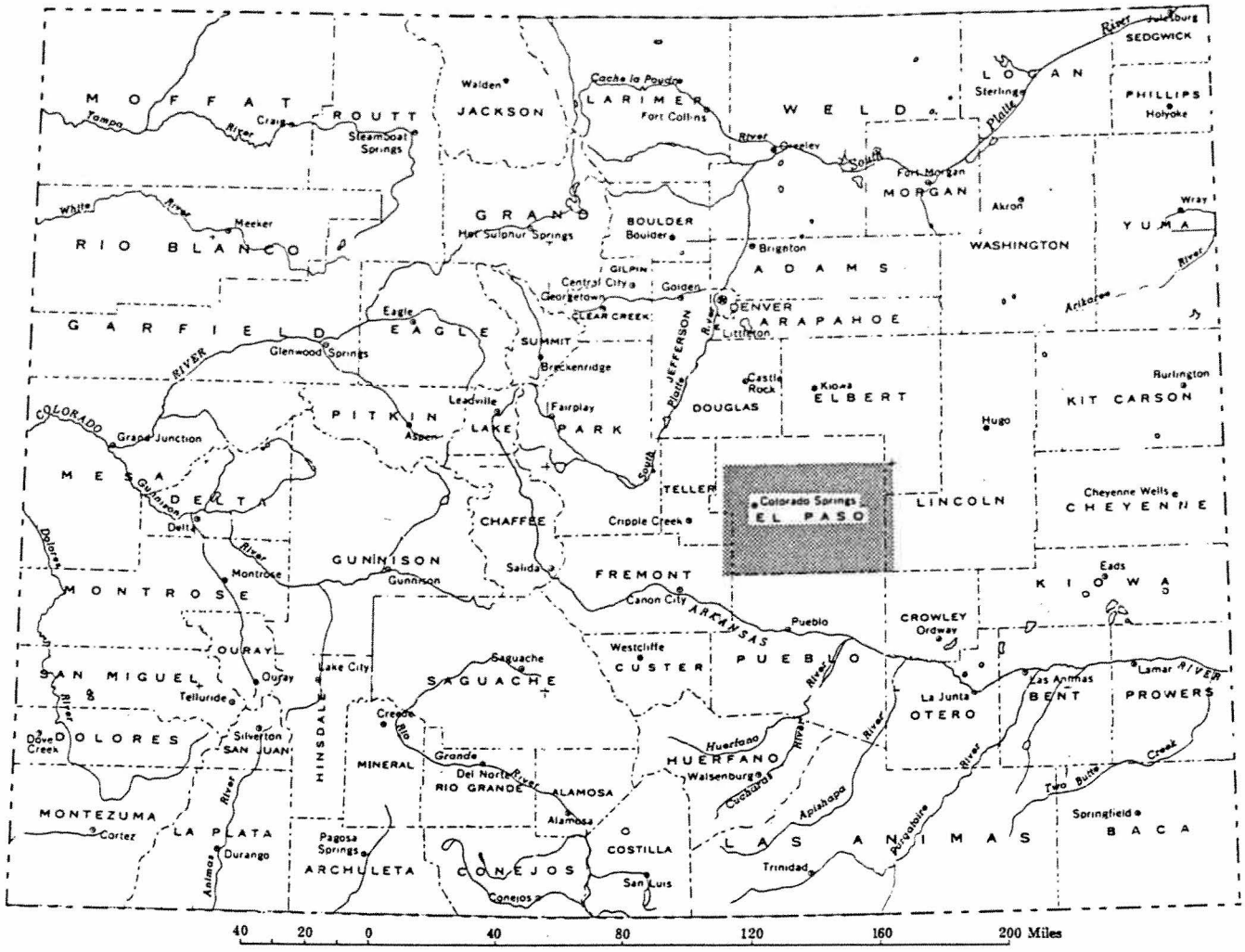


Figure 1. Location map of the Colorado Springs 1/2° X 1° Quadrangle.

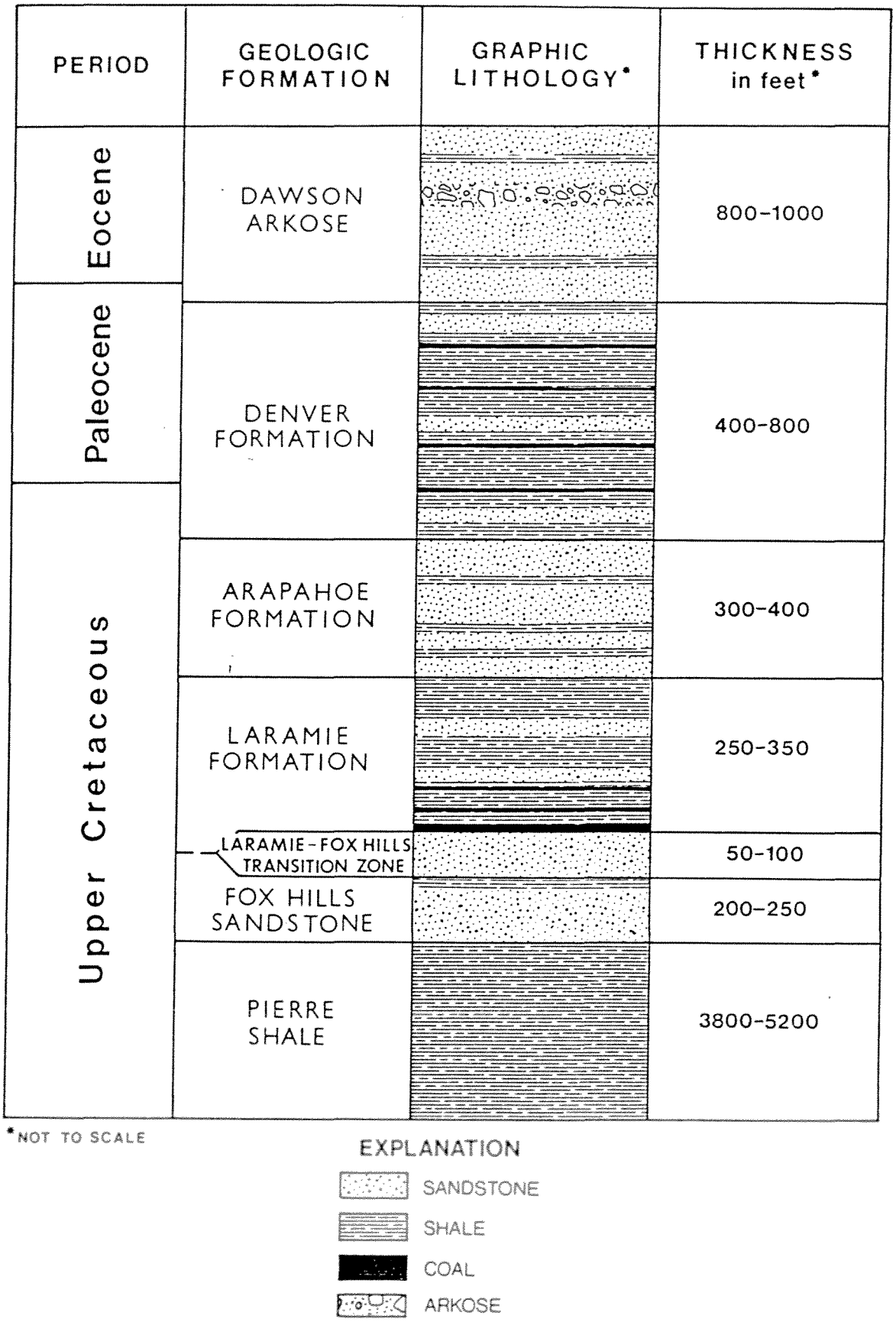


Figure 2. Generalized stratigraphy of the Colorado Springs 1/2° X 1° Quadrangle.

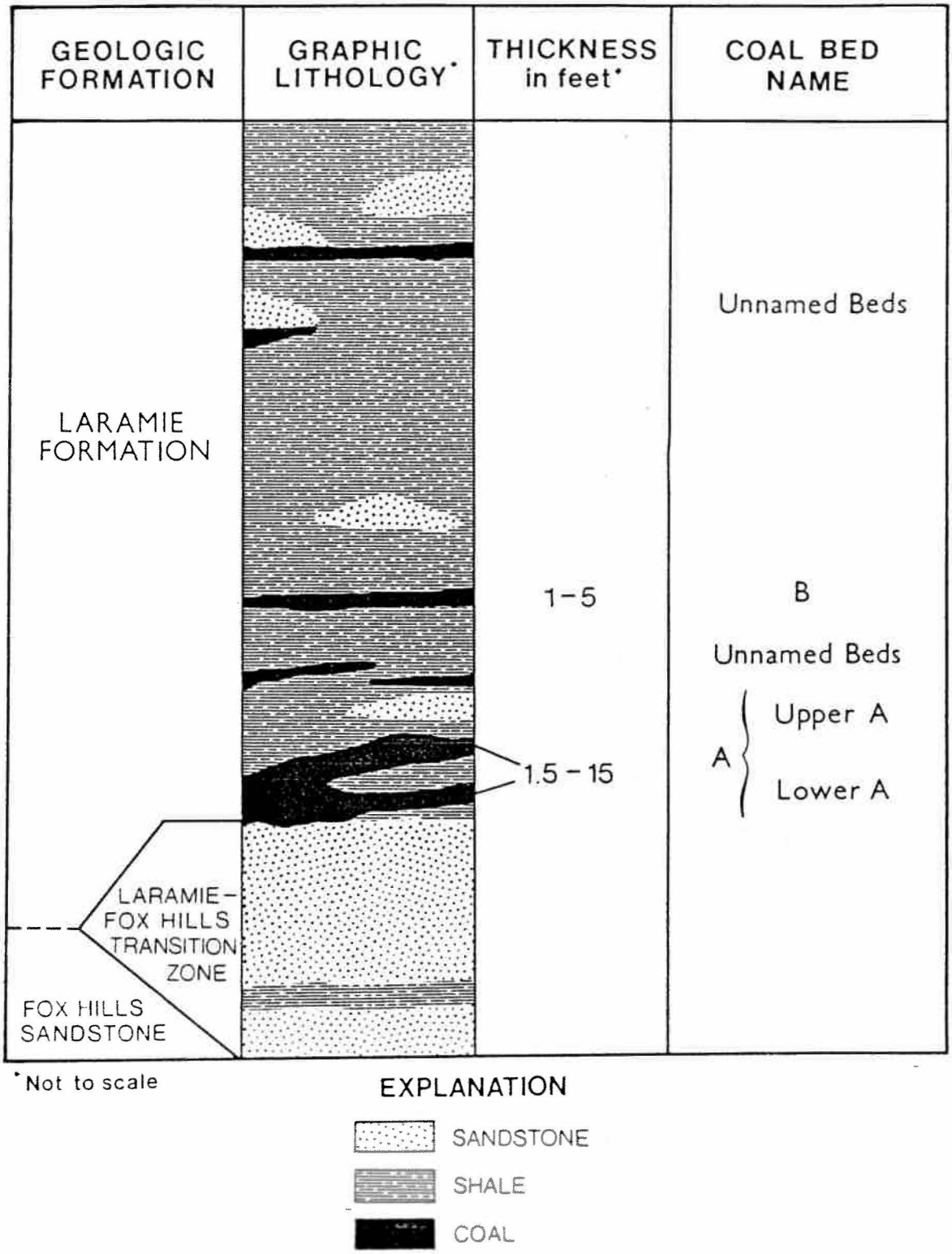
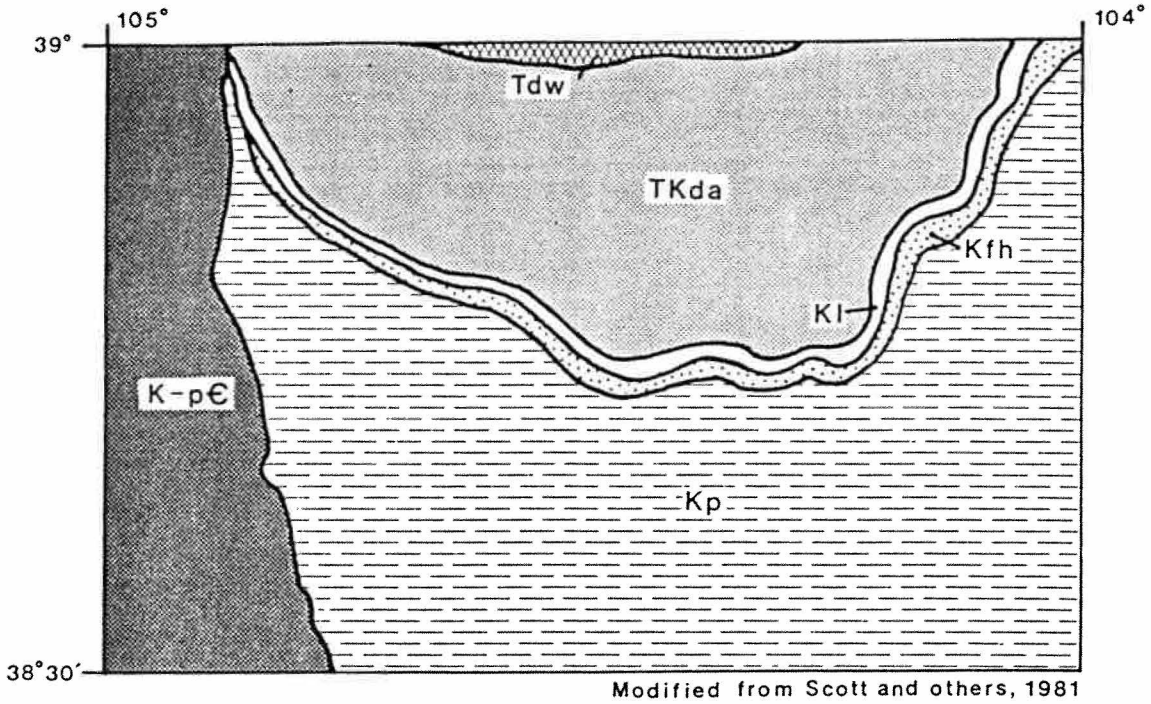


Figure 3. Generalized stratigraphy of the lower Laramie Formation and the Laramie-Fox Hills transition zone, Colorado Springs 1/2° X 1° Quadrangle.



EXPLANATION

Tdw	Dawson Arkose
TKda	Denver and Arapahoe Formations
Kl	Laramie Formation
Kfh	Fox Hills Sandstone
Kp	Pierre Shale
K-pЄ	Undifferentiated (Niobrara Fm. through pre-Cambrian age rocks)

Figure 4. Bedrock geology of the Colorado Springs 1/2° X 1° Quadrangle.

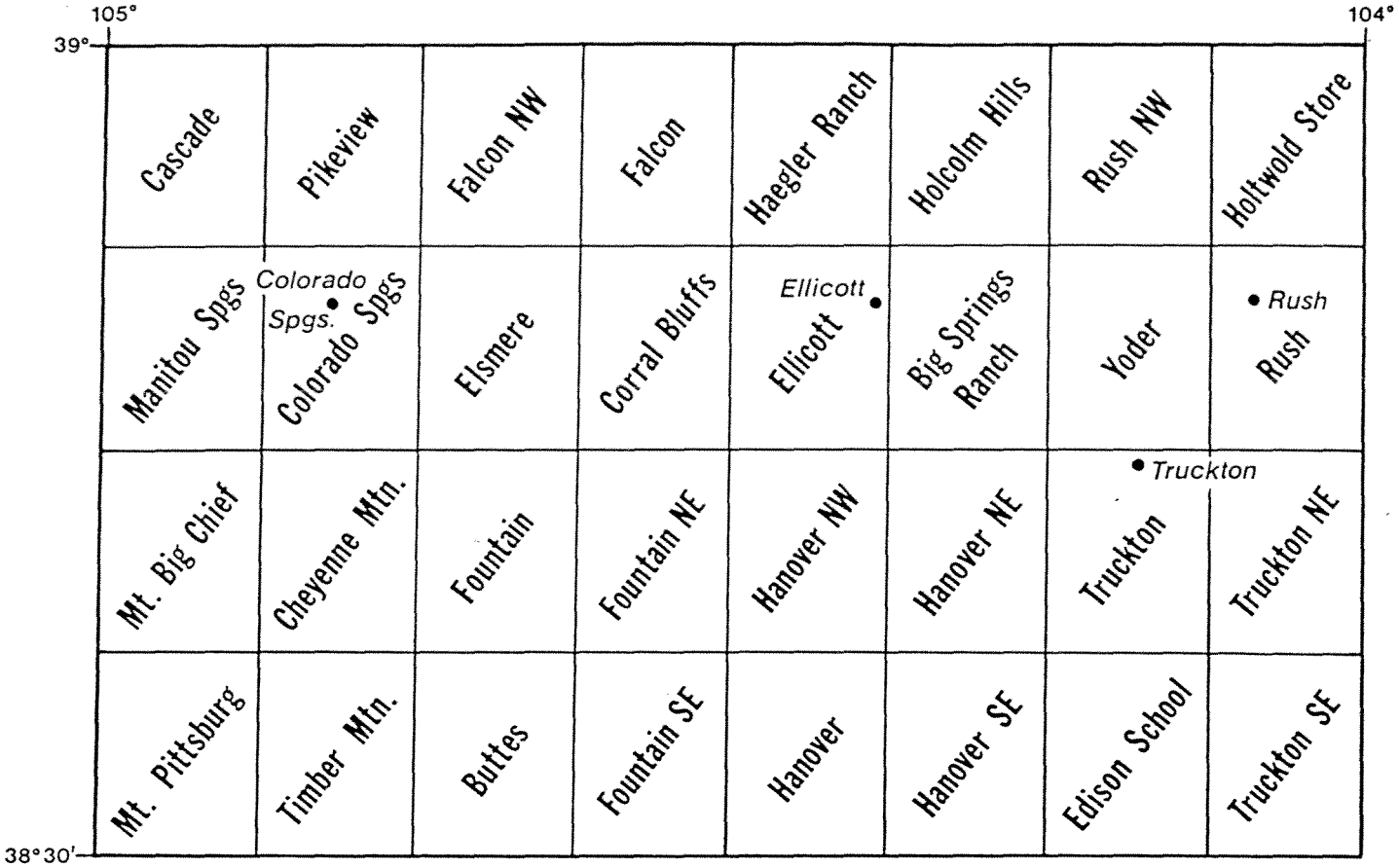
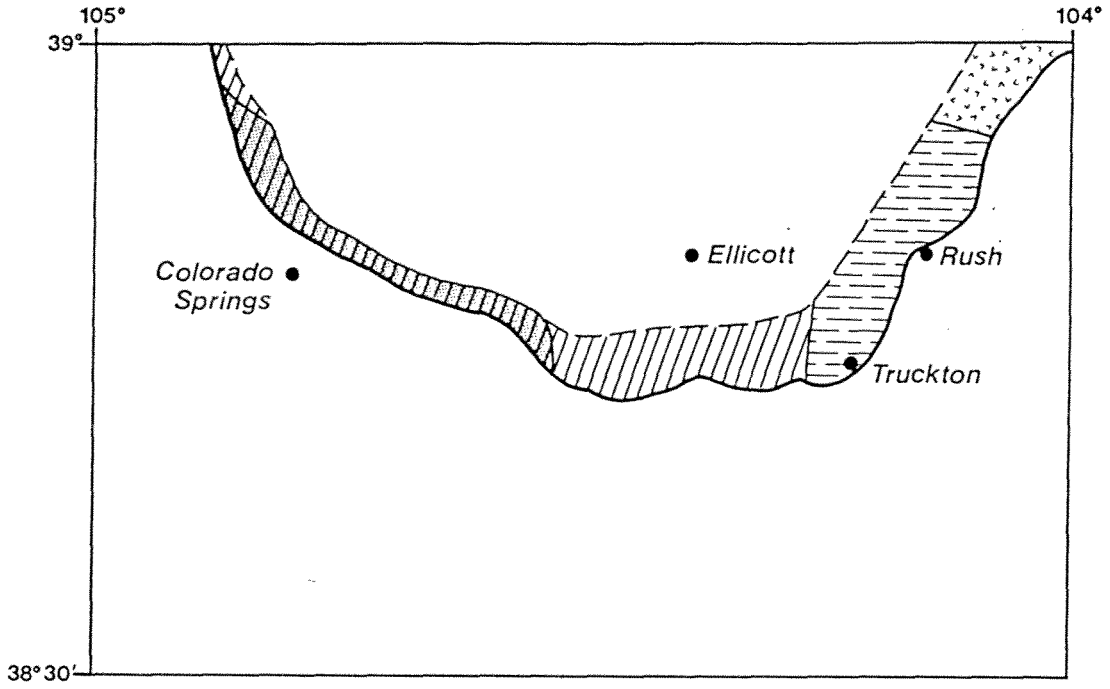


Figure 5. Index map of 7.5' Quadrangles within the Colorado Springs 1/2° X 1° Quadrangle.



EXPLANATION

Edge of Denver Basin

Colorado Springs Coal Field [approx. location]

Area estiminated to have an apparent rank of:

Lignite A

Lignite A – subbituminous B

Subbituminous C – subbituminous B

Figure 6. Location map of the Colorado Springs Coal Field and apparent rank of the A coal bed near the Denver Basin margin, Colorado Springs 1/2° X 1° Quadrangle.

TABLE 1
DRILL HOLE AND MINE DATA
QUADRANGLES WITH DENVER FORMATION AND LARAMIE FORMATION DATA

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	DENVER FM COAL ZONE Depth to Top	DENVER FM COAL ZONE Elevation of Top	DENVER FM COAL ZONE Zone Thickness (coal)	LARAMIE FM COAL ZONE Depth to top of A Bed	LARAMIE FM COAL ZONE Elevation top of A Bed	LARAMIE FM COAL ZONE A Bed Thickness (coal)	Comments
NOTE: All depths, elevations and thicknesses are in feet										
BIG SPRINGS RANCH QUADRANGLE										
GO-1	14S 62W 12 SWNW	6,280	759.0	VERY THIN BED			563.0	5,717.0	1.5	
GO-3	14S 62W 10 NW	6,034	38.0	30.0	6,004.0	4.0				
GO-4	14S 62W 1 SWNW	6,110	36.0	25.0	6,085.0	3.0				
GO-5	14S 62W 1 SE	6,155	15.0	13.0	6,142.0	2.0				
GO-6	14S 62W 12 SENE	6,221	30.0	24.0	6,197.0	1.0				
GO-8	14S 62W 11 SENE	6,275	15.0	4.0	6,271.0	2.0				
GO-9	14S 62W 3 NESE	6,080	40.0	30.0	6,050.0	2.0				
O-367	14S 61W 31 NENE	6,128	6,315.0		CSG		453.0	5,675.0	3.0	B BED 5.0 @ 415
O-369	14S 62W 14 NWSE	6,159	6,492.0		CSG		491.0	5,668.0	6.0	3.0/2.0P/3.0
O-370	14S 62W 27 SENW	5,981	6,355.0		CSG		354.0	5,627.0	5.0	COAL UNCERTAIN
O-374	15S 61W 18 NWNW	6,031	5,905.0		CSG		247.0	5,784.0	3.0	
ELSMERE QUADRANGLE										
16387-F	14S 65W 6 SENW	6,360	930.0	NO INFO. FROM LOG		773.0	5,587.0		5.0	
JC-579	14S 65W 16	6,240	200.0		OC		150.4	6,089.6	3.9	LOCATED TO SECTION ONLY
O-371	14S 65W 2 NWNW	6,548	7,600.0	303.0	6,241.0	4.0	1,121.0	5,427.0	4.0	B BED 3.0 @ 1109
W-114	14S 66W 1 SW	6,280	393.0		OC		303.0	5,977.0	3.0	
CARDIFF	14S 66W 2 SWSE	6,270			OC		?	?	2.5	NO DEPTH INFORMATION
ENTERPRISE	14S 66W 12 SWNW	6,230			OC		?	?	2.5	NO DEPTH INFORMATION
JIMMY CAMP	14S 65W 16 NESE	6,190	55.6		OC		50.0	6,140.0	5.6	
KURIE	14S 65W 14 NWNE	6,130			OC		?	?	5.0	NO DEPTH INFORMATION
McFERRAN	14S 65W 10 SWSE	6,230			OC		?	?	7.0	NO DEPTH INFORMATION
TUDOR	14S 66W 2 SESW	6,240			OC		?	?	5.5	NO DEPTH INFORMATION
FALCON QUADRANGLE										
65539	13S 64W 6 NWSE	6,890	110.0	35.0	6,855.0	1.0		NTH		
71041	13S 64W 8 SWSW	6,755	77.0	41.0	6,714.0	2.0		NTH		
O-324	12S 64W 22 SESW	6,871	8,263.0	NO INFO. FROM LOG		1,926.0	4,945.0		4.0	
FALCON NW QUADRANGLE										
52060	12S 66W 24 SESE	7,350	325.0	190.0	7,160.0	5.0				
CS-1	13S 65W 32 NENE	6,591	1,300.0	NO INFO. FROM LOG		1,252.0	5,339.0		4.0	B BED 3.0 @ 1228
HAEGLER RANCH QUADRANGLE										
62325	12S 62W 30 SESW	6,400	131.0	11.0	6,389.0	16.0				
68264	12S 63W 35 NENE	6,450	290.0	110.0	6,340.0	5.0				
O-361	13S 63W 16 NENE	6,382	7,227.0				1,165.0	5,217.0	4.0	B BED 4.0 @ 1150
O-362	13S 63W 20 NWSE	6,410	7,163.0				1,210.0	5,200.0	?	USED FOR STRUCTURE ONLY

TABLE 1 (CONT'D)

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	DENVER FM COAL ZONE Depth to Top	DENVER FM COAL ZONE Elevation of Top	DENVER FM COAL ZONE Zone Thickness (coal)	LARAMIE FM COAL ZONE Depth to top of A Bed	LARAMIE FM COAL ZONE Elevation top of A Bed	LARAMIE FM COAL ZONE A Bed Thickness (coal)	Comments
				HOLCOLM HILLS QUADRANGLE						
0-351	12S 62W 32 NESE	6,506	7,215.0	151.0	6,335.0	?	1,263.0	5,243.0	?	CAN'T DETERMINE COAL THICKNESS
0-354	13S 61W 5 NWNW	6,727	7,270.0	410.0	6,317.0	4.0	1,315.0	5,412.0	?	APPROX BED DEPTH FROM L-F AQ
0-358	13S 62W 16 SESE	6,272	6,939.0		CSG		938.0	5,234.0	5.0	COALS QUESTIONABLE B BED 2.0 @ 811
MOSBY	13S 61W 18 NESE	6,490		?	?	4.3		NTH		1.2/0.1P/1.5/0.3P/1.6 "MOSBY BED", NO DEPTH INFORMATION
MM AND P	13S 61W 19 NENW	6,380		?	?	4.5		NTH		NO DEPTH INFORMATION

LIST OF ABBREVIATIONS

CSG	CASING
L-F AQ	LARAMIE-FOX HILLS AQUIFER
NTH	NOT TO HORIZON
OC	OUTCROP
P	PARTING

NOTE: SEE TABLE 3 FOR SOURCES OF DATA POINTS

TABLE 2

DRILL HOLE AND MINE DATA
QUADRANGLES WITH LARAMIE FORMATION DATA ONLY

Data Point ID	Location Twp	Rge	Sec	1/4	1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED A Bed Thickness (coal)	Comments
Note: All depths, elevations and thicknesses are in feet														
COLORADO SPRINGS (7.5') QUADRANGLE														
AUSTIN BLUFFS	14S	66W	4	NW	NE	6,300					?	?	6.2	NO DEPTH INFORMATION
CITY NO. 4	14S	66W	3	NW	SE	6,270					?	?	4.5	NO DEPTH INFORMATION
EL PASO	13S	66W	33	SW	SE	6,300	48.2				?	?	8.0	NO DEPTH INFORMATION
RAPSON	13S	66W	33	SW	SW	6,230	70.3				60.0	6,170.0	8.0	USED AVERAGES FROM 29 DRILL HOLES FROM COLO. MINED LAND RECL. DIV.
DH NO. 2	14S	66W	3	NW	NE	6,390	354.0				351.0	6,039.0	3.0	INFORMATION FROM MINE MAP
DH NO. 3	14S	66W	3	NE		6,330	269.0				262.0	6,068.0	7.0	INFORMATION FROM MINE MAP
DH NO. 4	14S	66W	3	SE	NE	6,320	205.0				201.0	6,119.0	4.0	INFORMATION FROM MINE MAP
DH NO. 5	14S	66W	3	NE	NW	6,350	213.0				209.0	6,141.0	4.0	INFORMATION FROM MINE MAP
CORRAL BLUFFS QUADRANGLE														
CM-3a	14S	64W	32	SW	NE	6,140	300.0	84.2	6,055.8	2.0	92.8	6,047.2	2.6	A BED 1.4/1.1P/1.2 B BED 2.3 @ 69.5
CM-15	14S	64W	32	NW	SE	6,130	200.0	89.4	6,040.6	2.4	95.5	6,034.5	1.5	
CM-16	14S	64W	32	NE	SE	6,125	220.0	111.6	6,013.4	1.3	121.9	6,003.1	1.4	
CM-17	14S	64W	32	SW	SE	6,120	100.0				66.2	6,053.8	3.8	B BED 2.3 @ 17.4
CM-18	14S	64W	32	SW	SE	6,080	120.0				63.0	6,017.0	2.9	1.3/0.4P/1.6
CM-19	14S	64W	32	SE	SE	6,130	140.0				101.0	6,029.0	1.3	ALSO 1.5 @ 27.5 B BED 2.4 @ 18
CM-20	15S	64W	9	NE	NE	6,125	200.0							SS CHANNEL IN A POSITION
CM-22	15S	64W	11	SW	SE	6,000	200.0	114.8	5,885.2	1.3	133.3	5,866.7	1.7	
SLB-25	14S	64W	29	NW	NW	6,140	85.0	59.0	6,081.0	3.0	74.0	6,066.0	5.1	ALSO 1.0 @ 84
SLB-26	14S	64W	29	NW	SW	6,085	72.6	40.0	6,045.0	2.4	56.0	6,029.0	7.4	ALSO 1.6 @ 71
SLB-27	14S	64W	32	NW	NW	6,070	56.2	45.0	6,025.0	2.7	51.0	6,019.0	5.2	
SLB-28	14S	64W	32	SE	NW	6,100	47.7	21.0	6,079.0	2.0	46.0	6,054.0	1.7	
SLB-29	14S	64W	32	NW	SW	6,080	25.0	5.0	6,075.0	3.2	23.0	6,057.0	2.0	
SLB-30	14S	64W	32	SW	SW	6,140	33.2				31.0	6,109.0	2.2	
SLB-31	14S	64W	32	SE	SW	6,115	30.3				27.0	6,088.0	3.3	
W-153	15S	64W	5	SE	NE	6,090	260.0				70.0	6,020.0	4.0	
BACON	14S	64W	29	NW		6,090		88.0	6,002.0	2.0	95.0	5,995.0	5.0	ANALYSIS, NO DEPTH INFO
CELL	14S	64W	30	SE	NE	6,080					?	?	5.3	NO DEPTH INFORMATION
CLARA BELLE	14S	64W	19	SW	SE	6,090	109.0				100.0	5,990.0	9.0	
CORLEY NO. 3	14S	64W	30	NE	NE	6,115	114.2				110.0	6,005.0	4.2	
DAVIES	14S	64W	29	NW	SW	6,100					?	?	4.6	NO DEPTH INFORMATION
FRANCEVILLE	14S	64W	30	NE	NE	6,110					?	?	6.0	NO DEPTH INFORMATION
FRANCEVILLE NO. 1	14S	64W	19	NE	SW	6,070					?	?	8.0	NO DEPTH INFORMATION
FRANCEVILLE STRIP	14S	64W	19	SW		6,070					?	?	7.5	6.5-9 FT., NO DEPTH INFORMATION

TABLE 2 (cont'd)

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED A Bed Thickness (coal)	Comments
FRANCEVILLE NO. 2	14S 65W 24 NWSE	6,100					?	?	8.0	NO DEPTH INFORMATION
FRANCEVILLE NO. 2a	14S 65W 24 NESE	6,075					?	?	7.0	NO DEPTH INFORMATION
FRANCEVILLE NO. 2b	14S 65W 24 SENE	6,090					?	?	5.7	NO DEPTH INFORMATION
THOMAS D. DAVIS	14S 64W 30 NE	6,090					?	?	4.7	NO DEPTH INFORMATION
RME-2	14S 64W 30 SENE	6,077	70.0				47.3	6,029.7	8.4	5.0/3.2P/3.4
RME-4	14S 64W 30 SENE	6,097	95.0	77.6	6,017.4	1.6	88.7	6,006.3	1.6	
RME-5	14S 64W 30 SENE	6,070	55.0	20.0	6,050.0	1.0	33.0	6,037.0	10.8	6.7/2.4P/4.1, NESENE SEC 30
RME-6	14S64W 19 NWSW	6,070	100.0	66.0	6,004.0	3.0	77.9	5,992.1	8.9	
RME-7	14S 64W 30 SENE	6,075	60.0				38.9	6,036.1	8.3	4.4/3.6P/3.9
RME-8a	14S 65W 24 NESE	6,070	80.0				60.0	6,010.0	9.0	
RME-8b	14S 64W 30 SENE	6,075	55.0				43.5	6,031.5	5.0	
RME-14	14S 64W 19 CSW	6,050	60.0	34.0	6,016.0	1.0	43.7	6,006.3	9.4	
RME-15	14 64W 19 SESW	6,080	85.0				66.1	6,013.9	9.4	
					ELLICOTT QUADRANGLE					
15752F	14S 63W 13 SENE	5,980	708.0				435.5	5,544.5	3.5	B BED 2.0 @ 421.5
					HANOVER NE QUADRANGLE					
CM-55	15S 61W 20 NWSW	6,000	120.0				87.7	5,912.3	2.5	B BED 3.2 @ 77.5
JC-29	15S 62W 21 SWSW	5,810	300.0							N/C TO 5810 - POOR LOG?
JC-41	15S 62W 21 NESW	5,870	200.0				62.5	5,907.5	3.1	
JC-42	15S 62W 21 SWSE	5,860	100.0				49.2	5,910.8	4.6	
JC-43c	15S 62W 21 NWSE	5,880	200.0				79.0	5,801.0	4.6	CORE HOLE
JC-44	15S 62W 21 NESW	5,880	200.0				83.6	5,796.4	3.8	
JC-46c	15S 62W 21 SWNE	5,880	120.0				102.0	5,778.0	5.3	CORE HOLE, B BED 2.5 @ 61.7
JC-47c	15S 62W 21 SWSE	5,850	80.0				34.9	5,815.1	4.7	CORE HOLE
JC-60c	15S 62W 21 NWSE	5,865	80.0				53.7	5,811.3	4.9	CORE HOLE
JC-63	15S 62W 21 SESE	5,875	80.0				41.9	5,833.1	3.8	
JC-64	15S 62W 21 SESE	5,860	100.0							N/C, SURFICAL DEPOSITS TO 86 FT.?
JC-65	15S 62W 21 SESE	5,880	100.0				67.0	5,813.0	7.6	
JC-66c	15S 62W 21 NESE	5,885	100.0				75.4	5,809.6	7.0	CORE HOLE, 2.0/1.0P/5.0
JC-67	15S 62W 21 NESE	5,890	120.0				92.3	5,797.7	8.4	
JC-74	15S 62W 21 SWSW	5,830	60.0				38.0	5,792.0	3.8	
JC-75	15S 62W 21 SWSW	5,830	100.0							N/C
JC-81	15S 62W 21 NENE	5,920	140.0					NTH		
JC-82	15S 62W 21 NWNE	5,915	140.0				128.3	5,786.7	5.3	B BED 3.3 @ 76.3
JC-85	15S 62W 21 NWNE	5,910	140.0				126.3	5,783.7	4.4	
JC-86	15S 62W 21 NENW	5,900	140.0							N/C
JC-89	15S 62W 21 NWNW	5,875	120.0				95.4	5,779.6	1.8	

TABLE 2 (cont'd)

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED Thickness (coal)	Comments
JC-94	15S 62W 17	5,830	260.0				95.8	5,734.2	1.4	B BED 1.5 @ 63.7
JC-98	15S 62W 21 NWNW	5,875	234.0							N/C ?
JC-100	15S 62W 21 SWNW	5,870	140.0							N/C, ALL SURFICIAL DEPOSITS ?
JC-101	15S 62W 21 NWSW	5,880	140.0							N/C, ALL SURFICIAL DEPOSITS ?
JC-107	15S 62W 22 NENW	5,970	120.0					NTH		
JC-109	15S 62W 22 SWNW	5,905	120.0				105.2	5,799.8	4.3	
JC-121	15S 62W 22 NWSW	5,895	100.0				71.8	5,799.8	6.0	
JC-123c	15S 62W 22 NWSW	5,895	80.0				69.6	5,825.4	4.6	CORE HOLE
JC-125c	15S 62W 22 SESW	5,915	80.0				73.0	5,842.0	4.4	CORE HOLE
JC-129c	15S 62W 22 SWSW	5,890	67.0				53.1	5,836.9	5.0	CORE HOLE
JC-131	15S 62W 22 NESW	5,915	140.0				117.0	5,798.0	4.8	
JC-132	15S 62W 22 NWSE	5,970	140.0				126.0	5,844.0	4.3	
JC-134	15S 62W 22 SWSE	5,970	160.0				139.5	5,830.5	4.4	
JC-138	15S 62W 27 NWNE	5,930	120.0				95.8	5,834.2	4.5	
JC-139	15S 62W 22 SESW	5,930	120.0				94.4	5,833.6	6.2	
JC-146	15S 62W 22 SWSW	5,875	60.0				51.6	5,823.4	4.5	
JC-149	15S 62W 22 SWSW	5,880	131.0				51.3	5,828.7	4.2	
JC-152	15S 62W 23 SWNW	6,090	300.0							N/C, THICK SURFICIAL DEPOSITS
JC-158	15S 62W 23 SWSW	6,080	300.0							N/C, THICK SURFICIAL DEPOSITS
JC-161	15S 62W 27 NENE	5,940	120.0				68.8	5,871.2	4.3	
JC-163	15S 62W 27 SENE	5,960	100.0				87.7	5,872.3	4.3	
JC-164c	15S 62W 26 SWNW	5,940	100.0				74.3	5,865.7	4.8	CORE HOLE
JC-166	15S 62W 26 NWSW	5,910	120.0							N/C, A BED ERODED, SURFICIAL DEPOSITS
JC-167	15S 62W 27 NESE	5,900	120.0							N/C, A BED ERODED, SURFICIAL DEPOSITS
JC-168	15S 62W 27 NESE	5,900	100.0							N/C, A BED ERODED, SURFICIAL DEPOSITS
JC-169	15S 62W 27 SENE	5,910	60.0				50.2	5,859.8	6.3	
JC-177	15S 62W 27 NWNW	5,890	75.0				54.9	5,835.1	5.2	1.0/1.0P/4.2
JC-181	15S 62W 27 SWNW	5,885	40.4				28.8	5,856.2	3.9	
JC-186	15S 62W 21 SESE	5,865	100.0							N/C, USED FOR SUBCROP LINE
JC-192c	15S 62W 27 NESE	5,920	80.0				56.7	5,863.3	4.4	CORE HOLE
JC-195c	15S 62W 27 SENW	5,900	80.0				64.0	5,836.0	4.9	CORE HOLE
JC-196c	15S 62W 27 NENW	5,920	80.0	62.6	5,857.4	1.3	67.1	5,852.9	4.0	CORE HOLE
JC-207	15S 62W 21 SWSE	5,845	80.0							N/C, ALL SURFICIAL DEPOSITS ?
JC-209	15S 62W 21 SWSE	5,845	53.5				42.0	5,803.0	3.9	SMUT AT TOP
JC-214	15S 62W 21 SESW	5,840	40.0				24.0	5,816.0	4.1*	SMUT
JC-215	15S 62W 21 SESW	5,840	100.0							N/C
JC-218	15S 62W 21 SESW	5,850	60.0				36.3	5,803.7	4.0	
JC-224	15S 62W 27 NENE	5,880	122.0				117.2	5,862.8	2.3	
JC-226	15S 62W 27 NENE	5,960	120.0				114.0	5,846.0	4.1	
JC-232	15S 62W 21 SESW	5,850	50.0				37.4	5,812.6	3.1	
JC-237	15S 62W 21 SESW	5,860	60.0				38.9	5,821.1	4.1	
JC-241	15S 62W 21 SESW	5,830	40.0				20.0	5,810.0	2.6*	SMUT
JC-252	15S 62W 21 SENE	5,895	120.0				95.5	5,799.5	5.2	
JC-262	15S 62W 27 SWNE	5,915	80.0				69.0	5,846.0	3.5	
JC-264	15S 62W 27 NENW	5,900	80.0				65.8	5,834.2	3.3	

TABLE 2 (cont'd)

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED A Bed Thickness (coal)	Comments
JC-267	15S 62W 27 NWNW	5,870	60.0				40.4	5,829.6	6.9	1.7/0.9P/5.2
JC-268	15S 62W 27 NWNW	5,860	100.0							N/C, USED FOR SUBCROP LINE
JC-274	15S 62W 28 NENE	5,855	85.0							N/C, USED FOR SUBCROP LINE
JC-275	15S 62W 21 SESE	5,860	60.0				46.8	5,813.2	4.9	
JC-276	15S 62W 27 SWNW	5,860	100.0							N/C, USED FOR SUBCROP LINE
JC-278	15S 62W 27 SWNW	5,865	60.0				19.0	5,846.0	*	DARK SHALE WITH COAL
JC-281	15S 62W 21 SENW	5,880	100.0				92.9	5,787.1	3.7	
JC-283	15S 62W 21 SENW	5,880	120.0				103.0	5,777.0	4.4	
JC-286	15S 62W 21 NWNE	5,900	120.0				112.9	5,787.1	4.3	
JC-288	15S 62W 26 NWSW	5,945	80.0				62.0	5,883.0	3.0*	SMUT, PAST BURN LINE
JC-290	15S 62W 27 SWNW	5,875	100.0				14.4	5,860.6	4.7*	SMUT, PAST BURN LINE
JC-293	15 62W 27 NESW	5,890	60.0				27.0	5,863.0	3.7	
JC-296	15S 62W 27 NESW	5,870	100.0							N/C, ALL SURFICIAL DEPOSITS ?
JC-298	15S 62W 27 NESW	5,900	80.0				52.0	5,848.0	4.9	
JC-304	15S 62W 26 NESW	5,950	70.0				57.0	5,893.0	5.1	
JC-306	15S 62W 26 SESW	5,925	48.0				42.1	5,882.9	4.0	
JC-309	15S 62W 26 SESW	5,935	100.0							N/C, USED FOR SUBCROP LINE
JC-310	15S 62W 27 NWSE	5,900	60.0				45.8	5,854.2	4.9	
JC-312	15S 62W 27 NWSE	5,890	100.0							N/C, ALL SURFICIAL DEPOSITS
JC-315	15S 62W 26 SWNW	6,000	140.0				127.0	5,873.0	4.1	
JC-321	15S 62W 26 SWSE	5,945	80.0							N/C
JC-323	15S 62W 26 NWSW	5,950	80.0				54.5	5,895.5	3.0*	SMUT
JC-324	15S 62W 26 SWSE	5,985	80.0				66.0	5,919.0	4.1	
JC-326c	15S 62W 26 SWSE	5,970	60.0				52.1	5,917.9	3.9	CORE HOLE
JC-331	15S 62W 26 NWSW	5,990	160.0				154.9	5,835.1	4.5	
JC-332	15S 62W 26 NESW	5,990	140.0				118.5	5,871.5	4.3	
JC-333	15S 62W 26 NESW	5,975	120.0				99.4	5,875.6	4.6	
JC-335	15S 62W 26 NWSE	5,995	120.0				101.5	5,893.5	4.1	
JC-336	15S 62W 26 SWSE	6,005	120.0	99.6	5,905.4	1.3	103.3	5,901.7	1.3	
JC-350	15S 62W 26 SWSE	5,950	40.0				27.4	5,922.3	3.2*	SMUT
JC-353	15S 62W 26 SESE	5,995	100.0	85.9	5,909.1	1.9	89.2	5,905.8	1.2	
JC-355	15S 62W 26 SESE	5,960	200.0	80.8	5,879.2	2.0	86.0	5,874.0	1.1	
JC-357	15S 62W 26 NESE	5,960	200.0				75.1	5,884.9	2.1	
JC-362	15S 62W 26 SENE	6,000	160.0	136.6	5,863.4	1.4	140.5	5,859.5	1.2	
JC-364	15S 62W 26 SENE	6,000	160.0	131.0	5,869.0	1.1	134.8	5,865.2	1.4	
JC-368	15S 62W 23 SESE	6,030	200.0	153.0	5,877.0	1.9	166.5	5,863.5	2.2	
JC-369	15S 62W 24 SWSW	6,040	160.0				155.1	5,884.9	1.5*	CORRELATION UNCERTAIN
JC-370	15S 62W 25 SWNW	5,990	120.0				103.3	5,886.7	1.4	
JC-372	15S 62W 25 NWNW	6,010	150.0				118.6	5,891.4	2.2	
JC-382	15S 62W 24 NWSW	6,015	140.0				126.5	5,888.5	3.1*	DARK SHALE WITH COAL, B BED 1.8 @ 106.9
JC-388	15S 62W 24 SWNW	6,010	180.0				164.6	5,845.4	1.4	B BED 1.6 @ 122.4
JC-390	15S 62W 24 NENW	6,000	140.0							N/C, SOME DARK SHALE WITH COAL
JC-392	15S 62W 13 SESW	6,010	160.0				141.3	5,868.7	2.4	CORRELATION UNCERTAIN
JC-394	15S 62W 13 SENW	6,050	100.0							N/C, SOME DARK SHALE WITH COAL
JC-396	15S 62W 13 NWSE	5,990	120.0				109.0	5,881.0	1.7	B BED 2.4 @ 71.4
JC-398	15S 62W 13 NWSE	6,020	180.0				152.1	5,867.9	1.4	ALSO DARK SHALE WITH COAL UNITS

TABLE 2 (cont'd)

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED A Bed Thickness (coal)	Comments
JC-399	15S 62W 13 SENE	6,020	180.0				164.2	5,855.8	1.4	B BED 1.8 @ 145.7
JC-421	15S 62W 13 NESE	6,005	160.0	116.7	5,888.3	1.9	124.2	5,880.8	1.2	
JC-425	15S 62W 13 SESE	5,955	100.0				83.7	5,871.3	2.2	
JC-426	15S 61W 19 NWNW	5,950	200.0				86.9	5,863.1	2.1	
JC-427	15S 62W 24 SENE	5,940	200.0							N/C
JC-428	15S 62W 24 NESE	5,920	160.0		ERODED		50.4	5,869.6	1.4	
JC-429	15S 62W 24 SESE	5,915	200.0		ERODED					N/C
JC-430	15S 61W 30 NWNW	5,900	100.0		ERODED		28.0	5,872.0	0.4	
JC-432	15S 61W 30 SENW	5,890	60.0		ERODED					N/C
JC-435	15S 61W 19 SESW	5,940	80.0	30.4	5,909.6	1.7*	40.7	5,899.3	2.1	UPPER A BED IS SMUT
JC-437	15S 61W 19 SENW	5,980	100.0				89.6	5,890.4	1.6	UPPER A BED IS DARK SHALE WITH COAL
JC-439	15S 61W 18 SESW	6,005	140.0	117.0	5,888.0	2.6	125.6	5,879.4	1.8	
JC-440	15S 62W 18 SESW	6,010	160.0	134.8	5,875.2	1.6	141.7	5,868.3	1.4	
SLB-1	15W 62W 26 NWSW	5,930	78.0				58.0	5,872.0	5.8	
SLB-2	15S 62W 26 NWSW	5,920	59.0				44.0	5,876.0	3.5	
SLB-3	15S 62W 26 SWNW	5,940	138.0				89.5	5,850.5	4.0	
SLB-4	15S 62W 26 NWSW	5,900	108.0							N/C, USED FOR SUBCROP LINE
SLB-5	15S 62W 26 NWNW	6,030	108.0					NTH		
SLB-6	15S 62W 21 SWNW	5,870	148.0				124.0	5,746.0	*	ALL BEDS BURNED
SLB-7	15S 62W 21 NWSW	5,860	98.0				79.3	5,780.7	*	B BED 1.0/1.0P/2.0 @ 92 ALL BEDS BURNED, B BED 2.3 @ 43
SLB-8	15S 62W 21 SWSW	5,840	98.0				73.0	5,767.0	*	B-BED 2.0 SMUT/3.0 COAL @ 55
SLB-9	15S 62W 20 NENW	5,850	118.0				78.0	5,772.0	*	B BED 0.5 @ 61
SLB-10	15S 62W 19 NENE	5,780	78.0				56.0	5,724.0	0.7	MOSTLY BURNED?
SLB-11	15S 62W 20 SENW	5,840	108.0				88.0	5,752.0	*	B BED 0.5 SMUT @ 64.5 B BED 1.3 SMUT/0.7 COAL @ 60
SLB-12	15S 62W 27 NESE	5,900	65.0				54.0	5,846.0	6.0	POSS B BED 0.7 SMUT @ 39
SLB-51	15S 62W 19 NENE	5,770	56.7				56.0	5,714.0	0.7	BURNED ?
SLB-52	15S 62W 20 NWNW	5,835	81.4				81.0	5,756.0	0.4	BURNED ?
SLB-53	15S 62W 20 SWNW	5,820	89.4				89.0	5,731.0	0.4	BURNED ?
SLB-54	15S 62W 21 SWNW	5,870	148.0							POSS B BED 0.7 @ 62 N/C
SLB-55	15S 62W 21 NWSW	5,860	45.0				43.0	5,817.0	2.0	
SLB-56	15S 62W 21 SWSW	5,820	38.0				36.0	5,784.0	2.0	
SLB-57	15S 62W 26 NWNW	6,030	108.0					NTH		N/C
SLB-58	15S 62W 27 SENE	5,930	60.0				54.0	5,876	6.0	
SLB-59	15S 62W 26 SWSW	5,900	108.0					NTH		N/C
SLB-60	15S 62W 26 SWSW	5,930	57.4				54.0	5,876.0	3.4	
SLB-61	15S 62W 26 NWSW	5,960	63.8				58.0	5,902.0	5.8	
SLB-62	15S 62W 26 SWNW	5,970	94.0				90.0	5,880.0	4.0	

TABLE 2 (cont'd)

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED A Bed Thickness (coal)	Comments
				HANOVER NW QUADRANGLE						
CC-163	15S 62W 20 SWNE	5,835	45.2	35.0	5,800.0	3.0	43.4	5,791.6	1.8	
CM-24	15S 63W 15 NESE	5,760	140.0							N/C, USED FOR SUBCROP LINE
CM-25	15S 63W 20 NENE	5,830	240.0							N/C, USED FOR SUBCROP LINE
CM-26	15S 63W 21 SWNW	5,830	140.0	73.7	5,756.3	1.9	77.0	5,753.0	1.0	
CM-27	15S 63W 20 NESE	5,840	120.0	58.0	5,782.0	4.4	66.7	5,773.3	3.0	
CM-28	15S 63W 16 SESW	5,820	160.0	91.8	5,728.2	2.6	99.5	5,720.5	3.5	
CM-29	15S 63W 20 NWNE	5,835	100.0	59.5	5,775.5	1.5	63.6	5,771.4	1.8	B BED 3.7 @ 51.5
CM-30	15S 63W 17 SESE	5,840	140.0	84.3	5,755.7	4.2	96.2	5,743.8	1.5	
CM-31	15S 63W 21 NWSW	5,800	80.0				38.0	5,762.0	3.0	
CM-32	15S 63W 21 NWSW	5,830	100.0	57.0	5,773.0	5.5	66.8	5,763.0	3.1	
CM-33	15S 63W 21 NESW	5,830	100.0	50.6	5,779.4	4.4	65.9	5,764.1	3.0	
CM-34	15S 63W 21 NESW	5,820	80.0	38.2	5,781.8	3.0	50.5	5,769.5	3.1	
CM-35	15S 63W 17 NESE	5,860	200.0	149.0	5,711.0	1.7	157.0	5,803.0	1.8	B BED 1.7 @ 135
CM-36	15S 63W 17 NENW	5,880	200.0	144.8	5,735.2	3.2	165.0	5,715.0	2.3	B BED 2.0 @ 102
CM-37	15S 63W 17 SWSE	5,835	140.0				97.0	5,738.0	1.0	SURFICAL DEPOSITS TO 89'
CM-38	15S 63W 17 SESE	5,845	140.0	108.5	5,736.5	1.0	118.7	5,726.3	1.3	B BED 4.3 @ 96
CM-39	15S 63W 21 SENW	5,815	140.0				71.0	5,744.0	2.0	
CM-40	15S 63W 22 SENW	5,785	140.0							N/C, USED FOR SUBCROP LINE
CM-41	15S 63W 23 SENE	5,715	80.0							N/C, USED FOR SUBCROP LINE
CM-42	15S 63W 23 SESE	5,685	140.0							N/C, USED FOR SUBCROP LINE
CM-43	15S 63W 13 NESE	5,720	60.0							N/C, USED FOR SUBCROP LINE
DRENNON	15S 63W 21 NWSW	5,820	56.0				52.0	5,768.0	4.0	OVERBURDEN 52' PLUS
JC-414	15S 63W 19	5,880	300.0							N/C, LOC TO SECTION ONLY
JC-415	15S 63W 30	5,800	200.0							N/C, LOC TO SECTION ONLY
SLB-13	15S 63W 18 SESE	5,865	98.0	65.0	5,793.0	2.0	82.0	5,783.0	1.2	
SLB-14	15S 63W 19 NENE	5,850	76.5	45.2	5,804.8	1.7	58.6	5,791.4	2.2	
SLB-15	15S 63W 16 SESE	5,795	118.0	47.5	5,747.5	2.5	63.0	5,732.0	3.3	
SLB-16	15S 63W 19 SENE	5,840	68.0	25.0	5,815.0	2.0	37.5	5,802.5	3.7	
SLB-17	15S 63W 16 NESE	5,790	95.0							N/C
SLB-18	15S 63W 18 SWSW	5,955	128.0	115.0	5,843.5	0.9*	125.0	5,830.0	1.3	UPPER A BED IS SMUT
SLB-20	15S 63W 19 SWNW	5,880	108.0							N/C
SLB-21	15S 63W 16 SWSW	5,828	109.0	89.0	5,739.0	5.5	103.0	5,725.0	2.0	
SLB-22	15S 63W 19 SWNW	5,852	68.0							N/C, ALL SURFICIAL DEPOSITS?
SLB-23	15S 63W 19 NWNW	5,926	101.0	86.0	5,840.0	1.0	97.0	5,826.0	1.3	CORRELATION UNCERTAIN
SLB-38	15S 63W 18 SWSW	5,945	126.3				125.0	5,820	1.3	CORRELATION UNCERTAIN
SLB-45	15S 63W 20 SENE	5,840	64.9	52.0	5,788.0	6.0	61.5	5,778.5	3.4	
SLB-46	15S 63W 20 NESE	5,820	58.0							N/C
SLB-48	15S 63W 16 SESW	5,820	78.1				77.0	5,743.0	1.1	CORRELATION UNCERTAIN

TABLE 2 (cont'd)

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED A Bed Thickness (coal)	Comments
					HOLTWOOD STORE QUADRANGLE					
PS-1262	12S 59W 20 SWSW	6,160	440.0				253.0	5,907.0	5.0	
PS-1263	12S 60W 24 SESW	6,225	660.0				407.0	5,818.0	5.0	
PS-1269	13S 60W 21 SESW	6,240	700.0				475.0	5,765.0	?	USED FOR STRUCTURE, THICKNESS UNCERTAIN
PS-1270	13S 60W 15 NENE	6,180	620.0				293.0	5,887.0	2.5	
PS-1271	13S 60W 26 NWSW	6,135	464.0				234.0	5,901.0	5.0	
PS-1272	13S 59W 8 SWSW	5,950	260.0							N/C, USED FOR SUBCROP LINE
PS-1273	13S 60W 25 SESE	6,010	260.0				127.0	5,883.0	2.5	
PS-1304	13S 60W 12 SWSE	6,040	360.0				219.0	5,821.0	5.5	
					PIKEVIEW QUADRANGLE					
NOTE: No depth information available for mines, except where shown										
2222-F	13S 66W 17 NWNE	6,400	753.0				546.0	5,854.0	6.0	
ALTITUDE	13S 66W 29 SWNW	6,270	112.5				100.0	6,170.0	9.4	3.5/3.0P/5.9
BUSY BEE	13S 66W 32 NWNE	6,200					?	?	9.0	
CITY NO. 1	13S 66W 29 SW	6,210	176.7				170.0	6,040.0	6.7	
CITY NO. 2	13S 66W 33 NWNW	6,230	57.0				43.0	6,187.0	14.0	
CITY NO. 3	13S 66W 33 NWNW	6,220					?	?	6.0	THICKNESS SHOWN AS 4.5' AND 6 TO 20'
CLIMAX NO. 1	13S 66W 29 SESW	6,240					?	?	9.0	
COLUMBINE	13S 67W 12 SENE	6,400					?	?	8.0	
CORLEY	13S 66W 32 NENE	6,240					?	?	8.0	
COTTONWOOD	13S 67W 13 SESE	6,300					?	?	3.5	
CURTIS	13S 66W 29 SWSE	6,260					?	?	16.4	THICKNESS RANGE OF 9 TO 20' IN MINE
DANVILLE	13S 66W 29 SESW	6,200					?	?	10.0	
KLONDIKE	13S 66W 8 SWNW	6,340					?	?	8.9	
LAST CHANCE	13S 67W 13 SESE	6,300					?	?	4.0	
MONUMENT VALLEY	13S 67W 11 SESW	6,600					?	?	2.6	
MOUNTAIN VIEW	13S 66W 18 NWSW	6,300					?	?	3.0	
NEER	13S 67W 13 SE	6,350					?	?	4.6	
NEW ALTITUDE	13S 66W 29 NWNW	6,300					?	?	2.3	NOT THE A BED ? SEE MONUMENT VALLEY
OAK GROVE	13S 67W 11 SESW	6,600								
PATTERSON	13S 66W 32 NWNE	6,200					?	?	8.0	
PIKEVIEW	13S 66W 18 SESW	6,250					?	?	11.1	NUMEROUS ROLLS
PIKEVIEW-a	13S 66W 18 NWNE	6,360					?	?	6.0	
PIKEVIEW-b	13S 66W 18 NWSE	6,245	200.0				194.0	6,051.0	6.0	
PIKEVIEW-c	13S 66W 18 NESE	6,260					?	?	7.1	3.1/1.7P/4.0
PIKEVIEW-d	13S 66W 7 SWSE	6,340					?	?	7.0	
PIKEVIEW-e	13S 66W 7 SWSE	6,360					?	?	9.5	7.0/1.5P/2.5
PIKEVIEW-f	13S 66W 7 SWSE	6,320	704.0				695.0	5,625.0	9.0	
PIKEVIEW-g	13S 66W 7 SWSE	6,280					?	?	9.0	6.0/1.3P/3.0
PIKEVIEW-h	13S 66W 7 NESW	6,430	916.0				907.0	5,525.0	9.0	

TABLE 2 (cont'd)

Data Point ID	Location Twp Rge Sec 1/4 1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED A Bed Thickness (coal)	Comments
PIKEVIEW-i	13S 67W 13 NE	6,370	242.0				234.0	6,136.0	8.0	
PIKEVIEW-j	13S 67W 13 NE	6,340	213.0				205.0	6,135.0	8.0	
PIKEVIEW-k	13S 67W 13 SENE	6,300	182.0				175.0	6,125.0	7.0	
PIKEVIEW FH NO. 1	13S 67W 12 NENW	6,510	596.0	306.0	6,204.0	6.0	317.0	6,193.0	5.0	GEOPHYSICAL LOG FROM WILLARD OWENS
PINE GROVE PROSPECT	13S 66W 19 NWSE	6,210					?	?	3.0	CORRELATION UNCERTAIN
OPENING	13S 67W 24 SESE	6,250								2.3' C BED
TAYMAN TH NO. 1	13S 66W 27 NWNE	6,400	1,318.0				677.0	5,723.0	4.0	THIN COALS ABOVE - 1.5/3.5P/2.0/6.0P/1.5 @ 660, GEOPHYSICAL LOG FROM WILLARD OWENS
					RUSH NW QUADRANGLE					
O-350	12S 61W 29 NENW	6,776	7,183.0				1,400.0	5,376.0	?	USED FOR STRUCTURE ONLY, DEPTH APPROXIMATE
O-356	13S 61W 21 NWNE	6,543	6,753.0				995.0	5,548.0	4.0	
PS-1267	13S 60W 8 NWSE	6,320	820.0				543.0	5,777.0	?	USED FOR STRUCTURE ONLY
PS-1268	12S 60W 33 SWSW	6,295	840.0				5,45.0	5,750.0	2.5	
PS-1302	13S 60W 30 NENE	6,320	800.0				540.0	5,780.0	?	USED FOR STRUCTURE ONLY
					TRUCKTON QUADRANGLE					
CM-52	15S 61W 15 NWNW	6,105	190.0				140.0	5,965.0	?	USED FOR STRUCTURE ONLY
CM-54	15S 61W 20 SENW	6,030	140.0	72.3	5,957.7	4.3	82.5	5,947.9	2.5	
CM-56	15S 61W 28 NWSW	6,040	120.0				53.0	5,987.0	1.7	UPPER A BED IS ERODED
					YODER QUADRANGLE					
CM-1	14S 60W 28 SWSW	6,020	100.0				67.2	5,952.8	2.8	
CM-2	14S 60W 33 NWNW	6,010	120.0							N/C, L-F AQ @ 64'
CM-4	14S 60W 31 SENE	5,990	140.0				49.8	5,940.2	2.2	35 FT TO L-F AQ
CM-5	14S 60W 31 SWNE	5,990	160.0				81.3	5,908.7	3.21	B BED 1.3 @ 46.1
CM-6	14S 60W 31 SWNW	5,990	200.0				122.8	5,867.2	2.0	B BED 3.0 @ 110.2
CM-7	14S 60W 29 SESW	6,040	160.0				69.5	5,970.5	2.0	B BED 1.2 @ 58.0
CM-8	14S 60W 29 SWSE	6,045	180.0				118.4	5,926.6	1.7	
CM-9	14S 60W 29 SESE	6,030	120.0				64.9	5,965.1	2.2	B BED 2.0 @ 8.0 (?)
CM-10	14S 60W 20 SWSW	6,090	220.0				164.5	5,925.5	5.5	B BED 2.0 @ 148.7
CM-11	14S 60W 31 NENE	6,020	160.0				84.8	5,935.0	2.4	
CM-12	14S 60W 20 SWSE	6,045	140.0							N/C, POOR LOG
CM-13	14S 60W 20 SESE	6,055	90.0							N/C, LOG ENDS @ 46.0
CM-14	14S 60W 31 SWNE	5,990	120.0				84.0	5,906.0	6.1	2.5/0.5OP/2.1/1.4P/1.5
CM-44	14S 61W 36 SESE	5,960	160.0							N/C, USED FOR SUBCROP LINE
CM-45	14S 60W 32 SENE	6,000	120.0				52.9	5,947.1	1.6	
CM-46	14S 61W 36 SWSE	5,970	140.0							N/C, USED FOR SUBCROP LINE
CM-47	15S 61W 1 NESE	5,920	120.0				58.8	5,861.2	1.4	

TABLE 2 (cont'd)

Data Point ID	Location Twp	Rge	Sec	1/4	1/4	Surface Elevation	Total Depth	UPPER A BED Depth to Top	UPPER A BED Elevation of Top	UPPER A BED Zone Thickness (coal)	A BED OR LOWER A BED Depth to top of A Bed	A BED OR LOWER A BED Elevation top of A Bed	A BED OR LOWER A BED A Bed Thickness (coal)	Comments
CM-48	15S	60W	6	SW	SW	5,900	160.0							N/C USED FOR SUBCROP LINE
CM-49	15S	61W	13	NW	NW	5,970	80.0							N/C USED FOR SUBCROP LINE
CM-50	15S	61W	14	NW	NW	6,045	140.0				96.7	5,948.3	1.3	
CM-51	15S	61W	15	NE	NW	6,090	180.0				131.5	5,958.5	1.2	
CM-58	13S	60W	32	SE	SE	6,180	100.0					NTH		
CM-59	13S	60W	32	SW	SW	6,200	160.0					NTH		
CM-60	14S	60W	6	SE	SW	6,200	140.0					NTH		
O-365	14S	60W	20	NW	NW	6,145	5,756.0				310.0	5,815.0		USED FOR STRUCTURE ONLY
PS-1305	13S	60W	31	SW	SW	6,285	840.0	532.0	5,753.0	2.0	536.6	5,748.5	8.5	
PS-1306	14S	61W	1	SW	SW	6,330	860.0	555.0	5,775.0	4.0	570.0	5,760.0	5.0	
W-139	14S	60W	4	SW	SW	6,110	116.0				95.0	6,015.0	5.0	
GOLDEN DAWN	14S	60W	32	NE	NE	6,010							7.0	NO DEPTH INFORMATION
RUSH	14S	60W	29	SE	SE	6,030							3.5	NO DEPTH INFORMATION

LIST OF ABBREVIATIONS

*	BURNED COAL
CSG	CASING
L-F AQ	LARAMIE-FOX HILLS AQUIFER
LOC	LOCATION
NTH	NOT TO HORIZON
N/C	NO COAL
OC	OUTCROP
P	PARTING

NOTE: SEE TABLE 3 FOR SOURCES OF DATA POINTS

TABLE 3

INDEX TO SOURCES OF DATA POINTS

16387-F, etc.	Water well, identified by permit number; drillers' logs from Colorado Division of Water Resources records
Cardiff, etc.	Coal mine measurement; records from Colorado Division of Mines and Colorado Geological Survey Open File Report 78-9
CC	Drill hole by Columbine Coal Co.; data obtained from map
CM	Coal exploration drill holes from a confidential source, interpreted from natural gamma, gamma gamma density and resistivity logs
CS	Drill hole by Fountain Sand and Gravel Co.; interpreted from a geophysical log
DH	Drill hole information from coal mine maps, Colorado Division of Mines
GO	Coal exploration drill holes by Gypsy Oil Co.; information from lithologic logs of cores, obtained from Colorado Oil and Gas Conservation Commission
JC	Coal exploration drill holes by Ark Land Co.; drillers' logs supplied by Ark Land Co.; maps from Colorado State Land Board
O	Oil and gas exploration holes; interpreted from geophysical logs, generally spontaneous potential and resistivity, from Colorado Oil and Gas Conservation Commission
PS	Uranium exploration drill holes by Powerco/Shell joint venture; interpreted from natural gamma, spontaneous potential and restivity logs
RME	Coal exploration drill holes by Rocky Mountain Energy; data from cross sections and index map
SLB	Coal exploration drill hole data from files of the Colorado State Land Board; SLB 1 TO 24: Holes drilled by Pittsburg and Midway Coal Co.; SLB 25 to 62: data from a 1938 map
W-109 to 114	Water wells; data interpreted from geophysical logs, Colorado Division of Water Resources
W-115 +	Water wells; data from drillers' logs, Colorado Geological Survey Open File Report 78-8

TABLE 4
COAL RESOURCES ESTIMATES
A COAL BED, LARAMIE FORMATION

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Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
ELBERT COUNTY												
T12S R59W												
0-200' OVERBURDEN												
D	--	--	--	180	5.5	1.7	--	--	--	180	5.5	1.7
I	--	--	--	1390	5.8	14.3	--	--	--	1390	5.8	14.3
H	--	--	--	--	--	--	--	--	--	--	--	--
T	--	--	--	1570	5.8	16.0	--	--	--	1570	5.8	16.0
200-500' OVERBURDEN												
D	330	4.8	2.8	620	5.5	6.0	--	--	--	950	5.2	8.8
I	200	4.5	1.6	780	5.5	7.6	--	--	--	980	5.3	9.2
H	--	--	--	--	--	--	--	--	--	--	--	--
T	530	4.7	4.4	1400	5.5	13.6	--	--	--	1930	5.3	18.0
T13S R59W												
0-200' OVERBURDEN												
D	--	--	--	160	5.3	1.5	--	--	--	160	5.3	1.5
I	780	3.7	5.1	580	5.3	5.4	--	--	--	1360	4.3	10.4
H	--	--	--	--	--	--	--	--	--	--	--	--
T	780	3.7	5.1	740	5.3	6.9	--	--	--	1520	3.7	11.9
200-500' OVERBURDEN												
D	--	--	--	15	5.3	0.1	--	--	--	15	5.3	0.1
I	--	--	--	120	5.2	1.1	--	--	--	120	5.2	1.1
H	--	--	--	--	--	--	--	--	--	--	--	--
T	--	--	--	135	5.2	1.2	--	--	--	135	5.2	1.2
ELBERT COUNTY TOTALS												
0-200' OVERBURDEN												
D	--	--	--	340	5.4	3.2	--	--	--	340	5.4	3.2
I	780	3.7	5.1	1970	5.7	19.7	--	--	--	2750	5.1	24.8
H	--	--	--	--	--	--	--	--	--	--	--	--
T	780	3.7	5.1	2310	5.6	22.9	--	--	--	3090	5.1	28.0
200-500' OVERBURDEN												
D	330	4.8	2.8	630	5.4	6.1	--	--	--	960	5.3	8.9
I	200	4.5	1.6	900	5.5	8.7	--	--	--	1100	5.4	10.3
H	--	--	--	--	--	--	--	--	--	--	--	--
T	530	4.7	4.4	1530	5.4	14.8	--	--	--	2060	5.3	19.2
EL PASO COUNTY												
T12S R60W												
0-200' OVERBURDEN												
D	100	4.6	0.8	--	--	--	--	--	--	100	4.6	0.8
I	70	4.9	0.6	40	5.0	0.3	--	--	--	110	4.9	0.9
H	--	--	--	--	--	--	--	--	--	--	--	--
T	170	4.7	1.4	40	5.0	0.3	--	--	--	210	4.8	1.7

*

[Calculations are in millions of short tons; to convert feet to meters multiply by 0.3048, to convert short tons to metric tons multiply by 0.9071; D=demonstrated resources, I=indicated resources, H=hypothetical resources, T=total of D, I and H]

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
200-500' OVERBURDEN												
D	2680	4.1	19.5	--	--	--	--	--	--	2680	4.1	19.5
I	2250	3.5	13.9	320	5.1	2.9	--	--	--	2570	3.7	16.8
H	--	--	--	190	5.1	1.7	--	--	--	190	5.1	1.7
T	4930	3.8	33.4	510	5.1	4.6	--	--	--	5440	3.9	38.0
500-1000' OVERBURDEN												
D	430	2.6	2.0	--	--	--	--	--	--	430	2.6	2.0
I	3550	2.8	17.6	--	--	--	--	--	--	3550	2.8	17.6
H	260	2.7	1.2	--	--	--	--	--	--	260	2.7	1.2
T	4240	2.8	20.8	--	--	--	--	--	--	4240	2.8	20.8
T12S R61W												
500-1000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	1180	3.2	6.6	--	--	--	--	--	--	1180	3.2	6.6
H	2240	3.5	13.9	--	--	--	--	--	--	2240	3.5	13.9
T	3420	3.4	20.5	--	--	--	--	--	--	3420	3.4	20.5
1000-2000' OVERBURDEN												
D	540	4.0	3.8	--	--	--	--	--	--	540	4.0	3.8
I	6500	4.0	46.0	--	--	--	--	--	--	6500	4.0	46.0
H	1520	4.5	12.1	--	--	--	--	--	--	1520	4.5	12.1
T	8560	4.1	61.9	--	--	--	--	--	--	8560	4.1	61.9
T12S R62W												
1000-2000' OVERBURDEN												
D	90	4.0	0.6	--	--	--	--	--	--	90	4.0	0.6
I	8000	4.0	56.6	360	5.1	3.2	--	--	--	8360	4.1	59.8
H	3450	4.5	27.5	70	5.0	0.6	--	--	--	3520	4.5	28.1
T	11540	4.1	84.7	430	5.1	3.8	--	--	--	11970	4.2	88.5
T12S R63W												
1000-2000' OVERBURDEN												
D	180	3.1	1.0	--	--	--	--	--	--	180	3.1	1.0
I	7680	3.6	48.9	300	5.1	2.7	--	--	--	7980	3.7	51.6
H	3720	4.4	29.0	130	5.0	1.2	--	--	--	3850	4.4	30.2
T	11580	3.8	78.9	430	5.1	3.9	--	--	--	12010	3.9	82.8
T12S R64W												
1000-2000' OVERBURDEN												
D	1130	4.0	8.0	--	--	--	--	--	--	1130	4.0	8.0
I	8900	4.0	63.0	--	--	--	--	--	--	8900	4.0	63.0
H	280	4.0	2.0	--	--	--	--	--	--	280	4.0	2.0
T	10310	4.0	73.0	--	--	--	--	--	--	10310	4.0	73.0
2000'+ OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	1680	4.0	11.9	--	--	--	--	--	--	1680	4.0	11.9
H	--	--	--	--	--	--	--	--	--	--	--	--
T	1680	4.0	11.9	--	--	--	--	--	--	1680	4.0	11.9

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
T12S R65W												
1000-2000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	3840	4.0	27.2	--	--	--	--	--	--	3840	4.0	27.2
H	2520	4.5	20.1	--	--	--	--	--	--	2520	4.5	20.1
T	6360	4.2	47.3	--	--	--	--	--	--	6360	4.2	47.3
2000'+ OVERBURDEN												
D	1050	4.0	7.4	--	--	--	--	--	--	1050	4.0	7.4
I	3200	4.0	22.7	--	--	--	--	--	--	3200	4.0	22.7
H	1040	4.2	7.7	--	--	--	--	--	--	1040	4.2	7.7
T	5290	4.0	37.8	--	--	--	--	--	--	5290	4.0	37.8
T12S R66W												
500-1000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	820	4.5	6.5	20	5.2	0.2	--	--	--	840	4.6	6.7
H	70	4.9	0.6	90	5.1	0.8	--	--	--	160	5.0	1.4
T	890	4.5	7.1	110	5.1	1.0	--	--	--	1000	4.6	8.1
1000-2000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	2080	4.7	17.3	80	5.2	0.7	--	--	--	2160	4.8	18.0
H	7850	4.6	63.9	760	5.2	7.0	--	--	--	8610	4.7	70.9
T	9930	4.6	81.2	840	5.2	7.7	--	--	--	10770	4.7	88.9
2000'+ OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	--	--	--	--	--	--	--	--	--	--	--	--
H	320	4.5	2.5	--	--	--	--	--	--	320	4.5	2.5
T	320	4.5	2.5	--	--	--	--	--	--	320	4.5	2.5
T12S R67W												
200-500' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	720	4.0	5.1	--	--	--	--	--	--	720	4.0	5.1
H	980	4.0	6.9	--	--	--	--	--	--	980	4.0	6.9
T	1700	4.0	12.0	--	--	--	--	--	--	1700	4.0	12.0
500-1000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	2120	4.0	15.0	150	5.2	1.4	--	--	--	2270	4.0	16.4
H	2080	4.5	16.6	320	5.1	2.9	--	--	--	2400	4.6	19.5
T	4200	4.2	31.6	470	5.1	4.3	--	--	--	4670	4.4	35.9
1000-2000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	20	5.0	0.2	110	5.1	1.0	--	--	--	130	5.1	1.2
H	--	--	--	10	5.1	0.1	--	--	--	10	5.1	0.1
T	20	5.0	0.2	120	5.1	1.1	--	--	--	140	5.1	1.3

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
T13S R60W												
0-200' OVERBURDEN												
D	780	4.2	5.8	310	5.2	2.9	--	--	--	1090	4.6	8.7
I	1530	3.5	9.5	230	5.1	2.1	--	--	--	1760	3.8	11.6
H	--	--	--	--	--	--	--	--	--	--	--	--
T	2310	3.7	15.3	540	5.2	5.0	--	--	--	2850	4.1	20.3
200-500' OVERBURDEN												
D	2200	3.8	14.8	1240	5.6	12.3	--	--	--	3440	4.5	27.1
I	4580	3.5	28.4	2780	6.0	29.5	--	--	--	7360	4.5	57.9
H	--	--	--	--	--	--	--	--	--	--	--	--
T	6780	3.6	43.2	4020	5.9	41.8	--	--	--	10800	4.5	85.0
500-1000' OVERBURDEN												
D	290	2.7	1.4	190	7.0	2.4	--	--	--	480	4.5	3.8
I	5700	3.5	35.3	140	5.5	1.4	--	--	--	5840	3.6	36.7
H	300	3.5	1.9	--	--	--	--	--	--	300	3.5	1.9
T	6290	3.5	38.6	330	6.5	3.8	--	--	--	6620	3.7	42.4
T13S R61W												
500-1000' OVERBURDEN												
D	820	4.2	6.1	120	5.2	1.1	--	--	--	940	4.3	7.2
I	14500	4.3	110.0	--	--	--	--	--	--	14500	4.3	110.0
H	1320	3.5	8.2	--	--	--	--	--	--	1320	3.5	8.2
T	16640	4.2	124.3	120	5.2	1.1	--	--	--	16760	4.2	125.4
1000-2000' OVERBURDEN												
D	1100	4.0	7.8	--	--	--	--	--	--	1100	4.0	7.8
I	5140	4.0	3.6	--	--	--	--	--	--	5140	4.0	3.6
H	--	--	--	--	--	--	--	--	--	--	--	--
T	6240	4.0	11.4	--	--	--	--	--	--	6240	4.0	11.4
T13S R62W												
500-1000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	3460	4.0	24.5	--	--	--	--	--	--	3460	4.0	24.5
H	9000	4.5	71.7	60	5.0	0.5	--	--	--	9060	4.5	72.2
T	12460	4.4	96.2	60	5.0	0.5	--	--	--	12520	4.4	96.7
1000-2000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	2560	3.9	17.7	--	--	--	--	--	--	2560	3.9	17.7
H	7650	4.5	60.9	300	5.0	2.7	--	--	--	7950	4.6	63.6
T	10210	4.3	78.6	300	5.0	2.7	--	--	--	10510	4.4	81.3
T13S R63W												
500-1000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	1850	3.9	12.8	--	--	--	--	--	--	1850	3.9	12.8
H	4300	4.0	30.4	--	--	--	--	--	--	4300	4.0	30.4
T	6150	4.0	43.2	--	--	--	--	--	--	6150	4.0	43.2

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
1000-2000' OVERBURDEN												
D	1130	4.0	13.1	--	--	--	--	--	--	1130	4.0	13.1
I	14600	4.0	103.0	--	--	--	--	--	--	14600	4.0	103.0
H	2200	4.5	17.5	--	--	--	--	--	--	2200	4.5	17.5
T	17930	4.2	133.6	--	--	--	--	--	--	17930	4.2	133.6
T13S R64W												
500-1000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	--	--	--	--	--	--	--	--	--	--	--	--
H	810	4.5	6.5	--	--	--	--	--	--	810	4.5	6.5
T	810	4.5	6.5	--	--	--	--	--	--	810	4.5	6.5
1000-2000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	2430	4.0	17.2	--	--	--	--	--	--	2430	4.0	17.2
H	19800	4.0	140.0	--	--	--	--	--	--	19800	4.0	140.0
T	22230	4.0	157.2	--	--	--	--	--	--	22230	4.0	157.2
T13S R65W												
500-1000' OVERBURDEN												
D	20	4.0	0.1	--	--	--	--	--	--	20	4.0	0.1
I	630	4.5	5.0	--	--	--	--	--	--	630	4.5	5.0
H	--	--	--	--	--	--	--	--	--	--	--	--
T	650	4.5	5.1	--	--	--	--	--	--	650	4.5	5.1
1000-2000' OVERBURDEN												
D	1610	4.0	11.4	--	--	--	--	--	--	1610	4.0	11.4
I	11800	4.0	83.6	--	--	--	--	--	--	1180	4.0	83.6
H	9400	4.0	66.6	--	--	--	--	--	--	9400	4.0	66.6
T	22810	4.0	161.6	--	--	--	--	--	--	22810	4.0	161.6
T13W R66W												
0-200' OVERBURDEN												
D	170	4.6	1.4	380	8.2	5.5	60	11.2	1.2	610	7.6	8.1
I	--	--	--	--	--	--	--	--	--	--	--	--
H	--	--	--	--	--	--	--	--	--	--	--	--
T	170	4.6	1.4	380	8.2	5.5	60	11.2	1.2	610	7.6	8.1
200-500' OVERBURDEN												
D	480	4.5	3.8	690	7.5	9.2	140	11.0	2.7	1310	6.8	15.7
I	560	4.7	4.7	100	5.5	1.0	--	--	--	660	4.9	5.7
H	--	--	--	--	--	--	--	--	--	--	--	--
T	1040	4.6	8.5	790	7.3	10.2	140	11.0	2.7	1970	6.2	21.4
500-1000' OVERBURDEN												
D	1060	4.1	7.7	1280	8.0	18.1	--	--	--	2340	6.3	25.8
I	4190	4.5	33.4	1410	5.5	13.7	--	--	--	5600	4.8	47.1
H	--	--	--	--	--	--	--	--	--	--	--	--
T	5250	4.4	41.1	2690	6.7	31.8	--	--	--	7940	5.2	72.9

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
1000-2000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	5400	4.2	40.1	30	5.0	0.3	--	--	--	5430	4.3	40.4
H	1800	4.5	14.3	--	--	--	--	--	--	1800	4.5	14.3
T	7200	4.3	54.4	30	5.0	0.3	--	--	--	7230	4.3	54.7
T13S R67W												
0-200' OVERBURDEN												
D	460	4.5	3.7	320	6.0	3.4	--	--	--	780	5.2	7.1
I	25	4.0	0.2	--	--	--	--	--	--	25	4.0	0.2
H	--	--	--	--	--	--	--	--	--	--	--	--
T	485	4.5	3.9	320	6.0	3.4	--	--	--	805	5.2	7.3
200-500' OVERBURDEN												
D	320	4.8	2.7	420	7.5	5.5	--	--	--	740	6.3	8.2
I	520	4.5	4.1	--	--	--	--	--	--	520	4.5	4.1
H	--	--	--	--	--	--	--	--	--	--	--	--
T	840	4.6	6.8	420	7.5	5.5	--	--	--	1260	5.6	12.3
500-1000' OVERBURDEN												
D	320	4.8	2.7	220	7.5	2.9	--	--	--	540	5.9	5.6
I	480	4.5	3.8	--	--	--	--	--	--	480	4.5	3.8
H	--	--	--	--	--	--	--	--	--	--	--	--
T	800	4.6	6.5	220	7.5	2.9	--	--	--	1020	5.3	9.4
T14S R60W												
0-200' OVERBURDEN												
D	2290	3.5	14.2	240	5.4	2.3	--	--	--	2530	3.7	16.5
I	300	3.8	2.0	360	5.5	3.5	--	--	--	660	4.8	5.5
H	--	--	--	--	--	--	--	--	--	--	--	--
T	2590	3.5	16.2	600	5.5	5.8	--	--	--	3190	3.9	22.0
200-500' OVERBURDEN												
D	1040	4.5	8.3	460	6.5	5.3	--	--	--	1500	5.2	13.6
I	1160	4.5	9.2	1600	6.0	17.0	--	--	--	2760	5.4	26.2
H	--	--	--	--	--	--	--	--	--	--	--	--
T	2200	4.5	17.5	2060	6.1	22.3	--	--	--	4260	5.3	39.8
T14S R61W												
0-200' OVERBURDEN												
D	80	2.6	0.4	--	--	--	--	--	--	80	2.6	0.4
I	740	2.7	3.5	--	--	--	--	--	--	740	2.7	3.5
H	--	--	--	--	--	--	--	--	--	--	--	--
T	820	2.7	3.9	--	--	--	--	--	--	820	2.7	3.9
200-500' OVERBURDEN												
D	1570	3.0	8.3	240	6.0	2.5	--	--	--	1810	3.4	10.8
I	14100	3.5	87.3	110	5.5	1.1	--	--	--	14210	3.6	88.4
H	40	3.0	0.2	--	--	--	--	--	--	40	3.0	0.2
T	15710	3.5	95.8	350	5.8	3.6	--	--	--	16060	3.5	99.4

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
500-1000' OVERBURDEN												
D	890	4.6	7.2	360	6.0	3.8	--	--	--	1250	5.0	11.0
I	3360	3.6	21.4	10	5.0	0.1	--	--	--	3370	3.6	21.5
H	100	3.0	0.5	--	--	--	--	--	--	100	3.0	0.5
T	4350	3.8	29.1	370	6.0	3.9	--	--	--	4720	4.0	33.0
T14S R62W												
0-200' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	700	3.5	4.3	--	--	--	--	--	--	700	3.5	4.3
H	80	3.5	0.5	--	--	--	--	--	--	80	3.5	0.5
T	780	3.5	4.8	--	--	--	--	--	--	780	3.5	4.8
200-500' OVERBURDEN												
D	1570	4.3	11.9	760	5.6	7.5	--	--	--	2330	4.8	19.4
I	11400	4.0	80.7	540	5.5	5.3	--	--	--	11940	4.1	86.0
H	200	3.5	1.2	--	--	--	--	--	--	200	3.5	1.2
T	13170	4.0	93.8	1300	5.6	12.8	--	--	--	14470	4.2	107.6
500-1000' OVERBURDEN												
D	1170	3.8	7.9	100	6.0	1.1	--	--	--	1270	4.0	9.0
I	4240	3.8	28.5	--	--	--	--	--	--	4240	3.8	28.5
H	90	4.0	0.6	--	--	--	--	--	--	90	4.0	0.6
T	5500	3.8	37.0	100	6.0	1.1	--	--	--	5600	3.9	38.1
T14S R63W												
200-500' OVERBURDEN												
D	540	3.6	3.4	--	--	--	--	--	--	540	3.6	3.4
I	8480	4.0	60.0	--	--	--	--	--	--	8480	4.0	60.0
H	110	3.5	0.7	--	--	--	--	--	--	110	3.5	0.7
T	9130	4.0	64.1	--	--	--	--	--	--	9130	4.0	64.1
500-1000' OVERBURDEN												
D	200	3.5	1.2	--	--	--	--	--	--	200	3.5	1.2
I	4960	3.8	33.4	--	--	--	--	--	--	4960	3.8	33.4
H	8720	4.0	61.7	--	--	--	--	--	--	8720	4.0	61.7
T	13880	3.9	96.3	--	--	--	--	--	--	13880	3.9	96.3
T14S R64W												
0-200' OVERBURDEN												
D	160	4.2	1.2	310	6.6	3.6	--	--	--	470	5.8	4.8
I	--	--	--	--	--	--	--	--	--	--	--	--
H	--	--	--	--	--	--	--	--	--	--	--	--
T	160	4.2	1.2	310	6.6	3.6	--	--	--	470	5.8	4.8
200-500' OVERBURDEN												
D	980	4.0	6.9	480	6.0	5.1	--	--	--	1460	4.7	12.0
I	3120	3.3	18.2	440	5.5	4.3	--	--	--	3560	3.6	22.5
H	--	--	--	--	--	--	--	--	--	--	--	--
T	4100	3.5	25.1	920	5.8	9.4	--	--	--	5020	3.9	34.5

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
T14S R64W												
500-1000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	5200	4.2	0.8	--	--	--	--	--	--	5200	4.2	0.8
H	8560	4.0	3.7	--	--	--	--	--	--	8560	4.0	3.7
T	13760	4.1	4.5	--	--	--	--	--	--	13760	4.1	4.5
1000-2000' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	120	4.0	0.8	--	--	--	--	--	--	120	4.0	0.8
H	520	4.0	3.7	--	--	--	--	--	--	520	4.0	3.7
T	640	4.0	4.5	--	--	--	--	--	--	640	4.0	4.5
T14S R65W												
0-200' OVERBURDEN												
D	--	--	--	1360	6.0	14.4	--	--	--	1360	6.0	14.4
I	850	4.0	6.0	560	5.4	5.4	--	--	--	1410	4.6	11.4
H	--	--	--	--	--	--	--	--	--	--	--	--
T	850	4.0	6.0	1920	5.8	19.8	--	--	--	2770	5.3	25.8
200-500' OVERBURDEN												
D	500	4.7	4.2	750	5.8	7.7	--	--	--	1250	5.4	11.9
I	780	4.7	6.5	1280	5.5	12.5	--	--	--	2060	5.3	19.0
H	--	--	--	--	--	--	--	--	--	--	--	--
T	1280	4.7	10.7	2030	5.6	20.2	--	--	--	3310	5.3	30.9
500-1000' OVERBURDEN												
D	590	4.4	4.6	200	5.5	1.9	--	--	--	790	4.7	6.5
I	2040	4.5	16.2	1480	5.3	13.9	--	--	--	3520	4.9	30.1
H	--	--	--	--	--	--	--	--	--	--	--	--
T	2630	4.5	20.8	1680	5.3	15.8	--	--	--	4310	4.9	36.6
1000-2000' OVERBURDEN												
D	210	4.0	1.5	--	--	--	--	--	--	210	4.0	1.5
I	340	4.2	2.5	--	--	--	--	--	--	340	4.2	2.5
H	--	--	--	--	--	--	--	--	--	--	--	--
T	550	4.1	4.0	--	--	--	--	--	--	550	4.1	4.0
T14S R66W												
0-200' OVERBURDEN												
D	400	3.5	2.5	300	6.8	3.6	--	--	--	700	5.0	6.1
I	120	4.0	0.8	--	--	--	--	--	--	120	4.0	0.8
H	--	--	--	--	--	--	--	--	--	--	--	--
T	520	3.6	3.3	300	6.8	3.6	--	--	--	820	4.8	6.9
200-500' OVERBURDEN												
D	1000	3.5	6.2	260	6.0	2.8	--	--	--	1260	4.1	9.0
I	--	--	--	--	--	--	--	--	--	--	--	--
H	--	--	--	--	--	--	--	--	--	--	--	--
T	1000	3.5	6.2	260	6.0	2.8	--	--	--	1260	4.1	9.0

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
500-1000' OVERBURDEN												
D	160	3.5	1.0	--	--	--	--	--	--	160	3.5	1.0
I	140	4.0	1.0	--	--	--	--	--	--	140	4.0	1.0
H	--	--	--	--	--	--	--	--	--	--	--	--
T	300	3.7	2.0	--	--	--	--	--	--	300	3.7	2.0
T15S R61W												
0-200' OVERBURDEN												
D	440	2.6	2.0	--	--	--	--	--	--	440	2.6	2.0
I	170	2.6	0.8	--	--	--	--	--	--	170	2.6	0.8
H	--	--	--	--	--	--	--	--	--	--	--	--
T	610	2.6	2.8	--	--	--	--	--	--	610	2.6	2.8
200-500 OVERBURDEN												
D	550	2.6	2.5	--	--	--	--	--	--	550	2.6	2.5
I	3120	2.7	14.9	--	--	--	--	--	--	3120	2.7	14.9
H	--	--	--	--	--	--	--	--	--	--	--	--
T	3670	2.7	17.4	--	--	--	--	--	--	3670	2.7	17.4
T15S R62W												
0-200' OVERBURDEN												
D	1480	4.2	11.0	350	5.8	3.6	--	--	--	1830	4.6	14.6
I	2380	3.5	14.7	--	--	--	--	--	--	2380	3.5	14.7
H	760	3.0	4.0	--	--	--	--	--	--	760	3.0	4.0
T	4620	3.6	29.7	350	5.8	3.6	--	--	--	4970	3.8	33.3
200-500' OVERBURDEN												
D	3320	3.5	20.6	320	5.1	2.9	--	--	--	3640	3.7	23.5
I	2440	3.5	15.1	--	--	--	--	--	--	2440	3.5	15.1
H	--	--	--	--	--	--	--	--	--	--	--	--
T	5760	3.5	35.7	320	5.1	2.9	--	--	--	6080	3.6	38.6
T15S R63W												
0-200' OVERBURDEN												
D	980	3.0	5.2	--	--	--	--	--	--	980	3.0	5.2
I	3270	3.0	17.4	--	--	--	--	--	--	3270	3.0	17.4
H	--	--	--	--	--	--	--	--	--	--	--	--
T	4250	3.0	22.6	--	--	--	--	--	--	4250	3.0	22.6
200-500' OVERBURDEN												
D	910	4.5	7.2	70	5.0	0.6	--	--	--	980	4.5	7.8
I	2580	3.2	14.6	--	--	--	--	--	--	2580	3.2	14.6
H	--	--	--	--	--	--	--	--	--	--	--	--
T	3490	3.5	21.8	70	5.0	0.6	--	--	--	3560	3.6	22.4
T15S R64W												
0-200' OVERBURDEN												
D	170	3.0	0.9	--	--	--	--	--	--	170	3.0	0.9
I	100	2.7	0.5	--	--	--	--	--	--	100	2.7	0.5
H	--	--	--	--	--	--	--	--	--	--	--	--
T	270	2.9	1.4	--	--	--	--	--	--	270	2.9	1.4

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
200-500' OVERBURDEN												
D	--	--	--	--	--	--	--	--	--	--	--	--
I	1200	2.8	5.9	--	--	--	--	--	--	1200	2.8	5.9
H	--	--	--	--	--	--	--	--	--	--	--	--
T	1200	2.8	5.9	--	--	--	--	--	--	1200	2.8	5.9
EL PASO COUNTY TOTALS												
0-200' OVERBURDEN												
D	7510	3.7	49.1	3570	6.2	39.3	60	11.2	1.2	11140	5.1	99.6
I	10250	3.3	60.3	1190	5.4	11.3	--	--	--	11440	3.6	71.6
H	840	3.0	4.5	--	--	--	--	--	--	840	3.0	4.5
T	18600	3.5	113.9	4760	6.0	50.6	60	11.2	1.2	23420	4.3	175.7
200-500' OVERBURDEN												
D	17660	3.8	120.3	5690	6.1	61.4	140	11.0	2.7	23490	4.7	192.7
I	57010	3.7	369.4	7170	5.8	73.6	--	--	--	64180	3.9	443.0
H	1330	3.8	9.0	190	5.1	1.7	--	--	--	1520	4.0	10.7
T	76000	3.7	498.7	13050	5.9	136.7	140	11.0	2.7	89190	4.1	646.4
500-1000' OVERBURDEN												
D	5950	4.0	41.9	2470	7.2	31.3	--	--	--	8420	5.0	73.2
I	58420	4.0	409.7	3210	5.4	30.7	--	--	--	61630	4.1	440.6
H	37850	4.1	274.4	470	5.1	4.2	--	--	--	38320	4.2	278.6
T	102220	4.0	726.0	6150	6.1	66.2	--	--	--	108370	4.2	792.4
1000-2000' OVERBURDEN												
D	5990	4.7	49.7	--	--	--	--	--	--	5990	4.7	49.7
I	79410	3.8	529.2	880	5.1	7.9	--	--	--	80290	3.8	537.1
H	60710	4.3	457.6	1270	5.2	11.6	--	--	--	61980	4.3	469.2
T	146110	4.0	1036.5	2150	5.1	19.5	--	--	--	148260	4.1	1056.0
2000'+ OVERBURDEN												
D	1050	4.0	7.4	--	--	--	--	--	--	1050	4.0	7.4
I	4880	4.0	34.6	--	--	--	--	--	--	4880	4.0	34.6
H	1360	4.2	10.2	--	--	--	--	--	--	1360	4.2	10.2
T	7290	4.0	52.2	--	--	--	--	--	--	7290	4.0	52.2
A BED TOTALS												
0-200' OVERBURDEN												
D	7510	3.7	49.1	3910	6.1	42.5	60	11.2	1.2	11480	4.6	92.8
I	11030	3.3	65.4	3160	5.5	31.0	--	--	--	14190	3.9	96.4
H	840	3.0	4.5	--	--	--	--	--	--	840	3.0	4.5
T	19380	3.5	119.0	7070	5.9	73.5	60	11.2	1.2	26510	4.2	193.7
200-500' OVERBURDEN												
D	17990	3.8	123.1	6320	6.0	67.5	140	11.0	2.7	24450	4.5	193.3
I	57210	3.7	371.0	8070	5.8	82.3	--	--	--	65280	4.0	453.3
H	1330	3.8	9.0	190	5.1	1.7	--	--	--	1520	4.0	10.7
T	76530	3.7	503.1	14580	5.9	151.5	140	11.0	2.7	91250	4.1	657.3

TABLE 4 (CONT'D)

Rel. Cat.	Zone 2.5-5' Thick			Zone 5-10' Thick			Zone 10'+ Thick			Total of All Thickness Categories		
	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons	Area (Ac)	Avg Thk (Ft)	Mil Tons
500-1000' OVERBURDEN												
D	5950	4.0	41.9	2470	7.2	31.3	--	--	--	8420	5.0	73.2
I	58420	4.0	409.7	3210	5.4	30.7	--	--	--	61630	4.1	440.4
H	37850	4.1	274.4	470	5.1	4.2	--	--	--	38320	4.2	278.6
T	102220	4.0	726.0	6150	6.1	66.2	--	--	--	108370	4.2	792.2
1000-2000' OVERBURDEN												
D	5990	4.7	49.7	--	--	--	--	--	--	5990	4.7	49.7
I	79410	3.8	529.2	880	5.1	7.9	--	--	--	80290	3.8	537.1
H	60710	4.3	457.6	1270	5.2	11.6	--	--	--	61980	4.3	469.2
T	146110	3.9	1036.5	2150	5.1	19.5	--	--	--	148260	4.1	1056.0
MORE THAN 2000' OVERBURDEN												
D	1050	4.0	7.4	--	--	--	--	--	--	1050	4.0	7.4
I	4880	4.0	34.6	--	--	--	--	--	--	4880	4.0	34.6
H	1360	4.2	10.2	--	--	--	--	--	--	1360	4.2	10.2
T	7290	4.0	52.2	--	--	--	--	--	--	7290	4.0	52.2

TABLE 5
DEPLETION ESTIMATES,
A COAL BED, LARAMIE FORMATION

Township-Range	2.5-5' beds	5-10' beds	10'+ beds	TOTAL DEPLETION
13S 66W	994,000	21,641,000	5,618,000	28,253,000
13S 67W	35,000	541,000	--	576,000
14S 60W	13,000	35,000	--	48,000
14S 64W	370,000	485,000	--	855,000
14S 65W	--	1,218,000	--	1,218,000
14S 66W	141,000	1,164,000	--	1,305,000
15S 63W	28,000	--	--	28,000

(adapted from CGS Open File Report 79-1)

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

by Wynn Eakins

RESOURCE SERIES 27
PLATE 1 OF 10
1985

PIKEVIEW QUAD

COLORADO SPRINGS QUAD

CORRAL BLUFFS QUAD

YODER QUAD

HANOVER NW QUAD

HANOVER NE QUAD

EXPLANATION

- ● 0-361 — Drill hole data point and identification number
- ◩ — Underground mine data point
- Quadrangle where data is compiled at a scale of 1 : 24,000

Base map from U.S. Geological Survey; Colorado Springs, 1981

INDEX MAP OF DATA POINTS COMPILED AT A SCALE OF 1:100,000 AND QUADRANGLES WITH DATA COMPILED AT A SCALE OF 1:24,000

SCALE 1:100 000
1 CENTIMETER ON THE MAP REPRESENTS 1 KILOMETER ON THE GROUND
CONTOUR INTERVAL 10 AND 50 METERS

This report is the result of a cooperative investigation conducted by the Colorado Geological Survey and funded by U.S. Geological Survey Grant No. 14-08-001-A0086.

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COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

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PLATE 2 OF 10
1985

Base map from U.S.G.S 7.5' quadrangle

EXPLANATION

- RME-15 — Drill hole data point
- RAPSON — Underground mine data point

UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

INDEX MAP OF DRILL HOLE AND MINE DATA POINTS, COLORADO SPRINGS 7.5' QUADRANGLE

SCALE 1:24000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

This report is the result of a cooperative investigation conducted by the Colorado Geological Survey and funded by U. S. Geological Survey Grant No. 14-08-001-A0086.

COLORADO SPRINGS, COLO.

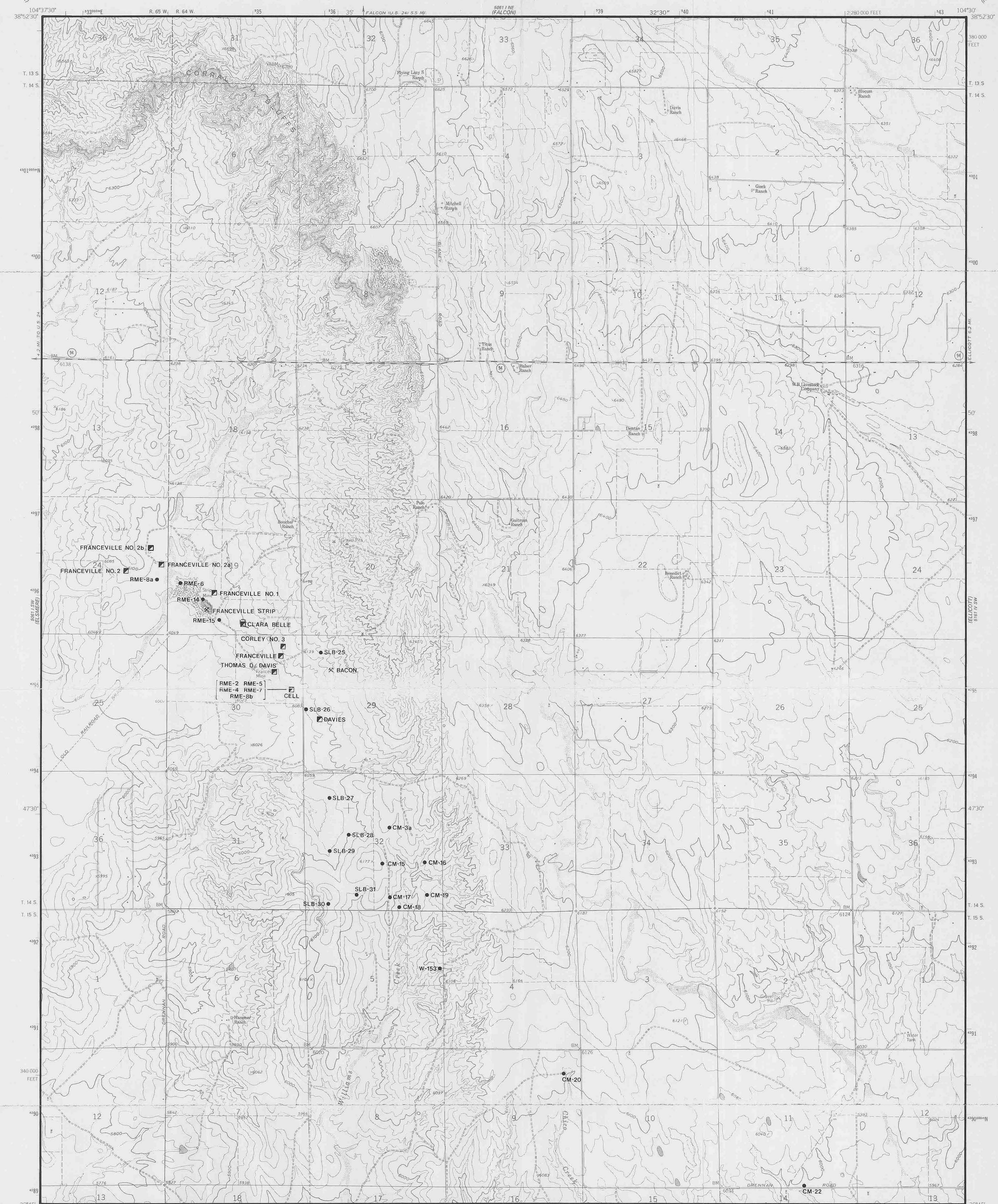
1961
PHOTOREVISED 1969 AND 1975

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

by Wynn Eakins

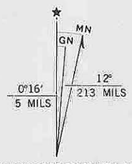
RESOURCE SERIES 27
PLATE 3 OF 10
1985



Base map from U.S.G.S 7.5 'quadrangle

EXPLANATION

- RME-15 — Drill hole data point
- RAPSON — Underground mine data point
- BACON — Surface mine data point



UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

INDEX MAP OF DRILL HOLE AND MINE DATA POINTS, CORRAL BLUFFS 7.5′ QUADRANGLE

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETRE

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

This report is the result of a cooperative investigation conducted by the Colorado Geological Survey and funded by U. S. Geological Survey Grant No. 14-08-001-A0086.

CORRAL BLUFFS, COLO.

1961
PHOTOREVISED 1975

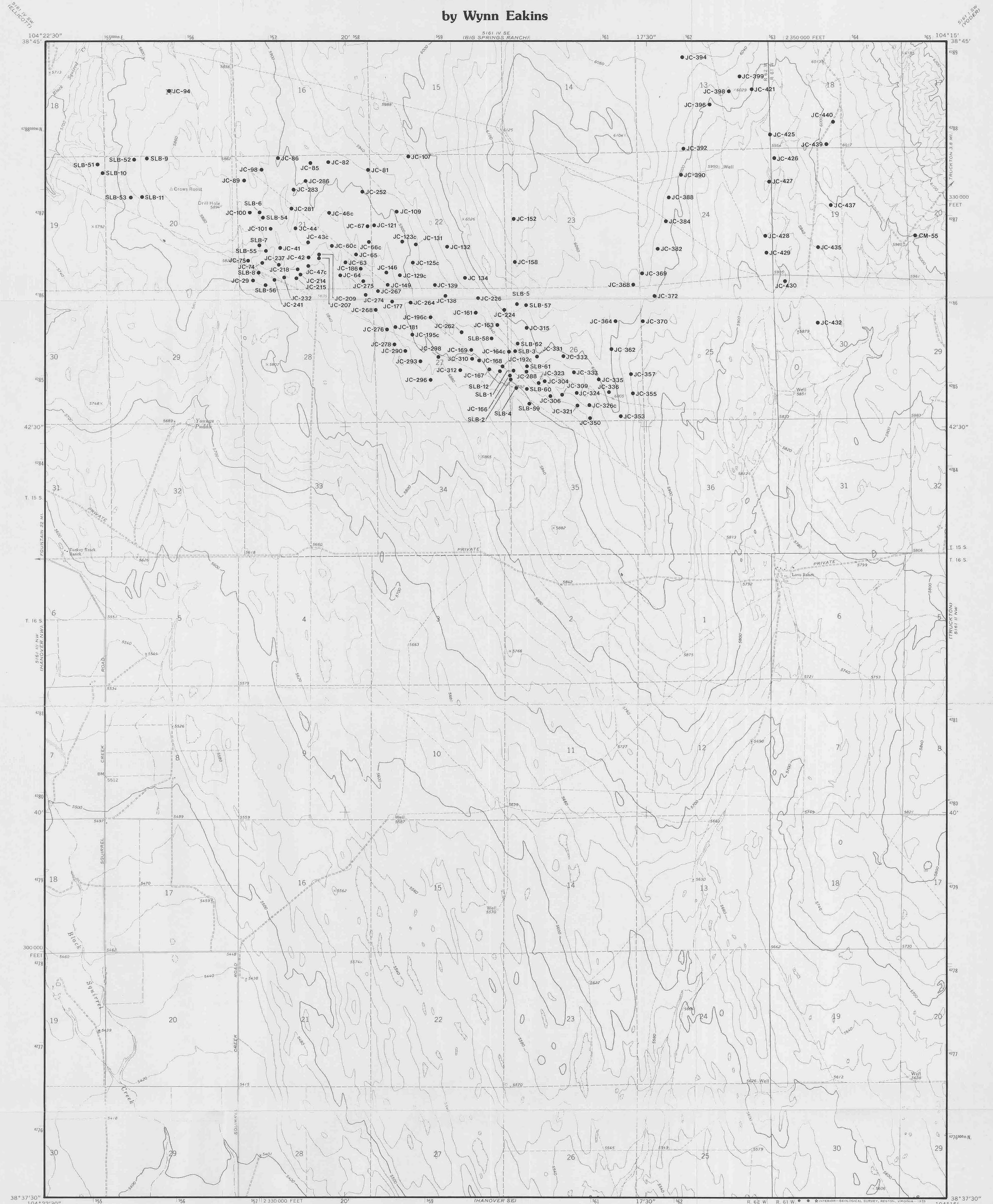
INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1977

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

by Wynn Eakins

RESOURCE SERIES 27
PLATE 4 OF 10
1985



Base map from U.S.G.S 7.5 'quadrangle

INDEX MAP OF DRILL HOLE AND MINE DATA POINTS, HANOVER NE 7.5' QUADRANGLE

EXPLANATION

RME-15 • Drill hole data point

UTM GRID AND 1973 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

0°26' 8 MILS — 12½° 222 MILS

SCALE 1:24 000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETRE

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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HANOVER NE, COLO.

1973

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COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

by Wynn Eakins

RESOURCE SERIES 27
PLATE 5 OF 10
1985

Base map from U.S.G.S 7.5' quadrangle

EXPLANATION

- ● RME-15 — Drill hole data point
- ◪ RAPSON — Underground mine data point

MN
GN
0°21'
6 MILS
12°
213 MILS
UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

INDEX MAP OF DRILL HOLE AND MINE DATA POINTS, HANOVER NW 7.5' QUADRANGLE

SCALE 1:24 000

1 0 1/2 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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HANOVER NW, COLO.

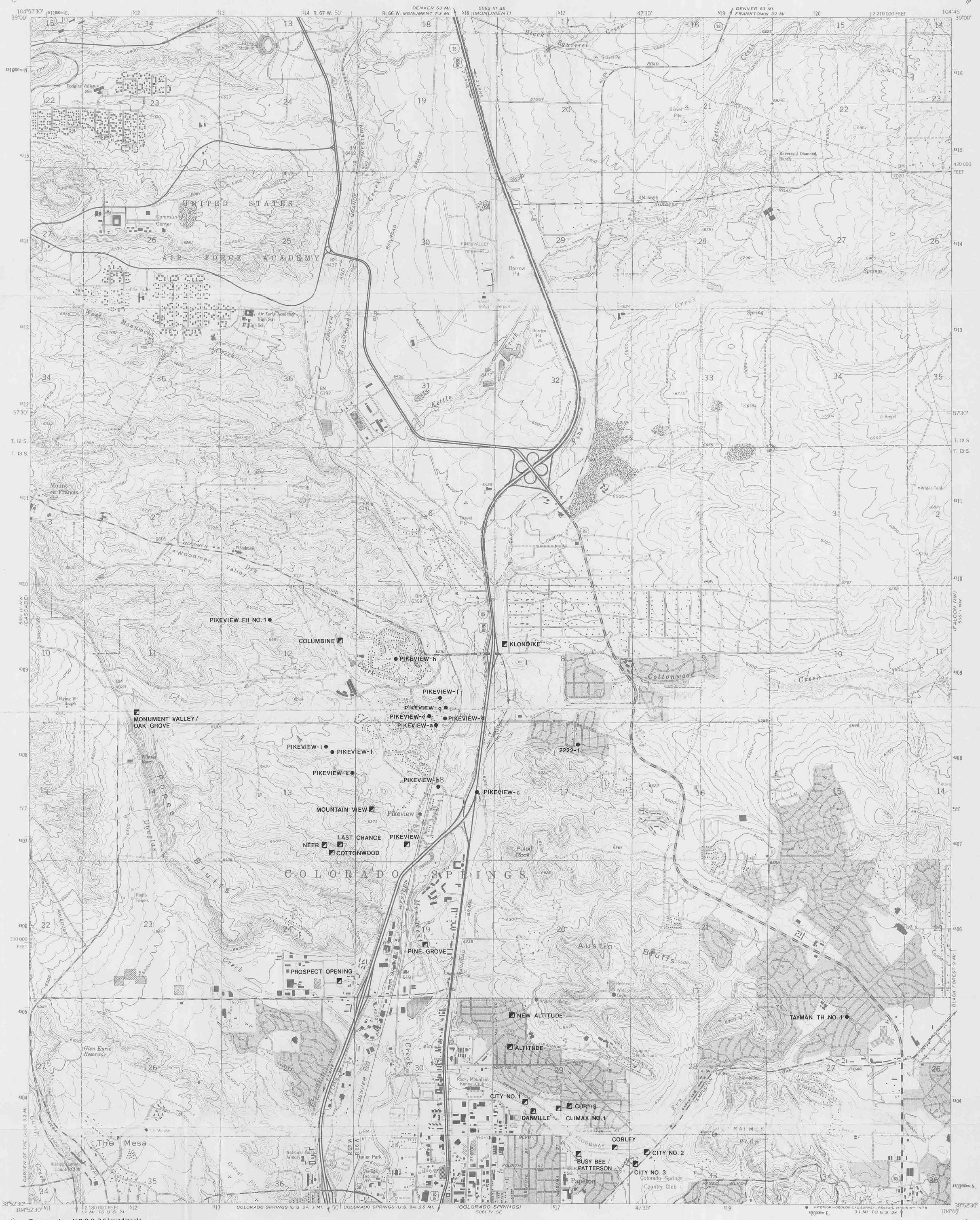
1954

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

RESOURCE SERIES 27
PLATE 6 OF 10
1985

by Wynn Eakins



Base map from U.S.G.S 7.5' quadrangle

EXPLANATION

- ● RME–15 Drill hole data point
- ◪ RAPSON Underground mine data point

GN MN
0°07' 2 MILS
12½° 222 MILS
UTM GRID AND 1975 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

INDEX MAP OF DRILL HOLE AND MINE DATA POINTS, PIKEVIEW 7.5' QUADRANGLE

SCALE 1:24 000
1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER
CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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PIKEVIEW, COLO.

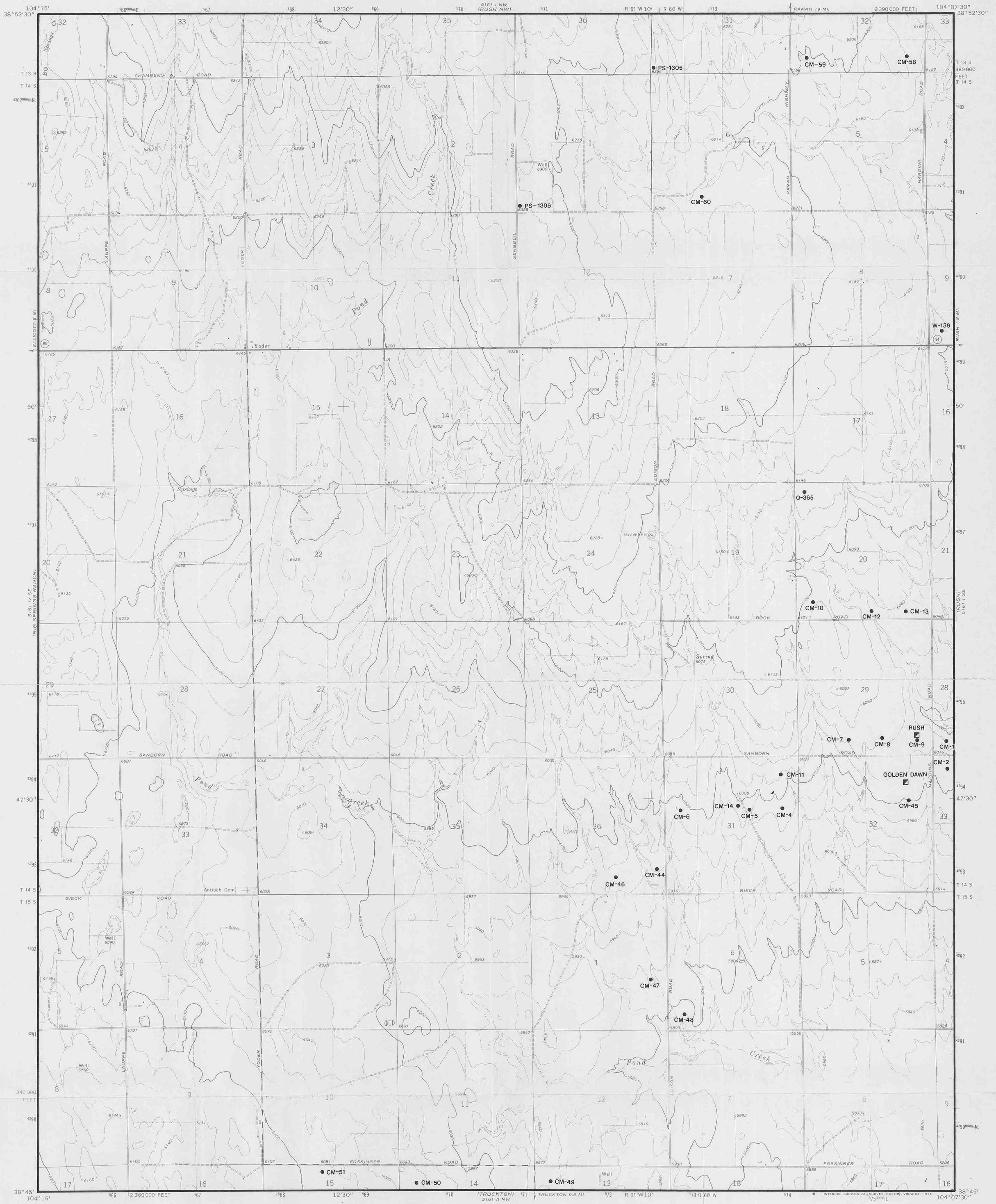
1961
PHOTOREVISED 1969 AND 1975

DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

by Wynn Eakins

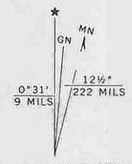
RESOURCE SERIES 27
PLATE 7 OF 10
1985



Base map from U.S.G.S 7.5' quadrangle

EXPLANATION

- RME-15 — Drill hole data point
- RAPSON — Underground mine data point



UTM GRID AND 1973 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

INDEX MAP OF DRILL HOLE AND MINE DATA POINTS, YODER 7.5' QUADRANGLE

SCALE 1:24 000

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETRE

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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YODER, COLO.

1973

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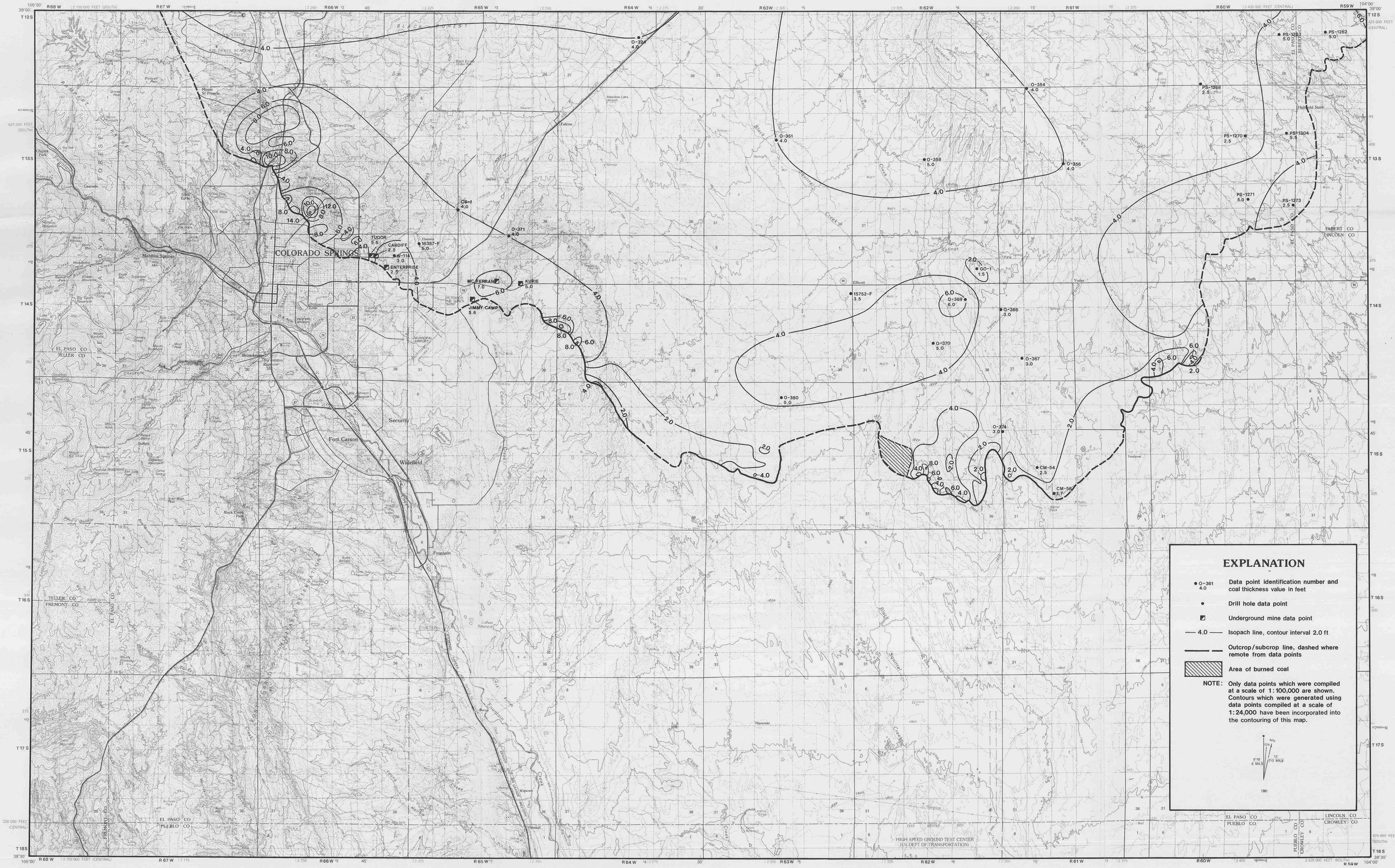
COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

by Wynn Eakins

RESOURCE SERIES 27
PLATE 8 OF 10
1985



EXPLANATION

- ● 0-361 4.0 — Data point identification number and coal thickness value in feet
- ● — Drill hole data point
- ◪ — Underground mine data point
- — 4.0 — Isopach line, contour interval 2.0 ft
- Outcrop/subcrop line, dashed where remote from data points
- Area of burned coal

NOTE: Only data points which were compiled at a scale of 1:100,000 are shown. Contours which were generated using data points compiled at a scale of 1:24,000 have been incorporated into the contouring of this map.

1981

Base map from U.S. Geological Survey; Colorado Springs, 1981

ISOPACH MAP OF THE A COAL BED, LARAMIE FORMATION

SCALE 1:100 000
1 CENTIMETER ON THE MAP REPRESENTS 1 KILOMETER ON THE GROUND
CONTOUR INTERVAL 10 AND 50 METERS

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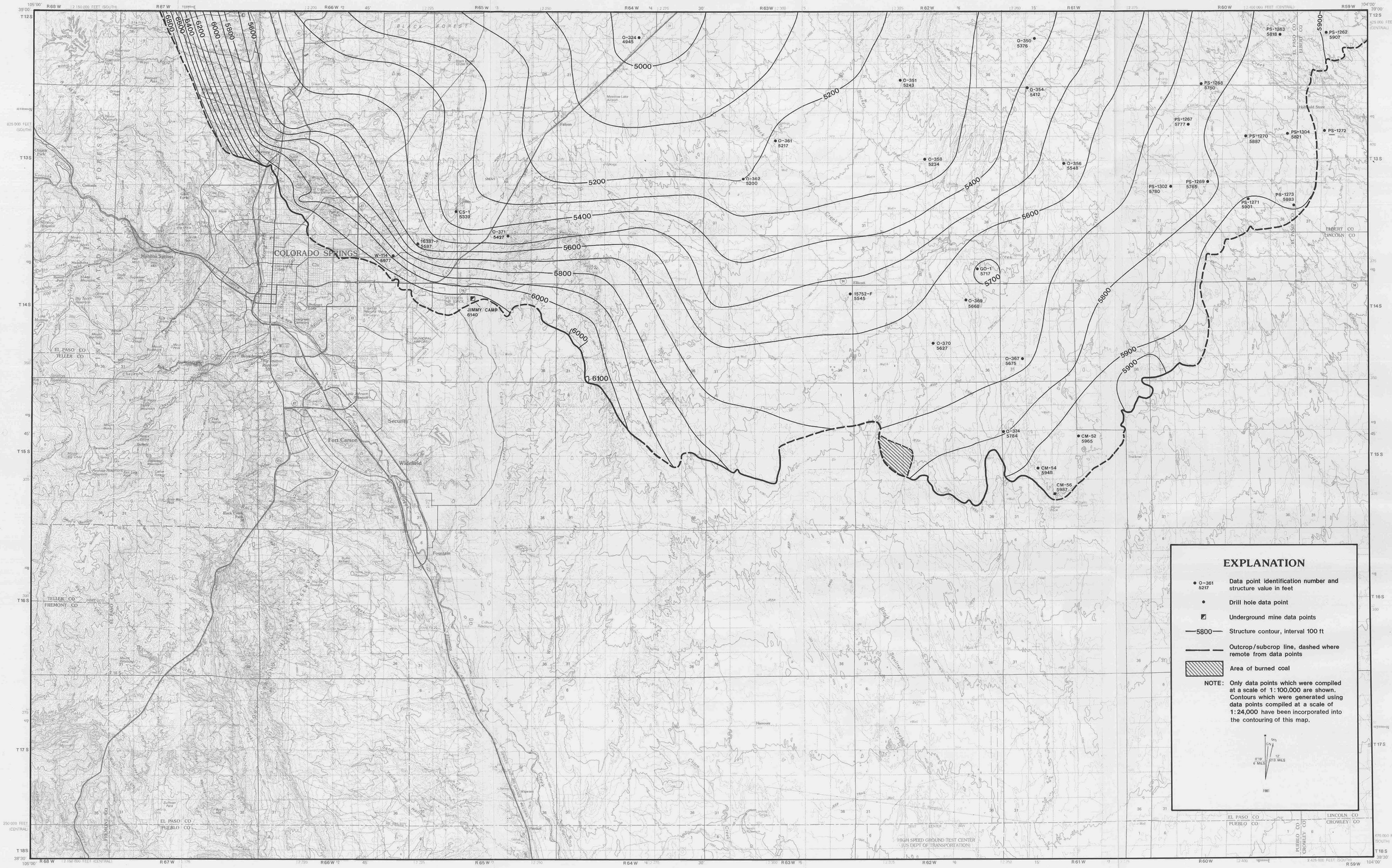
DEPARTMENT OF NATURAL RESOURCES
COLORADO GEOLOGICAL SURVEY
JOHN W. ROLD, DIRECTOR

COAL RESOURCES OF THE COLORADO SPRINGS ½°×1° QUADRANGLE, COLORADO

by Wynn Eakins

RESOURCE SERIES 27
PLATE 9 OF 10
1985



EXPLANATION

- ● O-361 5217 — Data point identification number and structure value in feet
- ● — Drill hole data point
- ◪ — Underground mine data points
- —5800— — Structure contour, interval 100 ft
- ——— — Outcrop/subcrop line, dashed where remote from data points
- ▨ — Area of burned coal

NOTE: Only data points which were compiled at a scale of 1:100,000 are shown. Contours which were generated using data points compiled at a scale of 1:24,000 have been incorporated into the contouring of this map.

Base map from U.S. Geological Survey; Colorado Springs, 1981

STRUCTURE CONTOUR MAP ON THE A COAL BED, LARAMIE FORMATION

SCALE 1:100 000
1 CENTIMETER ON THE MAP REPRESENTS 1 KILOMETER ON THE GROUND
CONTOUR INTERVAL 10 AND 50 METERS

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COAL RESOURCES OF THE COLORADO SPRINGS 1/2° × 1° QUADRANGLE, COLORADO

by Wynn Eakins

RESOURCE SERIES 27
PLATE 10 OF 10
1985

EXPLANATION

- ● O-361 1165 — Data point identification number and overburden value in feet
- ● — Drill hole data point
- ◪ — Underground mine data point
- —500— — Overburden isopach, contoured at 200, 500, 1000 and 2000 ft
- Outcrop/subcrop line, dashed where remote from data points
- Area of burned coal

NOTE: Only data points which were compiled at a scale of 1:100,000 are shown. Contours which were generated using data points compiled at a scale of 1:24,000 have been incorporated into the contouring of this map.

1981

OVERBURDEN ISOPACH MAP OF THE A COAL BED, LARAMIE FORMATION

SCALE 1:100 000
1 CENTIMETER ON THE MAP REPRESENTS 1 KILOMETER ON THE GROUND
CONTOUR INTERVAL 10 AND 50 METERS

KILOMETERS 1 0 1 2 3 4 5 6 7 8 9 10
MILES 1 0 1 2 3 4 5 6
1000 0 5000 10 000 METERS
5000 0 10 000 20 000 30 000 FEET

Base map from U.S. Geological Survey; Colorado Springs, 1981

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