KENTUCKY GEOLOGICAL SURVEY
LEXINGTON, KENTUCKY

WALLACE W. HAGAN
Director and State Geologist

Series X
1963

Coal Reserves in Portions of Butler, Edmonson, Grayson, Muhlenberg, Ohio, and Warren Counties, Kentucky

In cooperation with Tennessee Valley Authority

INFORMATION CIRCULAR 11

College of Arts and Sciences
UNIVERSITY OF KENTUCKY

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Tennessee Valley Authority
Allan T. Mullins
David L. Hodgson
Gleason G. Avery

Kentucky Geological Survey
Edward Norman Wilson

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ABSTRACT

Reserve estimates for twelve coal seams occurring within nineteen adjacent quadrangles of the western Kentucky coal basin indicate the presence of 1,202,276,000 tons of coal remaining in place. Very little, if any, of this tonnage is considered suitable for large scale commercial mining operations. However, smaller operators can find some of these deposits sufficiently large for commercial operation.

INTRODUCTION

This Information Circular presents estimates of coal reserves in nineteen adjacent quadrangles in the eastern portion of the western Kentucky coal field. The report reflects the results of a reconnaissance in parts of Muhlenberg, Ohio, Grayson, Butler, Edmonson, and Warren Counties, Kentucky.

The material for this Information Circular has been collected as part of a broad study of the coal reserves and Pennsylvanian geology of the western Kentucky coal field and is being issued at this time so that the figures may be made available to private organizations and public agencies interested in the economic development of the area involved.

This study is part of a cooperative project between the Kentucky Geological Survey and the Tennessee Valley Authority. The work in this particular area was done primarily by the personnel of the Madisonville, Kentucky office of the Fuels Planning Staff, Tennessee Valley Authority. Personnel of the Henderson office of the Kentucky Geological Survey prepared the generalized stratigraphic section and gave helpful consultation on stratigraphy and correlation.

SCOPE AND METHOD

Reserves were estimated for twelve seams underlying portions of nineteen 7-1/2 minute quadrangles adjacent to the Green River (Figure 1).

Field work was done in this area during the summer and fall of 1961 with three TVA geologists and field assistants participating. An average of three weeks' field time was spent on each quadrangle. In actuality, some quadrangles received considerably more time than three weeks whereas several quadrangles with only small amounts of Pennsylvanian rocks received a lesser amount of attention.

All known outcrops and exposures of coal and mines were visited during the course of the field work. At each of the exposures, measurements were recorded of (1) the coal thickness to the nearest inch and of partings one-half inch or thicker, (2) the elevation of the seam obtained by hand leveling, and (3) the rock section above and below the coal.

Isopachous and structural maps were prepared for each seam on which sufficient data were available. For each seam in each quadrangle, reserve sheets were made which indicated (1) the thickness of the coal in six-inch increments, (2) the depth to the coal from the surface in 50-foot increments up to 150 feet, and (3) mined-out areas with symbols to distinguish strip and underground mining.

Areas considered questionably mineable, such as under rivers, under river flood plains to a depth of 50 feet, under towns, closely adjacent to faults, and between closely adjacent abandoned underground mines were excepted from the estimate.

Procedures were patterned after standard United States Geological Survey estimates (Averitt, 1961). The reserve maps were planimetered to

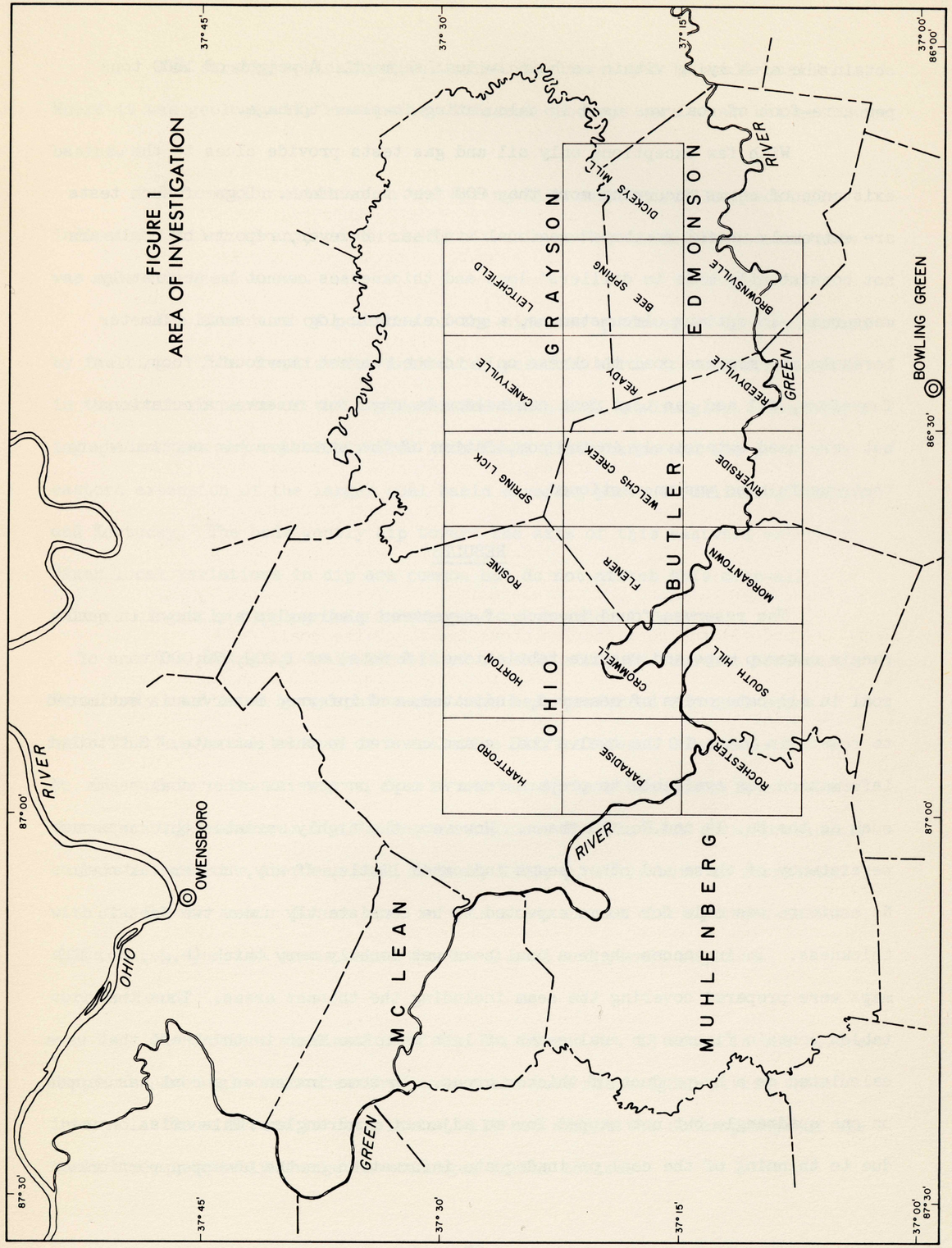


FIGURE 1
AREA OF INVESTIGATION

obtain the area lying within each individual segment. A weight of 1800 tons per acre-foot of coal was used in calculating in-place tonnage.

With few exceptions only oil and gas tests provide clues to the existence of seams occurring more than 200 feet subsurface. Logs of such tests are extremely useful for broad regional studies. However, reports of coals are not consistently made in drillers' logs and thicknesses cannot be accurately measured. In optimum circumstances, a good electric log in a small diameter borehole may measure coal thickness only to the nearest one-fourth foot. Therefore, oil and gas test data can seldom be used for reserve calculations but were used extensively in the compilation of the stratigraphic section where their usefulness was unquestioned.

RESULTS

The reserves found in each of seventeen quadrangles are shown in quadrangle outcrop maps and reserve tabulations. A total of 1,202,276,000 tons of coal in all categories of measured, indicated, and inferred reserves is estimated to remain in place in the twelve coal seams covered in this estimate. Sufficient information was available to prepare reserve maps on several other coal seams such as the No. 14 and No. 10 seams. However, the highly variable thickness and persistency of these and other seams indicated little, if any, commercial coal. No estimate was made for seams expected to be consistently under two feet in thickness. In instances where a coal seam was locally very thick (e.g., No. 13) maps were prepared covering the seam including the thinner areas. Thus the tables contain figures on coal seams of less than two feet in thickness that were calculated as a by-product of thicker areas. In some instances a coal was mapped on one quadrangle but not mapped for an adjacent quadrangle. This omission was due to thinning of the coal or inadequate information on the unmapped portions.

The stratigraphically lower seams were developed in small basins. Where it was geologically reasonable, inferred outcrops were shown between these basins.

Information obtained on the Spring Lick and Reedyville quadrangles indicated little, if any, commercially mineable coals; therefore, no estimate was made for these areas.

The structure of portions of the nineteen quadrangles is complicated by faulting. This complication introduces possible error in coal correlation in the southern parts of the Rochester and South Hill Quadrangles. The remaining quadrangles are relatively free from fault disturbance and lie in an eastern extension of the larger coal basin covering parts of Illinois, Indiana, and Kentucky. The beds gently dip toward the axis of this eastward extension. Minor local variations in dip are common but do not affect this over-all pattern of gently dipping beds interrupted by occasional faults.

The naming of coals identified in this study is somewhat arbitrary. Previously used local geographic names have been preferred for coal seams below the No. 9 coal because of correlation difficulties. Only coals No. 9, No. 11, and to a lesser degree, No. 12 and No. 13 have been correlated with corresponding numbers in the Tradewater region. The Elm Lick coal, previously correlated with the Aberdeen coal (Crider, 1915, p. 174), here is correlated with the Dunbar seam. Future work in this study should clarify the relationships among the coal seams below the No. 9 coal and permit regional correlations.

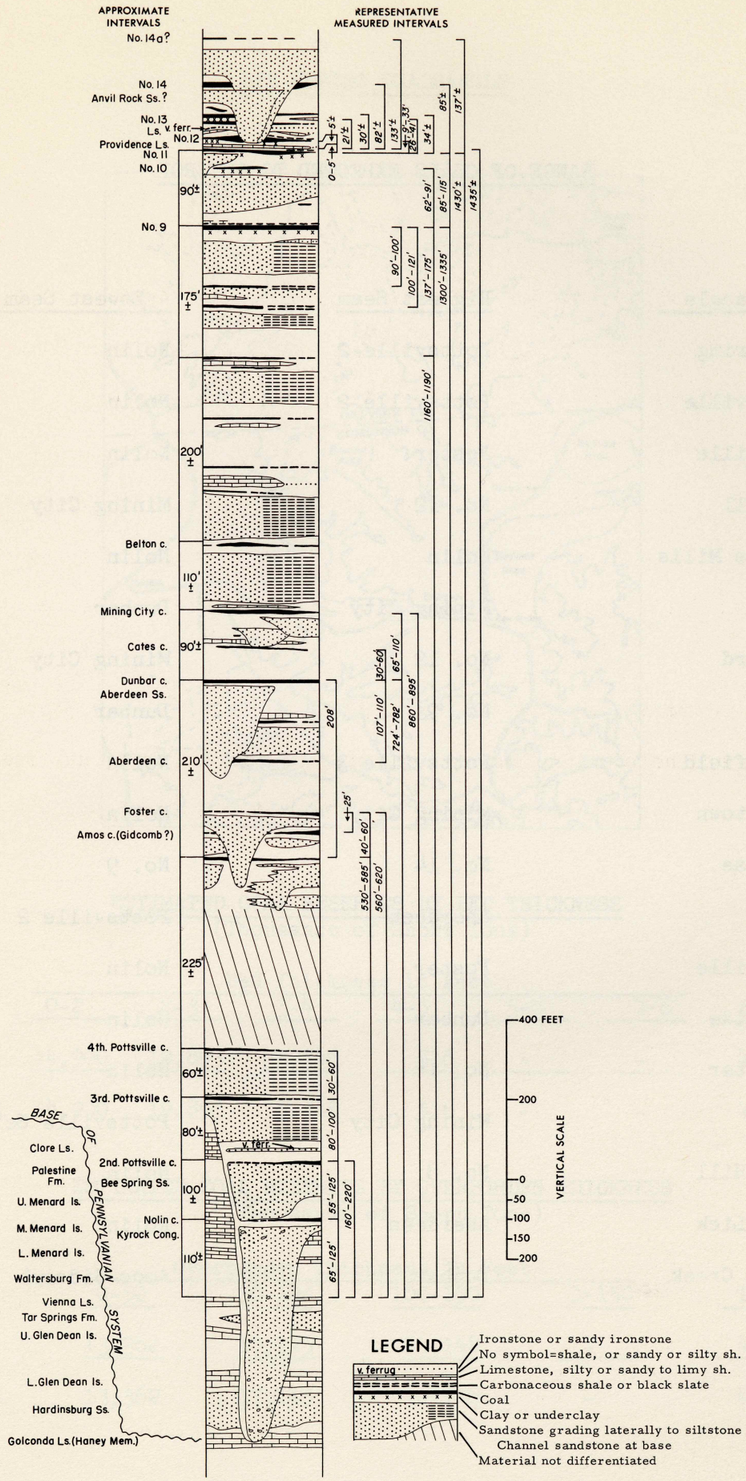
More recent examination of the No. 12 and No. 13 seams in the southern Hartford quadrangle indicates that some coals were misassigned within this interval. These errors in correlation will not affect the outcrop maps of the coals nor appreciably change the tonnages in the tables.

ACKNOWLEDGEMENTS

Mapping of this region was greatly facilitated by the cooperation of many coal companies and individuals too numerous to list.

However, special thanks are due the following companies for making their records available to us: Peabody Coal Company, Riverview Coal Company, Pittsburg & Midway Coal Mining Company, and W. H. Reynolds Company. Messrs. John Donan, Sid Loving, Paul Jones, and C. E. Parks, all consulting engineers, gave generously of their time and knowledge. The U. S. Corps of Engineers, the Paul Weir Company, and Brandon Nuttall, consulting geologist, furnished a copy of their field investigations of coal reserves adjacent to the Green River.

Most of the populace of the several counties covered proved to be cooperative and helpful in finding exposures of coals. Their assistance is appreciated and resulted in an increased number of field observations.

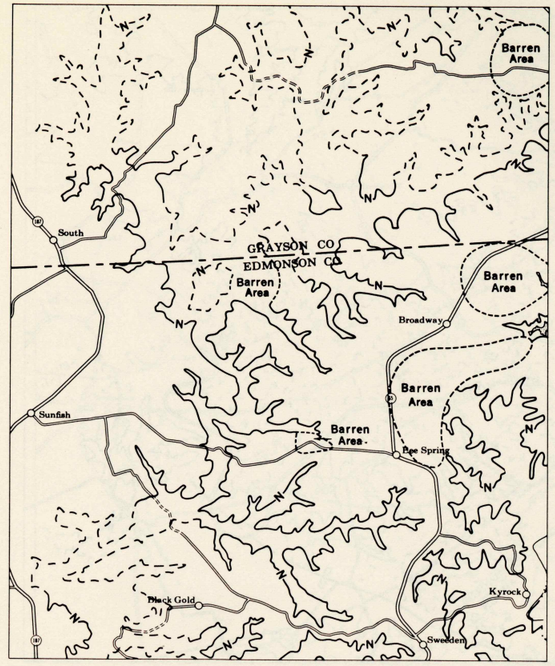


COMPOSITE STRATIGRAPHIC SECTION

RANGE OF COALS EXPECTED TO OUTCROP

Quadrangle	Highest Seam	Lowest Seam
Bee Spring	Pottsville 2	Nolin
Brownsville	Pottsville 2	Nolin
Caneyville	Foster	Nolin
Cromwell	No. 12	Mining City
Dickeys Mills	Nolin	Nolin
Flener	Mining City	Dunbar
Hartford	No. 12	Mining City
Horton	No. 9	Dunbar
Leitchfield	Pottsville 3	Nolin
Morgantown	Mining City	Nolin
Paradise	No. 14	No. 9
Ready	Aberdeen	Pottsville 2
Reedyville	Foster	Nolin
Riverside	Dunbar	Nolin
Rochester	No. 14	Nolin
Rosine	Mining City	Pottsville Series
South Hill	No. 8	Nolin
SpringLick	Aberdeen	Nolin
Welchs Creek	Dunbar	Amos-Gidcomb

BEE SPRING QUADRANGLE



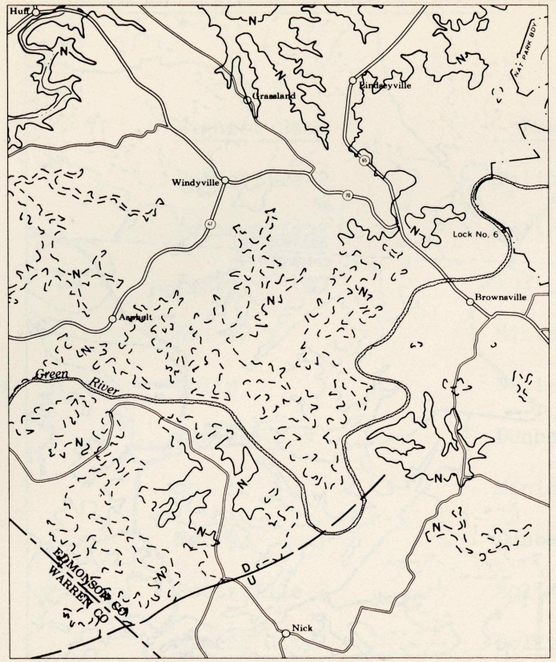
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Nolin	14,900	19,893	5,346	516	-	-	40,655
Total	14,900	19,893	5,346	516	-	-	40,655

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Nolin	13,362	17,145	10,148	-	40,655
Total	13,362	17,145	10,148	-	40,655

BROWNSVILLE QUADRANGLE



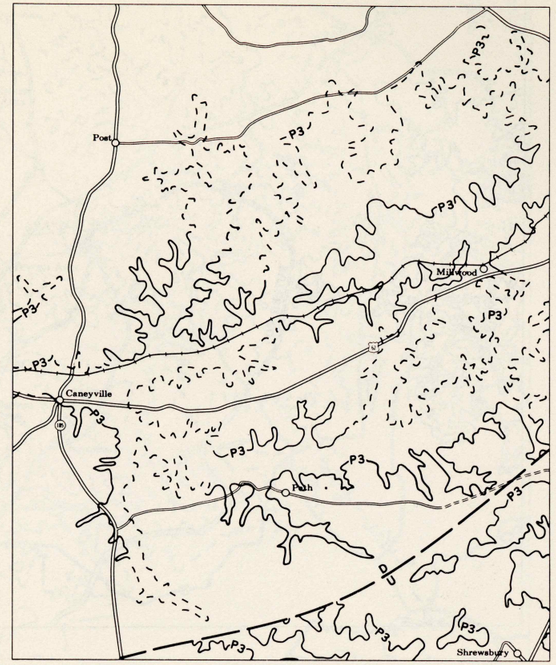
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Nolin	6,039	3,650	504	-	-	-	10,193
Total	6,039	3,650	504	-	-	-	10,193

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Nolin	5,690	3,549	922	32	10,193
Total	5,690	3,549	922	32	10,193

CANEYVILLE QUADRANGLE



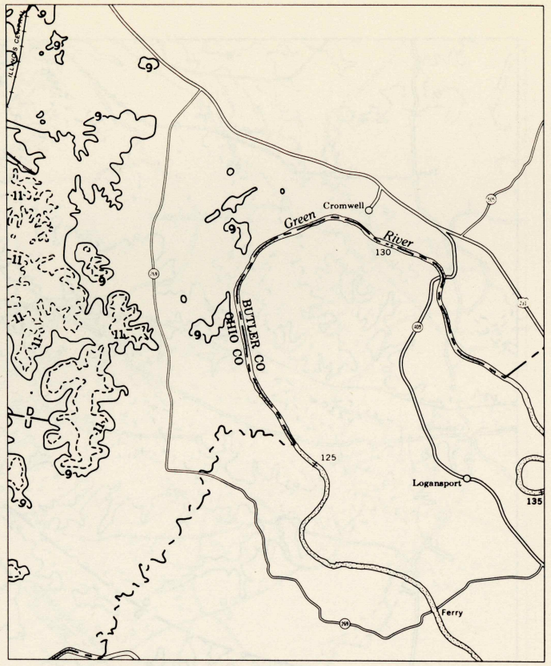
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Pottsville 3	9,783	4,509	-	-	-	-	14,292
Total	9,783	4,509	-	-	-	-	14,292

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Pottsville 3	9,787	3,659	652	194	14,292
Total	9,787	3,659	652	194	14,292

CROMWELL QUADRANGLE



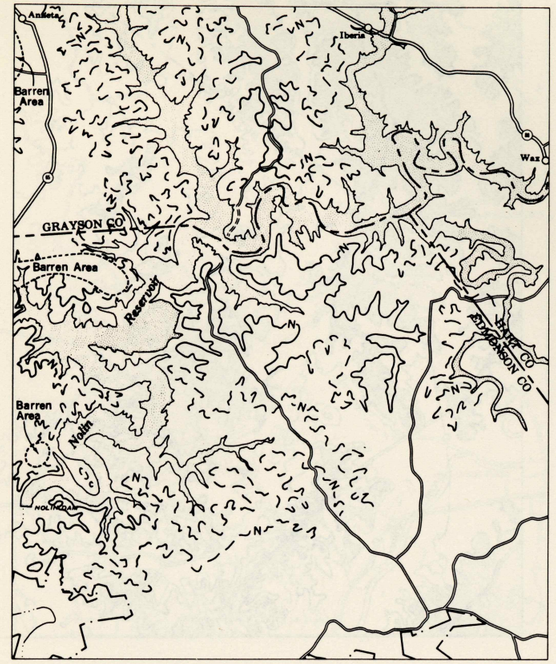
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
No. 12	1,049	636	179	-	-	-	1,865
No. 11	34	4,017	46	-	-	-	4,097
No. 9	-	-	1,267	18,053	1,554	1,483	22,357
Total	1,083	4,653	1,493	18,053	1,554	1,483	28,318

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
No. 12	1,748	117	-	-	1,865
No. 11	2,861	1,236	-	-	4,097
No. 9	9,043	9,290	3,872	151	22,357
Total	13,653	10,642	3,872	151	28,318

DICKEYS MILLS QUADRANGLE



ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Nolin	2,587	8,090	4,163	3,429	-	-	18,269
Total	2,587	8,090	4,163	3,429	-	-	18,269

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	> 150	Total
Nolin	7,400	8,155	2,706	8	18,269
Total	7,400	8,155	2,706	8	18,269

FLENER QUADRANGLE

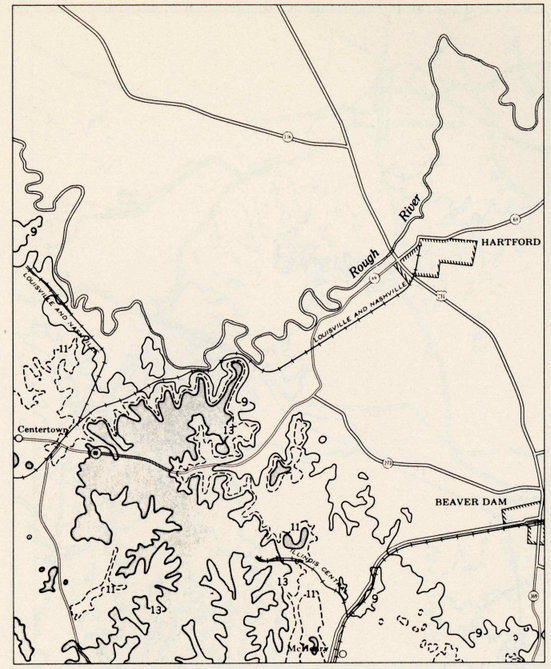
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Mining City	11,961	17,608	804	-	-	-	30,373
Dunbar	11,227	54,832	18,733	-	-	-	84,791
Total	23,187	72,440	19,537	-	-	-	115,164

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Mining City	18,981	9,147	2,236	10	30,373
Dunbar	30,362	24,564	19,505	10,361	84,791
Total	49,343	33,711	21,740	10,371	115,164

HARTFORD QUADRANGLE



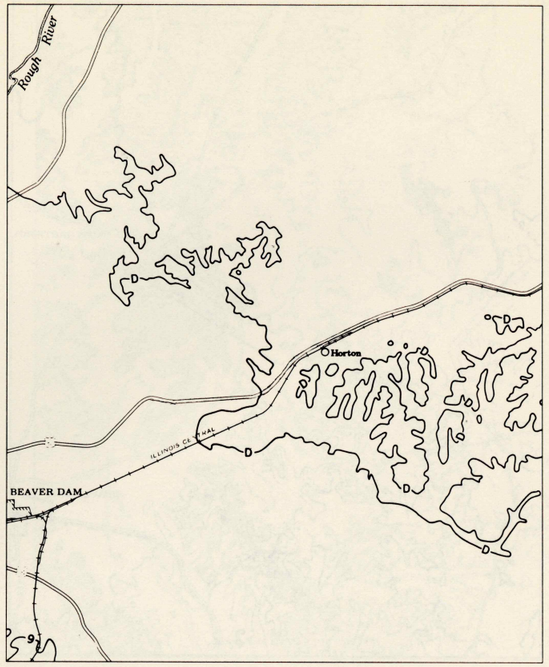
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
No. 13	1,743	4,372	2,719	-	-	-	8,834
No. 12	4,904	8,008	6,237	6,598	3,055	1,418	30,220
No. 11	-	18,294	5,811	8,596	8,355	1,408	42,463
No. 9	-	-	40,813	19,458	200	-	60,471
Total	6,647	30,674	55,579	34,652	11,609	2,826	141,988

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
No. 13	6,875	1,954	5	-	8,834
No. 12	17,246	10,710	2,222	41	30,220
No. 11	18,578	16,737	6,912	236	42,463
No. 9	7,437	13,019	24,832	15,183	60,471
Total	50,136	42,420	33,972	15,460	141,988

HORTON QUADRANGLE



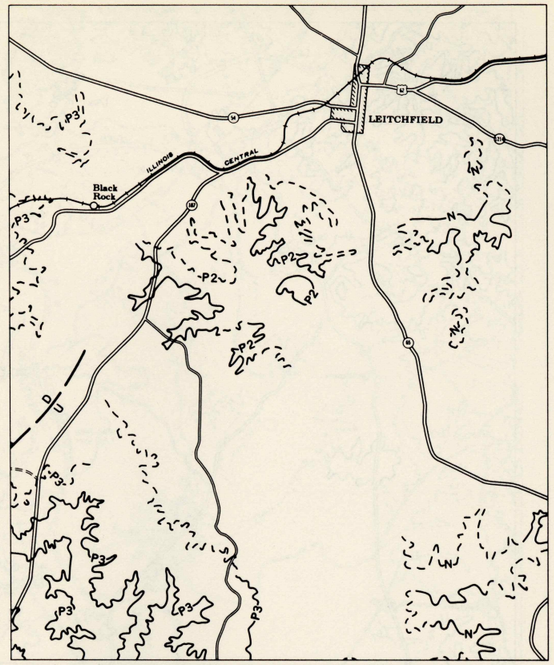
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
No. 9	-	-	41	186	1,154	-	1,380
Dunbar	18,837	6,310	8,527	15,271	4,146	-	53,091
Total	18,837	6,310	8,568	15,457	5,299	-	54,471

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
No. 9	1,380	-	-	-	1,380
Dunbar	17,705	24,030	9,238	2,117	53,091
Total	19,085	24,030	9,238	2,117	54,471

LEITCHFIELD QUADRANGLE



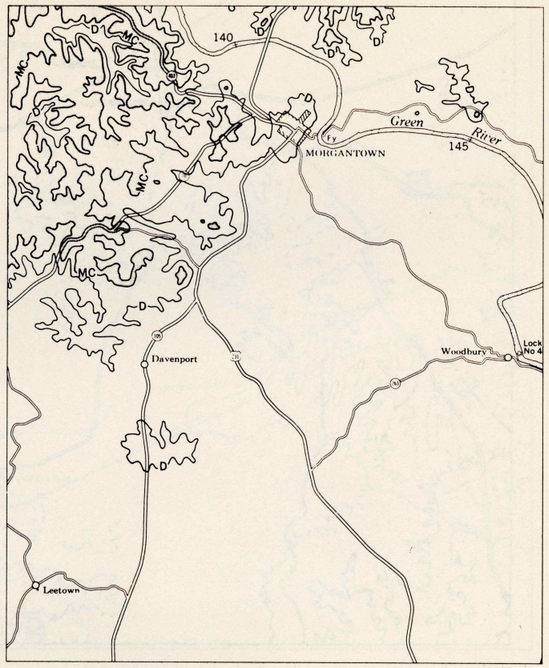
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Pottsville 3	2,254	5,625	-	-	-	-	7,879
Pottsville 2	2,469	716	-	-	-	-	3,185
Nolin	1,534	712	-	-	-	-	2,246
Total	6,257	7,053	-	-	-	-	13,310

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Pottsville 3	5,375	2,418	86	-	7,879
Pottsville 2	2,543	626	16	-	3,185
Nolin	2,129	117	-	-	2,246
Total	10,047	3,161	102	-	13,310

MORGANTOWN QUADRANGLE



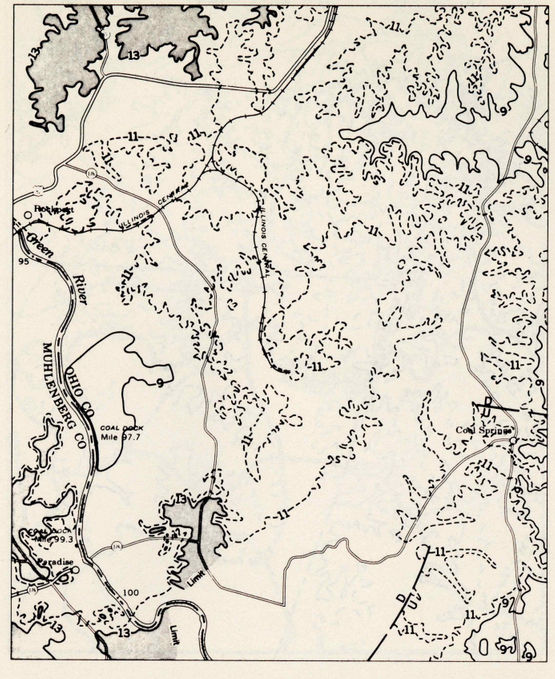
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Mining City	-	5,562	9,100	171	-	-	14,833
Dunbar	-	12,191	23,176	3,555	-	-	38,922
Total	-	17,753	32,276	3,727	-	-	53,755

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Mining City	8,365	5,580	871	17	14,833
Dunbar	15,289	10,658	8,575	4,400	38,922
Total	23,653	16,239	9,446	4,417	53,755

PARADISE QUADRANGLE



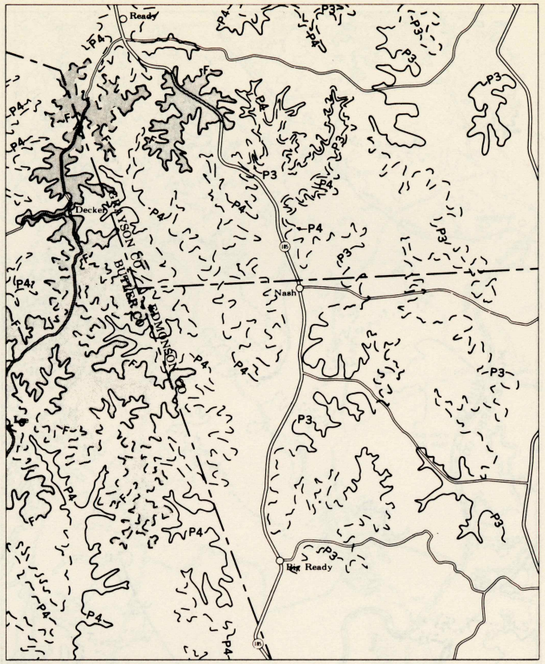
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
No. 13	1,342	905	1,024	766	-	-	4,037
No. 12	6,578	14,529	20,578	13,285	8,246	3,835	67,051
No. 11	6,073	15,510	18,133	18,610	15,900	20,860	95,088
No. 9	-	310	16,777	127,618	10,700	-	155,405
Total	13,992	31,255	56,513	160,279	34,847	24,695	321,580

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
No. 13	3,374	663	-	-	4,037
No. 12	39,458	22,588	4,879	125	67,051
No. 11	41,530	39,826	12,100	1,631	95,088
No. 9	29,205	54,519	45,606	26,076	155,405
Total	113,567	117,596	62,585	27,832	321,580

READY QUADRANGLE



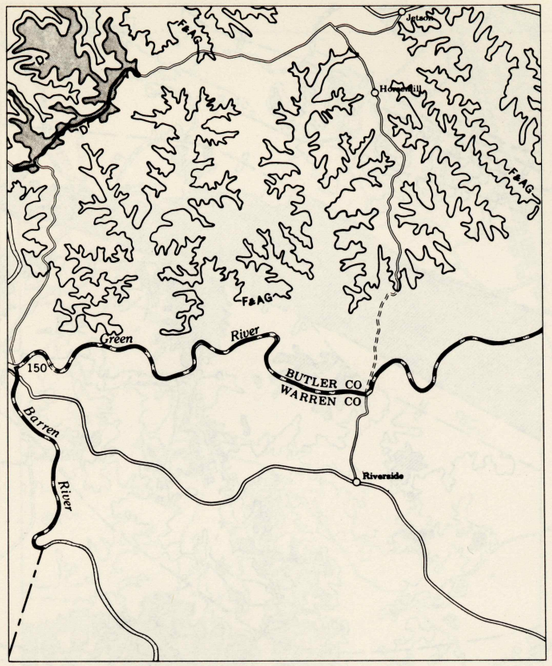
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Foster	1,415	2,268	-	-	-	-	3,683
Pottsville 4	3,368	135	-	-	-	-	3,503
Pottsville 3	3,488	3,192	-	-	-	-	6,680
Total	8,271	5,595	-	-	-	-	13,866

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Foster	2,858	821	5	-	3,684
Pottsville 4	1,499	768	802	435	3,504
Pottsville 3	2,246	2,703	1,430	299	6,678
Total	6,603	4,292	2,237	734	13,866

RIVERSIDE QUADRANGLE



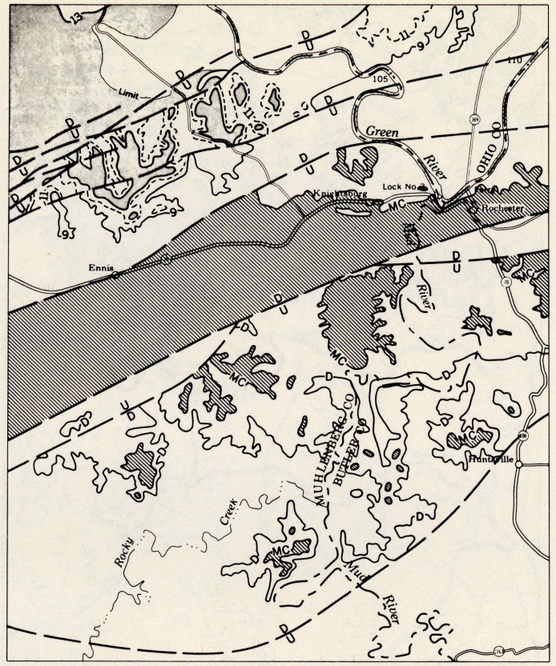
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Dunbar	756	1,888	58	-	-	-	2,703
Foster	13,024	10,083	-	-	-	-	23,107
Amos-Gidcomb	7,978	2,624	-	-	-	-	10,602
Total	21,759	14,596	58	-	-	-	36,412

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Dunbar	2,067	636	-	-	2,703
Foster	11,060	7,310	3,174	1,564	23,107
Amos-Gidcomb	4,877	5,725	-	-	10,602
Total	18,004	13,671	3,174	1,564	36,412

ROCHESTER QUADRANGLE



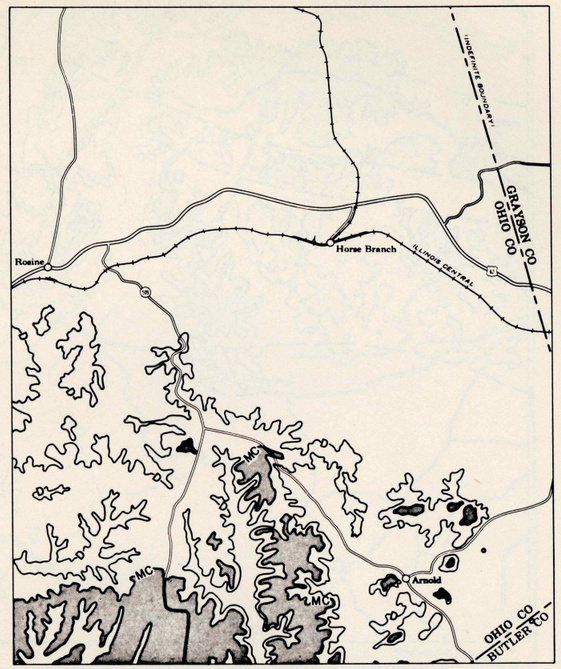
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
No. 13	4,637	1,905	-	-	-	-	6,541
No. 12	3,820	4,649	4,877	3,503	791	-	17,640
No. 11	50	2,802	2,771	6,888	13,855	15,903	42,269
No. 9	-	-	964	26,502	30,019	473	57,958
Mining City	-	-	4,842	-	-	-	4,842
Dunbar	5,492	6,033	30,893	18,700	-	-	61,118
Total	13,998	15,390	44,348	55,593	44,665	16,376	190,369

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
No. 13	3,107	2,712	643	79	6,541
No. 12	3,905	7,433	4,983	1,319	17,640
No. 11	11,266	13,958	13,100	3,945	42,269
No. 9	6,569	12,423	8,107	30,860	57,958
Mining City	3,743	914	185	-	4,842
Dunbar	17,305	18,901	10,348	14,565	61,118
Total	45,894	56,342	37,366	50,768	190,369

ROSINE QUADRANGLE



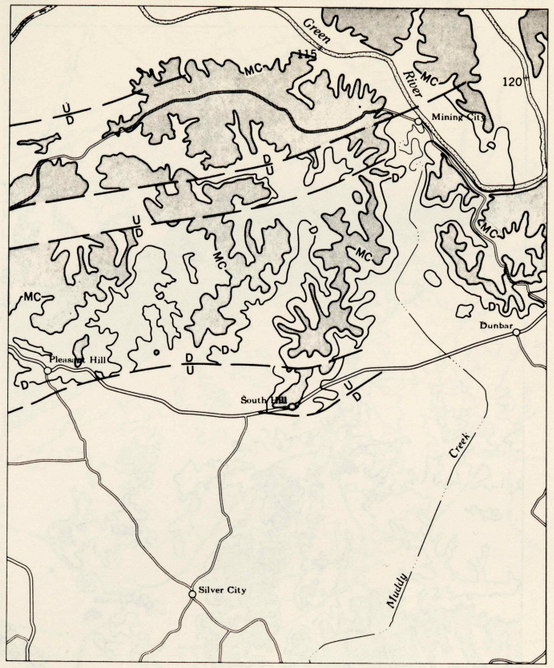
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Mining City	2,941	4,541	1,603	-	-	-	9,085
Dunbar	3,158	17,029	16,858	-	-	-	37,046
Total	6,099	21,571	18,461	-	-	-	46,131

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Mining City	6,354	2,322	409	-	9,085
Dunbar	14,895	12,684	6,898	2,569	37,046
Total	21,249	15,005	7,307	2,569	46,131

SOUTH HILL QUADRANGLE



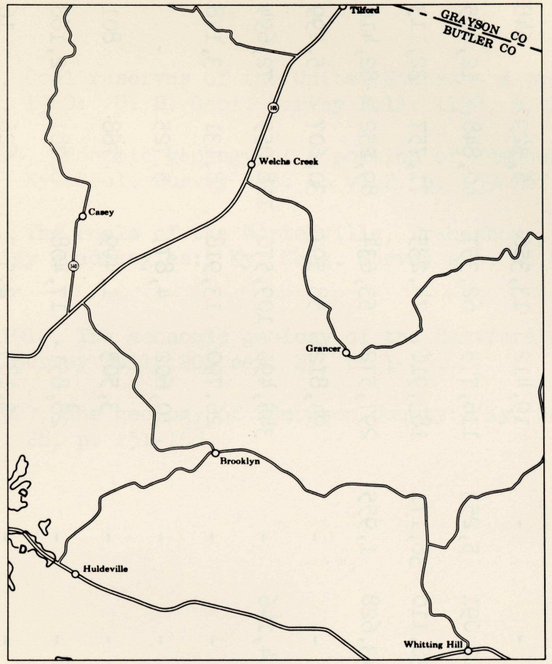
ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Mining City	233	13,657	21,799	-	-	-	35,680
Dunbar	4,303	24,955	37,442	372	-	-	67,072
Total	4,526	38,613	59,241	372	-	-	102,752

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Mining City	21,155	12,645	1,798	81	35,680
Dunbar	11,291	26,491	18,130	11,160	67,072
Total	32,446	39,136	19,929	11,241	102,752

WELCHS CREEK QUADRANGLE



ESTIMATED COAL RESERVES BY BED THICKNESS
(Thousands of Short Tons)

Bed	Bed Thickness in Feet 0-2	2-3	3-4	4-5	5-6	>6	Total
Dunbar	7	744	-	-	-	-	751
Total	7	744	-	-	-	-	751

ESTIMATED COAL RESERVES BY OVERBURDEN THICKNESS
(Thousands of Short Tons)

Bed	Overburden Thickness in Feet 0-50	50-100	100-150	>150	Total
Dunbar	656	95	-	-	751
Total	656	95	-	-	751

SUMMARY OF IN-PLACE COAL RESERVES IN PORTIONS OF BUTLER, EDMONSON, GRAYSON, MUHLENBERG, OHIO, AND WARREN COUNTIES, KENTUCKY
(Thousands of Short Tons)

Bed	Bed Thickness in Feet						Total	Overburden Thickness in Feet			
	0-2	2-3	3-4	4-5	5-6	>6		0-50	50-100	100-150	>150
No. 13	7,721	7,182	3,743	766	-	-	19,412	13,356	5,329	648	79
No. 12	16,351	27,823	31,871	23,386	12,091	5,253	116,775	62,357	40,848	12,085	1,485
No. 11	6,156	40,623	26,761	34,095	38,110	38,171	183,916	74,235	71,757	32,113	5,812
No. 9	-	310	59,862	191,817	43,628	1,955	297,572	53,634	89,252	82,416	72,270
Mining City	15,124	41,369	38,148	171	-	-	94,812	58,597	30,607	5,499	108
Dunbar	43,780	123,983	135,688	37,898	4,146	-	345,495	109,570	118,059	72,694	45,172
Foster	14,439	12,351	-	-	-	-	26,790	13,918	8,131	3,178	1,564
Amos-Gidcomb	7,978	2,624	-	-	-	-	10,602	4,877	5,725	-	-
Pottsville 4	3,368	135	-	-	-	-	3,503	1,499	768	801	435
Pottsville 3	15,525	13,326	-	-	-	-	28,851	17,408	8,781	2,168	494
Pottsville 2	2,469	716	-	-	-	-	3,185	2,543	626	16	-
Nolin	25,060	32,345	10,013	3,945	-	-	71,363	28,581	28,966	13,776	40
Totals	157,971	302,787	306,086	292,078	97,975	45,379	1,202,276	440,575	408,849	225,394	127,459

Note: All figures rounded to nearest thousand.

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