ACKNOWLEDGMENTS

Funding for this investigation was provided by the United States Geological Survey through USGS Grant No. 14-08-0001-G-487, whose financial support and cooperation made this report possible. Special thanks to E. R. Landis of the U.S.G.S. Branch of Coal Resources, who provided assistance and advice on both funding and project development, and to Robert G. Hobbs for technical information on drilling and geophysical logging.

This project was carried out in two parts. Part 1 was done by Karl Brand, who researched existing drill hole and outcrop data, planned and implemented the drilling program, and correlated and mapped the coal zones and beds. Part 2 by Wynn Eakins included all resource calculations and compilation of the tables, along with the final editing of the maps and text.

Thanks also to personnel of the Colorado Geological Survey, who have contributed to this project: L. R. Ladwig, Chief, Mineral Fuels Section and principal project investigator for overall guidance and John W. Rold, State Geologist, for insight into geophysical log interpretations and assistance in dealing with other state agencies; Donna Boreck, Carol Tremain, and Bruce Kelso, who assisted with the field work, and Charles Campbell and Jennifer Caine, who assisted in map preparation and with critical review of the text.

John Romero, Colorado Division of Water Resources, provided unpublished file information and helped with Denver Basin stratigraphy and structure. Tom Bretz, Colorado State Land Board, helped in the preparation of required permits.

Many thanks also go to the individuals and companies from private industry who assisted with information for this report. Robert Kirkham, consultant, gave much assistance on depositional environments, basin history, structure and stratigraphy, and also a critical review of the many cross sections. Will Owens, of Willard Owens and Associates and Kevin Jackson, Terry Cox, and Carrie Rodgers, all of Rocky Mountain Energy Company, provided valuable information and comments.

INTRODUCTION

This report and series of maps present the findings of an investigation entitled "Exploratory Coal Drilling and Coring Program in the Denver East $1/2^{\circ} \times 1^{\circ}$ Quadrangle". This program is a cooperative investigation conducted by the Colorado Geological Survey and funded by U.S. Geological Survey Grant No. 14-08-0001-G-487, and is part of a nationwide program sponsored by the USGS 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 was to evaluate the coal resources in the 1,780 mi² (4,610 km²) Denver East $1/2^{\circ} \times 1^{\circ}$ guadrangle. This was accomplished by researching existing data, which included drillers' and geophysical logs from exploration holes, water wells, oil and gas wells drilled by numerous individuals and companies, and other miscellaneous investigations. Sources of these data include the Colorado Division of Water Resources (water well information), the Colorado State Oil and Gas Conservation Commission (oil and gas well logs), the Colorado State Board of Land Commissioners (various logs of holes drilled on state properties), and exploration holes drilled by industry. This was followed by a drilling and coring program in areas where additional data were needed. Information obtained from the CGS drilling and coring program is contained in Colorado Geological Survey open-file reports 80-1 and 80-9. All information pertinent to this investigation is used as data for interpretation, with certain proprietary information deleted on the final versions.

The Denver East $1/2^{\circ} \times 1^{\circ}$ quadrangle is located between latitude 39°30' and 40°N. and longitude 104° and 105°W. The quadrangle includes much of Adams and Arapahoe Counties, northern Elbert and northeastern Douglas Counties, and part of the City and County of Denver. See Figure 1.

Developmental pressures from the expanding Denver metropolitan area require identification and classification of the coal resources to optimize resource recovery with land use. Our nation's expanding energy demands also require that a detailed knowledge of the coal resources be available for energy planning.

Most of the information obtained from this investigation is presented in map 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, 1980), Romero (1976), Soister (1972, 1974, 1978a, 1978b), and Soister and Tschudy (1978).

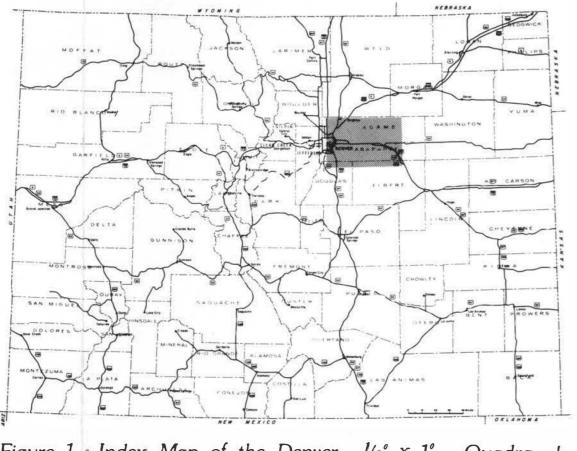


Figure 1 Index Map of the Denver $1/2^{\circ} \times 1^{\circ}$ Quadrangle

The Denver East $1/2^{\circ} \times 1^{\circ}$ quadrangle lies within the Great Plains province of the Interior Plains (Fenneman, 1931) and occupies a part of the Denver Basin. A generalized stratigraphic column of the Upper Cretaceous through the Eocene is presented in Figure 2. Only the Denver and Laramie Formations contain appreciable quantities of coal within this quadrangle, although coal and/or lignite has been reported in the Dawson Formation (Kirkham, 1979) and the Fox Hills Sandstone (Kirkham and Ladwig, 1979).

PERIOD	GEOLOGIC FORMATION	GRAPHIC LITHOLOGY*	T
Eocene	DAWSON ARKOSE		
Paleocene	DENVER FORMATION		4
Cretaceous	ARAPAHOE FORMATION		5
Upper C	LARAMIE FORMATION		3
Ŋ	FOX HILLS SANDSTONE		1
	PIERRE SHALE		50

* Not to Scale Modified from Kirkham and Ladwig, 1979, and Romero, 1976 Figure 2 Generalized Stratigraphy of the Denver Quadrangle

LARAMIE FORMATION COAL ZONE

The Laramie Formation coal zone underlies the entire quadrangle except for the extreme northeastern corner where the coal has been eroded. The Laramie coal zone reaches a maximum depth of about 1,700 ft (518 m) near the structural center of the basin (Kirkham and Ladwig, 1980, p. 51), which is located in the southwestern portion of the quadrangle. Plates 4 and 5 respectively show the top of the Laramie Formation coal zone and the total cumulative coal-bed thickness. The stratigraphy of the Laramie coal zone changes significantly from west to east across the quadrangle, making correlations difficult.

Depth to the Laramie coal zone placed limitations on drilling of certain areas within this quadrangle. Correlation of the coals, in part, were based on those water well and petroleum exploration well logs which were considered to be reliable. Drilling by the Colorado Geological Survey to the Laramie coal zone was concentrated in the Antelope Flats-Deer Trail Areas as shown on Plate 2. These areas have the highest development potential of Laramie coals within the quadrangle, and their relatively thin overburden allowed for a greater drill hole density.

Three separate coal beds are located within the lower portion of the Laramie Formation in the Antelope Flats-Deer Trail area. These are designated the Lower A, the Upper A, and the B beds. Where present, the Lower A bed is usually located immediately above the Laramie Formation-Fox Hills Sandstone contact. The Upper A bed is located 10 to 25 ft (3 to 7.6 m) above the Lower A bed, and it locally splits into as many as three beds. The B bed is located 50 to 100 ft (15 to 30 m) above the Upper A bed and generally marks the top of the Laramie coal zone in the area. Thin coals and carbonaceous lenses are commonly found above the B bed, but are of little economic significance. The general stratigraphy of the Laramie Formation in the Antelope Flats-Deer Trail area is shown in Figure 3.

Three coal samples taken from two holes that penetrated the Laramie Formation were found to have an apparent rank of Lignite A, with as-received heating values ranging from 5,926 to 6,912 Btu/lb, and as-received sulfur contents of 0.3 to 0.5 percent (Brand, 1980). Complete analyses of these samples may be found in CGS open-file report 80-1. Other analyses of Laramie coals are available in CGS open-file report 78-9.

Economic development of Laramie Formation coals will be based on such factors as bed thickness, Btu value, overburden thickness, demand, and environmental considerations. The Antelope Flats-Deer Trail area (see Plate 2) appears to be more suitable for strip and/or underground mining than the remainder of the quadrangle. In this area overburden is less than 250 ft (76 m) thick, normally considered the limit for strip mining, and individual coal bed thicknesses exceed 10 ft (3 m). Factors that may limit mining in this area include the erosion of the B bed by Bijou Creek and the position of the A beds beneath an "alluvial valley floor." Mining of such areas is precluded by Public Law 95-87.

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

by Karl E. Brand and Wynn Eakins

1980

In-situ gasification of Laramie Coal may be possible in areas where individual coal beds exceed 10 ft (3 m) and overburden thicknesses range from 500 to 1,000 ft (152 to 304 m). These limitations were based on work done by Hand (1979) that related drilling costs to coal bed and overburden thickness, and by Kirkham (1979) whose work indicated that subsidence effects may be reduced where 600 ft or more of overburden is present.

Total Laramie coal resources within the Denver East quadrangle are estimated to be 16.6 billion tons.

THICKNESS in feet * 0 - 300400 - 800500 - 600 350 - 500100 - 200 000 - 7000

GEOLOGIC FORMATION	GRAPHIC LITHOLOGY *	THICKNESS in feet *	COAL BED NAME
LARAMIE FORMATION		1 - 10 1 - 10 1 - 6	B A, UPPER BED A, LOWER BED
FOX HILLS SANDSTONE			

* Not to Scale Modified from Kirkham and Ladwig, 1979 Figure 3 - Generalized Stratigraphy of the Laramie Formation

DENVER FORMATION LIGNITE

Denver Formation lignites occur in the upper 300 to 500 ft (91 to 152 m) of the formation (Kirkham and Ladwig, 1979). The main lignite-bearing area within the Denver East quadrangle is designated the Watkins-Lowry area, as shown on Plate 12. Plates 14 and 15 respectively show the top of the Denver Formation coal zone and the total cumulative coal thickness within the zone. Gun Club Road has been arbitrarily chosen as the western boundary of this area even though there are lignite deposits to the west (Kirkham and Ladwig, 1979). This line was chosen as it is an approximate limit of the Denver metropolitan area urban development.

With the support of additional drill hole data, new correlations of the coals reveal the need for certain changes from those of previous workers. Cross-sectional traverses throughout the Watkins-Lowry area support the assumption that these new correlations are correct even though many hole-to-hole correlations are not immediately evident. Cross sections and structure maps seem to indicate that faulting may be present but only small reverse faults with throws of two or four ft have been observed. Variations in bed elevations are probably due to differences in sedimentation, differential compaction and minor compaction faults.

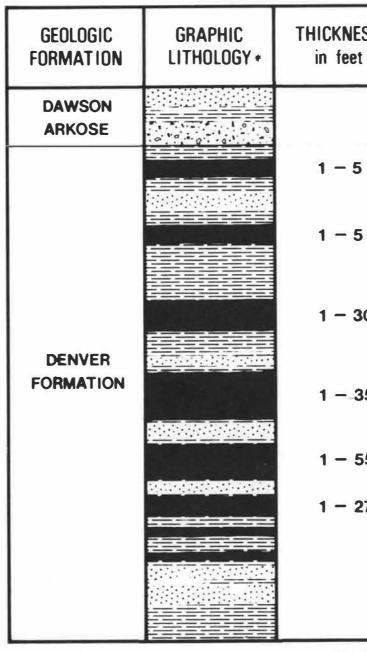
Changes in the correlations necessitated changes in the bed nomenclature (see Figure 4). Soister (1972) and Kirkham and Ladwig (1979) have designated the lignite beds, in descending order, as the A, B, C, D, and E lignite beds. The B, C, and E beds were named the Lowry, Bennett, and Watkins beds, respectively, by these authors. Work done during this investigation shows that the A and B beds tend to be thin, carbonaceous, and limited in lateral extent. Previous workers may have confused the A and B beds with the C and D beds, respectively. In this report the C and D beds are, respectively, referred to as the Lowry and Bennett beds. The E bed in this report is called the Upper Watkins bed. South of the town of Watkins the Lower Watkins bed splits off from the Upper Watkins bed.

Minor lignite beds occur below the Lower Watkins bed, but due to a lack of data, detailed correlations are difficult (see Plate 22). Correlation between the northern and southern coal areas that were designated by Kirkham and Ladwig (1979), may be possible, but additional drilling is needed to verify this. Much of the Denver lignite lies within 200 ft (60 m) of the surface and is well suited for strip mining (see Plate 13). The cutoff of 200 ft is used in this case because a 250 ft overburden isopach line could not be accurately delineated with available data. In some cases more than one lignite bed could be strip mined during the same operation. In most areas in which the overburden exceeds 200 ft (60 m), in-situ gasification is possible since the lignite beds often exceed 10 ft (3 m). This is especially true in the southern part of the area (see Plate 13). Ideally, overburden should exceed 500 feet to avoid subsidence problems, but on Plate 13 the 200-500 foot range is shown because only the overburden to the top bed is isopached and other beds in this area are deeper than 500 feet.

Typical as-received heat values for Denver Formation lignites range from 4,000 to 7,500 Btu/lb (Kirkham and Ladwig, 1979). Sulfur content varies from 0.2 to 0.5 percent (Kirkham and Ladwig, 1979). Two core samples were taken by the CGS; analyses from these and other lignite samples may be found in CGS open-file reports 78-9, 80-1, and 80-9.

Denver Formation lignites are noted for their many noncoal partings. Most of these are clay and carbonaceous clay, but some are kaolinitic, containing upward of 25 percent alumina (Kirkham and Ladwig, 1979). These alumina-rich partings might be of economic interest dependent upon the future price of aluminum (Kirkham and Ladwig, 1979).

Total Denver Formation lignite resources within the Denver East quadrangle are estimated to be about 12.9 billion tons (See Table III).



* Not to Scale Modified from Kirkham and Ladwig, 1979 Figure 4 - Generalized Stratigraphy of the Denver Formation

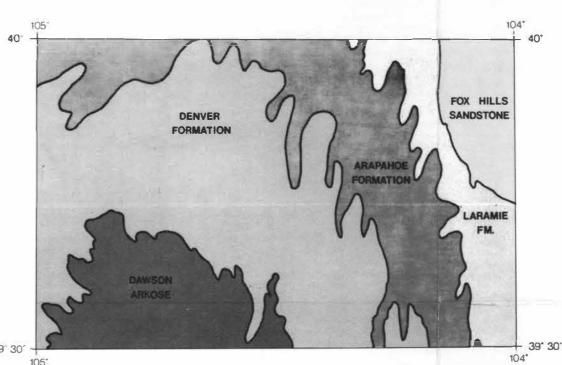


Figure 5 - Bedrock Geology of the Denver $\frac{1}{2}$ × 1° Quadrangle

CONCLUSIONS

Coal and lignite resources located within the Denver East quadrangle are greater than previously thought. Future mining within 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 portions of the Antelope Flats-Deer Trail area. In-situ gasification of thick (10 ft or greater) Laramie Formation coals may be possible in areas where the coal cannot be mined by conventional methods, provided that the depth of coal versus coal thickness and other factors are favorable. Most of the Laramie coal is too deep or too thin for economical recovery using present methods.

Exploration during this investigation has expanded the known areal extent of the Denver Formation lignites. Much of this lignite is well suited for strip mining because of relatively thin overburden and thick beds; multiple bed mining is feasible in certain areas. In-situ gasification shows promise as a method for recovering much of the lignite that is unsuitable for conventional mining practices; this is especially true in areas near the Lowry Bombing Range. Mining of the Denver Formation lignites may be limited by the proximity of possible mining areas to the Denver metropolitan area and by the numerous clay partings within them.



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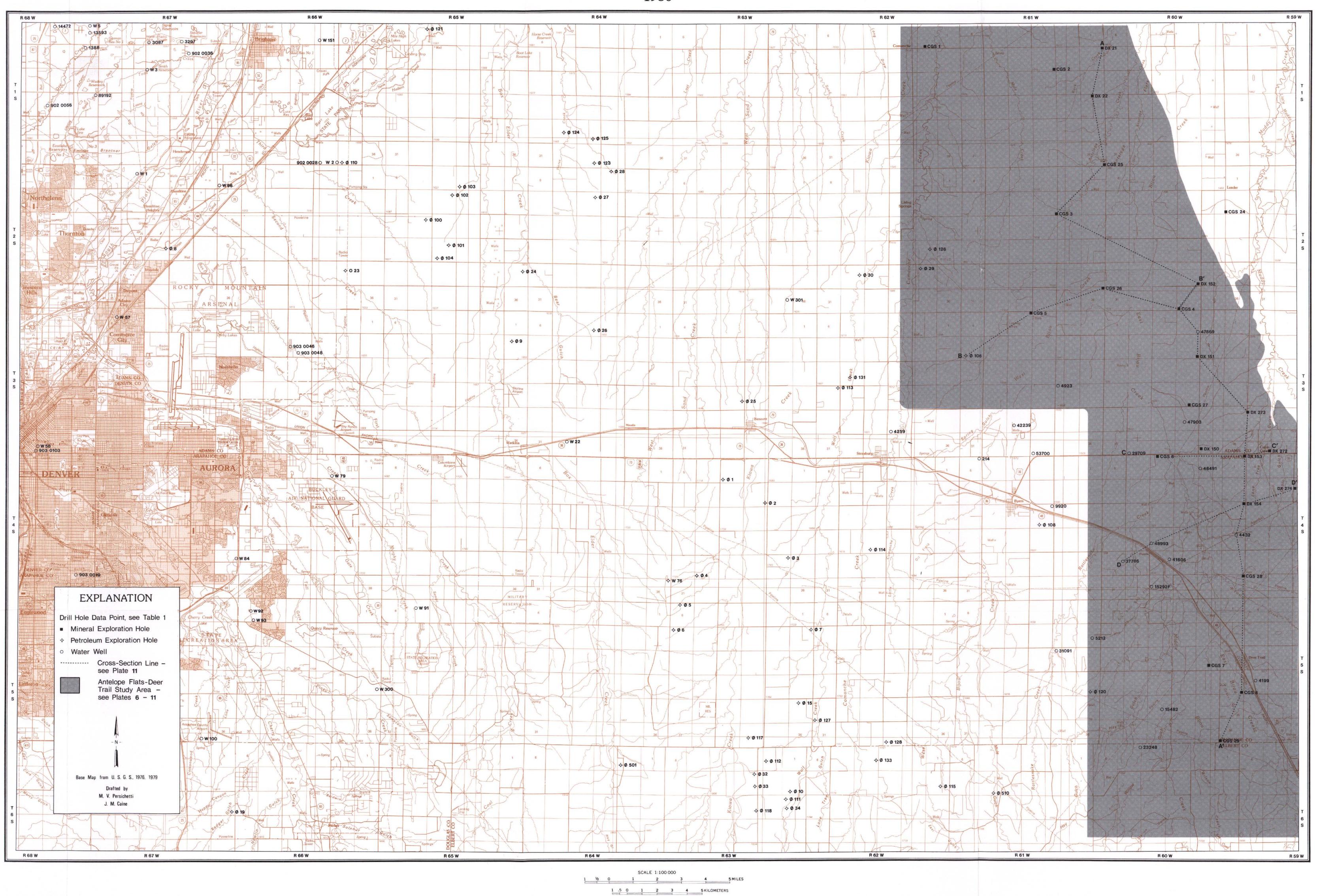
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SS *	COAL BED NAME
	A
	В
0	C, LOWRY
5	D, BENNETT
5	E, UPPER WATKINS
7	LOWER WATKINS

Modified from Kirkham and Ladwig, 1979

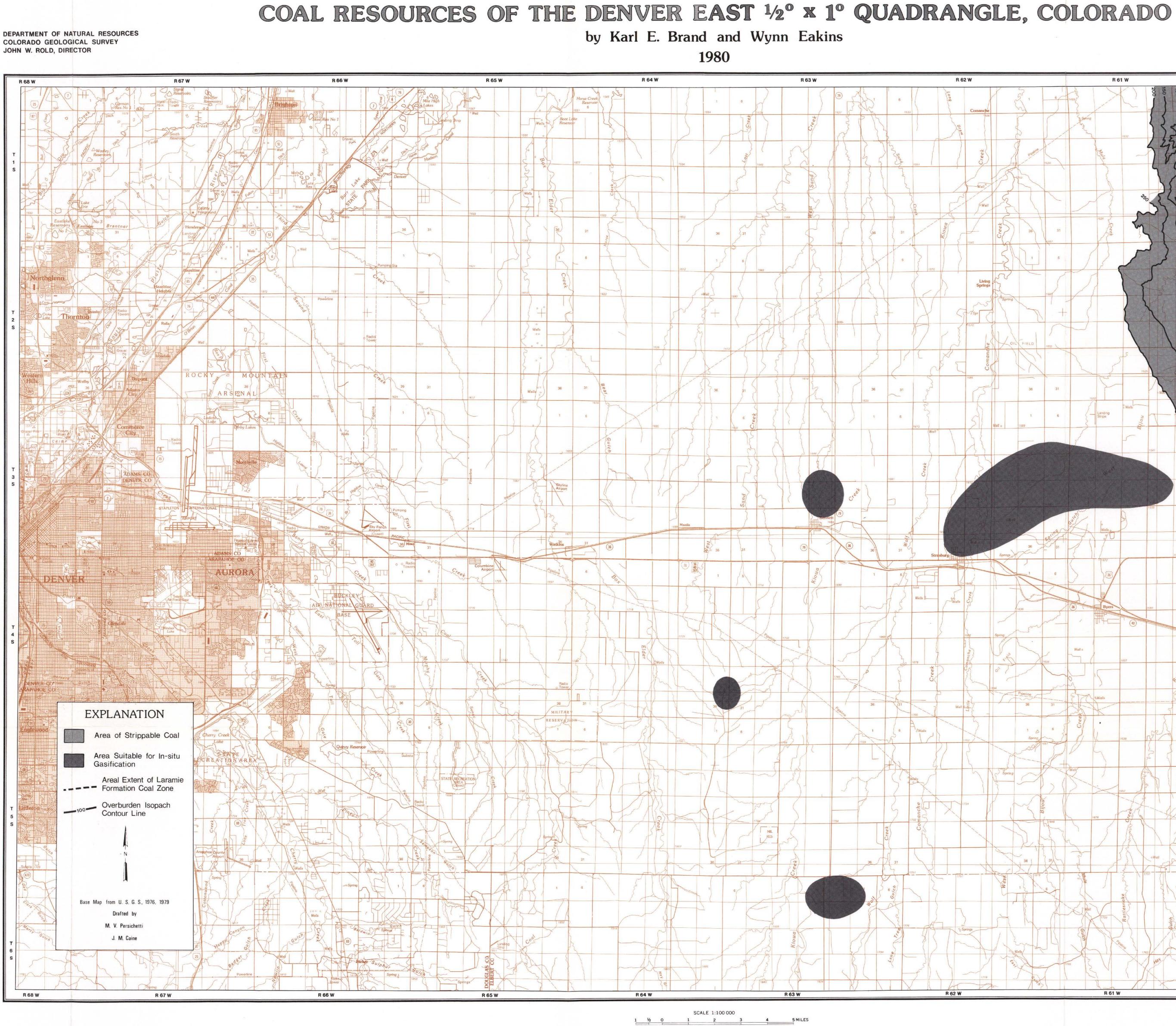


COAL RESOURCES OF THE DENVER EAST ¹/2° × 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980

INDEX MAP OF LARAMIE FORMATION DRILL HOLES AND CROSS-SECTIONS, AND OUTLINE OF THE ANTELOPE FLATS-DEER TRAIL STUDY AREA

COLORADO GEOLOGICAL SURVEY **RESOURCE SERIES 13** PLATE 2 OF 25

DEPARTMENT OF NATURAL RESOURCES COLORADO GEOLOGICAL SURVEY



MAP OF LARAMIE FORMATION COALS SUITABLE FOR STRIPPING AND IN-SITU GASIFICATION

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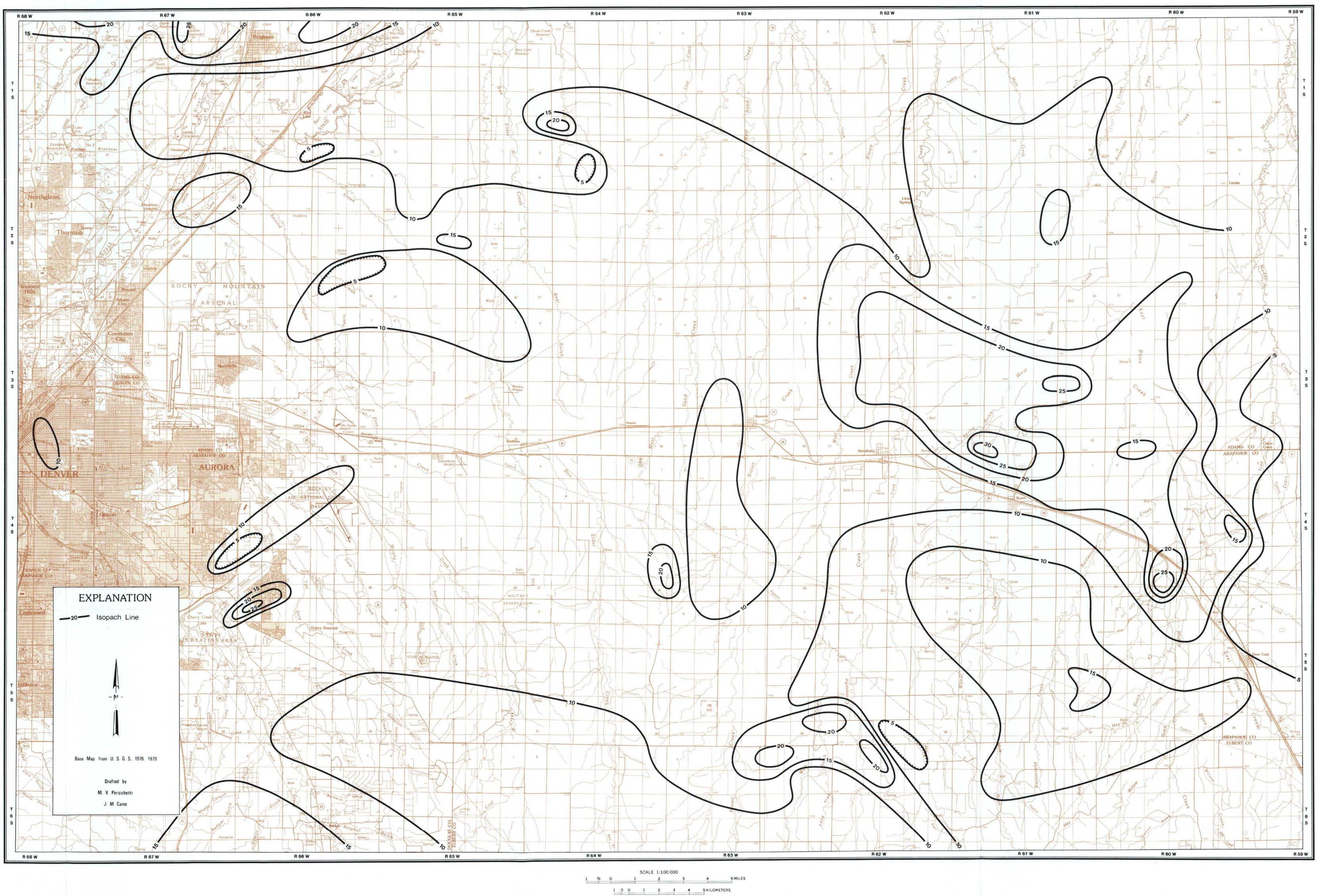
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R 59 W

COLORADO GEOLOGICAL SURVEY **RESOURCE SERIES 13** PLATE 3 OF 25

R 61 W

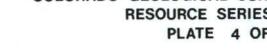


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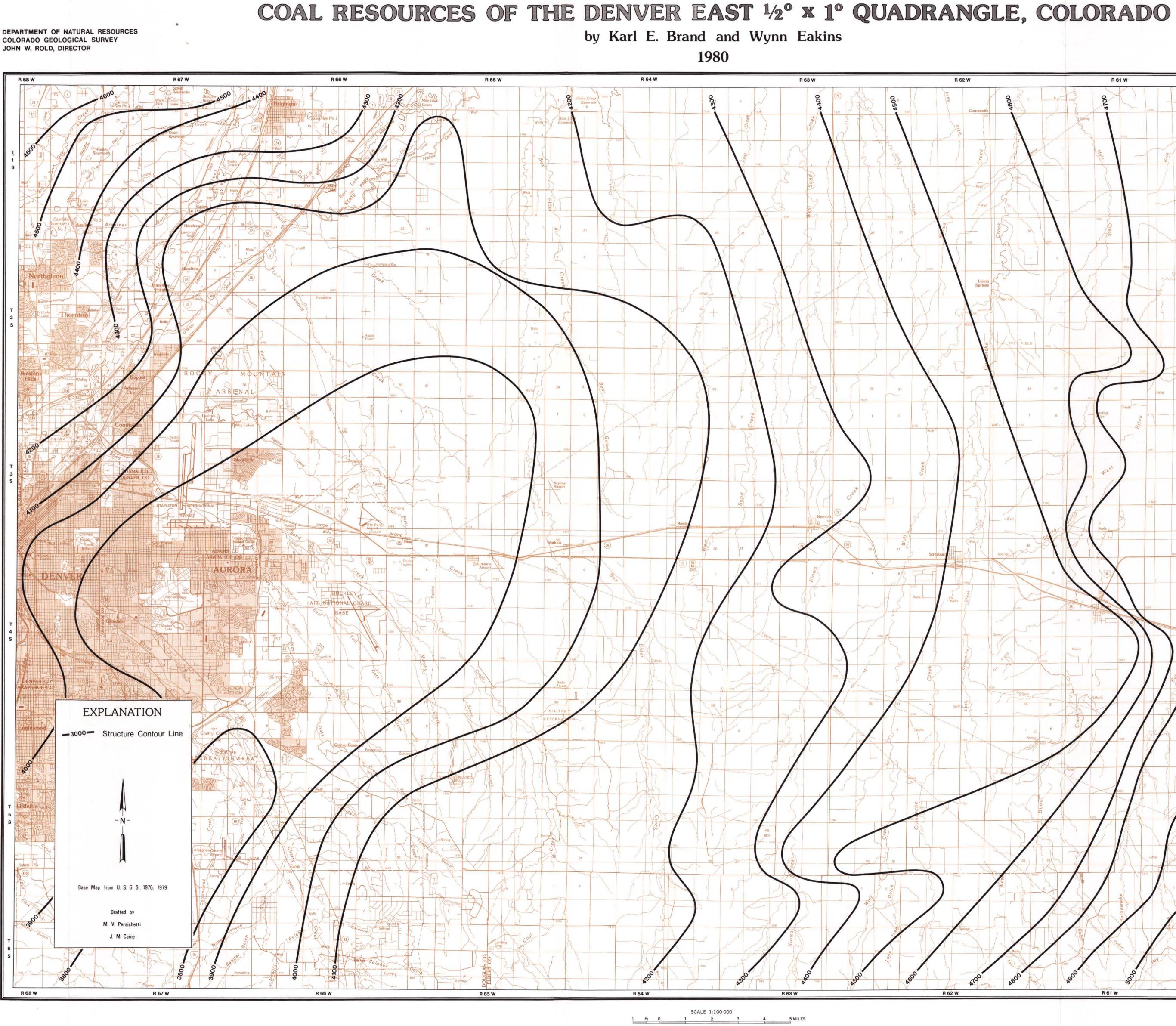
TOTAL COAL THICKNESS MAP OF THE LARAMIE FORMATION COAL ZONE



COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 4 OF 25



JOHN W. ROLD, DIRECTOR



STRUCTURE MAP OF THE LARAMIE FORMATION COAL ZONE

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COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 5 OF 25 R 59 W R 61 W R 60 W 8 Well ADAMS CO Cabin ARAPAHOE CO Haven ARAPAHOE CO ELBERT CO

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COAL RESOURCES OF THE DENVER EAST ¹/2° x 1° QUADRANGLE, COLORADO

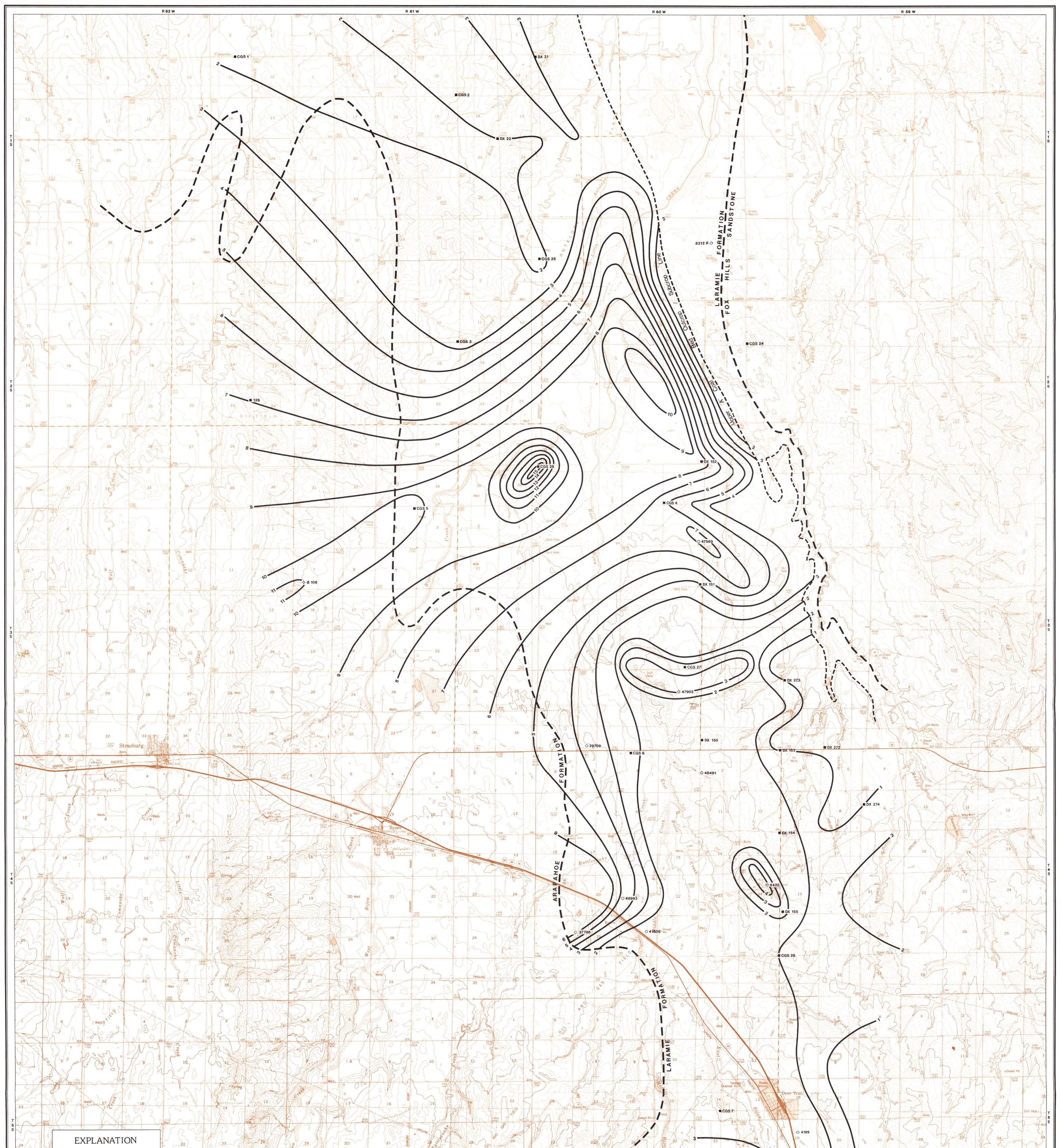
DEPARTMENT OF NATURAL RESOURCES COLORADO GEOLOGICAL SURVEY JOHN W. ROLD, DIRECTOR

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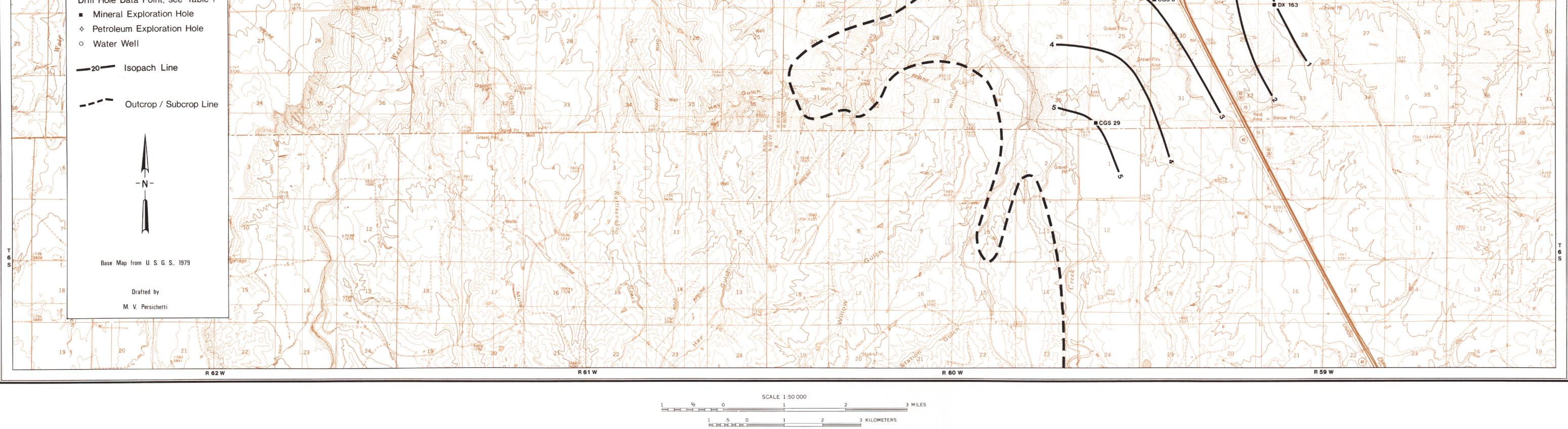
by Karl E. Brand and Wynn Eakins

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 6 OF 25

1980



ISOPACH MAP OF THE UPPER "A" COAL BED, LARAMIE FORMATION, ANTELOPE FLATS-DEER TRAIL AREA



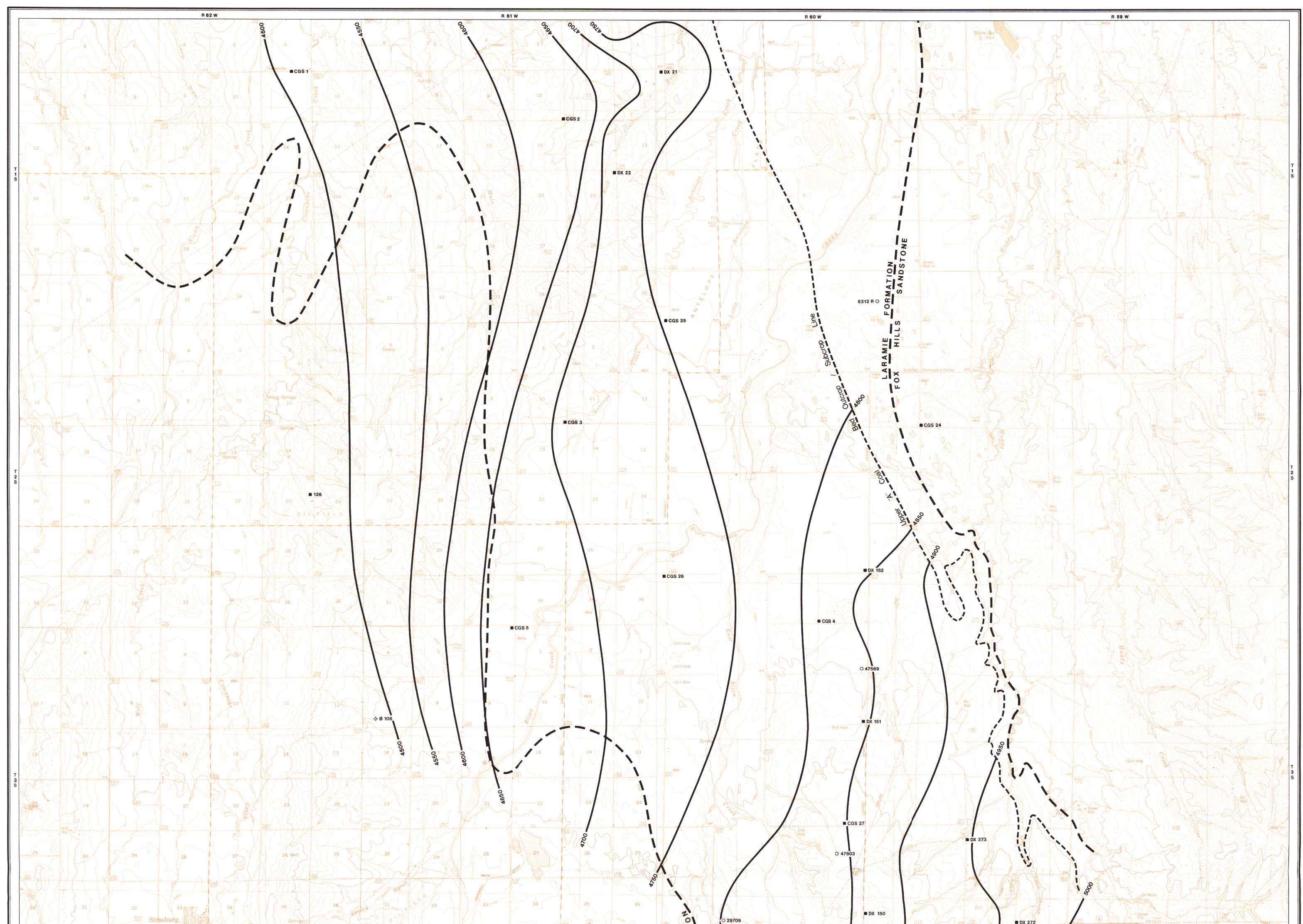
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COAL RESOURCES OF THE DENVER EAST 1/2° x 1° QUADRANGLE, COLORADO

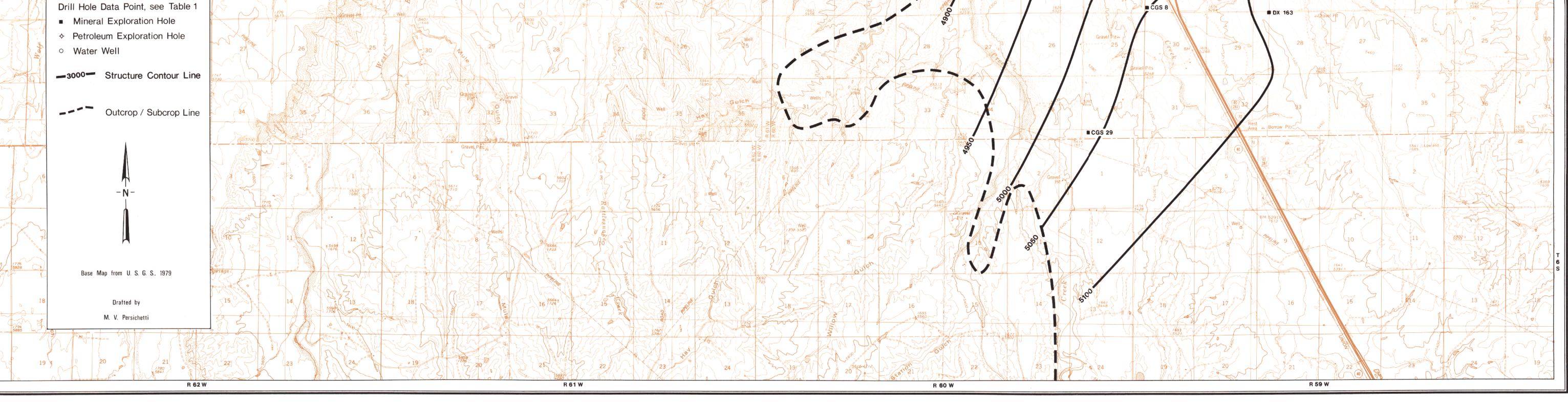
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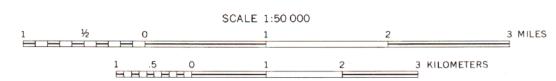
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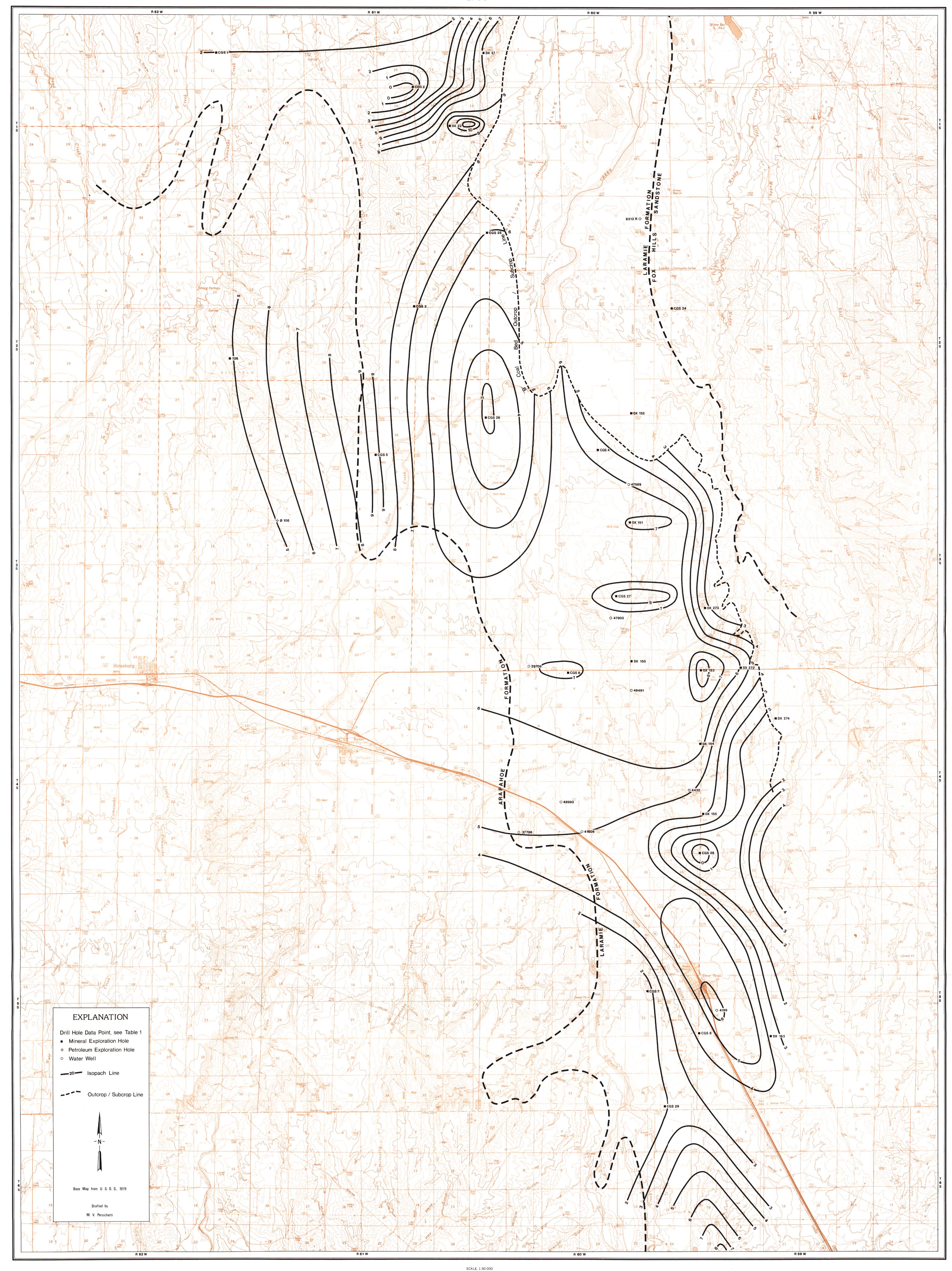
STRUCTURE MAP OF THE UPPER "A" COAL BED, LARAMIE FORMATION, ANTELOPE FLATS-DEER TRAIL AREA

COAL RESOURCES OF THE DENVER EAST ¹/2° x 1° QUADRANGLE, COLORADO

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1980

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 8 OF 25



ISOPACH MAP OF THE "B" COAL BED, LARAMIE FORMATION, ANTELOPE FLATS-DEER TRAIL AREA

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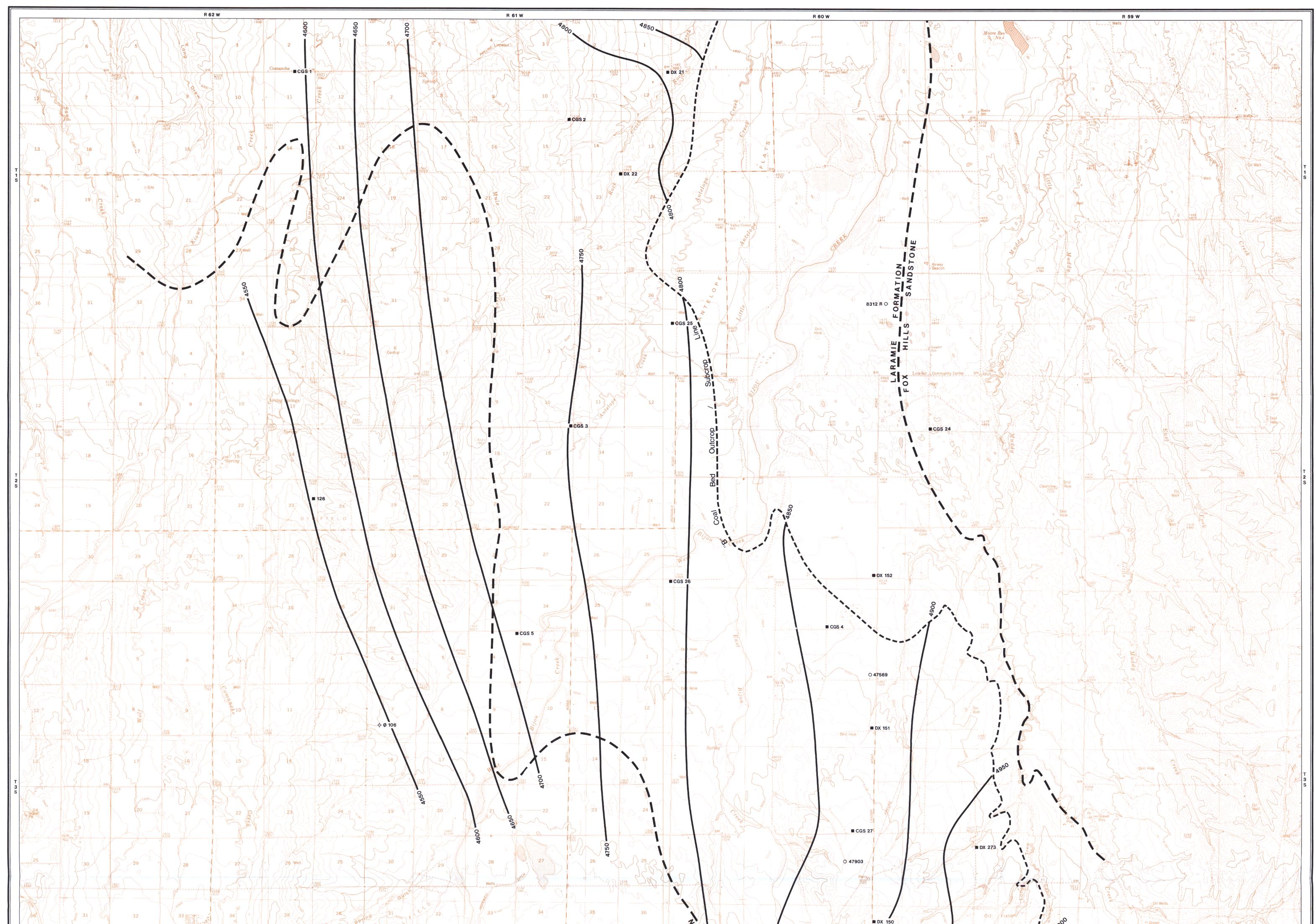
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COAL RESOURCES OF THE DENVER EAST ¹/2° x 1° QUADRANGLE, COLORADO

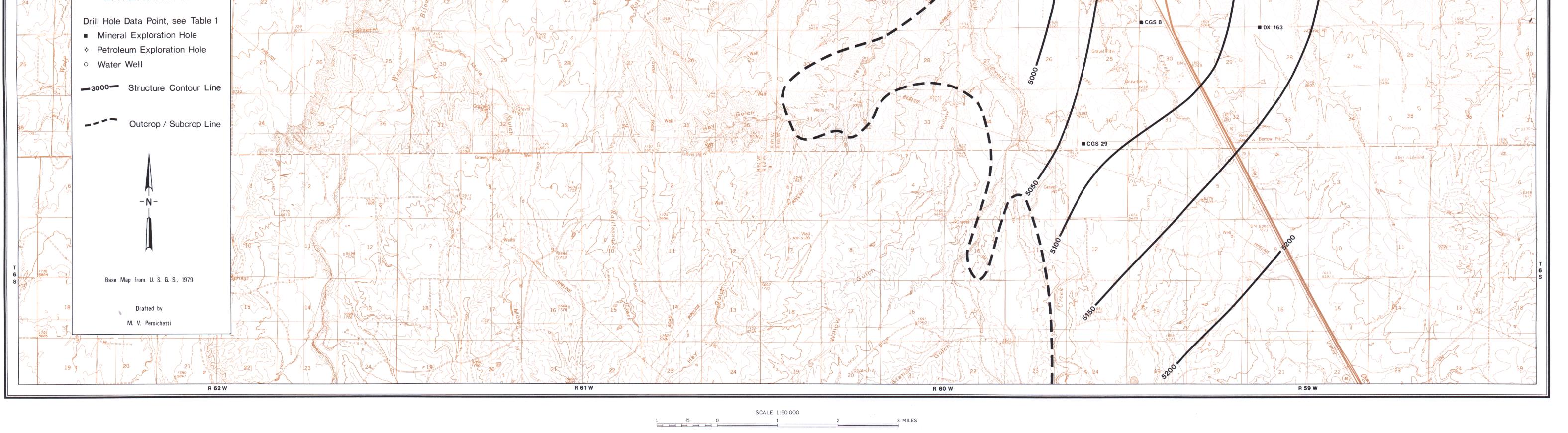
DEPARTMENT OF NATURAL RESOURCES COLORADO GEOLOGICAL SURVEY JOHN W. ROLD, DIRECTOR by Karl E. Brand and Wynn Eakins

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 9 OF 25

1980



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STRUCTURE MAP OF THE "B" COAL BED, LARAMIE FORMATION, ANTELOPE FLATS-DEER TRAIL AREA

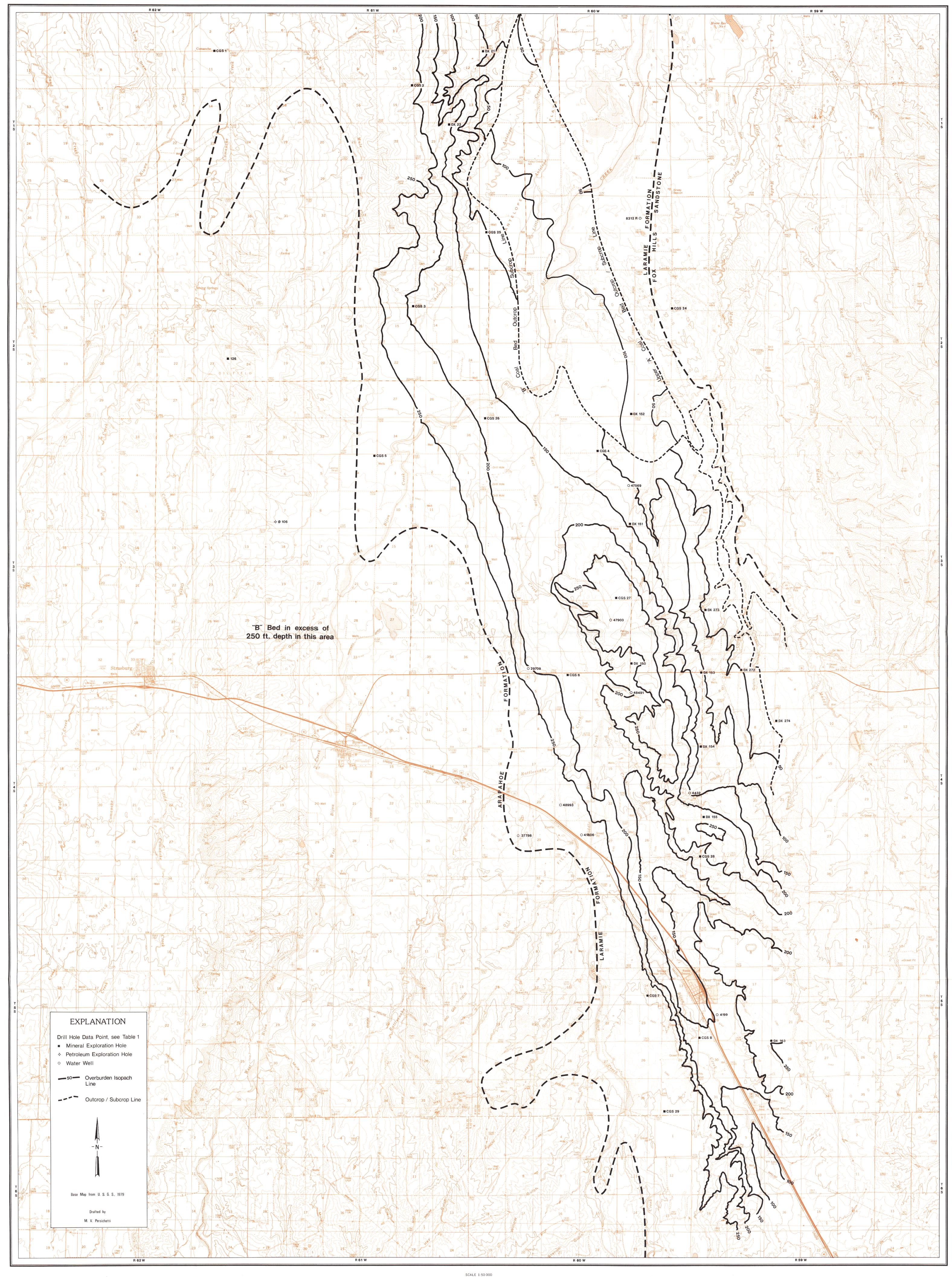
1 .5 0 1 2 3 KILOMETERS

COAL RESOURCES OF THE DENVER EAST 1/2° x 1° QUADRANGLE, COLORADO

DEPARTMENT OF NATURAL RESOURCES COLORADO GEOLOGICAL SURVEY JOHN W. ROLD, DIRECTOR by Karl E. Brand and Wynn Eakins

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 10 OF 25

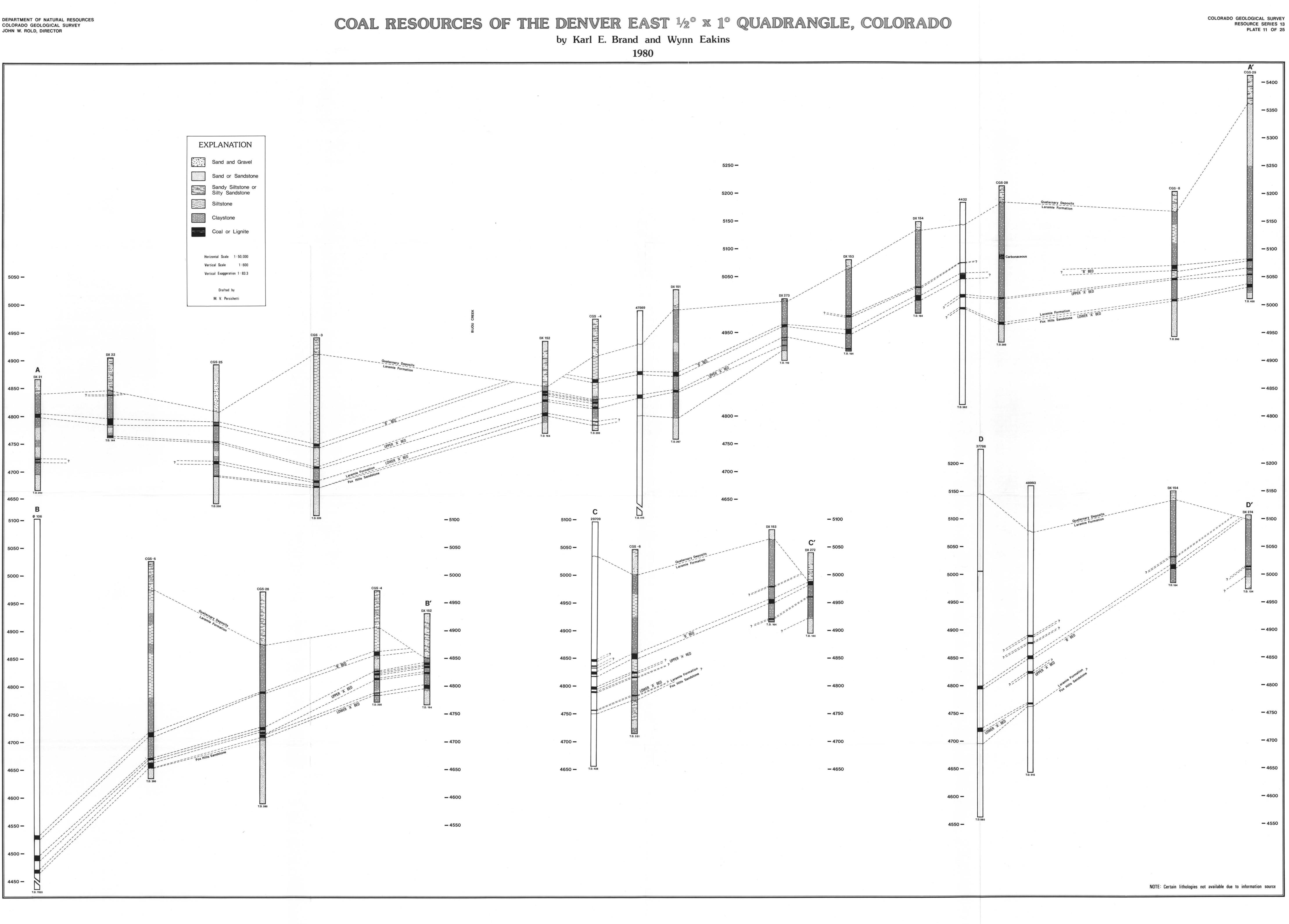
1980

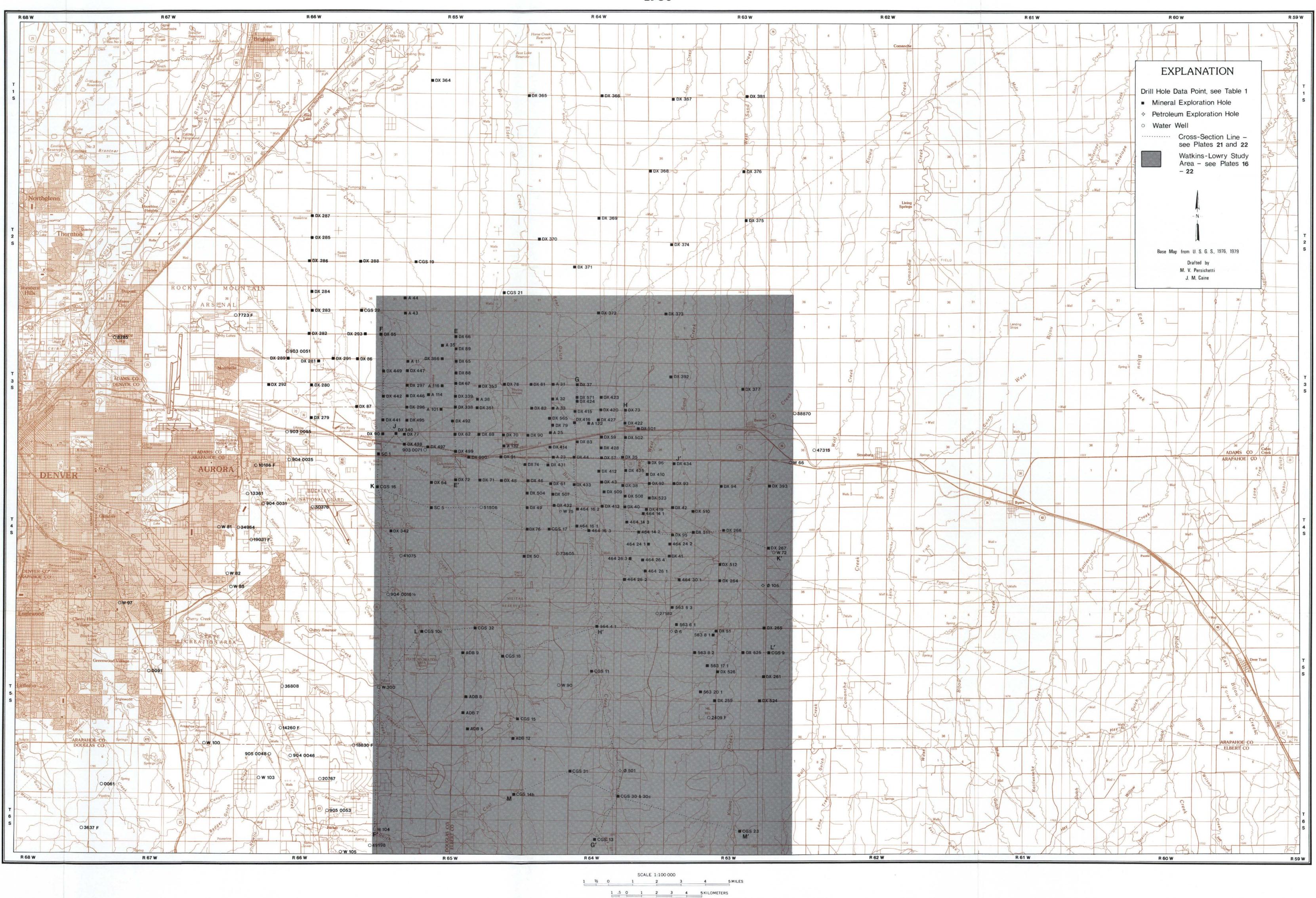


OVERBURDEN ISOPACH MAP OF THE LARAMIE FORMATION COAL ZONE, ANTELOPE FLATS-DEER TRAIL STUDY AREA

1 .5 0 1 HHHHHH 3 MILES

2 3 KILOMETERS

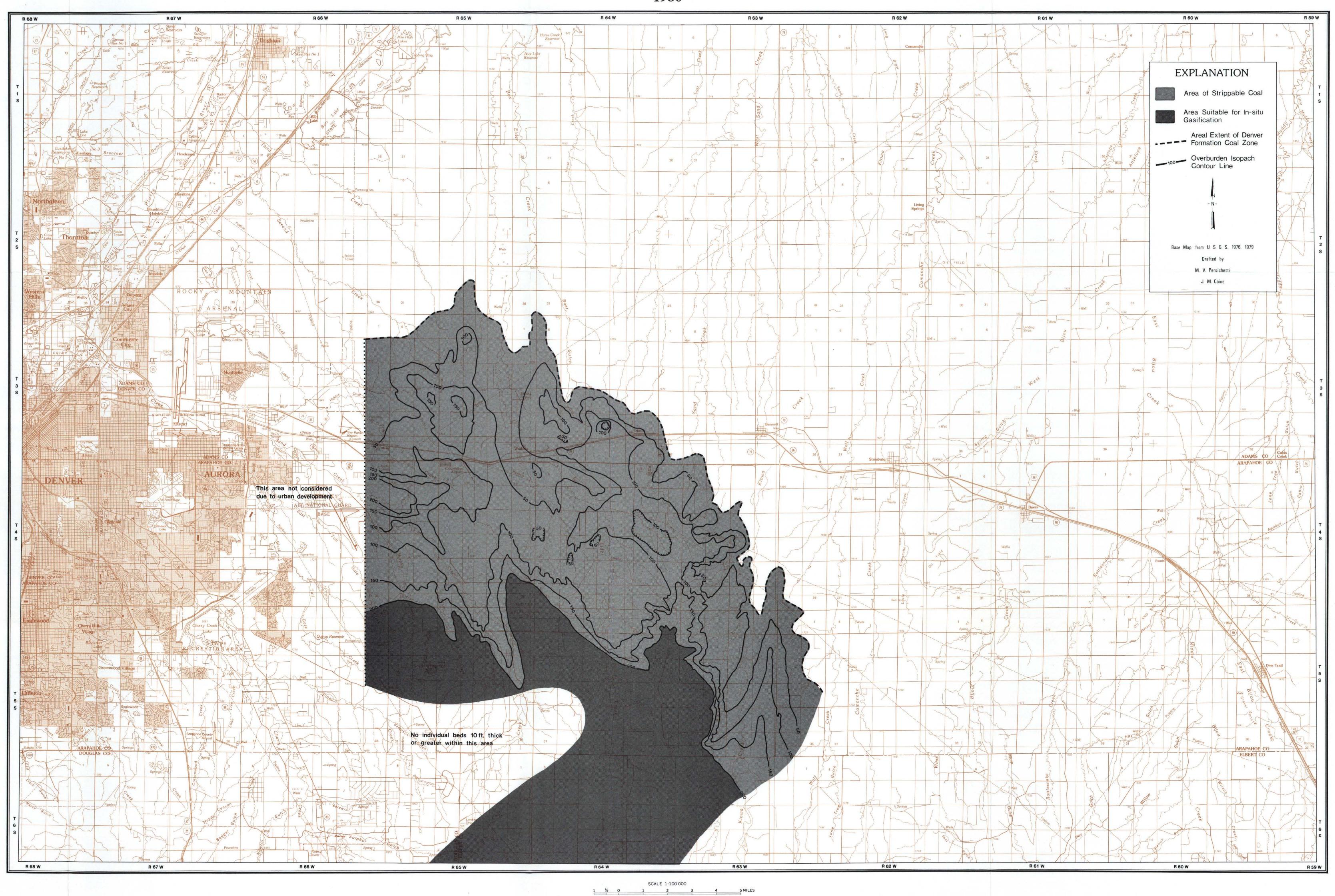




INDEX MAP OF THE DENVER FORMATION DRILL HOLES AND CROSS-SECTIONS, AND OUTLINE OF THE WATKINS-LOWRY STUDY AREA

COAL RESOURCES OF THE DENVER EAST ¹/2° × 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980

COLORADO GEOLOGICAL SURVEY **RESOURCE SERIES 13** PLATE 12 OF 25



COAL RESOURCES OF THE DENVER EAST 1/2° × 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980

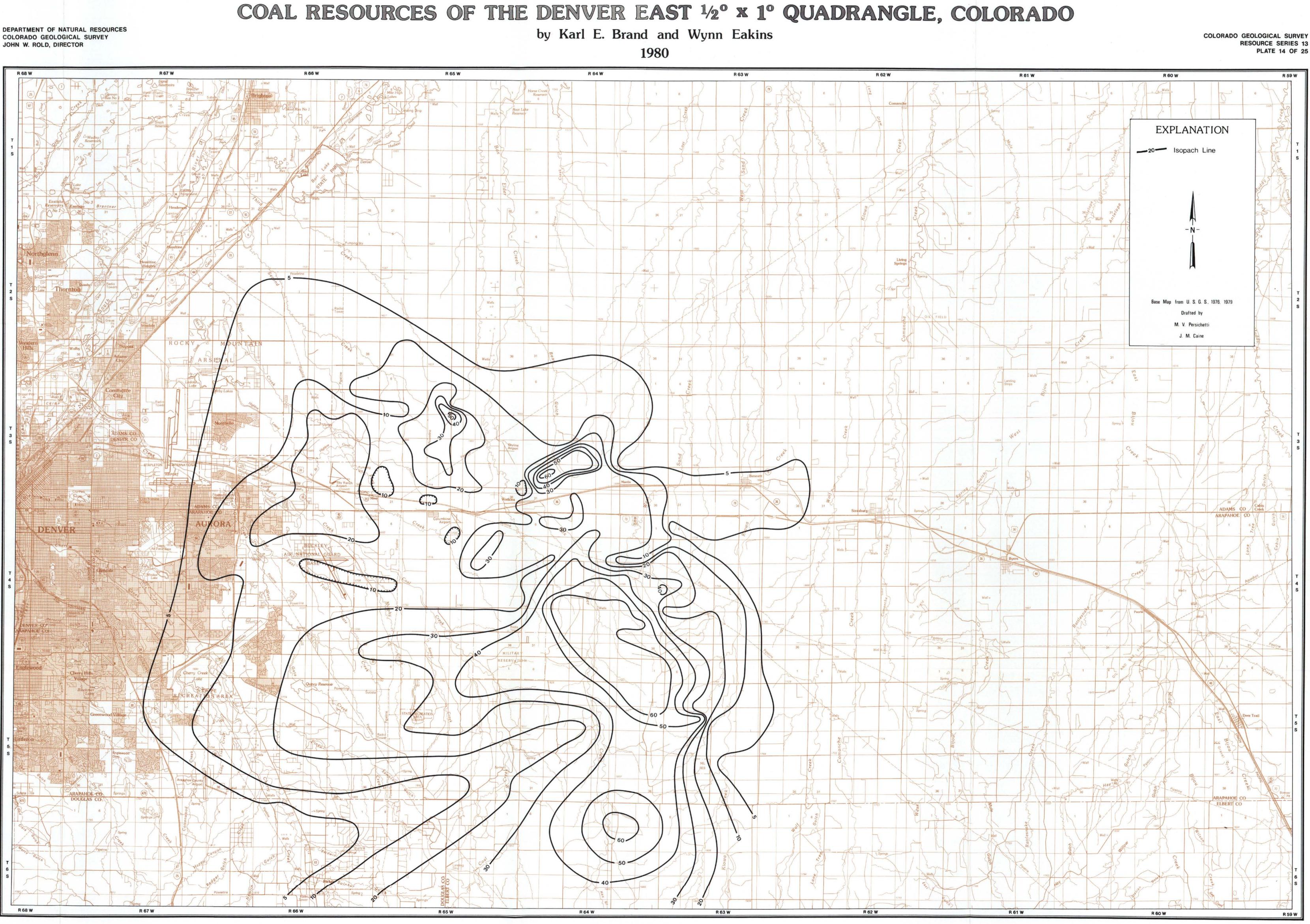
MAP OF DENVER FORMATION COALS SUITABLE FOR STRIPPING AND IN-SITU GASIFICATION

1 .5 0 1 2 3 4 5KILOMETERS

COLORADO GEOLOGICAL SURVEY **RESOURCE SERIES 13**

PLATE 13 OF 25

DEPARTMENT OF NATURAL RESOURCES COLORADO GEOLOGICAL SURVEY

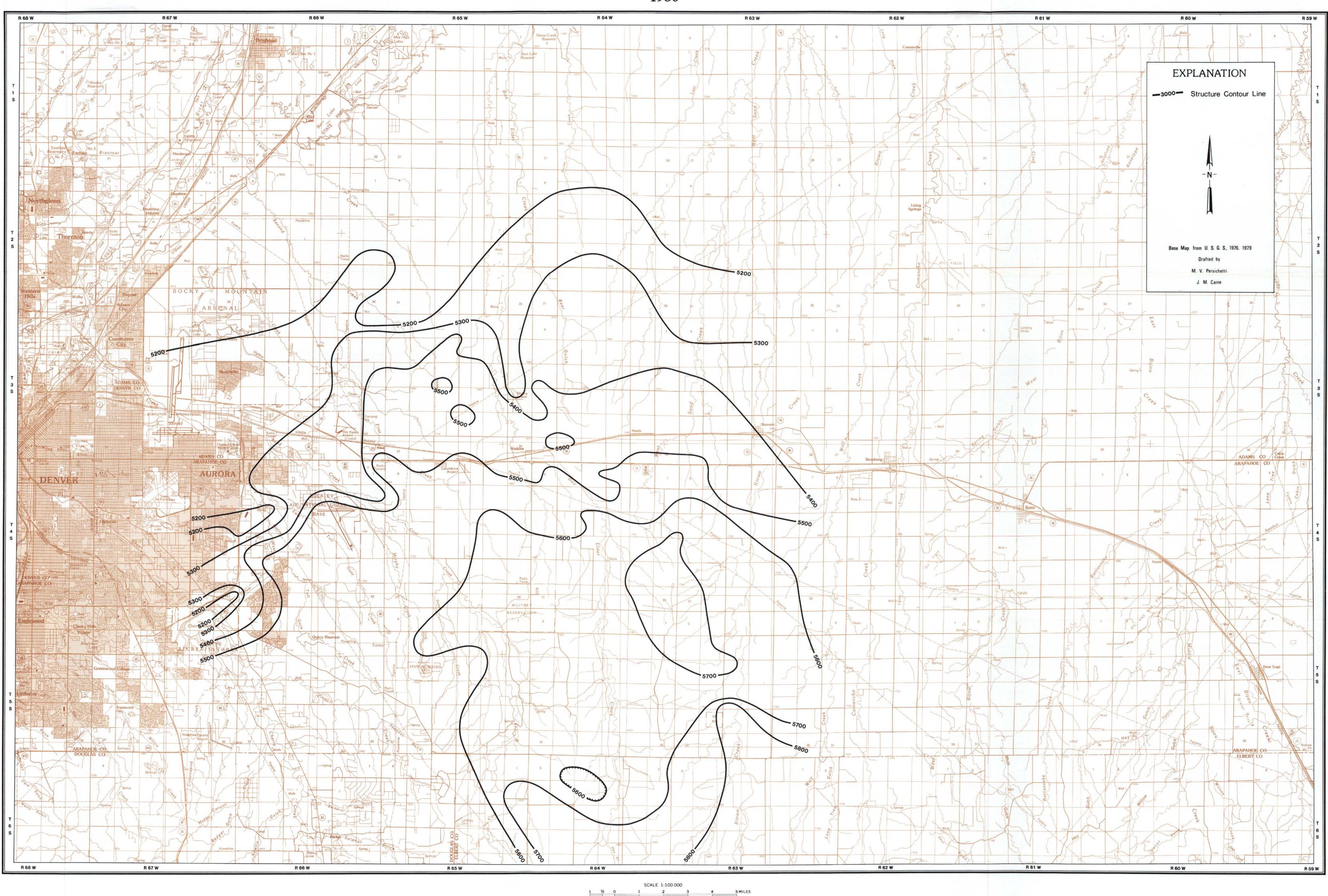


TOTAL COAL THICKNESS MAP OF THE DENVER FORMATION COAL ZONE

SCALE 1:100 000 1 ½ 0 1 2 3 4 5 MILES

1 .5 0 1 2 3 4 5KILOMETERS

RESOURCE SERIES 13

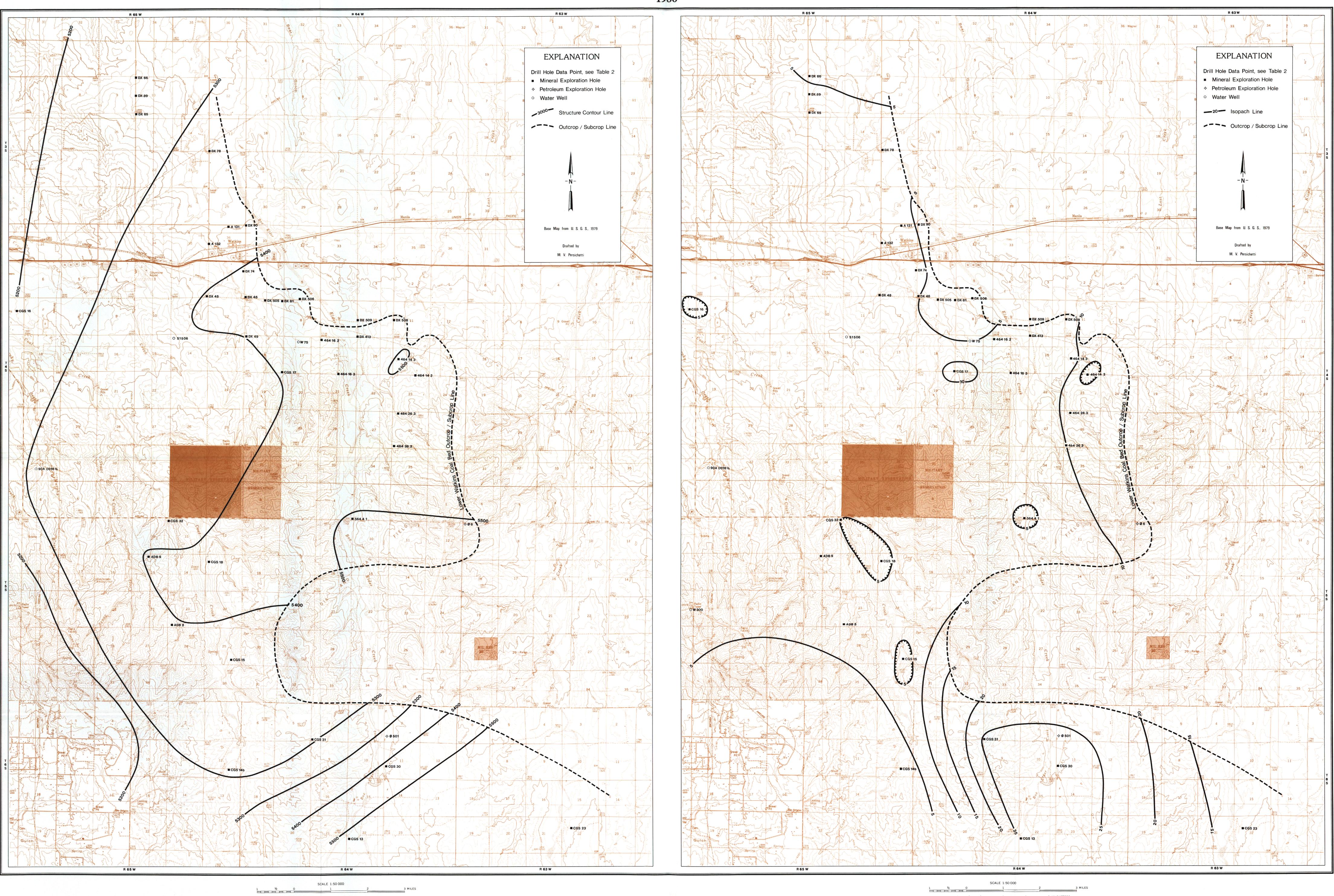


COAL RESOURCES OF THE DENVER EAST 1/2° × 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980

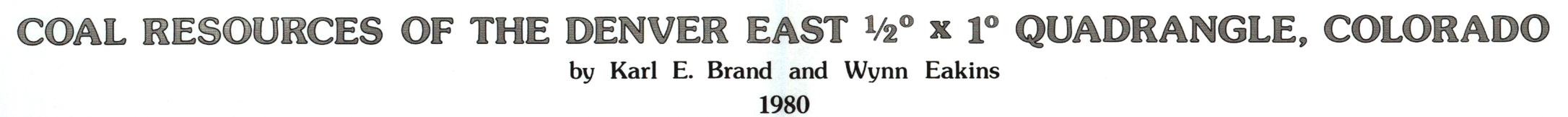
STRUCTURE MAP OF THE DENVER FORMATION COAL ZONE

1 .5 0 1 2 3 4 5KILOMETERS

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 15 OF 25



1 .5 0 1 2 3 KILOMETERS



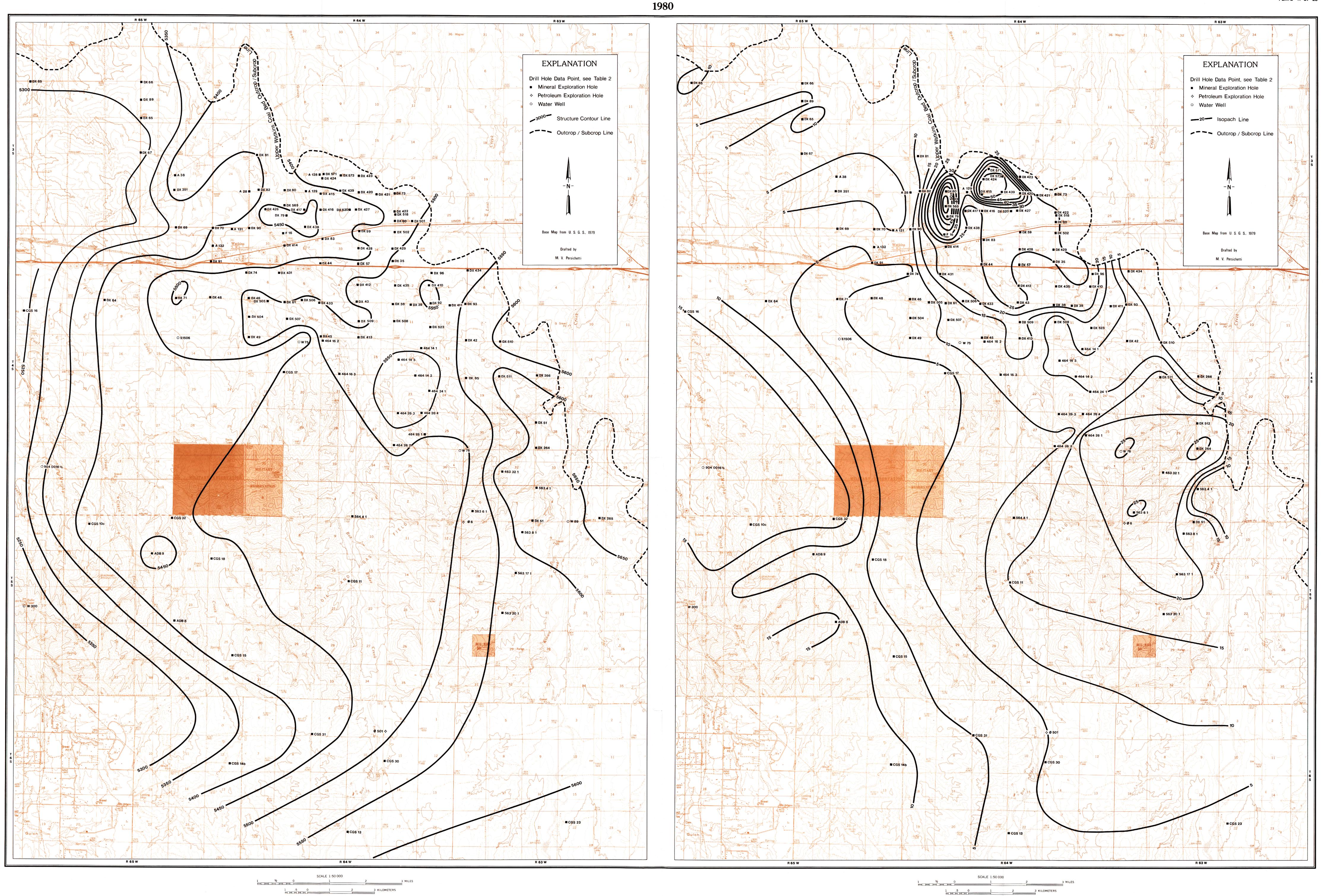
A. STRUCTURE MAP OF THE LOWER WATKINS COAL BED, DENVER FORMATION, WATKINS-LOWRY AREA

B. ISOPACH MAP OF THE LOWER WATKINS COAL BED, DENVER FORMATION, WATKINS-LOWRY AREA

1 .5 0 1 2 3 HHHHH

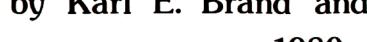
3 KILOMETERS





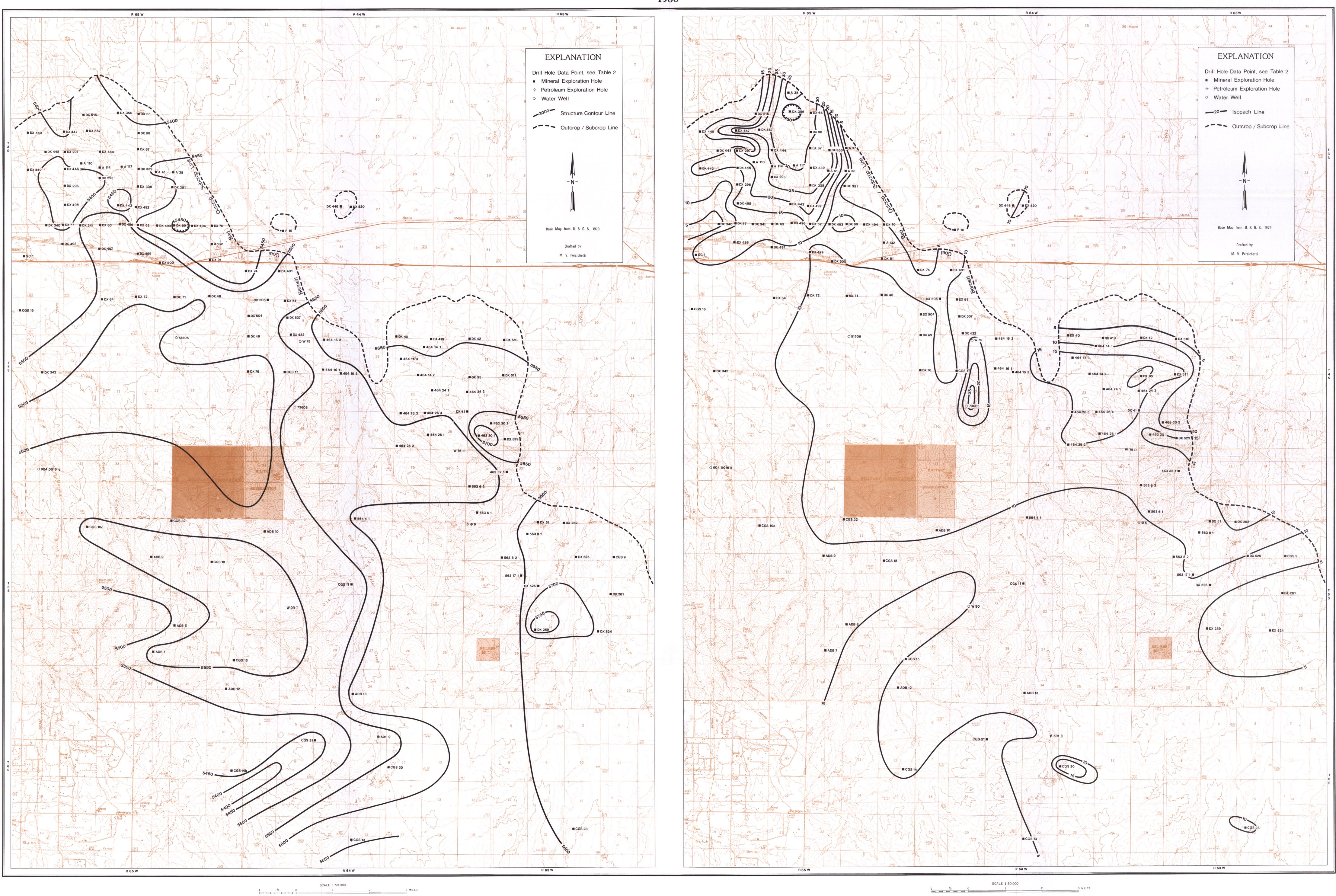
A. STRUCTURE MAP OF THE UPPER WATKINS COAL BED, DENVER FORMATION, WATKINS-LOWRY AREA

COAL RESOURCES OF THE DENVER EAST ¹/2° x 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins



B. ISOPACH MAP OF THE UPPER WATKINS COAL BED, DENVER FORMATION, WATKINS-LOWRY AREA

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 17 OF 25



JOHN W. ROLD, DIRECTOR

DEPARTMENT OF NATURAL RESOURCES COLORADO GEOLOGICAL SURVEY

A. STRUCTURE MAP OF THE BENNETT COAL BED, DENVER FORMATION, WATKINS-LOWRY AREA

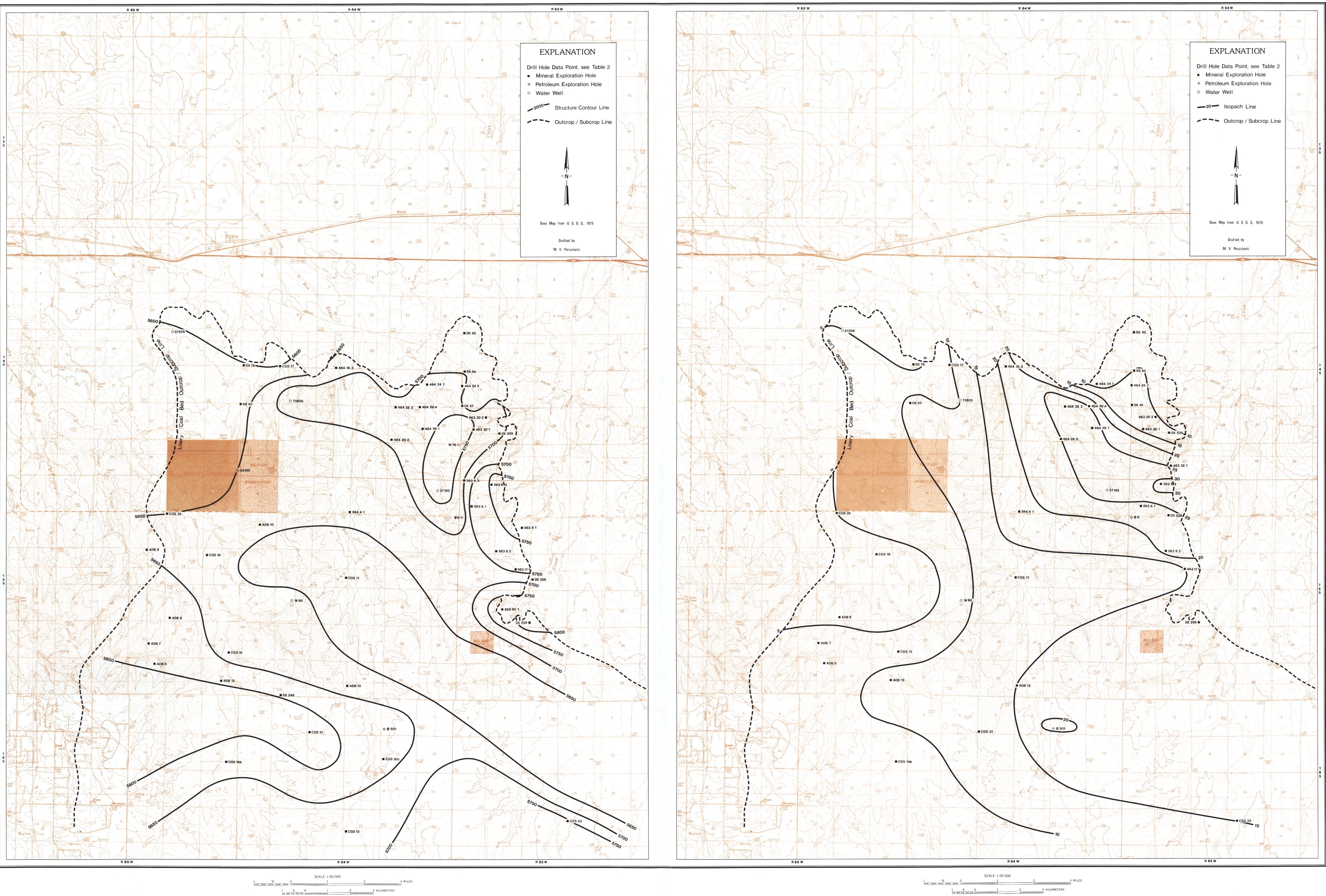
1 .5 0 1 2 3 KILOMETERS

COAL RESOURCES OF THE DENVER EAST ¹/2° x 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980

B. ISOPACH MAP OF THE BENNETT COAL BED, DENVER FORMATION, WATKINS-LOWRY AREA

1 .5 0 1 2 3 KILOMETERS

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 18 OF 25



A. STRUCTURE MAP OF THE LOWRY COAL BED, DENVER FORMATION, WATKINS-LOWRY AREA

COAL RESOURCES OF THE DENVER EAST ¹/2° x 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980



B. ISOPACH MAP OF THE LOWRY COAL BED, DENVER FORMATION, WATKINS-LOWRY AREA

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 19 OF 25

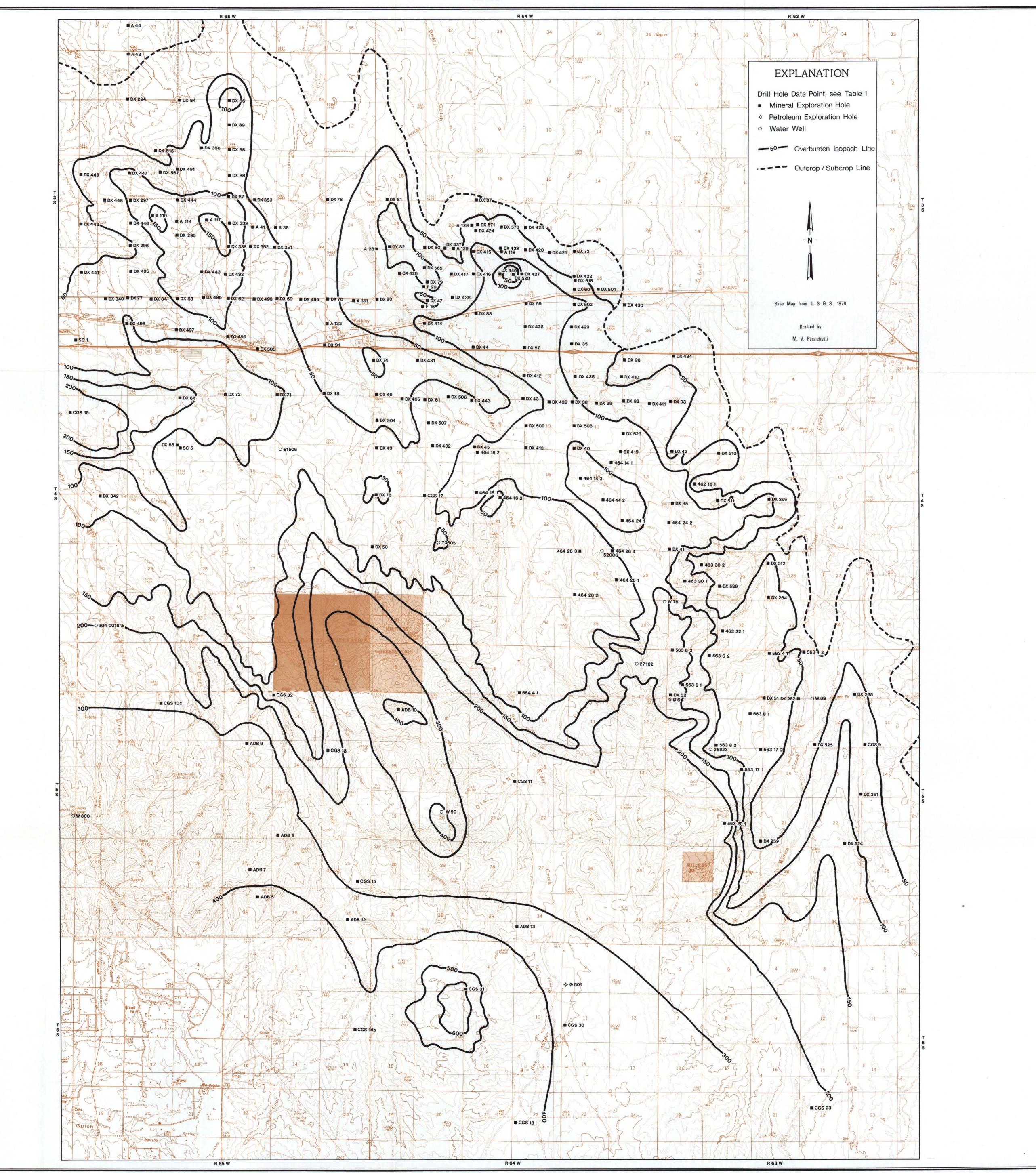
COAL RESOURCES OF THE DENVER EAST 1/2° x 1° QUADRANGLE, COLORADO

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

by Karl E. Brand and Wynn Eakins

COLORADO GEOLOGICAL SURVEY RESOURCE SERIES 13 PLATE 20 OF 25

1980



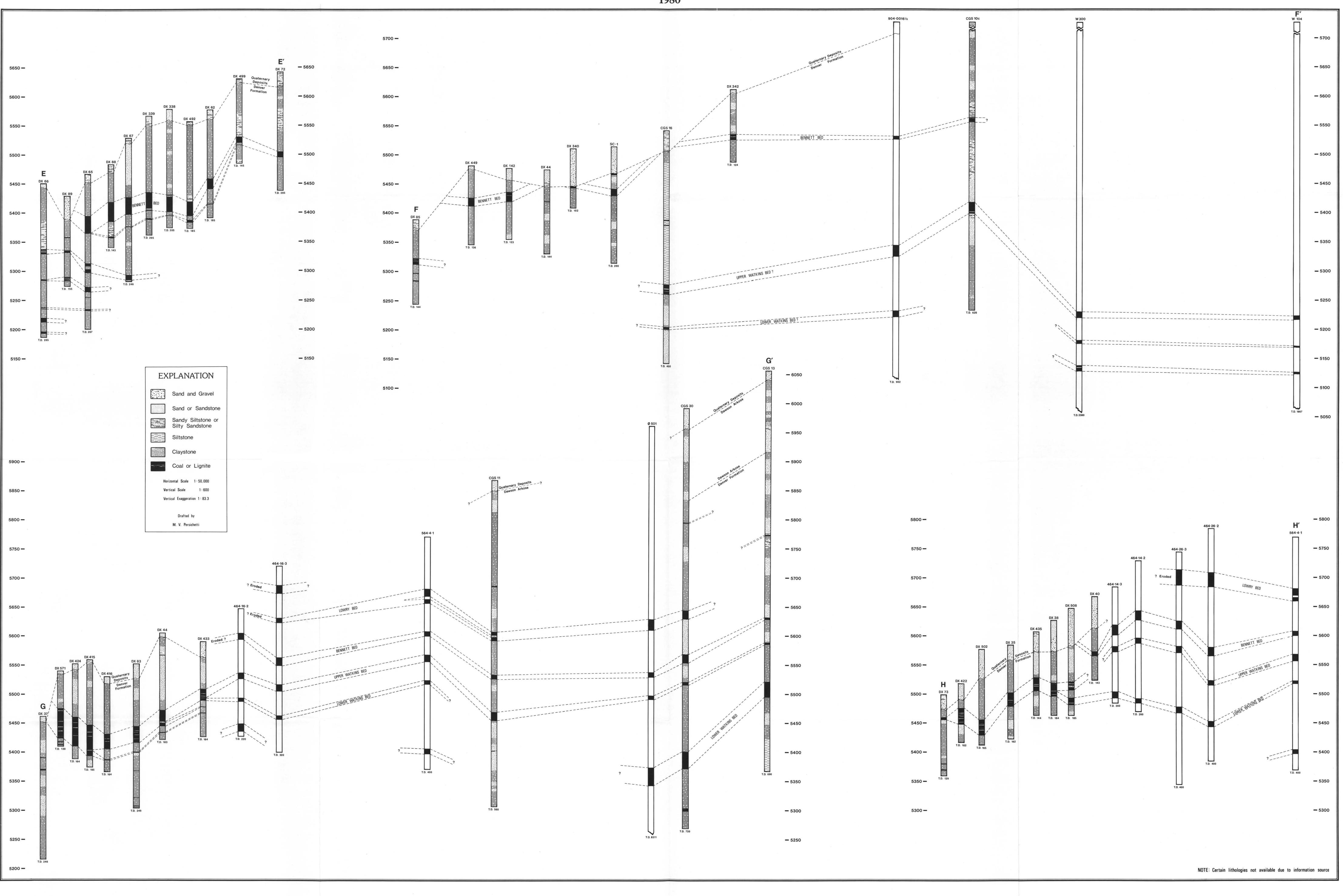
OVERBURDEN ISOPACH MAP OF THE DENVER FORMATION COAL ZONE, WATKINS-LOWRY STUDY AREA

SCALE 1:50 000

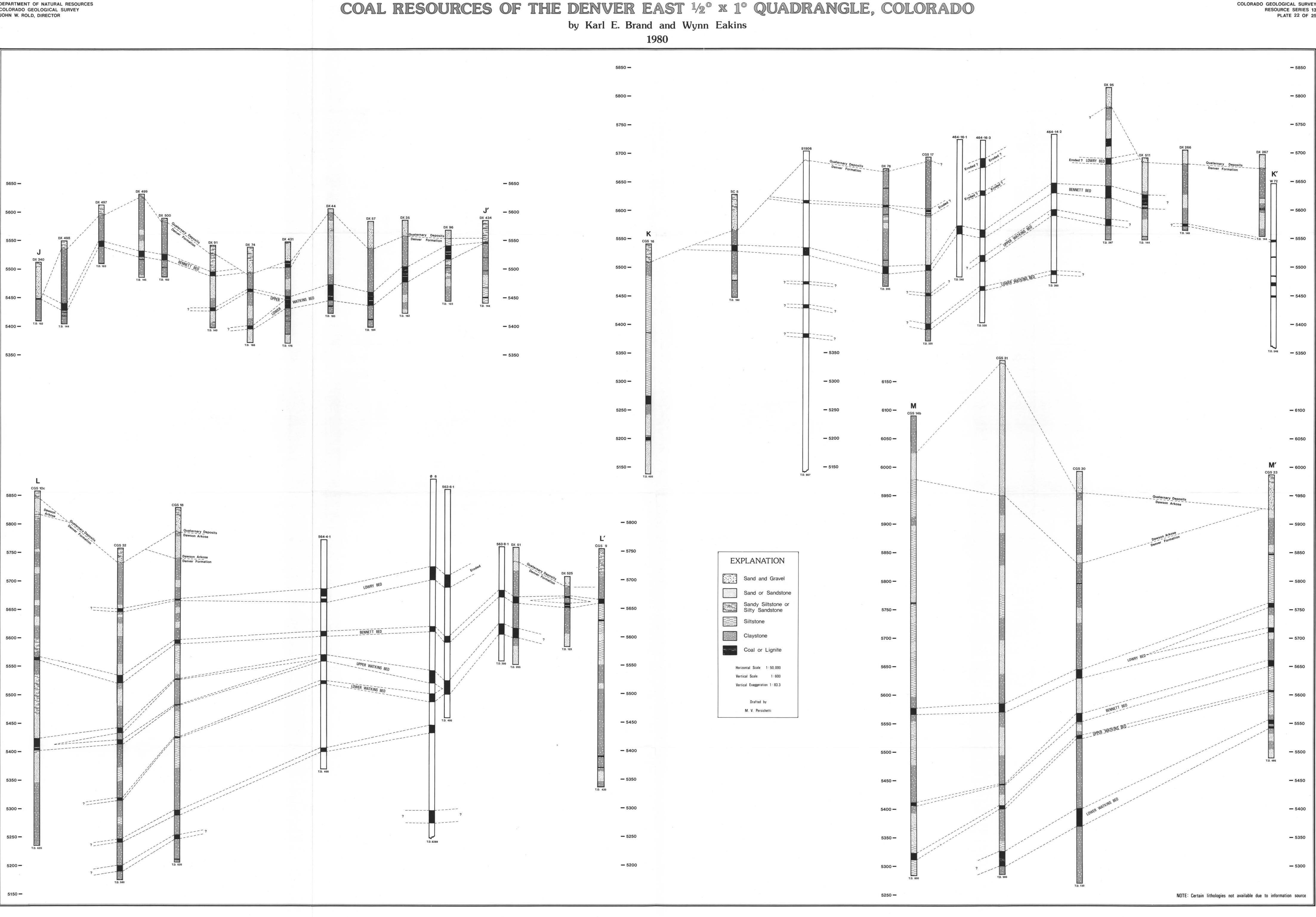
3 MILES

3 KILOMETERS

1 .5 0



COAL RESOURCES OF THE DENVER EAST 1/2° x 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980





		-		CORRI	ELATED	LARAMI	E COALS					
Hole #	Location	Elevation	Total Depth (ft)	Depth to 1st Seam	Depth	"B" BEI Elevation) Thickness	Depth	"A" BEI) Thickness	Total Laran (undifferen Elevation of Top Coal	
CGS 1 CGS 2 CGS 3 CGS 4 CGS 5	T1S-R62W-SWSE2 T1S-R61W-SESE10 T2S-R61W-NWNW14 T2S-R60W-NENE34 T3S-R61W-NENE4	4925 5011 4942 4975 5027	500 355 320 200 390	326 287 191 109 306	326 191 109 306	4599 4751 4866 4721	2.0 7 5.5 9	407 287 232 148 352	4518 4724 4710 4827 4675	2.0 2.5 3 10	4599 4724 4752 4866 4721	8.5 6 17 14 19
CGS 6 CGS 7 CGS 8 CGS 24 CGS 25	T4S-R60W-NENW4 T5S-R60W-SWSE14 T5S-R60W-SESE24 T2S-R60W-SWSW12 T1S-R61W-SESE36	5046 5297 5205 4892 4893	331 420 260 240 250	187 306 131 no coal 103	187 306 131 103	4859 4993 5074 4790	7 1.5 3.5 	217 346 155 — 174	4829 4953 5050 4719	2.5 2.5 3 4	4859 5085 5074 4790	16 8 11 10
CGS 26 CGS 27 CGS 28 CGS 29 DX 21	T2S-R61W-NENE36 T3S-R60W-SWSW22 T4S-R60W-NENE36 T5S-R59W-SWSW36 T1S-R61W-NENE12	4968 5154 5215 5414 4867	380 380 280 400 200	244 280 243 329 61	 280 329 61		8 	244 312 243 374 117	4724 4842 4972 5040 4750	3 2.5 2 5 3	4724 4865 5013 5085 4806	13.5 12.5 3.5 9 7
DX 22 DX 151 DX 152 DX 153 DX 154	T1S-R61W-NENW24 T3S-R60W-SESE10 T2S-R60W-SESE27 T4S-R59W-NWNW6 T4S-R59W-NWNW18	4906 5027 4934 5082 5151	144 267 164 164 164	109 147 87 125 134	109 147 125 134	4797 4880 4957 5018	11 7.5 8 6.5	179 87	NDE 4848 4847 NDE NDE	4 3	4797 4880 4847 4981 5014	11 11.5 14 9.5 6.5
DX 156 DX 272 DX 273 DX 274 4199	T45-R59W-NENE28 T3S-R59W-SWSW32 T3S-R60W-SENE25 T4S-R59W-SWNW9 T5S-R59W-SENW19	5205 5041 5012 5108 5225	164 144 110 134 320	102 51 46 92 140	102 51 46 140	5103 4989 4966 5079	6 6 3.5 6	79 69 92 186	4962 4943 5016 5039	0.5 1 1.5 2	5103 4989 4966 5016 5085	6 6.5 4.5 1.5 8
4259 4432 15292F 15482 23248	T3S-R62W-SWSW27 T4S-R60W-SWNE24 T4S-R60W-SWNW33 T5S-R60W-NWSE28 T6S-R60W-NENE5	5350 5180 5245 5295 5350	1291 362 568 415 508	921 157 355 286	921 157 355 286	4429 5028 4890 4945 5064	$ \begin{array}{r} 10 \\ 5 \\ - \\ 1 \end{array} $	191	4989	4	4429 5067 4890 4945 5064	14 18 23 12 11
29709 37786 41606 47569 47903	T3S-R60W-SWSW32 T5S-R60W-SENE30 T4S-R60W-NW 27 T3S-R60W-SESE3 T3S-R60W-NESW27	5095 5225 5185 4990 5160	438 660 560 415 465	268 222 278 108 305	268 425 — 108 305	4827 4800 4882 4855	6 5 6 6	296 500 327 152 338	4799 4720 4828 4838 4822	4 6 2 7 7	4827 5003 4907 4882 4949	13 12.5 20 13 18
48491 48993 0106 0126	T4S-R60W-NWSW2 T4S-R60W-NWSW21 T3S-R61W-SWSW7 T2S-R62W-SWNE23	5120 5160 5093 5150	380 515 7055 7210	171 268 570 586	203 306 2532 2657	4917 4854 4523 4553	6 5 5 5	333 2566 2740	4827 4489 4470	4 11 7	4949 4892 4523 4564	10 16 22 9
W 1	T2S-R67W- 5	5150	1250	954	2'@954	4,6'@980,3		8			4196	11.5
W 2 W 3 W 5 W 22	TIS-R66W-SESE34 TIS-R67W-NWNW16 TIS-R68W-NWNE1 T3S-R64W-SWNE32	5175 5140 5072 5580	1317 1117 875 1752	840 730 452 1590	4'@73 1'@45	0,4'@1136, 0,5'@766,2 2,5'@504,2 90,5'@1596	'@775 '@525,4'@	\$536,1'@	569,1′@587	7,6′@589	4335 4390 4620 4005	10 11 20 14
W 57 W 58 W 76 W 79 W 84	T3S-R67W-SWNE6 T3S-R68W-SESW34 T4S-R64W-NENE36 T4S-R66W-SESE3 T4S-R67W-SENE25	5138 5270 5870 5500 5610	1373 1610 1954 2210 2323	960 1204 1635 1620 1737	2'@12 14'@1 10'@1	04,1'@1230 635,7'@171	3,6'@1730				4178 4066 4235 3980 3880	12 7 27 10 10
W 91 W 92	T5S-R65W-SENW5 T5S-R66W-C 6	5812 5710	2101 2186	1862 1796	1'@17 2'@	1903,5'@19	2,2'@1846,2 945,4'@195	3	2'@1896,2'	@1900,	3873 3914	14 25
W 93 W 94 W 95	T5S-R66W-SWSE6 T5S-R67W-SENW5 T5S-R67W-NENW8	5723 5550 5600	2182 2092 1995	1836 1588 1657	2'@15 1'@ 1'@16	88,2'@1633 1780,1'@1	797,2'@180),1'@1682,1	2'@1719, 3,1'@180	2'@1733,1' % 1'@1710,2'		3887 3962 3943	14 15 11
W 96 W 100 W 101 W 151 W 300	T2S-R67W-SWSW1 T5S-R67W-SWSE35 T5S-R68W-SENW12 T1S-R66W-SWSW3 T5S-R66W-SE 24	5620 5805 5420 5135 6090	1493 2485 1867 1131 2380	1236 2023 1503 820 1950	3'@12 2'@20 2'@15 6'@82		3,2'@1275,3 3,6'@2099 5,2'@1586 '@954	5′@1278,	6'@1308		4384 3782 3917 4315 4140	17 11 6 21 9
W 301	T2S-R63W-SENE35 T4S-R61W-NENE6 T1S-R68W-NENW12 T1S-R67W-SWSW4 T1S-R67W-NWSE1	5310 5205 5070 5220 4965	1240 712 875 1054 1040	957 201 504 670 646	5'@95 4'@50 3'?@6	7,7′@1009, 4,4′@536,2	2'@1030 '@570 4'@694,5'	@704,2'@	2715		4353 5004 4516 4793 4550	14 31 10 12 20
4923	T3S-R61W-NWNW23 T5S-R61W-NWSE12	5085 5430 5225 5090 5145	566 775 672 950 995	309 585 485 408 450			'@451,3'@	\$536,6'@	572,3'@581		4776 4845 4740 4682 4695	25 10 16 22 18
31091 42239 53700 89192 902-0028		5125 5155	734 625 638 1043 1247	505 365 775 496				9819,2'@	829,7'@870)	4835 4760 4758 4475 3873	14 20 25 15 4
902-0036 902-0056 903-0046 903-0048 903-0079	T1S-R67W-SWNE10 T1S-R68W-NESE22 T3S-R66W-NWSW9 T3S-R66W-SESW9 T4S-R68W-NWNW36	5040 5150 5310 5308 5365	1048 956 1520 1700 1830	645 626 50 1421 1363	3'@62 4.5'?@ 6'?@1	421,1'?@14	'@727 ',1'?@301, 62,2'?@14 3,4'@1482,1	91,3'?@1			4395 4524 3871 3887 3990	13 14 10 12 8
01	T3S-R68W- 12 T4S-R63W-SWSW4 T4S-R63W-SESE10 T4S-R63W-NENE26 T4S-R63W-SWSW29	5559 5585 5580 5719	7825 7788 7790 8047	1245 1284 1275 1529	2'?@1 3'@12		34,2'@1298 35,2'@1315				3984 4314 4301 4305 4190	8 9 13 11 7
05 06 07 08 09	T5S-R63W-NENW6 T5S-R63W-NWNW7 T5S-R63W-NENE12 T2S-R67W-SENE20 T3S-R65W-SENW12	5860 5878 5685 5103 5397	8232 8288 — 8608 8220	1581 1668 1198 997 1492	4'?@1 2'?@1	668,3'@169 198,2'?@12 7,8'@1070	77,4'@1694 99,4'@1705 205,2'@124	,3'@1721	250,2′@129	1	4279 4210 4487 4106 3905	11 14 12 14 6
	T6S-R63W-SESW12 T5S-R63W-NENW25 T6S-R67W-SESE13 T2S-R66W-SENW26 T2S-R65W-NESW25	5830 5923 5945 5315 5299	7772 8626 9397 8520 8200	1405 1838 1988 1386 1305	4'@18 5'@19 4'@13		23 3,4′@2167,5	5′@2233			4425 4085 3957 3929 3994	10 8 17 4 11
026	T3S-R63W-NESE21 T3S-R64W-CSE4 T2S-R64W-CNE9 T2S-R64W-NENW3 T2S-R62W-NWNW26	5440 5414 5365 5294 5144	7963 8210 8089 8000 7238	4238 4040 4144 4171 602	3'@12	74,4'@1404 21,4'@1264		2′@1257			4238 4040 4144 4171 4542	10 13 10 13 9
030 032 033 034 0100	T2S-R62W-SENE29 T6S-R63W-NENE10 T6S-R63W-NESE10 T6S-R63W-NWSW13 T2S-R65W-SWNE17	5206 5941 5860 5863 5360	7400 8040 7950 7810 8420	754 4351 4383 4445 1429	6'@15 2'@14 4'@14	18,5'@1440 90,10'@160 77,3'@1493 48,5'@1440 29,5'@1460)3 3,6′@1506,3)	3'@1535			4452 4351 4383 4445 3931	18 16 14 9 10
0101 0102 0103 0104 0108	T2S-R65W-SWNE21 T2S-R65W-NE 9 T2S-R65W-SWSW3 T2S-R65W-SW 21 T4S-R61W-SESW15	5401 5279 5439 5400 5493	8400 8225 8234 8422 7486	1436 1304 1263 1486 1048	4'@13 4'@12 3'@14	36,6'@1468 04,3'@1333 63,3'@1297 86,4'@1505 48,4'@1124	8,4'@1358 7 5				3965 3975 4176 3914 4445	15 11 7 7 8
0110 0111 0112 0113 0114	T6S-R63W-NESW2 T3S-R62W-NENE19	5166 5865 5872 5324 5493	8350 7844 7500 7486	1138 1432 1525 937 1047	432 9'@1432,3'@1452 525 18'@1525,4'@1552 537 6'@937,9'@975,4'@1002			4028 4433 4347 4387 4446	6 12 22 19 9			
0115 0117 0118 0120 0121		5601 5790? 5874 5474 5063	7220 7523 7848 6837 8065	959 1200 1480 646 948	3'@12 5'@14		4,3′@1217,4 9,1.5′@149: 1′@1006				4642 4590 4394 4828 4115	8 17 11.5 16 11
0123 0124 0125 0126 0127	T1S-R64W-NESW29 T1S-R64W-SWSE28	5282 5176 5232 5150 5762	8104 8005 8000 7208 7660	1129 970 1025 588 1209	6'@97 2'@10 3'@58	29,5'@1263 0,6'@1013, 25,10'@103 8,7'@690 09,5'@1220	4'@1037 55				4153 4206 4210 4562 4553	8 16 12 13 20
0128 0131 0133 0501 0510	T3S-R62W-NWSW17 T6S-R62W-NESW4 T6S-R64W-SWSW2	5757 5308 5758 5962	7555 7500 7520 8310	1205 912 1176 1776		2,9'?	2,5′@1195,3 5	5′@1204			4553 4386 4593 4198 4828	5 18 23 8 11

Table I Drill Hole Points of the Laramie Formation Coal Zone

Sources of Data

CGS Colorado Geological Survey

DX Public Service Company of Colorado Permit # Colorado Department of Water Resources (4199, etc.)

- Cal

0 Colorado Oil and Gas Conservation Commission 902-0028, etc. John Romero, Colorado Department of Water Resources

COAL RESOURCES OF THE DENVER EAST 1/2° x 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins

1980

		Elevation	Total Depth	Depth to 1st Seam	Depth	LOWRY Elevation of Top of Seam	Seam Thickness	Depth	BENNETT Elevation of Top of Seam	Seam Thickness	Depth	UPPER WATK Elevation of Top of Seam	INS Seam Thickness	Depth	OWER WATH Elevation of Top of Seam	Seam Thickne
Hole # CGS 9 CGS 10c CGS 11	Location T5S,R63W-SWSW 11 T5S,R65W-NWNE 8 T5S,R64W-SESE 16	(ft) 5758 5857 5867	(ft) 420 620 560	(ft) 89 290 259	(ft) 	(ft) 	(ft) 12	(ft) 89 290 334	(ft) 5669 5567 5533	(ft) 8 7 8	(ft) 	(ft) 5422 5370	(ft) 	(ft) 	(ft) — —	(ft) — — —
CGS 13 CGS 14b CGS 15 CGS 16	T6S,R64W-NWSW 15 T6S,R65W-SWSE 12 T5S,R64W-SWSE 12 T4S,R66W-SENE 12	6057 6085 5937 5543	690 800 600 400	424 457 276 264	457 276	5661	9	424 622 383	5633 5463 5554 	2.5 6	467 708 512 264	5590 5377 5425 5279	3 12 6 15	534 778 5405 336	5523 5307 5324 5207	26 2 2 3.5
CGS 17 CGS 18 CGS 19 CGS 21 CGS 22	T4S,R64W-SESE 18 T5S,R65W-SWNW 13 T2S,R65W-SWSE 20 T2S,R65W-NWNW 36 T3S,R66W-SWSW 36	5692 5826 5290 5343 5324	320 640 300 280 380	92 160 126 146 208	1000	5600 5666 2 125.5 (uncorrela 2 145.5 (uncorrela		190 231	5502 5595	10 7	238 300	5454 5526	4 2	290 401 208	5402 5425 5116	10 2 5
CGS 22 CGS 23 CGS 30 CGS 31	T6S,R63W-SWSW 30 T6S,R63W-SENW 22 T6S,R63W-SWSW 11 T6S,R64W-SWSW 4 T4S,R65W-NENE 10	5985 5993 6187 5755	495 720 900 580	224 347 602	224 347 602 115	5761 5646 5585 5640	15 15 12 5	324 424 742 222	5661 5569 5445 5533	13 16 2 12	376 471 780 314	5609 5522 5407 5441	4 5.5 5	428 591 860 436	5557 5402 5327 5319	12 29 26 5
DX 35 DX 37 DX 38 DX 39 DX 40	T3S,R64W-SWSW 35 T3S,R64W-SWSW 16 T3S,R64W-NWNW 11 T4S,R64W-SESW 2 T4S,R64W-SWSW 11	5585 5462 5628 5615 5668	164 246 164 143	81 90 108 83 95	1111			 95		- - - 7	81 108 83	5504 5521 5532	25 23 24.5	90 - -	5370 	
DX 41 DX 42 DX 43 DX 44	T4S,R64W-SESE 24 T4S,R63W-SWSW 7 T4S,R64W-SWSW 3 T3S,R64W-SESE 32	5830 5721 5616 5605	205 246 164 185	143 42 86 132	143 42 -	5687 5679 — —	12 9 —	 69.5 -	5652 	8.5	160 86 132	5564 5530 5473 5525	9 27.5 25	- 119 -		2
DX 45 DX 46 DX 47 DX 48 DX 49	T4S,R64W-NWNW 16 T4S,R64W-SWSW 6 T3S,R64W-NWNW 32 T4S,R65W-NENE 11 T4S,R64W-NWNW 18	5638 5548 5589 5567 5618	144 185 102 246 185	112 35 47 50 81		f coal @ 47', 5' c	 of coal at 55' (uncorrela 50 81	tted) 5517 5537	14 13	35 79.5 105	5512 5487 5512	9 9.5 9	100 151 134	5448 5416 5400	5.5 8 6
DX 50 DX 51 DX 52 DX 57 DX 59	T4S,R65W-NENE 25 T5S,R63W-NENE 8 T5S,R63W-SWSW 6 T3S,R64W-SWSW 34 T3S,R64W-NWNW 34	5735 5759 5900 5583 5572	185 205 226 185 185	95 86 123 108	95 no coal 	5640 — — —		160 86 —	5575 5673 —	7 12 —	141 123 108	5618 5460 5464	17 23 26.5	 171 166	5412 5406	2 1.5
DX 60 DX 61 DX 62 DX 63 DX 64	T3S,R64W-SWSW 26 T4S,R64W-NENE 7 T3S,R65W-NENE 34 T3S,R65W-NENE 32 T4S,R65W-NWNW 9	5550 5604 5576 5623 5587	143 185 185 185 190	88 65 118 104 58	11111			65 118 104 58	5539 5458 5519 5529	13 17 12 9	88 104 160 165	5462 5500 5416 	26 11 1 6		5470 — — —	4 - - -
DX 65 DX 66 DX 67 DX 69 DX 70	T3S,R65W-NWNW 15 T3S,R65W-NWNW 10 T3S,R65W-SWSW 15 T3S,R65W-NWNW 35 T3S,R65W-NWNW 36	5466 5450 5528 5504 5496	267 266 246 185 164	72 113 101 62 39	1 1 1 1	I I I I I	F I I I I I	72 	5394 	33 29 12 5	153 113 234 142 94	5313 5338 5292 5364 5204	10 7.5 9.5 9.5 6.5	194 165 — —	5272 5285 — —	8.5 2
DX 71 DX 72 DX 73 DX 74 DX 76	T4S,R65W-SWSW 2 T4S,R65W-SESE 4 T3S,R64W-SWSW 23 T4S,R65W-NE 1 T4S,R65W-NE 18	5666 5642 5500 5537 5668	205 205 139 165 205	123 137 38 72 35	 35			123 137 170	5543 5510 5498	11 10.5 12	166 	5500 	3 	176 135 	5490 — 5402 —	5.5 6
DX 77 DX 78 DX 79 DX 80	T3S,R65W-NENE 31 T3S,R65W-SWSW 13 T3S,R64W-NWSW 29 T3S,R64W-SWSW 19	5547 5444 5557 5503	164 205 185 143	95 154 104 59	ŢŢŢŢ			95 — — —	5452 — — —	10 	154 104 59 97	5290 5452 5444 5400	8.5 51 51 13	 179 246 	5265 5311 —	2
DX 81 DX 82 DX 83 DX 85 DX 85 DX 86	T3S,R64W-SWSW 18 T3S,R64W-SESW 19 T3S,R64W-SWNW 33 T3S,R66W-SESE 1 T3S,R66W-SESE 11	5497 5496 5553 5388 5430	125 185 250 144 164	97 103 108 65 106				1 1 1		1 1 1 1	103 108 65 106	5393 5445 5323 5324	10 26.5 10 20.5	138 152 113	5358 5401 5275	2 1. 1.
DX 87 DX 88 DX 89 DX 90	T3S,R66W-SESE 23 T3S,R65W-W ¼ 15 T3S,R65W-W ¼ 10 T3S,R64W-NWNW 31	5433 5483 5428 5501	143 143 156 143	48 65 93 87	0.5' (@ 47.5, 1' @ 52 (65 	5417 — —	32	124 93 87	5359 5335 5414	2 4 9		5289 5397	8.1
DX 91 DX 92 DX 93 DX 94	T3S,R65W-SWSW 36 T4S,R64W-SWSW 1 T4S,R64W-SESE 1 T4S,R63W-NWNW 9	5540 5631 5650 5557	143 165 143 143	45 77 85 60				45 170	5495 	8 — — 20	108 77 85 230	5432 5554 5565 5583	5 21 10 10		-	
DX 95 DX 96 DX 259 DX 259 DX 261 DX 262	T4S,R63W-NWNW 19 T4S,R64W-NWNW 1 T5S,R63W-SESE 20 T5S,R63W-SESE 15 T5S,R63W-NWNE 9	5813 5568 5880 5751 5715	267 123 153 143 120	122 26 46 74 45	122 	5834			5767 5677 5670	3.5 17	26		24.5 	11.64		
DX 264 DX 265 DX 266 DX 280	T45,R63W-SWSW 28 T55,R63W-SESE 3 T45,R63W-SWSW 16 T35,R66W-NWNW 22	5691 5767 5703 5376	141 123 140	84 87 132 84	_ _ _ 2' @					111	84 87 132	5606 5680 5571	25 7.5 4		-	
DX 281 DX 282 DX 283 DX 284	T3S,R66W-NENW 15 T3S,R66W-SESE 4 T2S,R66W-SWSW 34 T2S,R66W-NWNW 34	5360 5346 5304 5305	164 144 144 143	67 55 74 —	20.5 10.0 .5' (no c	' @ 67 (7' of ptgs ' @ 55 (uncorrela @ 74, 1' @ 76, 1' oal	s), 1' @ 142, ated) @ 132, 1' @	1' @ 152.: 134 (unco	5 (uncorrelated)							
DX 285 DX 286 DX 287 DX 288 DX 288 DX 289	T2S,R66W-SWSW 15 T2S,R66W-SESE 21 T2S,R66W-NWNW 15 T2S,R66W-SWSW 24 T3S,R66W-SESE 8	5248 5250 5222 5347 5332	143 144 144 164 144	56 67 75 68 99	6' @ 2' @ 1.5'	2 56, 2' @ 60, 1' 2 67, 1' @ 110 (un 2 75, 1' @ 80, 1.5 @ 68, 1' @ 70, . @ 98.5, 1' @ 102	ncorrelated) 5' @ 97 (unco 5' @ 71.5, .5	rrelated) ' @ 72.5,	2' @ 108, 1' @	27 (uncorrel	ated)					
DX 291 DX 292 DX 293 DX 295 DX 296	T3S,R66W-SESE 10 T3S,R66W-NWNW 1 T3S,R66W-SWSW 1 T3W,R65W-SESE 20 T3S,R65W-SWSW 20	5416 5350 5482 5603 5507	165 144 175 205 102	107 105 143 146 41	20'	(*) 106.5, 3' @ 10 lignite and clay @ 142.5, 2.5' @ 1 	@ 105'						ated) 	-	-	-
DX 297 DX 338 DX 339 DX 340 DX 341	T3S,R65W-NWNW 20 T3S,R65W-SWSW 22 T3S,R65W-NWSW 22 T3S,R65W-NENW 31 T3S,R65W-NENW 32	5544 5578 5566 5510 5577	164 205 205 102 162	104 150 131 63 76	1111	1.1.1.1.1		104 150 131 63 76	5440 5430 5435 5447 5501	20.5 28 27 2.5 12	140 — — —	5404 — — — —	4.5	1.31, 1.3.3	1111	
DX 342 DX 351 DX 352 DX 353	T4S,R65W-NENW 19 T3S,R65W-SESE 22 T3S,R65W-SESW 22 T3S,R65W-NWNE 22	5614 5479 5525 5495	123 124 123 102	77 30 65 47	E E			77 30 47	5538 5449 5448	6.5 2.5 28	85 65	5410 5460	2.5 28.5	11 H 31		
DX 356 DX 364 DX 365 DX 366	T3S,R65W-SESW 9 T1S,R65W-SWNW 16 T1S,R64W-SWSW 18 T1S,R64W-SWSW 15 T1S,R64W-SWSW 15	5473 5187 5175 5256 5256	102 144 123 123	50 	no coal no coal no coal			50	5423	27		-	-		-	-
DX 367 DX 368 DX 369 DX 370 DX 370 DX 371	T1S,R63W-NWNW 19 T2S,R64W-NWNW 1 T2S,R64W-NENE 16 T2S,R64W-SESW 18 T2S,R64W-NENE 29	5091 5255 5340 5305 5411	144 144 123 123 144		no coal	 1′, 1′ @ 110.5 (ur										
DX 372 DX 373 DX 374 DX 375	T2S,R64W-SESE 33 T2S,R64W-SESE 36 T2S,R64W-NENE 1 T2S,R63W-NWNW 15	5404 5375 5350 5205	144 123 144 102	46 83 105 -	1' @ 4 1' @ 8 0.5' @ no co	46, .5' @ 56, 1' 83, .5' @ 85.5, 1 @ 68.5 al	@ 57.5, .5'									
DX 376 DX 377 DX 381	T3S,R63W-NENE 4 T3S,R63W-NENE 21 T1S,R63W-SWSW 15 T3S,R64W-NESE 13	5332 5429 5060 5469	123 144 144 144		no co	104 (uncorrelated al 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	incorrelated)		0.105 (
DX 393 DX 410 DX 411 DX 412	T4S,R63W-NWNW 14 T4S,R64W-NESE 2 T4S,R64W-SWSE 12 T4S,R64W-SWSE 12 T4S,R64W-SENE 4	5578 5587 5627 5621 5619	144 102 144 164	49 33 93 106	 	9 48.5, 1' @ 82, .: 	5' @ 102, .5 @ 	g 103, 1 ' (@ 105 (uncorreta 		33 93 106	5554 5534 5519 5505	24 11 25	1 1 1 36 1 1		-
DX 413 DX 414 DX 415 DX 416 DX 417	T4S,R64W-SWSW 10 T3S,R64W-SENE 31 T3S,R64W-NENE 29 T3S,R64W-NESE 29 T3S,R64W-C 29	5535 5559 5535 5511	165 165 185 164 103	113 106 112 98 64	ŭ T L				E F H H		106 112 98 64	5428 5447 5432 5447	23 52.5 26.5 24	E 4 31518		
DX 419 DX 420 DX 421 DX 422 DX 423	T4S,R64W-NENE 14 T3S,R64W-SWSW 22 T3S,R64W-SWSE 27 T3S,R64W-SWNE 26 T3S,R64W-NWSW 22	5690 5555 5525 5519 5519	164 144 103 102 82	105 84 38 43 32	11011			105 — — —	5585 	8.5 	84 38 43 32	5460 5487 5462 5487	46 22.5 26.5 21	13611		
DX 424 DX 426 DX 427 DX 428 DX 428 DX 429	T3S,R64W-NWSW 21 T3S,R64W-C 30 T3S,R64W-NESE 28 T3S,R64W-SWNW 34 T3S,R64W-SENE 34	5533 5545 5568 5584 5553	164 144 185 184 144	91 84 130 147 72					EETT	1111	91 84 130 147 72	5461 5461 5438 5437 5498	51.5 27.5 28.5 26 26	1.1.1.1	111	
DX 431 DX 432 DX 433 DX 433 DX 434	T4S,R64W-NENE 6 T4S,R64W-SWSW 8 T4S,R64W-NENE 8 T4S,R63W-NWNW 6 T4S,R63W-NWNW 2	5546 5651 5590 5585 5608	175 144 164 144 144	35 63 81 40 78				34 63 —	5512 5587 — —	8.5 12 	94 	5452 	21 19.5 2 22.5	THE FOR		
DX 435 DX 436 DX 438 DX 439 DX 439 DX 440	T4S,R64W-NWSW 2 T4S,R64W-SESW 10 T3S,R64W-SESW 29 T3S,R64W-SESW 21 T3S,R64WC 28	5608 5620 5548 5579 5630	144 164 144 225 185	106 771 106 52		@ 106 (uncorrelat 		 		- 13	77 106	5470 5471	25 25 -	22.5		-
DX 442 DX 443 DX 444 DX 446	T3S,R65W-SWNW 19 T3S,R65W-C 28 T3S,R65W-NENE 20 T3S,R65W-SWNW 20	5478 5627 5538 5547	123 205 185 145	41 137 103 97		-	-	41 97	5437 — 5450	17.5 — — 15		5490 5425 —	19 29	111	-	
DX 447 DX 448 DX 449 DX 492	T3S,R65W-NWSW 17 T3S,R65W-SENE 19 T3S,R65W-SWNW 18 T3S,R65W-SWNW 28	5505 5513 5482 5557	155 103 136 185	106 66 55 137			-	106 66 55 137	5399 5447 5427 5418	27 14 12.5 30	11	-	-			-
DX 492 DX 493 DX 494 DX 495	T35,R65W-5ESW 34 T35,R65W-C 35 T35,R65W-SESW 33	5536 5592 5664	103 123 103 135	63 45 88		=	-	63 45 88	5471 5488 5465	9.5 8.5 16		-				-

TABLE II Drill Hole Data Points of the Denver Formation Coal Zone

TABLE II Drill Hole Data Points of the Denver Formation Coal Zone

Hole #	Location	Elevation (ft)	Total Depth (ft)	Depth to 1st Seam (ft)	Depth (ft)	LOWRY Elevation of Top of Seam (ft)	Seam Thickness (ft)	Depth (ft)	BENNETT Elevation of Top of Seam (ft)	Seam Thickness (ft)	Depth (ft)	UPPER WATK Elevation of Top of Seam (ft)	Seam Thickness (ft)	Depth (ft)	LOWER WATH Elevation of Top of Seam (ft)	Seam Thicknes (ft)
DX 496 DX 497 DX 498 DX 499 DX 500	T3S,R65W-SESW 33 T3S,R65W-NESE 32 T3S,R65W-NWSW 31 T3S,R65W-SWSW 34 T4S,R65W-NENE 3	5664 5611 5548 5630 5588	205 103 144 145 102	145 63 108 99 63	11111			145 63 108 99 63	5519 5547 5439 5531 5525	14 9 12 10 10.5	30 E I F 31	I I I I		1.1.1.1	1111	1111
DX 501 DX 502 DX 504 DX 505 DX 506	T3S,R64W-SWSE 26 T3S,R64W-SWNW 34 T4S,R64W-NWSW 7 T4S,R64W-SESW 7 T4S,R64W-SESW 5	5542 5578 5567 5578 5588	102 165 115 144 144	44 121 35 53 86	11111	1 1 1 1	4 6 6 7 1		5532 5535		44 121 63 68 86	5498 5457 5504 5510 5502	21 26 9 9 17.5	 172	 5416	- - 4 3
DX 507 DX 508 DX 509 DX 510 DX 511	T4S,R64W-SWNW 8 T4S,R64W-SWNW 11 T4S,R64W-NWSW 10 T4S,R63W-NENE 18 T4S,R63W-SESE 18	5621 5648 5620 5641 5689	144 185 185 165 144	61 126 128 66 62			1111	61 66 62	5560 — 5575 5627	13 	100 126 128 127 —	5521 5522 5492 5514	10.5 8 17 4.5 —		5494 5470 — —	12.5 6 —
DX 512 DX 515 DX 518 DX 520 DX 523	T4S,R63W-SWNW 28 T3S,R65W-SENE 17 T3S,R64W-SWSW 26 T3S,R64W-SENE 28 T3S,R64W-SENE 28 T3S,R64W-SWNW 12	5691 5463 5534 5597 5670	122 82 123 215 185	68 22 72 39 147	1111	1.1.1.1	3-11-1		5541 	15 	68 72 169 147	5623 5462 5428 5523	22.5 25.5 27.5 11	E A MARK R		1.1.0.1.1
DX 524 DX 525 DX 526 DX 528 DX 529	T5S,R63W-SWSW 22 T5S,R63W-SWSW 10 T5S,R63W-NWSW 16 T5S,R63W-SWSW 5 T4S,R63W-NWSW 29	5823 5709 5764 5845 5755	154 123 123 185 144	133 34 69 88 46	 	5757 5709	 24 12	133 34 69 	5690 5675 5695 5662	1.5 10 7 15	E E E E		1111	11111		11111
DX 565 DX 567 DX 571 DX 573 463-30-1	T3S,R64W-SENE 30 T3S,R65W-SWNE 17 T3S,R64W-SWNW 21 T3S,R64W-C 21 T4S,R63W-SESW 30	5550 5493 5540 5543 5760	179 100 130 150 400	104 57 68 72 73	 73	 5747	- - - 14		5436 — 5724	26 — — 16	104 68 72 —	5446 	52 47 51	1.1.1.1		11111
463-30-2 463-32-1 464-14-1 464-14-2 464-14-3	T4S,R63W-NENE 30 T4S,R63W-NWSW 32 T4S,R64W-SWNE 14 T4S,R64W-SWSE 14 T4S,R64W-SWSE 14 T4S,R64W-NWSW 14	5748 5755 5688 5730 5685	400 200 160 260 200	15 92 120 85 65	15 	5733 	10.5 	81 92 120 85 65	5667 5663 5568 5645 5620	9 12 10 17 18	163 176 131 113	5592 5512 5599 5572	24 11 10 9	 237 180	 5493 5505	- - 8 11
464-16-1 464-16-2 464-16-3 464-18-1 464-24-1	T4S,R64W-SWSW 16 T4S,R64W-NWNW 16 T4S2R64W-SWSE 16 T4S,R64W-NWSE 18 T4S,R64W-SWNW 24	5722 5640 5720 5705 5775	240 220 320 240 240	150 2? 32 36 67	 32 12' @ 67		25 22 1' @ 125 (un 9	150 2? 156 correlated 152	5570 5638 5564 5623	14 15 14 18	102 202 228	5538 5518 5547	11 12 10	 146 256 	 5494 5464 	
464-24-2 464-26-1 464-26-2 464-26-3 464-26-4	T4S,R64W-SENE 24 T4S,R64W-SESE 26 T4S,R64W-SWSW 26 T4S,R64W-SWSW 26 T4S,R64W-NWNE 26	5845 5800 5785 5754 5830	260 400 400 400 400	142 60 69 30 101	142 60 69 30 101	5703 5740 5716 5715 5729	11 28 25 27 25	197 167 200 118 211	5648 5632 5585 5627 5619	17 16 15 15 18	302 262 162 266	5498 5523 5583 5564	21 9 12 11			- 10 11 -
563-4-1 563-4-2 563-6-1 563-6-2 563-6-3	T5S,R63W-NWNW 4 T5S,R63W-NENE 4 T5S,R63W-SWSW 6 T5S,R63W-NENE 6 T5S,R63W-NWNW 6	5745 5660 5860 5840 5890	220 200 400 200 300	91 	 149 67 190	no coal 5711 5773 5700	23 ? 25	 257 297			220 335 —	5525 5525 —	? 25 	111		
563-8-1 563-8-2 563-17-1 563-17-2 563-20-1	T5S,R6 W-SWNE 8 T5S,R63W-SWSW 8 155,R63W-SWNE 17 T5S,R63W-SWNE 17 175,R63W-NENE 17 T5S,R63W-SWSW 20 20 20	5760 5830 5830 5765 5860	200 300 320 300 283	77 95 114 71 283	- 95 114 13' @	5735 5716 271, 15' @ 123		77 	5683 	12 11	135 257 283	5625 5573 5577	17 24 17			111
564-4-1 W 66 W 72 W 75 W 76	T5S,R64W-SESE 4 T4S,R63W-NENE 2 T4S,R63W-CSW 23 T4S,R64W-NENW 17 T4S,R64W-NENE 36	5770 5565 5645 5615 5870	400 600 548 815 1954	86 98 41 159	86 3'@ 	684 98, 2' @ 127, 2 —	18 '@ 160, 6' @ 	161 2 172, 4' @ 41 159	5609 2 195 5574 5711	8 15 13	201 177 284	5569 5438 5586	12 11 13	246 207 373	5524 5408 5497	5 5 25
W 81 W 82 W 85 W 89 W 90	T4S,R67W-SESW 13 T4S,R67W-SWSE 25 T4S,R67W-SENE 36 T5S,R63W-NENE 9 T5S,R64W-SENW 20	5640 5635 5667 5663 6080	1310 1599 1614 294 2202	370 300 506 19 415	2' @	2 370, 4' @ 393 (2 300, 2'?'451, 2 506, 4' @ 519 —	8'? @ 462	415	5551	5	19 —	5646	11	-	-	=
W 97 W 100 W 103 W 104 W 105	T5S,R67W-NENE 17 T5S,R67W-SWSE 35 T6S,R66W-SWSW 8 T6S,R66W-SENE 24 T6S,R66W-NWSE 26	5650 5805 5850 6040 6080	1435 2485 1750 1867 1874	391 1730 763 814 700	sand 4' @	391, 1.5' @ 419 y shale with coal 763 (?) (uncorre) @ 778, 2' (?)	layers elated)	1 -	@ 1087 (uncorr	elated)	814	5226	7	860	5180	3
W 300 0061 2409F 3637F 7723F	T5S,R66W-SE 24 T6S,R67W-NESW 7 T5S,R63W-NWSE 29 T6S,R68W-SWNE 24 T3S,R67W-NENE 1	6090 5900 5910 6140 5265	2380 1640 1804 1024 900	807 68 93	5' @	@ 807, 6' @ 86. @ 68, 11' @ 85, 6 @ 80, 7 @ 158 (un	 6' @ 112, 8' (1 -		-	-	-	_	-	-	-
8285 10186F 13361 14260F 18830F	T3S,R67W-NENE 7 T4S,R66W-NESE 6 T4S,R66W-SWNW 7 T5S,R66W-NENE 32 T5S,R66W-SESE 35	5155 5430 5460 5690 6125	705 1298 1101 1245 946	120 80 43 90	16' 1 24' 1 12'	2 120 (uncorrelat between 80 & 320 between 43 & 33' between 90 & 85 2 932 (uncorrelat	5, 2' @ 540 (u 7 (uncorrelate 1 (4' @ 560,	:d)				0				
19031F 20767 27182 34964 36808	T4S,R66W-SWNE 19 T6S,R66W-SWNE 10 T5S,R64W-SWNW 1 T4S,R66W-SWSW 18 T5S,R66W-NESE 20	5610 5875 5960 5580 5790	1200 426 225 1130 1208	190 183 197 431 421	2' @ 197 9' @	 190, 6' @ 52, 4 183 (uncorrela 5763 431 (uncorrela 421 (uncorrela 	ted) 27 ted)	correlated)	_	-	-	-	-	-	-	-
38870 47315 49198 50376 51506	T3S,R63W-NWNW 25 T3S,R63W-NESE 36 T6S,R66W-NWNE 25 T4S,R66W-NWNW 15 T4S,R65W-NWNW 14	5400 5435 6070 5545 5704	524 325 315 630 667	47 120 109 35 84	5' @ 2' @	 a 47(uncorrelate a 120 (uncorrela a 109, 2' a 118 a 35' (uncorrel 5620 	ted) (uncorrelated	1) 166	5538	14	228	5476	3	316	5388	7
52006 73605 903-0051 903-0055 903-0071	T4S,R64W-NWNE 26 T4S,R64W-SESW 20 T3S,R66W-NWSW 9 T3S,R66W-SWSW 28 T3S,R65W-NESE 32	5815 5760 5306 5405 5592	547 575 1200 1199 1040	35 83	35 no 0	5725	10	185	5575	3, 5' @ 336 4 26 —	@ 366, 3@ 	≱ 417 (uncorrelat — —	ed) 	-	-	-
904-0016½ 904-0025 904-0031 905-0048 905-0053	T4S,R65W-NESW 31 T4S,R66W-NWNW 4 T4S,R66W-SWSW 8 T3S,R66W-SESW 9 T6S,R66W-NESE 15	5735 5460 5430 5308 5995	902 561 1400 1700 320	200 122 238 577 264	5' (1' ?	@ 238, 7' @ 248	4' @ 324, 2' 0, 3' ? @ 876	@ 472 (u		10	387 902, 4' @ 3	5348 337, 7' @ 353 (u	18 ncorrelated)	400	5335	10
A 11 A 23 A 25 A 28 A 31	T3S,R65W-NWNW 17 T3S,R64W-SWSW 32 T3S,R64W-SESE 28 T3S,R64W-NWNW 30 T3S,R64W-NWNW 20	5414 5540 5587 5478 5430	120 120 200 200 80	96 79 43 75 47	20.1 	' @ 96 (uncorrel 3' @ 79 (uncorre 2' @ 43, 21' @ @ 47 (uncorrela	elated) 159, 4@ 183 (uncorrelat	ed)	Н	75	5395	6	_	_	-
A 32 A 33 A 35 A 38 A 41	T3S,R64W-NWSW 20 T3S,R64W-SWSW 20 T3S,R64W-SWSW 20 T3S,R65W-SWNE 9 T3S,R65W-NESE 22 T3S,R65W-NWSE 22	5456 5507 5476 5486 5525	100 140 120 80 120	57 63 70 30 75	7.1	7' @ 57 (uncorr ' @ 63, 37' @ 7 ' @ 70 (uncorrel — —	5 (uncorrelate	ed) 30 75	5456 5451	13 28	66	5421	2.5	-	-	
A 43 A 44 A 101 A 102 A 110	T2S,R66W-SENE 36 T2S,R66W-SESE 36 13S,R65W-NWNE 26 T3S,R65W-SESE 21 T3S,R65W-SENW 20	5327 5345 5648 5576 5574	200 500 250 300 200	146 144 190 31 153	7'	@ 146, 2' @ 16 @ 144, 6' @ 17 .1' @ 190, 4.9' ((other very t	thin coals, 239, 1.9 (153	uncorrelated) @ 242 (uncorrela 	ued) 22	31	5426	6.5	_	-	1.1
A 114 A 116 A 117 A 122 A 128	T3S,R65W-SENE 20 T3S,R65W-NENW 21 T3S,R62W-C 21 T3S,R64W-NESW 26 T3S,R64W-NWNW 21	5579 5541 5599 5601 5534	300 200 220 260 150	136 40 155 196 57	-	@ 40, 30' @ 13 		136 incorrelate 155 —	5442 :d) 5444 —	25 33.5 —		 5476	 42	-	-	-
A 129 A 131 A 132 ADB 5 ADB 7	T3S,R64W-SWSE 20 T3S,R65W-NWNE 36 T3S,R65W-NWSW 36 T5S,R65W-NWNE 34 T5S,R65W-NESW 27	5489 5491 5513 6080 6000	100 180 500 550	42 90 33 465 384	 465 384				5480 5568		42 90 	5448 5402 — — —	30.5 5 	 131 143 -	5360 5370 —	- 6 - -
ADB 8 ADB 9 ADB 10 ADB 12 ADB 13	T5S,R65W-SWSW 23 T5S,R65W-NENW 15 T5S,R64W-SENW 7 T5S,R65W-NESW 36 T5S,R64W-SESE 33	5965 5880 5950 5945 5995	600 1020 6209 600 600	351 326 386 324 321	351 324 321	5614 	4 12 15	462 326 386 411 386	5503 5554 5564 5534 5609	6 9 11 7 13	553 418 458 —	5412 5462 5492 —	15 8 8 	574 471 	5391 5409 — — —	7 7 —
06 0501 SC 1 SC 5 F 16	T5S,R63W-NWNW 7 T6S,R64W-SWSW 2 T3S,R66W-SESE 36 T4S,R65W-NWNW 16 T3S,R64W-NENE 31	5878 5962 5510 5630 5560	8288 8310 200 180 160	154 332 68 88 16	154 332 — —	5724 5630 — —	22 20 — —	259 424 68 88 16	5619 5538 5442 5542 5542 5544	9 8 11 11 9	336 464 120	5542 5498 5440	22 5 	377 586 — —	5501 5376 — —	13 27

	Sources of Data
CGS	Colorado Geological Survey

DX Public Service Company of Colorado T.-R.-Sec.#

A CGS Open File Report 78-8

Permit # Colorado Department of Water Resources

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(0061, etc.) ADB SC Colorado Board of Land Commissioners

W

0 Colorado Oil and Gas Conservation Commission 902-0028, etc. John Romero, Colorado Department of Water Resources

COLORADO GEOLOGICAL SURVEY **RESOURCE SERIES 13** PLATE 23 OF 25

/		/	/				/				/			/		/ MORE TH	AN /	тота	L OF ALL
Constitution Constitution Constitution	Creation of the second	100		VERB	-250' URDE	51		VERB	URDE	\$1	OVE	500'-1000' ERBURDE	- /	/ ovi	1000'-2000' CRBURDEN	2000' OVERBURDEN 5.3 = 5		OVER	BURDEN GORIES
28°0°	A Star	10 000 100 000	In beek 5.10.101	In be	Inician Inician	19.5°	In beas	In Berlin I	I'ore thick.		⁴⁵ ⁴⁵ ⁴⁵ ⁴⁵ ⁴⁵ ⁴⁵ ⁴⁵ ⁴⁵		14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10,00 10,00 10,00	Total of the second of the sec	4 10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	In bees S. Dees	In Be	dict.
LARAMIE FORMATION "B" BED	M IND		0.8 5.9		0.8 5.9 7.7						T1S R60W				1		0. 5. 7.	8	0.8
UPPER "A" BED	INF HYP T	0.1 2.4 27.3	7.7 14.4		7.7 14.4 0.1 2.4 35.1					-							14.		5.9 7.7 14.4 0.1
LARAMIE FM	M IND INF HYP T	29.8	7.8 7.8 0.8		37.6											24	0.1 2.4 7.3 7.1 0.8 7.1 0.1 0.1	8	0.1 2.4 35.1 37.6 0.9
TOTAL	M IND INF HYP T	2.4 27.3 29.8	5.9 15.5 22.2		0.9 8.3 42.8 52.0											2:	2.4 5.9 2.3 15.1 2.8 22.1		0.9 8.3 42.8 52.0
LARAMIE FORMATION "B" BED	M IND INF	2.3 10.8	3.4 17.8 34.0	1.5	5.7 30.1 34.0	2.5	28.6		31.1		TIS R61W					10	.3 3.4 .8 17.5 .5 62.0	4 8 1.5 6	5.7 30.1 65.1
UPPER "A" BED	HYP T M IND INF	13.1 0.4 2.7 7.8	55.2	1.5	69.8 0.4 2.7 7.8	2.5 0.4 9.4	28.6		31.1 0.4 9.4			0.3				15	.6 83.8 .4 .1		100.9 0.4 3.1 17.5
UNCORRELATED BEDS	HYP T M IND INF	10.9			10.9	9.8			9.8			0.3				21			21.0
LARAMIE FM TOTAL	HYP T M IND INF	2.7 13.5 7.8	3.4 17.8 34.0	1.5		7.6 7.6	15.6		23.2 23.2 0.4			0.1				2		5 4 3 1.5	23.2 23.2 6.1 33.2
	HYP T	24.0	55.2	1.5	41.8 80.7	11.9 7.6 19.9	28.6 15.6 44.2		40.5 23.2 64.1	0.3		0.3 0.3				20 7 44	.6 15.6	5	82.6 23.2 145.1
LARAMIE FORMATION "B" BED	M IND INF HYP					6.8			6.8								.8		6.8
UPPER "A" BED	T M IND INF HYP					6.8			<u>6.8</u> 6.9	25.0		25.0				-31			6.8 31.9
UNCORRELATED BEDS	T M IND INF HYP					6.9	6.3		6.9		22.4	25.0 57.4				31		1.	68.2
LARAMIE FM TOTAL	T M IND INF HYP					4.5	6.3		10.8	35.0	22.4	57.4 25.0 57.4				39	5 28.7 7		68.2 38.7
LARAMIE FORMATION	T					4.5 18.2	6.3 6.3		10.8 24.5		22.4	82.4				39 78			68.2 106.9
UNCORRELATED BEDS	M IND INF HYP T									4.8 140.5 145.3	102.4 102.4	4.8 242.9 247.7				4 140 145	5 102.4		4.8 242.9 247.7
LARAMIE FORMATION UNCORRELATED	M				_					0.9	2.6	3.5	1.7	2.2	3.9	2	6 4.8		7.4
BEDS	IND INF HYP T									4.6 47.7 24.7 77.9	16.3 144.0 158.2 321.1	20.9 191.7 182.9 399.0	12.3 23.1 37.1	20.1 43.7 66.0	32.4 66.8 103.1	16 70 24 115	8 187.7 7 158.2		53.3 258.5 182.9 502.1
LARAMIE FORMATION UNCORRELATED BEDS	M IND INF									2.4 12.6 60.3	23.9	2.4 12.6 84.2	169.1	47.4	216.5	2 12 229	6		2.4 12.6 300.7
ARAMIE FORMATION	HYP T									9.1 84.4	20.3 44.2	29.4 128.6	47.1 216.2	12.8 60.2	59.9 276.4	56.	2 33.1		89.3 405.0
UNCORRELATED BEDS	M IND INF HYP T										4.6 37.4 22.9 64.9	4.6 37.4 22.9 64.9	0.7 2.8 6.7		0.7 2.8 6.7	0. 2. 6.	8 37.4 7 22.9		5.3 40.2 29.6
ARAMIE FORMATION UNCORRELATED	M									3.5	18 R67W	4.8	10.2		10.2	10.			4.8
BEDS	IND INF HYP T							·		25.7 164.0 0.9 194.1	10.4 119.7 0.8 132.2	36.1 283.7 1.7 326.3	9.2 9.2	6.9 6.9	16.1 16.1	25. 173. 0. 203.	7 10.4 2 126.6 9 0.8		36.1 299.8 1.7 342.4
ARAMIE FORMATION UNCORRELATED BEDS	M IND INF								_	1.3 10.7 52.7	3.7	1.3 10.7 56.4				1.	7		1.3 10.7
ARAMIE FORMATION	HYP T	_				_				64.7	3.7 3.7 25 R60W	68.4				52.			56.4 68.4
"B" BED	M IND INF HYP	0.3 4.3 16.4	0.9 4.1 22.9		1.2 8.4 39.3											0. 4. 16.	4.1 22.9		1.2 8.4 39.3
UPPER "A" BED	T M IND INF HYP	1.0 15.8 1.4	27.9 2.7 18.2 138.6 7.2	1.4 8.3 9.9 0.8	48.9 4.1 27.5 164.3 9.4											21. 1.1 15:1	2.7 18.2 138.6	1.4 8.3 9.9	48.9 4.1 27.5 64.3 9.4
LARAMIE FM TOTAL	T M IND INF HYP	18.2 0.3 5.3 32.2 1.4	166.7 3.6 22.3 161.5 7.2	20.4 1.4 8.3 9.9 0.8	205.3 5.3 35.9 203.6 9.4											18. 0. 5. 32. 1.4	166.7 3.6 22.3 161.5	20.4 1.4 8.3	205.3 5.3 35.9 203.6 9.4
ARAMIE FORMATION "B" BED	T	39.2 0.4	194.6	20.4	254.2		0.8		0.0	т	25 R61W					39.2	194.6		254.2
UPPER "A" BED	IND INF HYP T	3.1 13.3 16.8	1.8 14.2 70.9 86.9	1.7	17.3 84.2 103.7		0.8 6.8 135.7 143.3	- pr -	0.8 6.8 135.7 143.3		27.1 27.1	27.1 27.1				0.4 3.1 13.2 16.8	21.0 233.7 257.3	2	3.0 24.1 47.0 74.1
	M IND INF HYP T	0.5 2.4 8.6 11.5	23.1 23.1	1.7 3.5 5.2	2.2 6.3 31.7 40.2	0.1 2.7 26.7 29.5	6.6 72.5 79.1	0.8 8.0 8.7 17.5	0.9 17.3 107.9 126.1	10.8 10.8	48.8 48.8	59.6 59.6				0.6 5.1 46.1 51.8	6.6 144.4	11.5 8.7 1	3.1 23.2 99.2 25.5
UNCORRELATED BEDS	M IND INF HYP T					6.6 6.6	11.1 11.1		17.7 17.7							6.6 6.6			17.7 17.7
LARAMIE FM TOTAL	M IND INF HYP T	0.9 5.5 21.9 28.3	1.8 14.2 94.0 110.0	1.7 3.5 5.2	4.4 23.2 115.9 143.5	6.6	0.8 13.4 208.2 11.1 233.5	0.8 8.0 8.7 17.5	1.7 24.1 243.6 17.7 287.1	10.8 10.8	75.9 75.9	86.7 86.7				1.0 8.2 59.4 6.6 75.2	27.6 378.1 11.1	11.5 8.7 4	6.1 47.3 46.2 17.7 17.3
ARAMIE FORMATION "B" BED	M IND										2S R62W	1.1				0.4.	3 0.3		1.1
UPPER "A" BED	IND INF HYP T M IND			_		9.1 9.1		0.7 0.7	9.8 9.8	4.4 59.5 64.7	22.1 26.1 1.5	81.6 90.8 1.5				4. 68. 73.	5 22.1 3 26.1 1.5	0.7	91.4 100.6 1.5
UNCORRELATED	INF HYP T M	-								2.8 2.8 2.2	11.7 139.5 152.7	11.7 142.3 155.5 2.2				2.	11.7 8 139.5 8 152.7		11.7 142.3 155.5 2.2
BEDS LARAMIE FM	IND INF HYP T M					2.7 2.7	3.7 3.7		6.4 6.4	11.7 91.0 53.0 157.9 3.0	5.4 20.2 25.6 1.8	11.7 96.4 73.2 183.5 4.8				11. 91. 55. 160.	5.4 23.9 29.3		11.7 96.4 79.6 189.9
TOTAL	IND INF HYP T					9.1 2.7 11.8	3.7 3.7	0.7 0.7	9.8 6.4 16.2	16.1 153.3 53.0 225.4	15.4 167.0 20.2 204.4	4.6 31.5 320.3 73.2 429.8				331 16. 162. 55. 237.	15.4 167.0 23.9	0.7	31.5 30.1 79.6
ARAMIE FORMATION										т	2S R63W								2.6

COAL RESOURCES OF THE DENVER EAST 1/2° x 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980

TABLE III Coal Resource Estimates

MORE THAN 2000' OVERBURDEN MORE THAN 1000'-2000' OVERBURDEN OVERBURDEN TOTAL OF ALL OVERBURDEN CATEGORIES TOTAL OF ALL OVERBURDEN 250'-500' OVERBURDEN* 0-250' 250'-500' OVERBURDEN* OVERBURDEN* 0-250' OVERBURDEN* 500'-1000' OVERBURDEN 1000'-2000' 500'-1000' OVERBURDEN OVERBURDEN CATEGORIES T3S R64W T2S R64W DENVER FORMATION BENNETT BED DENVER FORMATION LOWRY BED 3.1 UPPER WATKIN BED LARAMIE FORMATIO UNCORRELATED BEDS
 55.7

 6.2
 296.6
 64.7

 37.7
 11.7

 374.1
 76.4
 302.8 64.7 37.7 11.7 380.3 76.4 361.3 LOWER WATKIN BED T2S R65W DENVER FORMATION LOWRY BED DENVER FM TOTAL IND INF HYP 42.3 UNCORRELATED BEDS LARAMIE FORMATIO UNCORRELATE BEDS 26.7 20.4 DENVER FM TOTAL 1.1 3.5 9.9 26.7 42.3 20.4 9.9 26.7 DENVER FORMATION BENNETT BED LARAMIE FORMATION UNCORRELATED BEDS
 8.3
 2.6
 10.9

 69.6
 17.2
 86.8

 246.6
 49.1
 295.7
 8.3 2.6 69.6 17.2 246.6 49.1 86.8 295.7 UPPER WATKINS BED 324.5 68.9 324.5 68.9 393.4 T2S R66W DENVER FORMATI LOWER WATKINS BED LOWER WATKINS BED LARAMIE FORMATION DENVER FM TOTAL
 1.6
 0.3
 1.9

 12.9
 2.9
 15.8

 202.8
 51.8
 254.6

 19.8
 10.2
 30.0

 237.1
 65.2
 302.3

 1.6
 0.3

 12.9
 2.9

 202.8
 51.8

 19.8
 10.2

 237.1
 65.2
 UNCORRELATED M BEDS IND INF 254.6 30.0 302.3 HYP LARAMIE FORMATION UNCORRELATED BEDS **T2S R67W** LARAMIE FORMATION UNCORRELATED 2.4 5.7 23.3 45.3 103.7 308.0 7.9 11.6 137.3 370.6 9.1 25.0 31.8 129.1 34.1 14.2 20.3 160.9 71.9 178.9 7.9 11.6 200.1 95.7 212.1 BEDS 34.5 250.8 19.5 41.6 158.5 DENVER FORMATION LOWRY BED T2S R68W LARAMIE FORMATION UNCORRELATED BEDS 51.7 20.4 134.2 24.4 185.9 44.8 51.7 20.4 134.2 24.4 185.9 44.8 72.1 158.6 230.7 BENNETT BED 158.6 T3S R59W LARAMIE FORMATION UPPER WATKINS BED "B" BED 3.3 5.0 5.9 0.9 3.3 5.0 5.9 0.9 9.7 7.0 97 70 16.7 LOWER WATKINS BED UPPER "A" BED 4.1 UNCORRELATEI BEDS LARAMIE FM TOTAL 0.5 1.1 7.4 5.0 5.9 0.9
 0.3
 1.1

 7.4
 5.0

 5.9
 0.9
 12.4 13.8 7.0 20.8 13.8 7.0 DENVER FM TOTAL T3S R60W LARAMIE FORMATION "B" BED 1.3 11.8 0.1 LARAMIE FORMATION UNCORRELATED BEDS 19.1 147.9 6.4 21.4 225.8 167.0 UPPER "A" BED 1.6 2.2 12.8 14.7 61.7 53.9 15.7 0.5 0.6 6.0 46.0 53.4 LARAMIE FORMATION LARAMIE FM TOTAL UNCORRELATED BEDS 1.9 12.5 14.8 75.9 80.8 201.8 0.7 15.7 98.2 305.9
 19.4
 1.3

 254.6
 15.7
 12.3

 9.7
 0.6
 6.1

 368.1
 16.3
 19.7
 IND 14.8 74.6 INF 65.1 189.5 HYP 0.1 9.6 T 81.9 286.2 T3S R61W LARAMIE FORMATION LARAMIE FORMATION UNCORRELATED BEDS "B" BED 14.8 142.1 11.3 66.1 28.0 222.2 21.2 142.3 11.3 66.7 34.4 223.0 6.4 0.1 156.9 0.1 257.4 UPPER "A" BED 4.6 108.9 7 76.8
 6.1
 15.6
 21.7

 172.6
 26.8
 199.4

 115.2
 115.2

 293.9
 46.2
 340.1
 1.5 10.3 4.7 68.4 LARAMIE FM TOTAL
 0.5
 1.8
 1.3
 3.6

 1.4
 16.8
 5.3
 23.5

 14.8
 251.0
 22.1
 287.9

 11.3
 142.9
 154.2

 28.0
 412.5
 28.7
 469.2

 0.5
 1.8
 3.8
 6.1

 1.4
 18.3
 15.6
 35.3

 21.2
 314.9
 26.8
 362.9

 11.3
 181.9
 193.2

 34.4
 516.9
 46.2
 597.5

 2.5
 2.5

 1.5
 10.3
 11.8

 63.8
 4.7
 68.5

 38.4
 38.4

 103.7
 17.5
 121.2
 6.4 0.1 DENVER FORMATION T3S R62W DENVER FORMATION LARAMIE FORMATION LOWRY BED IND 3.0 INF 28.4 31.3 3.0 28.4 31.3 31.5 31.3 ADAMS COUNTY TOTAL LARAMIE FORMATION "B" BED 2.3 51.8 1.4 5.2 59.3 1.4 26.1 1.1 7.2 25.7 0.3 36 11 25.7 0.3 UPPER "A" BED
 0.7
 4.4
 5.1

 96.1
 21.3
 117.4

 16.6
 16.6

 113.4
 25.7
 139.1
 0.7 4.4 96.1 21.3 117.4 16.6 16.6 UNCORRELATED BEDS 0.8 8.8 5.4 48.7 46.0 237.5 5.5 0.8 3.3 28.2 5.4 20.5 183.0 14.8 85.7 LARAMIE FORMATION "B" BED 31.2 151.8 283. 1.2 185.5 52.2 295.0 216.7 21.0 109.5
 5.5
 5.5
 0.8
 3.3

 2.3
 28.9
 4.4
 33.3
 5.4
 20.5

 27.2
 56.9
 248.2
 21.3
 326.4
 14.8
 85.7

 5.2
 16.6
 16.6
 34.7
 56.9
 299.2
 25.7
 381.8
 21.0
 109.5
 LARAMIE FM TOTAL
 0.8
 8.8
 9.6

 7.7
 49.4
 57.1

 97.8
 335.0
 4.4
 437.2

 5.2
 16.6
 21.3
 43.1

 111.5
 409.8
 25.7
 547.0
 2.3 20.1 1.1 5.2 33.6 1.1 UPPER "A" BED T3S R63W LARAMIE FM TOTAL DENVER FORMATION LOWRY BED M 1.8 1.5 IND 3.8 12.4 INF 1.2 35.3 HYP T 6.8 49.2 1.8 1.5 3.8 12.2 1.2 35.3 16.2 36.5 _____ 6.8 49.2 56.0 LARAMIE FORMATION "B" BED UPPER WATKINS BED DENVER FM TOTAL 1.9 1.5 5.3 12.4 1.3 35.3 IND INF 5.3 12.4 1.3 35.3 UPPER "A" BED 8.5 49.2 57 LARAMIE FORMATION LARAMIE FM TOTAL UNCORRELATED BEDS 1.2 1.7 72.5 109.3 8.8 10.4 82.5 121.4 1.2 1.7 6.0 8.4 2.9 14.4 66.5 100.9 8.8 10.4 17.3 75.3 111.3 181.8 167.4

ION										T3S I	864W										L	ARAMIE FORMATION			
т	M IND INF HYP	0.6	2.6 2.7	0.1	2.6 3.4												0.6	2.6 2.7	0.1	2.6 3.4		"B" BED	M IND INF HYP		
KINS	M IND	0.6 0.2 0.3	5.3 2.1 5.3	0.1 184.9 259.5	6.0 187.2 265.1											+	0.6 0.2 0.3	5.3 2.1 5.3		6.0 187.2 265.1		UPPER "A" BED	T M IND		
	INF HYP T	0.5	6.5 13.9	11.2	17.7 470.0												 0.5	6.5	11.2	17.7 \$70.0		UNCORRELATED	INF HYP T		
TKINS	M IND INF HYP	0.5 1.2			0.5 1.6												0.5	0.4		0.5		BEDS	IND INF HYP T		
FM	T M IND INF	1.7 0.7 1.2	0,4 4.7 8.4 6.5		2.1 190.3 270.1 17.7								1				1.7 0.7 2.1	0.4 4.7 8.4 6.5	259.6 2	2.1 190.3 270.1 17.7		LARAMIE FM TOTAL	M IND INF		
TION	HYP T	2.8			478.1												2.8	19.6		178.1			HYP T		_
ATED	M IND INF HYP												3.2 25.8 198.2 35.8	8 20.6 5 181.9		5.9 46.4 380.4 58.9	3.3 25.8 198.5 35.8	2.6 20.6 181.9 23.1	3	5.9 46.4 180.4 58.9	D	ENVER FORMATION LOWRY BED	M IND	0.7	
	T									T3S R	65W		264.3			491.6	 263.4	228.2		91.6		ARAMIE FORMATION	INF HYP T	27.7 28.4	
TON BED	M IND INF	2.2 6.5 0.5	11.8 27.0 0.4		164.9 211.9 3.8												 2.2	11.8 27.0	178.4 2	64.9 11.9		UNCORRELATED BEDS	M IND INF HYP		
KINS	HYP T M	9.2 3.3	39.2 7.8		380.6 13.4		1.6		1.6							_	0.5 9.2 3.3	0.4 39.2 9.4	332.2 3	3.8 80.6 15.0			Ť		
	IND INF HYP T	12.7 10.7 26.7	43.2 64.0 115.0	4.3 6.6	60.2 74.7 148.3	1.1 11.9 13.0	7.8 65.5 0.7 75.6		8.9 77.4 0.7 88.6								13.8 22.6 39.7	51.0 129.5 0.7 190.6	1	69.1 52.1 0.7 36.9		ENVER FORMATION LOWRY BED	M IND INF	1.0 0.7	2.4 11.3 2.6
KINS	M IND INF HYP	1.2 4.3 13.6	7.1 25.9 61.0 0.4		8.3 30.2 74.6 0.4		3.8 96.6 9.7		3.8 96.6 9.7								1.2 4.3 13.6	7.1 29.7 157.6	r	8.3 34.0 71.2		BENNETT BED	HYP T M IND	1.7 0.4 2.7	16.3
FM	T M IND	19.1 6.7 23.5	94.4 26.7 96.1	153.2 182.7	113.5 186.6 302.3	1.1	110.1 1.6 11.6		110.1 1.6 12.7							-	19.1 6.7 24.6	10.1 204.5 28.3 107.7	153.2 1	10.1 23.6 88.2 15.0			INF HYP T	3.1	9.5 0.7 13.2
TION	INF HYP T	24.8 55.0	125.4 0.4 248.6		153.1 0.4 642.4	11.9 13.0	162.1 10.4 185.7		174.0 10.4 198.7								36.7 68.0	287.5 10.8 434.3		27.1 10.8 41.1		UPPER WATKINS BED	M IND INF HYP	1.4 8.9 3.3	2.2 14.4 10.0
TED	M IND INF												37.8			1.3 10.7 131.7	37.8	1.3 10.7 93.9	13	1.3 10.7 37.1		DENVER FM TOTAL	T M IND INF	13.6 1.8 12.6 4.0	26.6 7.6 35.2 13.3
	НҮР Т									T3S R	66W		44.2 82.0			119.9 263.6	44.2 82.0	75,7 181.6		19.9 63.6	L	ARAMIE FORMATION	HYP T	18.4	
ION ED	M IND	0.9 6.4	2.2 13.7	4.0 16.5	7.1 36.6												 0.9 6.4	2.2 13.7	16.5	7.1			M IND INF HYP		
ED	INF HYP T M	0.6 5.2 13.1 0.1	5.5 21.4 0.9	20.5	6.1 5.2 55.0 5.6								-				0.6 5.2 13.1 0.1	5.5 21.4 0.9	20.5	6.1 5.2 55.0 5.6		ENVER FORMATION	Т		
	IND INF HYP T	1.7 1.4 3.2	4.4 4.1 9.4	19.9 10.7	26.0 16.2 47.8												1.7 1.4 3.2	4.4 4.1 9.4	19.9 2 10.7 1	26.0 16.2 47.8		LOWRY BED	M IND INF	0.4	5.2 17.4 0.4
KINS	M IND INF		1.9 4.5	1.5 12.3 2.4	3.4 16.8 2.4		0.2 3.5 2.9		0.2 3.5 2.9									2.1 8.0 2.9	1.5 12.3 2	3.6 20.3 5.3		BENNETT BED	HYP T M IND	0.4 0.4 0.5	23.0 8.8 22.5
KINS	HYP T M IND		6.4	16.2	22.6	_	6.6 0.6 3.8		6.6 0.6 3.8				+			+		13.0 0.6 3.8		29.2 0.6 3.8		UPPER WATKINS	INF HYP T	0.9	31.3
TED	INF HYP T						1.4 5.8		1.4 5.8									1.4 5.8		1.4 5.8		BED	IND INF HYP T	1.6 0.4 2.3	40.7 5.6 57.5
TED	M IND INF HYP	0.8 6.5 7.1	1.5 11.4 12.4		2.3 17.9 19.5	0.2 2.3 1.9	0.3 4.1 3.4		0.5 6.4 5.3								1.0 8.8 9.0	1.8 15.5 15.8	222	2.8 24.3 24.8		LOWER WATKINS BED	M IND INF	3.2 6.6 0.9	5.3 17.8 6.5
м	T M IND INF	14.4 1.8 14.6 9.1	25.3 6.5 34.0 22.0	48.7	39.7 18.4 97.3 44.2	4.4 0.2 2.3 1.9	7.8 1.1 11.4 7.7		12.2 1.3 13.7 9.6								18.0 2.0 16.9 11.0	33.1 7.6 45.4 29.7	10.1 1 48.7 11	9.7 1.0 3.8	-	DENVER FM TOTAL	HYP T M IND	10.7 4.3 8.7	29.6 30.5 98.4
TION	HYP T	5.2 30.7	62.5	71.9 1	5.2 165.1	4,4	20.2		24.6								5.2 35.1	82.7		5.2 9.7		ARAMIE FORMATION	INF HYP T	1.3 14.3	12.5 141.4
TED	M IND INF HYP T												4.5 23.9 119.9 11.3	6.7 41.9 20.5	1	5.8 30.6 61.8 31.8	4.5 23.9 119.9 11.3	1.3 6.7 41.9 20.5	3 16	5.8 0.6 1.8 1.8		UNCORRELATED BEDS	M IND INF HYP		
TION	1									T3S R6	7W		159.6	70.4	2	230.0	159.6	70.4	23	0.0			T		
TED	M IND INF HYP									1.7 6.1 1.1		1. 6. 1.	1 5.7 1 100.4	2.6	,	5.7 03.0	1.7 11.8 101.5	2.6	1 10	1.7 1.8 4.1	DE	ENVER FORMATION LOWRY BED	M IND INF	0.8 4.3 3.5	1.2 10.2 31.1
	T									8.9 T3S R6	8W	8.9	64.6 9 170.7			75.5 84.2	64.6 179.6	10.9 13.5		5.5 3.1		BENNETT BED	HYP T M IND	8.6 0.1 0.3	42.5 5.6 50.0
TON TED	M IND INF										29534												INF HYP T		79.8 135.4
	НҮР Т		_							34.6 25.9 60.5		34. 25. 60.	9 0.4			10.4 0.4 10.8	45.0 26.3 71.3		2	5.0 6.3 1.3		UPPER WATKINS BED	M IND INF HYP		5.1 23.6 7.0
									ļ	ADAMS (ГҮ										LOWER WATKINS BED	T M IND INF		35.7 2.7 10.7 1.7
L DN	M IND	12.9 62.9	42.9 177.6	348.2 491.0	404.0	0.2 3.4	2.7 23.0		2.9 26.4	TOT <i>A</i>	ALS						 13.1	45.6	348.2 40	06.9	-	DENVER FM	HYP T M	0.9	15.1
	INF HYP T	114.5 100.6 290.9	240.9 0.4 461.8	27.2 866.4 10	382.6 101.0 619.1	13.8 17.4	169.8 10.4 205.9		183.6 10.4 223.3				-				66.3 128.3 100.6 308.3	410.7 10.8 667.7	27.2 56 11 866.4 184			TOTAL	IND INF HYP T	4.6 3.5 9.0	94.5 119.6 228.7
e DN	M IND INF HYP	6.5 51.9 195.0 1.5	23.2 139.8 526.8 17.4	13.3 9.9 0.8	32.8 205.0 731.7 19.7	0.6 6.8 118.0 38.5	2.6 31.5 501.2 185.7	2.1 13.3 31.5	5.3 51.6 650.7 224.2	14.6 21 93.7 147 771.6 1099 552.8 484	.3 1- .1 2 .2	2.5 38. 4.7 255. 6.0 1896. 1037.	7 208.3 7 1585.3 0 327.6	119.0 963.5 217.1	2	41.6 327.3 548.8 544.7	920.4	62.4 437.6 3090.6 904.4	41.3 83 67.4 582 0.8 182	25.6		RAMIE FORMATION UNCORRELATED BEDS	M IND INF		
NTY	T M IND INF	254.9 19.4 114.8 309.5	707.2 66.1 317.4 767.7	351.3 504.3	989.2 436.8 936.5 114.3	163.9 0.8 10.2 131.8	721.0 5.3 54.5 671.0	46.9 2.1 13.3 31.5	931.8 8.2 78.0 834.3	1432.7 1752 14.6 21 93.7 147 771.6 1099	.7	3.2 3228. 2.5 38. 4.7 255. 6.0 1896.	8 26.7 7 208.3	14.9 119.0	1	462.4 41.6 327.3 548.8	61.5 427.0	4495.0 108.0 638.2 3501.3	117.2 861 355.9 52 534.3 159 94.6 639	15.4 17.5			HYP T	_	
	HYP T	102.1 545.8	17.8	0.8	120.7 608.3	38.5	196.1 926.9		234.6	552.8 484 1432.7 1752	.2	1037. 3.2 3228.	0 327.6		1	544.7 162.4		915.2	0.8 193 983.6 1045	7.0	DE	NVER FORMATION	M IND		3.2 23.7
										ARAPAH	OE CO) .										BENNETT BED	INF HYP T M		121.1 1.6 149.6
TION										T4S R	9W											DENNETT BED	IND INF HYP	0.6 3.2 5.3	5.2 41.1 2.4
non	M IND INF	0.6 6.5 21.7	1.6 7.4 3.6		2.2 13.9 25.3												0.6 6.5 21.7	1.6 7.4 3.6		2.2 13.9 25.3		UPPER WATKINS BED	T M IND INF	9.1	48.7
BED	HYP T M IND	28.8 0.3 0.7	12.6		41.4 0.3 0.7								-			-	 28.8 0.3 0.7	12.6		41.4 0.3 0.7		LOWER WATKINS BED	HYP T M IND		
614	INF HYP T	1.0			1.0												1.0	1.4		1.0			INF HYP T		
FM	M IND INF HYP	0.9 7.2 21.7	1.6 7.4 3.6		2.5 14.6 25.3												0.9 7.2 21.7	1.6 7.4 3.6	1	2.5 14.6 25.3		UNCORRELATED BEDS	M IND INF HYP		
TION	Γ	29.8	12.6		42.4					T4S R	50W		_				29.8	12.6	4			DENVER FM TOTAL	T M IND	0.6 3.2 5.3	3.2 28.9
	M IND INF	0.6 2.6 18.2	4.8 30.1 71.4		5.4 32.7 89.6	1.0 7.9 20.8	2.4 15.8 41.4		3.4 23.7 62.2								1.6 10.5 39.0	7.2 45.9 112.8	4	8.8 56.4 51.8	LA	RAMIE FORMATION	INF HYP T		162.2 4.0 198.3
BED	HYP T M IND	21.4 1.7 10.6	106.3		127.8 1.7 10.6	29.7 0.8 6.8	59.6 1.2 9.1		89.3 2.0 15.9								51.1 2.5 17.4	165.9 1.2 9.1	3	17.0 3.7 26.5		UNCORRELATED BEDS	M IND INF HVP		
FM	INF HYP T	13.3 25.6	10	£	13.3 25.6	19.1 26.7	32.2 42.5 3.6		51.3 69.2 5.4								32.4 52.3 4.1	32.2 42.5 8.4	9	64.6 94.8 12.5			HYP T		
. 71	M IND INF HYP T	2.3 13.2 31.5 47.0	4.8 30.1 71.4 106.3		7.1 43.3 102.9 153.3	1.8 14.7 39.9 56.4	3.6 24.9 73.6 102.1		5.4 39.6 113.5 158.5								27.9 71.4	55.0 145.0 208.4	2	12.3 82.9 16.4		es are in millions of tons. overburden categories are			
		47.0	100.3			50.4	102.1		, 30.3								 1992.14		و		0-200' Explanatio	and 200'-500' for the Denv	r Formation		

	/-	/.	VFR	0-250' Burd	EN*	/.	OVERB	Y-500' BURDE!	N* /	/	500'- /ERBU	RDE	N /	/。	VERBU	-2000' URDEN		MORE 2000 ERBUR	r	/	OVER	L OF A BURDE	EN /
CATEGORY C	In bout 2	S. 10-eds S. 10-eds	In beds more	Total of all	10 400 anon	In beds	the best	Tonal of thick	La best careauries	S. 10 bed	In beg Inan 10- more Inice	thickness of	2.5.5 bed areauros	In beds S. 10:05 Mick	In best mure	Initial of all	2.6 best "Former	un 10 more l'un 10 more l'un 10 more lickness of	2.5.5 the meaning	In beas	than lo thore	to the second se	¢ /
c	[<u> </u>					IS R61W	-	<u> </u>	~						~			<u> </u>	
M ND NF HYP					21.7 25.1 46.8	1 22.2		55.8 47.3 103.1											21.7 25.1 46.8	34.1 22.2 56.3		55.8 47.3 103.1]
M ND NF HYP					2.9) 50.6 39.0		53.5 39.0 92.5		71.2 71.2		71.2 71.2							2.9 2.9	50.6 110.2 160.8		53.5 110.2 163.7]
M ND NF HYP		7							1.8 12.0 84.8 98.7	1.4		1.8 12.1 86.2 100.1							1.8 12.1 84.8 98.7	1.4 1.4		1.8 12.1 86.2 100.1	
M ND NF HYP					24.6 25.1 49.7	5 84.7 1 61.2 7 145.9		109.3 86.3 195.6		1.4 71.2 72.6		1.8 12.1 86.2 71.2 171.3							1.8 12.1 109.4 25.1 148.4	86.1 132.4 218.5		1.8 12.1 195.5 157.5 366.9	
M ND NF IYP	0.7 27.7			0.7 27.7			-		T4	S R62W		~							0.7 27.7			0.7 27.7	1
M ND NF	28.4			28.4	£				35.6	34.5		70.1	2.0 16.0 184.6	30.0		2.0 16.0 214.6			28.4 2.0 16.0 220.2	64.5		28.4 2.0 16.0 284.7	1
IYP									14.1 49.7	39.4 73.9 S R63W		53.5 123.6	202.6	30.0		232.6			14.1 252.3	39.4 103.9		53.5 356.2]
M ND NF HYP	1.0 0.7 1.7	2.6 16.3	12.6 34.3 7.0 53.9	46.6 10.3 71.9	5		12	1.2											1.0 0.7 1.7	2.4 11.3 2.6 16.3	12.6 34.3 7.0 53.9	15.0 46.6 10.3 71.9	
A ND NF HYP	0.4 2.7 3.1 1.4	3.0 9.5 0.7 13.2 2.2	19.2 40.4 59.6	52.6 0.7 75.9	5		1.2 9.3 10.5 1.3	9.3 10.5											0.4 2.7 3.1	3.0 9.5 0.7 13.2 2.2	20.4 49.7 70.1 20.3	23.8 61.9 0.7 86.4 23.9	
ND NF IYP	8.9 3.3 13.6	14.4 10.0 26.6 7.6	96.2 28.8 144.0 50.8	119.5 42.1 184.2	2	0.1 0.4 0.5	27.1 21.8	27.2 22.2 50.7											8.9 3.3 13.6	2.2 14.5 10.4 27.1 7.6	123.3 50.6 194.2 53.3	23.9 146.7 64.3 234.9 62.7	-
ND NF IYP	12.6 4.0 18.4	35.2 13.3 56.1	170.9 35.8 257.5	218.7 53.1		0.1 0.4 0.5	36.4 21.8	36.5 22.2		_									12.6 4.0 18.4	35.3 13.7 56.6	207.3 57.6 318.2	255.2 75.3	
A ND NF IYP													6.6 59.7 206.6 272.9	1.2 11.3 7.5 20.0	1.1 12.1 8.1 21.3	8.9 83.1 222.2 314.2			6.6 59.7 206.6 272.9	1.2 11.3 7.5 20.0	1.1 12.1 8.1 21.3	8.9 83.1 222.2 314.2]
A ND NF	0.4	5.2 17.4 0.4	31.2 146.7 130.0	164.1		2.2	0.9		T4	S R64W									0.4	5.2 17.4	31.2 147.6	37.8 165.0	1
IYP 1 ND NF	0.4 0.4 0.5	23.0 8.8 22.5	307.9 50.3 142.1 41.5	331.3 59.5 165.1		2.2		21.1 12.1 56.8				_							0.4 0.4 0.5	2.6 25.2 8.8 22.5	148.0 326.8 62.4 198.9 116.5	150.6 352.4 71.6 221.9 116.5	-
IYP 1 ND NF	0.9 0.3 1.6 0.4	31.3 11.2 40.7 5.6	233.9 79.7 215.9 10.6	91.2 258.2	0.8	12.9	55.6	17.4 70.8	0.8	1.5	0.6	2.9				_			0.9 1.1 3.9 16.7	31.3 12.6 53.6 46.5	377.8 94.9 271.5 18.2	410.0 108.6 329.0 81.4	-
IYP 1 ND NF IYP	2.3 3.2 6.6 0.9	57.5 5.3 17.8 6.5	306.2 0.3 3.2 1.2	8.8 27.6	0.7	4.8	6.4 28.6	11.9 64.9	0.8	1.5 3.9	0.6	2.9 3.9							21.7 3.9 7.3 0.9	112.7 10.1 53.4 78.6	384.6 6.7 31.8 41.8	519.0 20.7 92.5 121.3	-
1 ND NF IYP	10.7 4.3 8.7 1.3	29.6 30.5 98.4 12.5	4.7 161.5 507.9 183.3	197.3 614.8 197.1	1.5 3.0 15.5	6.2 48.5 109.8	33.7 141.9 140.6	41.4 193.4 265.9	0.8	3.9 5.4	0.6	3.9 6.8							12.1 5.8 11.7 17.6	142.1 36.7 146.9 127.7	80.3 195.2 649.8 324.5	234.5 237.7 808.4 469.8	-
1 ND NF YP	14.3	141.4	852.7	1008.4	20.0	164.5	316.2	500.7	0.8	5.4	0.6	6.8	1.6 96.7	1.8 14.0 190.6	2.0 14.3 140.0	3.8 29.9 427.3			1.6 96.7	1.8 14.0 190.6	2.0 14.3 140.0	3.8 29.9 427.3]
	0.8	1.2	1.0	3.0					T45	6 R65W			79.9 178.2	148.3 354.7	104.0 260.3	332.2 793.2			79.9	148.3 354.7	104.0 260.3	332.2 793.2]
D F YP	4.3 3.5 8.6 0.1	10.2 31.1 42.5 5.6	1.3 2.3 14.0	15.8 34.6 53.4 19.7		6.6 6.6		6.6 6.6											0.8 4.3 3.5 8.6 0.1	1.2 10.2 37.7 49.1 5.6	1.0 1.3 2.3 14.0	3.0 15.8 41.2 60.0 19.7	
D F YP	0.3	50.0 79.8 135.4 5.1	68.2 36.6 118.8 1.6	118.5 116.4 254.6 6.7			0.6	0.6											0.1	50.0 79.8 135.4 5.1	68.2 36.6 118.8 2.2	118.5 116.4 254.6 7.3	
D F YP D		23.6 7.0 35.7 2.7 10.7	10.0 7.4 19.0	33.6 14.4 54.7 2.7 10.7	0.1	3.4 107.8 111.2 3.2 22.5	3.6 22.9 27.1	7.0 130.7 138.3 3.3 23.1											0.1	27.0 114.8 146.9 5.9	13.6 30.3 46.1	40.6 145.1 193.0 6.0	
F YP D	0.9 4.6	1.7 15.1 14.6 94.5	16.6 79.5	1.7 15.1 32.1 178.6	0.6 0.7 0.1 0.6	233.0 258.7 3.2 25.9	0.6 3.6	23.1 233.0 259.4 3.9 30.1		2.2 2.2		2.2 2.2					8		0.6 0.7 1.0 5.2	33.2 236.9 276.0 17.8 120.4	17.2	33.8 236.9 276.7 36.0 208.7	
F YP	3.5 9.0	228.7	44.0	178.0 167.1 377.8	0.0	347.4 376.5	22.9 27.1	30.1 370.3 404.3		2.2		2.2 2.2							5.2 3.5 9.7	120.4 469.2 607.4	83.1 66.9 167.2	208.7 539.6 784.3	1
D F YP				-					T40	R66W				2.8 75.5 119.7 198.0		6.6 176.1 279.3 462.0			3.8 100.6 159.6 264.0	2.8 75.5 119.7 198.0		6.6 176.1 279.3 462.0	
D F (P		3.2 23.7 121.1 1.6		3.2 23.7 121.1 1.6		0.4 2.1 0.7		0.4 2.1 0.7	145									,		3.6 25.8 121.8 1.6		3.6 25.8 121.8 1.6	
D F 7P	0.6 3.2 5.3	5.2 41.1 2.4	0.8 5.4 8.6	149.6 1.4 13.8 55.0 2.4		3.2		3.2			,								0.6 3.2 5.3	5.2 41.1 2.4	0.8 5.4 8.6	152.8 1.4 13.8 55.0 2.4	
D F 'P	9.1	48.7	14.8	72.6		1.2 6.4 10.7	0.6 23.4 103.4 7.2	1.8 29.8 114.1 7.2											9.1	48.7 1.2 6.4 10.7	14.8 0.6 23.4 103.4 7.2	72.6 1.8 29.8 114.1 7.2	
D F 'P					0.1 3.8 7.0 10.9	7.4 299.6 7.2 314.2	134.6	152.9 0.1 11.2 306.6 7.2 325.1												7.4 299.6 7.2 314.2	134.6	0.1 11.2 306.6 7.2	
D F 'P					2.8 38.3 31.2 1.7 74.0	314.2 3.8 37.8 22.6 64.2		325.1 6.6 76.1 53.8 1.7 138.2									X		10.9 2.8 38.3 31.2 1.7 74.0	314.2 3.8 37.8 22.6 64.2		325.1 6.6 76.1 53.8 1.7 138.2	
D F P	0.6 3.2 5.3 9.1	3.2 28.9 162.2 4.0 198.3	0.8 5.4 8.6 14.8	4.6 37.5 176.1 4.0 222.2	2.9 42.1 38.2 1.7 84.9	5.4 53.7 333.6 7.2 399.9	0.6 23.4 103.4 7.2 134.6	8.9 119.2 475.2 16.1 619.4											3.5 45.3 43.5 1.7	8.6 82.6 495.8 11.2	1.4 28.8 112.0 7.2 149.4	138.2 13.5 156.7 651.3 20.1 841.6	
D F 'P													2.3 53.4 29.8	16.5 15.7		2.3 69.9 45.5			2.3 53.4 29.8	16.5 15.7		2.3 69.9 45.5	
										_		,	85.5	32.2		117.7			85.5	32.2		45.5 117.7	

Explanation of Resource Categories: M Measured coal - within ¼ mile of a data point. IND Indicated coal - ¼ to ¼ mile from nearest data point INF Inferred coal - ¼ to 3 miles from nearest data point. HYP Hypothetical coal - over 3 miles from nearest data point. T Total of all resource categories.

MORE THAN
1000'-2000'TOTAL OF ALL
2000'OVERBURDENOVERBURDENOVERBURDENCATEGORIES

2.0 1.3 17.2 7.9 24.5 174.2 62.4 7.5 156.5 56.4 32.0 349.9 128.0

236.6 212.9 477.9

2.0 1.3 17.2 7.9 149.7 62.4 149.0 56.4 317.9 128.0

25.1 212.1 24.5 205.4 7.5 445.9 32.0

T4S R67W DENVER FORMATI LOWRY BED UNCORRELATED BEDS 2.0 2.5 6.3 14.1 3.0 14.8 DENVER FM TOTAL 2.0 2.5 6.5 14.1 3.6 14.8 4.5 20.6 18.4 2.1 31.4 LARAMIE FORMATION UNCORRELATED BEDS 6.0 6.0 6.0 T5S R59W LARAMIE FORMATION "B" BED 1.4 1.4 6.2 6.9 38.1 14.3 M 1.4 1.4 IND 6.2 6.9 INF 37.8 14.3 13.1 52.1 0.3 13.1 52.4 45.4 22.6 0.3 45.7 22.6 68.1 68.3 UPPER "A" BED LARAMIE FM TOTAL 2.0 1.4 8.6 6.9 46.6 14.3 M 2.0 1.4 IND 8.6 6.9 INF 44.8 14.3 15.6 59.1 1.8 HYP T 55.4 22.6 57.2 22.6 79.8 78.1 **T5S R60W** LARAMIE FORMATION "B" BED IND 3.7 INF 15.1 10.8 3.7 1.4 25.9 18.0 5.1 33.1 10.8 43.9 38.5 10.8 19.1 10.8 49.3 UPPER "A" BED M 0.3 IND 1.9 INF 4.3
 1.5
 0.3
 1.8

 11.5
 1.2
 12.7

 58.2
 5.7
 63.9
 0.3 1.2 0.3 1.9 9.6 1.2 4.3 53.9 5.7 71.2 7.2 77.4 64.7 7.2 UNCORRELATED 4.1 22.2 BEDS 4.1 6.9 4.1 22.2 15.3 15.3 15.3 26.3 11.0 26.3
 1.8
 0.3
 2.1

 16.6
 5.3
 21.9

 91.3
 38.7
 130.0
 LARAMIE FM IND 5.6 INF 19.4 10.8 TOTAL 5.6 11.0 1.2 30.2 71.9 21.0 4.1 6.9 92.9 109.7 44.3 25.6 10.8 36.4 84.1 22.5 11.0 154.0 T5S R61W LARAMIE FORMATION "B" BED 3.1 3.1 3.1 3.1 UPPER "A" BED 1.0 1.0 1.0 UNCORRELATED BEDS 11.9 8.8 11.8 8.8 11.8 8.8 25.9 8.8 25.9 LARAMIE FM TOTAL 11.9 12.9 11.8 4.1 8.8 11.8 4.1 8.8 25.9 12.9 25.9 38.8 **T5S R62W** LARAMIE FORMATION UNCORRELATED BEDS 18.4 2.8 130.8 18.4 133.6 18.4 133.6 2.8 130.8 2.8 151.3 28 154.1 154.1 T5 R63W DENVER FORMATION LOWRY BED 29.0 29.0 18.7 18.7 231.7 231.7 8.2 8.2 11.1 11.1 160.6 160.6 8.2 8.2 71.1 71.1 81.3 287.6 287.6 BENNETT BED
 2.6
 6.9
 11.6
 21.1

 17.7
 31.2
 50.1
 99.0

 18.4
 17.2
 7.3
 42.9

 2.7
 8.6
 14.8
 26.1

 18.2
 44.7
 59.8
 122.7

 19.2
 56.5
 7.3
 83.0
 0.5 13.5 9.7 2 38.7 55.3 69.0 153.0 1.4 54.5 12.9 68.8 40.1 109.8 81.9 231.8 UPPER WATKINS BED
 1.0
 24.9
 25.9

 5.3
 135.8
 141.1

 46.2
 219.4
 265.6

 15.6
 31.2
 46.8

 68.1
 411.3
 479.4
 42.1 47.4 53.2 98.3 93.7 93.7 0.8 165.5 166.3 0.1 24.6 24.7 0.9 300.5 301.4 0.3 0.7 1.0 0.3 0.7 LOWER WATKINS BED 3.2 3.1 0.9 0.9 5.5 5.5 DENVER FM TOTAL 0.3 0.7 0.3 0.7 LARAMIE FORMATION UNCORRELATED BEDS 59.4 322.4 4.8 397.4 59.4 322.4 4.8 397.4 59.4 322.4 4.8 397.4 322.4 4.8 397.4 **T5S R64W** DENVER FORMATION LOWRY BED
 1.9
 16.5
 18.4

 0.2
 11.3
 106.4
 117.9

 6.6
 35.6
 355.4
 397.6

 9.9
 9.9
 1.9
 0.0
 8.5

 42.0
 42.0
 0.2
 11.3
 64.4
 75.9

 41.6
 41.6
 6.6
 35.6
 306.8
 349.0
 7.0 6.8 48.8 377.8 433 6.8 48.8 478.3 533.9 BENNETT BED
 3.8
 2.6
 6.4
 0.4
 0.5

 2.1
 43.3
 11.7
 57.1
 1.7
 3.6

 6.9
 154.5
 31.7
 192.5
 17.3
 0.1
 0.4 6.1 2.6 9.1 3.8 51.1 13.9 68.8 24.2 155.1 36.0 215.3 4.2 2.2 6.4 0.5 4.9 5.4 9.0 201.6 45.4 256.0 19.4 4.2 6.5 7.1 13.6 28.4 212.3 52.5 293.2 UPPER WATKINS
 7.6
 7.6

 3.2
 46.9
 50.1

 5.8
 43.7
 128.6
 178.1

 25.9
 53.9
 107.4
 187.2
 0.8 4.7 58.7 64.2 31.7 97.6 236.0 365.3 BED 5.8 46.9 183.1 235.8 26.7 55.4 119.2 201. 32.5 102.3 302.3 437.1 LOWER WATKINS BED 1.8 0.9 2.7 0.9 12.9 9.2 23.0 94.5 35.2 129.7 1.8 0.9 2.7 0.9 9.2 4.6 14.7 49.8 10.1 59.9 3.7 4.6 8.3 44.7 25.1 69.8 2.7 59.0 15.6 77.3 2.7 107.4 45.3 155.4 48.4 29.7 7
 2.7
 59.0
 15.6
 /7.3
 48.4
 29.7
 78.1

 1.8
 9.9
 11.7
 1.8
 5.7
 17.7
 25.2
 0.4
 0.5
 0.9

 4.2
 44.2
 48.4
 3.2
 67.0
 127.6
 197.8
 2.5
 8.8
 16.4
 27.7

 0.5
 46.5
 47.0
 19.3
 283.6
 476.6
 779.5
 43.2
 98.7
 139.5
 281.4
 DENVER FM
 5.7
 80.0
 188.2
 273.9

 62.5
 382.8
 662.6
 1107.9
 TOTAL 6.5 100.6 107.1 24.3 356.3 621.9 1002.5 46.1 108.0 155.9 310 70.4 470.8 878.4 1419.6 LARAMIE FORMATION UNCORRELATED BEDS _____
 8.1
 8.1

 209.1
 12.0
 12.9
 234.0

 189.6
 42.7
 28.1
 260.4

 406.8
 54.7
 41.0
 502.5

 8.1
 8.1

 209.1
 12.0
 12.9
 234.0

 189.6
 42.7
 28.1
 260.4

 406.8
 54.7
 41.0
 502.5
 T5S R65W **DENVER FORMATIO** LOWRY BED
 2.5
 5.2
 2.4
 10.1

 14.7
 23.7
 7.1
 45.5

 17.0
 34.1
 0.7
 51.8

 10.9
 10.9
 10.9

 34.2
 73.9
 10.2
 118.3
 14.7 13.4 21.1 0.7 35.2 11.2 16.2 27.4 23.0 44.9 10.2 78. BENNETT BED
 0.6
 9.8
 2.4
 12.8

 8.4
 55.7
 20.4
 84.5

 14.2
 126.6
 39.7
 180.5

 8.3
 8.3
 8.3

 23.2
 200.4
 62.5
 286.1

 0.0
 9.7
 2.4
 12.7
 0.1

 8.2
 51.1
 19.1
 78.4
 0.2
 4.6

 9.5
 78.9
 37.4
 125.8
 4.7
 47.7
 18.3 139.7 58.9 216.9 UPPER WATKINS BED
 0.7
 3.9
 10.2
 14.8

 3.9
 24.8
 94.0
 122.7

 12.1
 36.0
 299.7
 347.8
 0.7 2.9 7.7 28.9
 0.7
 3.2
 7.3
 11.2
 0.7
 2.9
 3.6

 3.9
 17.1
 65.1
 86.1
 7.7
 28.9
 36.6

 11.4
 20.4
 94.7
 126.5
 0.7
 15.6
 205.0
 221.3
 16.0 40.7 167.1 223.8 0.7 24.0 236.8 2 16.7 64.7 403.9 485.3 LOWER WATKINS BED 2.2 4.1 6.4 43.7 36.6 139.0 1.3 2.0 4.7 24.6 0.6 58.4
 3.3
 0.9
 2.1

 29.3
 1.7
 19.1

 59.0
 36.0
 80.6
 38.7 101.8 0.1 45.3 186.8 6.6 85.0 DENVER FM TOTAL
 6.0
 23.0
 15.0
 44.0

 33.4
 147.9
 121.5
 302.8

 79.9
 335.7
 340.1
 755.7

 0.1
 19.2
 19.3

 119.4
 525.8
 476.6
 1121.8

0-250' 250'-500' OVERBURDEN* OVERBURDEN*

500'-1000' OVERBURDEN

LARAMIE FORMATIO

UNCORRELATED BEDS

COAL RESOURCES OF THE DENVER EAST 1/2° x 1° QUADRANGLE, COLORADO by Karl E. Brand and Wynn Eakins 1980

TABLE III Coal Resource Estimates

TOTAL OF ALL OVERBURDEN CATEGORIES MORE THAN 1000'-2000' OVERBURDEN OVERBURDEN MORE THAN 2000' TOTAL OF ALL 0-250' 250'-500' 500'-1000' 1000'-2000' 0-250' OVERBURDEN* 250'-500' OVERBURDEN* 500'-1000' OVERBURDEN **OVERBURDEN** OVERBURDEN* **OVERBURDEN*** OVERBURDEN OVERBURDEN OVERBURDEN / CATEGORIES T5S R66W DENVER FORMATION LOWER WATKIN BED DENVER FORMATION BENNETT BED 0.8 36.2 7.2 UNCORRELAT BEDS UPPER WATKINS BED 108.5 108.5 21.6 21.6 108.5 108.5 132.6 132.6 LOWER WATKINS BED DENVER FM TOTAL 1.4 60.3 12.0 73.7 2.0 2.0 21.8 16.0 55.7 126.9 3.2 4.5 82.7 140.4 UNCORRELATED BEDS LARAMIE FORMATIC UNCORRELATE BEDS 126.9
 2.0
 2.0
 2.5
 6.5

 21.8
 18.2
 108.5
 148.5

 55.7
 223.4
 21.6
 300.7

 3.2
 23.7
 26.7
 DENVER FM TOTAL
 2.0
 2.0
 2.5
 6.5

 21.8
 18.2
 108.5
 148.5

 55.7
 223.4
 21.6
 300.7

 3.2
 23.7
 26.9

 82.7
 267.3
 132.6
 482.6
 DENVER FORMATION UNCORRELATE BEDS LARAMIE FORMATION UNCORRELATED BEDS 4.5 1.8 22.2 10.3 201.1 119.9 41.7 19.8 269.5 151.8 4.3 1.8 22.2 10.3 201.1 119.9 41.7 19.8 269.5 151.8 321.0 61.5 LARAMIE FORMATIO UNCORRELATE BEDS **T5S R67W** DENVER FORMATION UNCORRELATED BEDS 1.9 1.9 56.1 17.6 73.7 1.9 56.1 17.6 INI INF HY 58.0 17.6 58.0 17.6 75.6 DENVER FORMATIO LARAMIE FORMATION UNCORRELAT BEDS UNCORRELATED BEDS
 0.7
 1.3
 2.0
 0.7
 1.3

 8.5
 1.7
 3.5
 5.2
 6.0
 7.7

 179.5
 4.9
 9.8
 14.7
 82.5
 111.7

 94.4
 36.5
 57.9
 3282.4
 7.3
 14.6
 21.9
 125.7
 178.6
 4.3 4.2 77.6 101.9 36.5 57.9 118.4 164.0 IND INF HYP 13.7 194.2 94.4 304.3 LARAMIE FORMATIO UNCORRELATE BEDS **T5S R68W** LARAMIE FORMATION UNCORRELATED M BEDS INL IND INF HYP 8.0 16.1 24.1 8.0 16.1 24.1 8.0 16.1 24.1 8.0 16.1 24.1 DENVER FORMATION UNCORRELATE BEDS **ARAPAHOE COUNTY** TOTALS LARAMIE FORMATION UNCORRELATEI BEDS
 27.0
 115.8
 382.3
 525.1

 163.0
 695.4
 1604.7
 2463.1

 373.3
 2183.4
 2044.6
 4601.3

 5.0
 69.7
 46.6
 121.3

 568.3
 3064.3
 4078.2
 7710.8

 11.6
 66.2
 285.8
 363.6
 14.1
 46.2
 93.6
 153.9
 1.3
 3.4
 2.9
 7.6

 53.9
 302.2
 912.5
 1268.6
 104.7
 353.0
 646.9
 1104.6
 4.4
 40.2
 45.3
 89.9

 64.4
 381.5
 541.6
 987.5
 223.5
 1549.5
 1157.2
 2930.2
 85.4
 252.4
 345.8
 683.6

 19.5
 14.8
 34.3
 4.9
 31.0
 31.8
 67.7
 0.1
 19.2
 19.3

 129.9
 769.4
 1754.7
 2654.0
 347.2
 1979.7
 1929.5
 4256.4
 91.2
 315.2
 394.0
 800.4
 DENVER FORMATION _____
 2.0
 39.3
 21.3
 3.1
 63.7

 5.2
 287.1
 140.5
 26.4
 454.0

 39.2
 2124.1
 925.6
 161.0
 3210.7

 7.5
 731.5
 609.0
 132.1
 1472.6

 53.9
 3182.0
 1696.4
 322.6
 5201.0
 LARAMIE FORMATION
 4.0
 28.0
 6.1
 3.1
 37.2
 0.7
 1.3

 28.1
 213.0
 50.5
 26.4
 289.9
 1.7
 3.5

 116.5
 1738.6
 616.3
 161.0
 2515.9
 29.4
 9.8

 71.2
 698.9
 476.6
 132.1
 1307.6
 7.5

 219.8
 2678.5
 1149.5
 322.6
 4150.6
 39.3
 14.6

 6.9
 1.8
 2.2

 51.8
 12.1
 16.0

 321.6
 96.4
 20.1

 86.3
 71.2

 466.6
 110.3
 109.5

 13.6
 3.0
 3.9

 79.0
 25.7
 26.1

 217.5
 142.3
 179.3

 25.1
 61.2

 310.1
 196.1
 270.5
 0 34.6 44.4 117.4 100.1 157.8 152.3
 M
 17.4
 74.0
 285.8
 377.2
 17.1
 50.1
 21.0.5
 110.3
 107.5
 20.0.5
 110.5
 50.1
 61.0
 107.6
 107.5
 50.1
 107.5
 50.0
 110.5
 107.5
 50.1
 107.5
 50.0
 110.5
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 107.5
 50.0
 110.5
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 107.5
 107.7
 107.5
 107.7
 107.5
 107.7
 107.5

 ARAPAHOE COUNTY TOTAL DENVER FORMAT LARAMIE FORMA **DENVER COUNTY** DOUGLAS COUN TOTAL T3S R66W DENVER FORMATION LOWRY BED 17.3 20.4 7.1 8.9 17.3 20.4 7.1 8.9 _____ 26.6 31.9 5 2 26.6 UPPER WATKINS BED 2.9 2.9 12.5 12.5 5.1 5.1 LARAMIE FORMATI 20.5 20.5 20.5 "B" BED DENVER FM TOTAL 5.1 5.5 29.8 32.9 12.2 14.0 5.1 5.5 29.8 32.9 12.2 14.0 5.3 47.1 52.4 47.1 52.4 UPPER "A" BE LARAMIE FORMATION UNCORRELATED M BEDS IN 0.6 0.5 56.2 43.3 0.5 1.0 57.3 44.8 0.6 0.5 56.2 43.3 99.5 99.5 LARAMIE FM TOTAL T3S R67W LARAMIE FORMATION _____ UNCORRELATED M BEDS IN IND INF HYP 43.3 161.4 43.3 161.4 204.7 LARAMIE FORMATI 43.3 43.3 161.4 "B" BED T3S R68W LARAMIE FORMATION UPPER "A" BE UNCORRELATED M BEDS IN IND INF HYP 0.4 40.4 1.2 4.5 1.6 49.7 40.4 4.5 49.7 0.4 40.8 40.8 LARAMIE FM TOTAL **T4S R67W** DENVER FORMATION UNCORRELATED BEDS _____ 4.2 6.5 10.7 4.2 6.5 4.2 6.5 LARAMIE FORMATI 4.2 6.5 UNCORRELATI BEDS LARAMIE FORMATION UNCORRELATED M BEDS IN 2.1 2.1 13.9 13.9 16.0 16.0 2.1 LARAMIE FORMATI T4S R68W UNCORRELAT BEDS DENVER FORMATION UNCORRELATED BEDS 2.1 2.1 LARAMIE FORMATION DENVER FORMATIO UNCORRELATED M LOWRY BED 0.1 6.0 8.4 0.7 14.5 0.7 BEDS IND INF HYP 6.0 8.4 0.7 BENNETT BEI DENVER COUNTY TOTALS 0.4 5.1 5.5 3.1 29.8 32.9 8.1 6.5 12.2 26.8 UPPER WATK BED
 M
 0.4
 5.1
 5.5

 IND
 3.1
 29.8
 32.9

 INF
 1.8
 12.2
 14.0
 6.3
 6.5

 HYP
 T
 5.3
 47.1
 52.4
 6.3
 6.5
 DENVER FORMATION 11.6 6.5 47.1 65.2 0.6 4.9 0.5 2.1 148.4 43.3 13.9 189.9 1.7 16.0 343.8 45.5 LARAMIE FORMATION 0.6 4.9 0.5 0.4 145.9 43.3 1.2 174.8 1.7 1.6 326.2 45.5 LOWER WATE BED 189.2 2.1 176.5 13.9 191.6 DENVER COUNTY TOTAL $\begin{array}{c|ccccc} 0.6 \\ 4.9 \\ 0.4 \\ 1.2 \\ 1.6 \\ 326.2 \end{array} \begin{array}{c} 0.5 \\ 43.3 \\ 1 \\ 1 \\ 1 \end{array}$
 1.0
 5.1
 6.1

 8.0
 0.5
 29.8
 38.3

 2.1
 156.5
 49.8
 12.2
 218.5

 13.9
 189.9
 1.7
 191.6

 16.0
 355.4
 52.0
 47.1
 454.5
 DENVER FM TOTAL 29.8 32.9 12.2 14.0 6.3 6.5 IND 3.1 INF 1.8 HYP 189.2 2.1 176.5 13.9 371.7 16.0 47.1 52.4 6.3 6.5 53 LARAMIE FORMAT **DOUGLAS COUNTY** UNCORRELA BEDS **T6S R65W** DENVER FORMATION LOWRY BED IND INF ____ 18.1 30.4 48.5 18.1 30.4 48.5 HYP DENVER FORMATIO BENNETT BED LOWRY BED IND INF HYP 15.4 61.9 15.4 61.9 BENNETT BEI UPPER WATKINS BED IND INF HYP 9.7 9.7 9.7 9.1 9.7 9.7 9.7

								1		LAS C s r65w	OUNT	Y				-			1			
M IND INF HYP T									4.1 4.1			4.1 4.1	4.3 4.3			.3			8.4 8.4			8.4 8.4
M IND INF HYP T									0.1 2.4 22.0 24.5	0.1 5.5 51.4 57.0		0.2 7.9 73.4 81.5							0.1 2.4 22.0 24.5	0.1 5.5 51.4 57.0		0.2 7.9 73.4 81.5
M IND INF HYP T									0.1 2.4 26.1 28.6	0.1 5.5 84.9 92.3 182.8		0.2 7.9 120.7 92.3 221.1	4.3 4.3			.3			0.1 2.4 30.4 32.9	0.1 5.5 84.9 92.3 182.8	9.7 9.7	0.2 7.9 125.0 92.3 225.4
M IND INF HYP T													25.1 25.1		25	10. .1 106. .1 116.	0	10.7 106.0 116.7	10.7 131.1 141.8			10.7 131.1 141.8
M	1				0.9			0.9	T65	2.6		6.5	23.1	1.2	1.		1	110.7	4.8	3.8		8.6
IND INF HYP T					4.1 1.5 6.5			4.1 1.5 6.5	24.6 52.3 80.8	12.5 20.0 35.1		37.1 72.3 115.9		7.6 10.6 19.4	7. 10. 19.	6 6			28.7 53.8 87.3	20.1 30.6 54.5		48.8 84.4 141.8
M IND INF HYP T													10.0 197.7 231.6 439.3	7.4 1.2 8.6	10. 205. 232. 447.	1 8			10.0 197.7 231.6 439.3	7.4 1.2 8.6		10.0 205.1 232.8 447.9
M						20			T65	5 R67W						1						
IND INF HYP T						2.8 26.1 28.9		2.8 26.1 28.9	14.7 14.7			14.7 14.7							2.8 40.8 43.6			2.8 40.8 43.6
M IND INF HYP T													1.1 3.6 13.8 3.6 22.1	0.7 7.1 7.2 15.0	20. 10.	3 19.1 9 160.1 8 108.9		2.2 23.2 201.0 145.5 371.9	3.3 22.8 174.1 112.5 312.7	4.7 47.8 43.8 96.3		3.3 27.5 221.9 156.3 409.0
M IND		1.5 9.2		1.5 9.2		1.8		1.8	T65	68W						1				1.5		1.5
INF HYP T		9.2 51.5 62.2		9.2 51.5 62.1		1.8 1.3 3.1		1.8 1.3 3.1												11.0 52.8 65.3		11.0 52.8 65.3
M IND INF HYP T													23.7 23.7	47.4 47.4	71. 71.	1 39.1 1 39.2	42.5	81.7 81.7	62.9 62.9	89.9 89.9		152.8 152.8
								D		AS CO OTALS												
M IND INF HYP		1.5 9.2 51.5		1.5 9.2 51.5	0.9 4.1 1.5	4.6 27.4		0.9 8.7 28.9	4.0 27.0 93.1	2.7 18.0 104.9 92.3	9.7	6.7 45.0 207.7 92.3	4.3	1.2 7.6 10.6	1	1.2 7.6 4.9			4.9 31.1 98.9	39.4 194.4 92.3	9.7	92.3
T IND INF HYP		62.2		62.2	6.5	32.0		38.5	124.1	217.9	9.7	351.7	4.3 1.1 13.6 211.5 284.0	0.7 14.5 55.8	1 22 33	6.0 17 9.8 25	9.2 4.0 1.0 40.7 4.1 79.1	2.2 23.2 211.7 333.2	2 32.8 382.5 538.1	4.7 55.2 134.9	9.7	476.1 3.3 37.5 437.7 673.0
T IND INF HYP		1.5 9.2 51.5		1.5 9.2 51.5	0.9 4.1 1.5	4.6 27.4		0.9 8.7 28.9	4.0 27.0 93.1	2.7 18.0 104.9 92.3	9.7	6.7 45.0 207.7 92.3	510.2 1.1 13.6 215.8 284.0	71.0 1.2 8.3 25.1 55.8	2 24 33	1.3 1.9 1 0.9 17 9.8 25	5.5 123.8 2.2 4.0 1.0 40.7 4.1 79.1	570.3 2.2 23.2 211.7 333.2	8.2 63.9 481.4 538.1	249.6 227.2	9.7	1151.5 13.6 108.0 740.7 765.3
Т	1	62.2		62.2	6.5	32.0		38.5	124.1	217.9	9.7 J NTY	351.7	514.5	90.4	60	4.9 44	5.5 123.8	570.3	1091.6	526.3	9.7	1627.6
M	1									6S R59W			<u> </u>			Т			1	_		
IND INF HYP T M	15.6 15.0 30.6	5.2 5.2		15.6 20.2 35.8	4.9 4.9	4.3 10.9 15.2		9.2 10.9 20.1											20.5 15.0 35.5	16.1		24.8 31.1 55.9
IND INF HYP T M	5.6 11.1 16.7			5.6 11.1 16.7	13.5 10.8 24.3	1.1 2.2 3.3		14.6 13.0 27.6								_			19.1 21.9 41.0	2.2		20.2 24.1 44.3
IND INF HYP T	21.2 26.1 47.3	5.2 5.2		21.2 31.3 52.5	18.4 10.8 29.2	5.4 13.1 18.5		23.8 23.9 47.7			r								39.6 36.9 76.5	18.3		45.0 55.2 100.2
M IND INF					0.6 10.4	1.9		0.6 12.3	1							Τ	5		0.6 10.4 4.5	1.9		0.6 12.3 8.7
HYP T M IND INF	-				4.5 15.5 1.1 1.6	4.2 6.1 0.2 2.2 48.5		8.7 21.6 0.2 3.3 50.1								+			1.1 1.6	6.1 0.2 2.2		21.6 0.2 3.3 50.1
HYP T M IND INF	-				2.7 1.7 12.0	50.9 0.2 2.2 50.4		53.6 0.2 3.9 62.4								+			2.7 1.7 12.0 4.5	0.2 2.2 50.4		53.6 0.2 3.9 62.4 8.7
HYP T					4.5 18.2	4.2 57.0		8.7 75.2	т	6S R61W									18.2			75.2
M IND INF HYP T									22.4 22.4			22.4 22.4	3.5 4.5 8.0			3.5 4.5 8.0			3.5 26.9 30.4			3.5 26.9 30.4
M IND INF									3.7	6S R62W		3.7	6.8 47.1 289.2	23.0	4	6.8 47.1 12.2			6.8 47.1 292.9			6.8 47.1 315.9
HYP T									3.7	65 R63W		3.7	26.8 369.9	23.0	1	26.8			26.8 373.6			26.8 396.6
M IND INF HYP T			28.7 8.8 37.5	28.7 8.8 37.5		2.7 1.1 3.8	3.1 24.4 307.0 12.0 346.5	3.1 24.4 309.7 13.1 350.3												2.7 1.1 3.8	3.1 24.4 335.7 20.8 384.0	3.1 24.4 338.4 21.9 387.8
M IND INF HYP T		7.6 1.6 9.2	- 1 - 4	7.6 1.6 9.2		0.4 14.1 191.0 1.5 207.0	1.3 1.1 2.4	1.7 15.2 191.0 1.5 209.4												0.4 14.1 198.6 3.1 216.2	1.3 1.1 7.6 1.6 11.6	1.7 15.2 206.2 4.7 227.8
M IND INF HYP T		1.4		1.4	7.7 6.7 28.5 42.9	0.2 91.7 5.2 97.1	13.8 13.8 27.6	7.7 6.9 134.0 19.0 167.6	4.1 0.4 4.5	2.1		6.2 0.4 6.6							7.7 6.7 32.6 0.4 47.4	0.2 93.8 5.2	13.8 13.8 27.6	7.7 6.9 140.2 19.4
T IND INF HYP T					74.3	77,1	27.6 2.6 13.1 109.9 125.6	2.6 13.1 109.9 125.6	4.3	4.1	0.4 7.6 115.9 2.1 126.0	0.4 7.6 115.9 2.1 126.0							47.4	19.2	3.0 20.7 225.8 2.1 251.6	3.0 20.7 225.8 2.1
M IND INF HYP		7.6 1.6 9.2	28.7 8.8 37.5	36.3 10.4 46.7	7.7 6.7 28.5 42.9	0.4 14.3 285.4 7.8 307.9	7.0 38.6 430.7 25.8 502.1	125.6 15.1 59.6 744.6 33.6 852.9	4.1 0.4 4.5		0.4 7.6 115.9 2.1 126.0	0.4 7.6 122.1 2.5 132.6							7.7 6.7 32.6 0.4 47.4	14.3 295.1 9.4	4.4 25.5 357.1 36.2	12.5 46.5 684.8 46.0
T		9.2	51.3	-40,7	72.9	2013	JU4-1	556.9	с.н.	£.1	. 20.0	.24.0	7.2 42.3 137.8 16.1	7.7 29.9 44.3	1	14.9 72.2 82.1 16.1			7.2 42.3 137.8 16.1	7.7 29.9 44.3	-43-6	14.9 72.2 182.1 16.1
M IND INF									1	65 R64W	(16.1 203.4	81.9		85.3			203.4			285.3
IND INF HYP T									-				-						-			
IND INF HYP						3.0 9.3 22.6 34.9	4.2 37.2 163.6 6.1 211.1	4.2 40.2 172.9 28.7 246.0		1.4 47.2 3.1 51.7	2.7 24.7 47.8 75.2	2.7 26.1 95.0 3.1 126.9								4.4 56.5 25.7 86.6	6.9 61.9 211.4 6.1 286.3	66.3 267.9 31.8

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/		/	/。		-250' URDE	N*	/。		'-500' URDI	N*	/.		'-1000' BURDI	EN	/	1000'-2 OVERBU			MORE 2000 VERBUR)'	*/	OVER	AL OF A RBURDE	EN
CORNALION COLUMITON	Careon Careon	the best	In beas	ha beds more	Tonal or all	In bed cureonies		5		51		-		e.	/	5*		Suites	in best an best of 10 more titan of all	Router	5.10 theds	In beds	à	
(~~				~	~~			(~~				14	- 8	2	~~~~~	5~5(~~	14	1.11	5	
DENVER FORMATION UPPER WATKINS BED	M IND INF HYP					0.1 2.7 14.1	7 4.4 3	•	14	.7 1.1 1.3 27.	1 9.	4 5 3.	.5 28							2.0 17.8 42.1	13.9		3.3 35.2 137.7]
LOWER WATKINS BED	T M IND INF HYP T					17.1	8 5.3	3	23	0. 7. 7.	8 1.9 0 20.7	23. 9 149. 7 378.	.7 23 .5 152 .5 406	.7 2 2						61.9 0.8 7.0 7.8	1.9 20.7	23.7 149.5 378.5	23.7 152.2 406.2	
DENVER FM TOTAL	M IND INF HYP T		_	_		0.8 3.2 14.7 18.7	2 27.3 7 83.8 22.6	42. 165.	8 73 2 263 1 28	.3 28. .7 76.	8 18.3 3 178.5 3.	3 177. 5 432. 1	7 224 1 686 3	8 9 1	1					3.6 32.0 91.0 126.6	45.6 262.3 25.7	220.5 597.3 6.1	40.3 298.1 950.6 31.8 1320.8	
UNCORRELATED BEDS	M IND INF HYP T													1 10 110 51 173	.0 .2		1.7 10.2 110.0 51.2 173.1	19.4 40.3 59.7	19.4 40.3 59.7	1.7 10.2 129.4 91.5 232.8			1.7 10.2 129.4 91.5 232.8	
DENVER FORMATION LOWRY BED	M IND INF HYP						1.8 3.6 11.0	2.	5 6		T6S R65 0.4 6.5 87.8 6.1	4 5 8 0.	0. 6. 2 88. 6.	5	-						2.2 10.1 98.8	2.5 7.4	2.2 12.6 106.2]
BENNETT BED	M IND INF HYP T						16.4 0.9 0.5 1.4		0	.9 .5 .4	2.5 53.6 3.4 59.5	8 0. 0 0. 5 6. 1	2 101. 8 3. 0 59. 3.	0 7 6 4							6.1 117.2 3.8 54.1 3.4 61.3	9.9 0.8 6.0	4.6 60.1 3.4	-
UPPER WATKINS BED LOWER WATKINS	M IND INF HYP T M										5.9	2. 13. 153.0	4 2. 4 13. 0 158. 8 174.	4 4 9 7							61.3 5.9 5.9	2.4 13.4 153.0	68.1 2.4 13.4 158.9 174.7	
DENVER FM TOTAL	M IND INF HYP T M IND						1.8			0.1 5.4 49.1 56.1 8 0.1 5.5	4 7 0 9 0.4			4 7 6 0 6 7	3		6.3 6.3			0.9 5.4 56.0 62.3 0.9	2.2		0.9 5.4 56.0 62.3 5.5	
LARAMIE FORMATION UNCORRELATED	INF HYP T M						4.5 11.5 17.8	7.	2 18	.7 49.	7 147.3	159.3	2 356. 3.	2 6	3		6.3 6.3			5.4 49.7 56.0	158.8 3.4	166.4	36.0 374.9 3.4 419.8	
BEDS	IND INF HYP T													45.				86.4 86.4	86.4 86.4	132.3 132.3			132.3 132.3	
										ELI	BERT (TOTA		тү											
DENVER FORMATION	IND INF HYP T		7.6 1.6 9.2	28.7 8.8 37.5	10.4	8.5 9.9 43.2 61.6	46.1 380.7 30.4 461.8	14.5 83.9 603.1 31.9 733.4	139. 1027. 62. 1256.	9 34.2 0 130.1 3 0.4 8 168.4	27.7 327.9 6.5	199.5 707.2 2.1	5 261.4 2 1165.3 1 9.0	4 2 6.	3		6.3 6.3			12.2 44.1 179.6 0.4 236.3	5.4 73.8 716.2 38.5 833.9	283.4 1339.0 42.8	61.3 401.3 2234.8 81.7 2779.1	
ELBERT COUNTY TOTAL	M IND INF HYP T M IND	21.2 26.1 47.3	5.2		21.2 31.3 52.5	1.7 12.0 4.5 18.2 8.5 11.6	50.4 4.2 57.0 4.8	14.5 83.9		9 4 26.1 7 2 26.1 8 3.7	0.8			103. 1541. 140. 1800. 715.	1 29.5 5 67.3 0 3 104.9 7 7.7) 3) 7	140.0	19.4 126.7 146.1	19.4 126.7 146.1	15.7 104.8 620.2 297.3 1038.0 27.9	7.9 32.1 117.7 9.4 167.1 13.3	43.7	23.6 136.9 737.9 306.7 1205.1 84.9	
	INF HYP T	21.2 26.1 47.3	6.8	28.7 8.8 37.5	41.7	55.2 4.5 79.8	431.1 34.6	603.1 31.9 733.4	1189.	4 156.2 0 0.4	327.9 6.5	707.2	2 1191.3	3 547. 0 140.	8 67.3 0	1	615.1	19.4 126.7 146.1	19.4 126.7 146.1	148.9 799.8 297.7 1274.3	105.9 833.9 47.9 1001.0	283.4 1339.0 42.8 1708.9	538.2 2972.7 388.4 3984.2]
ADAMS COUNTY DENVER FORMATION	M IND	12.9 62.9	42.9 177.6	348.2 491.0	404.0 731.5	0.2 3.4	2.7 23.0		2.9 26.4	-	MARY	TOTA	ALS							13.1	45.6 200.6	348.2 491.0	406.9 757.9	1
LARAMIE FORMATION	INF HYP T M IND INF HYP	114.5 100.6 290.9 6.5 51.9 195.0 1.5	240.9 0.4 461.8 23.2 139.8 526.8 17.4	27.2 866.4 3.1 13.3 9.9 0.8	382.6 101.0 1619.1 32.8 205.0 731.7	13.8 17.4 0.6 6.8 118.0	169.8 10.4 205.9 2.6 31.5 501.2	2.1 13.3 31.5	183.6 10.4 223.3 5.3 51.6 650.7	14.6 93.7 771.6	21.7 147.3 1099.1	2.5 14.7 26.0		26.7 208.3 1585.3	963.5	2	41.6 327.3 548.8	-	-	128.3 100.6 308.3 48.4 360.7 2669.9	410.7 10.8 667.7 62.4 437.6 3090.6	27.2 866.4 7.7 41.3	566.2 111.4 1842.4 118.5 839.6 5827.9	
ADAMS COUNTY TOTAL	T M IND INF HYP T	254.9 19.4 114.8 309.5 102.1	707.2 66.1 317.4 767.7 17.8 1169.0	27.1 351.3 504.3 37.1 0.8	19.7 989.2 436.8 936.5 1114.3 120.7 2608.3	38.5 163.9 0.8 10.2 131.8 38.5 181.3	185.7 721.0 5.3 54.5 671.0 196.1 926.9	46.9 2.1 13.3 31.5 46.9	224.2 931.8 8.2 78.0 834.3 234.6 1155.1	552.8 1432.7 14.6 93.7 771.6 552.8 1432.7	484.2 1752.3 21.7 147.3 1099.1 484.2 1752.3	43.2 2.5 14.7 26.0	38.8 255.7 1896.7 1037.0	327.6 2147.9 26.7 208.3 1585.3 327.6	1314.5 14.9 119.0 963.5 217.1	3	544.7 462.4 41.6 327.3 548.8 544.7			61.5 427.0 2798.2 1021.0	904.4 4495.0 108.0 638.2 3501.3 915.2	117.2 355.9 534.3 94.6 0.8	1825.6 8611.6 525.4 1597.5 6394.1 1937.0	
ARAPAHOE COUNTY DENVER FORMATION	M IND INF HYP T	11.6 53.9 64.4 129.9	66.2 302.2 381.5 19.5	285.8 912.5 541.6 14.8	363.6 1268.6 987.5 34.3	14.1 104.7 223.5 4.9	46.2 353.0 1549.5 31.0	93.6 646.9 1157.2 31.8	153.9 1104.6 2930.2 67.7	1.3 4.4 85.4 0.1	3.4 40.2 252.4 19.2	2.9 45.3 345.8	7.6 89.9 683.6 19.3	2147.9	1314.5	34	462.4			27.0 163.0		1604.7 2044.6	525.1 2463.1 4601.3 121.3	
LARAMIE FORMATION	M IND INF HYP T	5.8 34.6 117.4 157.8	7.8 44.4 100.1 152.3		2654.0 13.6 79.0 217.5 310.1	3.0 25.7 142.3 25.1 196.1	3.9 26.1 179.3 61.2 270.5	1929.5	4256.4 6.9 51.8 321.6 86.3 466.6	91.2 1.8 12.1 96.4 110.3	315.2 2.2 16.0 20.1 71.2 109.5	394.0	800.4 4.0 28.1 116.5 71.2 219.8	28.0 213.0 1738.6 698.9 2678.5	6.1 50.5 616.3 476.6 1149.5	26.4 2 161.0 25 132.1 13	289.9 15.9 2 107.6	0.7 1.3 1.7 3.5 9.4 9.8 7.5 9.3 14.6	39.2 7.5	39.3 287.1 2124.1 731.5	21.3 140.5 925.6 609.0	3.1 26.4 161.0 132.1	7710.8 63.7 454.0 3210.7 1472.6 5201.0	
ARAPAHOE COUNTY TOTAL DENVER COUNTY	M IND INF HYP T	17.4 88.5 181.8 287.7	74.0 346.6 481.6 19.5 921.7	541.6 14.8 1754.7	377.2 1347.6 1205.0 34.3 2964.1	30.0	50.1 379.1 1728.8 92.2 2250.2	93.6 646.9 1157.2 31.8 1929.5	160.8 1156.4 3251.8 154.0 4723.0	3.1 16.5 181.8 0.1 201.5	5.6 56.2 272.5 90.4 424.7	2.9 45.3 345.8 394.0	11.6 118.0 800.1 90.5 1020.2	28.0 213.0 1738.6 698.9 2678.5	6.1 50.5 616.3 476.6 1149.5	26.4 2 161.0 25 132.1 13	89.9 15.9 2 07.6	0.7 1.3 1.7 3.5 9.4 9.8 7.5 9.3 14.6	7.5	736.5	3109.0 678.7	2205.6	588.8 2917.1 7812.0 1593.9 2911.8	
DENVER FORMATION	M IND INF HYP T	0.4 3.1 1.8 5.3		5.1 29.8 12.2 47.1	5.5 32.9 14.0 52.4	6.3 6.3	6.5 6.5		12.8 12.8					0.6			0.6			0.4 3.1 8.1 11.6 0.6	6.5 6.5	5.1 29.8 12.2 47.1	5.5 32.9 26.8 65.2 0.6	
DENVER COUNTY TOTAL	IND INF HYP T M IND INF	0.4 3.1 1.8		5.1 29.8 12.2	5.5 32.9 14.0					0.4 1.2 1.6			0.4 1.2 1.6	4.9 145.9 174.8 326.2 0.6 4.9	0.5 43.3 1.7 45.5 0.5	1 1 3	5.4 89.2 76.5 71.7 0.6 5.4	6.0		4.9 148.4 189.9 343.8 1.0 8.0	0.5 43.3 1.7 45.5 0.5	5.1 29.8	5.4 191.7 191.6 389.3 6.1 38.3	
DOUGLAS COUNTY DENVER FORMATION	HYP T M IND	5.3	1.5	47.1	52.4 1.5 9.2	6.3 6.3 0.9 4.1	6.5 6.5		12.8 12.8 0.9 8.7	0.4 1.2 1.6 4.0 27.0	2.7 18.0		0.4 1.2 1.6 6.7 45.0	145.9 174.8 326.2	43.3 1.7 45.5 1.2 7.6	1 1 3	89.2 2	2.1 3.9 5.0	13.9	156.5 189.9 355.4 4.9 31.1	49.8 1.7 52.0 5.4 39.4	12.2	218.5 191.6 454.5	
LARAMIE FORMATION	INF HYP T M IND INF HYP		51.5 62.2		51.5 62.2	1.5 6.5	27.4 32.0		28.9 38.5	93.1 124.1	104.9 92.3 217.9	9.7 9.7	207.7 92.3 351.7	4.3 4.3 1.1 13.6 211.5	10.6 19.4 0.7 14.5	3	14.9 23.7 1.1 14.3	2.2 9.2 4.0 1.0 40.7	2.2 23.2	31.1 98.9 134.9 3.3 32.8 382.5	39.4 194.4 92.3 331.5 4.7 55.2	9.7	70.5 303.0 92.3 476.1 3.3 37.5 437.7	
DOUGLAS COUNTY TOTAL	HYP T IND INF HYP T		1.5 9.2 51.5 62.2		1.5 9.2 51.5 62.2	0.9 4.1 1.5 6.5	4.6 27.4 32.0		0.9 8.7 28.9 38.5	4.0 27.0 93.1	2.7 18.0 104 9 92.3 217 9	9.7	6.7 45.0 207.7 92.3 351.7	284.0 510.2 1.1 13.6 215.8 284.0	55.8 71.0 1.2 8.3 25.1 55.8	3 5 2 3	39.8 254 81.2 446 1.3 2 21.9 19 40.9 171 39.8 254	4.1 79.1 5.5 123.8 2.2 9.2 4.0 1.0 40.7 4.1 79.1	333.2 570.3 2.2 23.2 211.7 333.2	538.1 956.7 8.2 63.9 481.4 538.1	134.9 194.8 5.4 44.1 249.6 227.2	9.7	673.0 151.5 13.6 108.0 740.7 765.3	
ELBERT COUNTY DENVER FORMATION	M IND INF HYP		7.6 1.6	28.7 8.8 37.5	36.3 10.4	8.5 9.9 43.2	4.6 46.1 380.7 30.4	14.5 83.9 603.1 31.9	38.5 27.6 139.9 1027.0 62.3	3.7 34.2 130.1 0.4	0.8 27.7 327.9 6.5	2.1	351.7 33.7 261.4 1165.2 9.0	6.3	90.4		6.3	5.5 123.8		091.6 12.2 44.1 179.6 0.4	526.3 5.4 73.8 716.2 38.5	9.7 1 43.7 283.4		
LARAMIE FORMATION	T M IND INF HYP T	21.2 26.1 47.3	9.2 5.2 5.2	37.5	46.7 21.2 31.3 52.5	61.6 1.7 12.0 4.5 18.2	0.2 2.2 50.4 4.2 57.0	733.4	1256.8 0.2 3.9 62.4 8.7 75.2	168.4 26.1 26.1	362.9	938.0	1469.3 26.1 26.1	6.3 15.7 103.1 541.5 140.0 800.3	7.7 29.9 67.3 104.9	1: 60 14	6.3 23.4 33.0 08.8 19 40.0 126 05.2 146	5.7	19.4 126.7	236.3 15.7 104.8 620.2 297.3		1708.9 2	81.7 779.1 23.6 136.9 737.9 306.7 205.1	
ELBERT COUNTY TOTAL DENVER EAST QUAD	M IND INF HYP T	21.2 26.1 47.3	7.6 6.8 14.4	28.7 8.8 37.5	57.5 41.7 99.2	8.5 11.6 55.2 4.5 79.8	34.6	31.9	27.8 143.8 1189.4 71.0 1432.0	3.7 34.2 156.2 0.4 194.5	0.8 27.7 327.9 6.5 362.9	2.1	33.7 261.4 1191.3 9.0 1495.4	15.7 103.1 547.8 140.0 806.6	7.7 29.9 67.3 104.9	1: 6 14	23.4 33.0 15.1 19 40.0 126 11.5 146	9.4	19.4 126.7	27.9 148.9 799.8 297.7	13.3 105.9 833.9 47.9	43.7 283.4 339.0 2	84.9 538.2 972.7 388.4	
DENVER FORMATION	M IND INF HYP T M	12.3	489.0 681.5 21.5 1302.6 31.0	1433.3 609.7 23.6 2705.7 3.1	1471.9 145.7 4434.4 46.4	4.9 439.0 3.6	426.7 2133.9 1 71.8 2685.9 2 6.7	2662.9 2.1	185.3 1279.6 4182.5 140.4 5787.8 12.4	9.0 65.6 308.6 0.5 383.7 16.4	118.0	2.1	48.0 396.3 2056.5 120.6 2621.4 42.8	10.6 10.6 72.1	1.2 7.6 10.6 19.4 28.7	3	1.2 7.6 21.2 30.0 03.9 2	9 1 2	1	307.6 1 788.2 3 106.0 259.4 4	009.2 2 3511.2 3 211.3 1903.9 6	408.9 3 432.7 7 89.4 5710.3 12	406.7 873.6	
DENVER EAST TOTAL	IND INF HYP T M IND	86.5 333.6 27.6 460.0 37.2 206.4	184.2 626.9 22.6 864.7 141.6 673.2	13.3 9.9 0.8 27.1 642.2 446.6	284.0 970.4 51.0 1351.8 821.0 2326.2	34.2 272.3 68.1 378.2 27.3 156.3	59.8 730.9 251.1 1048.5 60.2 486.5	13.3 31.5 46.9 110.2 744.1	107.3 1034.7 319.2 1473.6 197.7 1386.9	105.8 894.5 554.0 1570.7 25.4 171.4	163.3 1119.2 555.4 1861.8 30.8 249.2	14.7 26.0 43.2 34.6 259.5	283.3 2039.7 1109.4 3475.7 90.8 680.1	542.9 4222.8 1625.3 6463.1 72.1 542.9	200.6 1704.9 751.2 2685.4 29.9 208.2	26.4 76 161.0 608 132.1 250 322.6 947 3.1 10 26.4 77	59.9 20 38.7 221 38.6 402 71.1 647	1.3 0.9 7.5 1.9 50.5 1.2 79.1 1.9 138.4 1.9 1.3 0.9 7.5	28.4 272.4 5 481.3 2 786.3 9 4.2	945.1 4 677.2 1 519.9 6 164.9	659.4 598.8 263.8	67.7 1 228.4 10 132.9 4 439.8 16	469.5 558.5 218.8	
Notes:	INF HYP T	514.3 128.2		619.6 24.4	2442.3 196.7	560.6 2 73.0		791.8 63.7	5217.2 459.6	1203.1 554.5		1088.7 2.1	4096.2 1230.0	4233.4 1625.3	208.2 1715.5 751.2 2704.8	161.0 610 132.1 250	9.9 221 8.6 402	1.9 7.5 .9 50.5 1.2 79.1 1.9 138.4	272.4 6	733.3 7 783.2 1	743.6 3 870.7	661.1 18 222.3 4	138.0 876.2	

Notes: All figures are in millions of tons. * These overburden categories are 0-200' and 200'-500' for the Denver Formation. Explanation of Resource Categories: 1 Measured coal - within 1/4 mile of a data point. IND Indicated coal - ¼ to 3 mile from nearest data point INF Inferred coal - ¼ to 3 miles from nearest data point INF Hypothetical coal - over 3 miles from nearest data point. HYP Hypothetical coal - over 3 miles from nearest data point. T Total of all resource categories.

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