

Bureau of Mines  
Report of Investigations 4807



ESTIMATE OF KNOWN RECOVERABLE RESERVES  
OF COKING COAL IN FAYETTE COUNTY, PA.

BY JAMES J. DOWD, LOUIS A. TURNBULL, ALBERT L. TOENGES,  
R. F. ABERNETHY, AND D. A. REYNOLDS

United States Department of the Interior—August 1951

metadc38566



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UNITED STATES DEPARTMENT OF THE INTERIOR  
Oscar L. Chapman, Secretary  
BUREAU OF MINES  
James Boyd, Director

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Work on manuscript completed March 1951. The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is made: "Reprinted from Bureau of Mines Report of Investigations 4807."

August 1951



## FOREWORD

Since its creation by Congress in 1910, the Bureau of Mines has borne a heavy responsibility for technical progress in the mining, preparation, and utilization of our national fuel reserves. Similarly, it has pioneered in scientific studies leading to better health and safety in mining and more efficient conservation of fuel resources.

Conservation means a full but prudent use of the national resources with avoidance of waste. Conservation requires an inventory to determine the extent, availability, and condition of our resources for, without these facts, it is impossible for either industry or Government to plan for sustained production and maintenance of the industrial capacity so essential to our peacetime prosperity and wartime survival. This is true particularly of fuels needed for special purposes, such as metallurgical coking coals that must possess certain favorable properties. Heavy use of our limited reserves of good coking coal has resulted in severe depletion and, in some areas, exhaustion of the thickest and best beds.

At the request of the Munitions Board, Department of Defense, the Bureau of Mines, made preliminary arrangements early in 1948 for an investigation of known minable reserves of coal that were or could be made suitable for the manufacture of metallurgical coke. In August of that year, actual field work began in the low- and medium-volatile coking coal fields of the Appalachian Region, specifically central Pennsylvania and southern West Virginia. As both the economic and technologic factors that determine whether a particular coal can be used for producing metallurgical coke will vary with changing conditions, the investigation was planned to cover three phases:

- (1) A determination from available data of coal reserves with coking properties that occur in beds thick enough and within depths considered economically minable by present methods, together with such additional reserves as may become economically minable under future conditions of improved technology and greater need.
- (2) A study of the preparation characteristics of the reserves thereby developed to determine: (a) which coals are suitable under present standards for producing metallurgical coke either as mined or after beneficiation by conventional preparation methods, and (b) which coals would require special and more intensive treatment in mining, preparation, or both.
- (3) A study of the carbonizing properties of the reserves thus developed to determine the yield and quality of coke, gas, and chemical products that can be obtained from coals carbonized singly and in blends.

This report is one in a series, by counties, covering in detail the estimated known minable coking coal reserves determined under the first phase of the investigation. It

also includes a general assessment of the carbonizing properties of the most important beds and a table of analyses of typical coals from the county. Publications will be issued later covering in more detail the preparation and carbonization data upon completion of the extensive laboratory work involved in these phases of the survey.

The estimates of coking coal reserves in these reports were derived from data made available to the Bureau of Mines by coal companies, land owners, Federal, state, and municipal engineers, geologists, land-record officials, and others having authentic records of the occurrence and characteristics of the coal in the respective counties. All of the data were assembled from mine maps, records of core drilling, test pitting and trenching, and related sources of information, for no new core drilling or geologic exploration was undertaken. Consequently, there are areas covered by these reports wherein the known data now available are inadequate to estimate reserves of measured and indicated coal, as these are defined in the reports. Geologic data also indicate the presence of large reserves of inferred coal in many of these areas, but no estimates or inferred reserves are presented in these reports. As their titles indicate, they include only known, minable reserves of measured and indicated coal, and not total estimated reserves of coal. Therefore, any comparison of these and other coal reserve estimates should be made with this distinction clearly understood.

The percentage recovery shown in these reports is a weighted average, based on the thickness of clean coal, less all partings  $3/8$ -inch or more thick, recovered from the mined-out areas in each bed. Thus, it is an over all net areal percentage recovery that, in many cases, will be lower than the recovery estimated by operators who eliminate from their calculations coal pillars left at property boundaries, under roads, and elsewhere. It is based on all coal removed since the beginning of mining operations, and, therefore, may vary from that of recent operations in which recovery either has been improved substantially by technologic advances or has declined, owing to flooded areas or other conditions that make it expedient to leave more coal in the ground. As the estimates are dated and represent a factual record of all past operations in the particular area, the percentage recovery and estimate of minable coal may be adjusted by operators to suit their particular conditions at any given time.

These county reports are being published as rapidly as the available data can be found and analyzed. Later, in cooperation with the U. S. Geological Survey, results of these studies will be combined with those from a complete geologic investigation of all coal reserves in the areas considered. Then, reports can be published, by states, giving estimates of total reserves, including the geologically inferred reserves that have been omitted herein.

This investigation was made possible only through the complete cooperation of the coal operators, landowners, and others who have made available to the Bureau their confidential records and data relating to mining operations, drill core and test pit operations, etc. This cooperation and assistance is appreciated and is gratefully acknowledged. To protect the confidence of data from private records, the Bureau of Mines is assembling and publishing the estimates on a county-wide basis only and will not release any supplementary or more detailed information.

This investigation will serve a triple purpose:

(1) By providing an inventory of known, minable reserves of coking coal that are or can be made suitable for the manufacture of metallurgical coke.

(2) By providing an inventory of known minable reserves of coal with coking properties, but unsuited for metallurgical coking coal use by present standards and techniques because of high sulfur, high ash, or weakly coking properties. When warranted by economic and technologic developments, these reserves later may be adapted to metallurgical use by suitable preparation, blending, carbonizing, or metallurgical techniques.

(3) By ascertaining the approximate location and magnitude of areas in which geologic data indicate the presence of inferred reserves but where exploratory work has been too limited to determine measured and indicated reserves. It is in these areas that more intensive exploratory work is needed in the future to complete the coking-coal inventory.

The first of these objectives is of prime importance for the present and immediate future, and the second for the more distant future. Accomplishment of the third objective will be of major aid both to industry and State and Federal agencies in more effectively planning and executing coal exploratory and testing investigations.

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ESTIMATE OF KNOWN RECOVERABLE RESERVES OF COKING COAL  
IN FAYETTE COUNTY, PA.

by

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## CONCLUSIONS

1. The investigation shows that there are two coal beds of major importance in Fayette County from the standpoint of present production - Pittsburgh and Sewickley - and five beds of minor importance - Waynesburg, Redstone, Upper Freeport, Lower Kittanning, and Brookville-Clarion. The Upper Freeport bed contains the largest remaining known reserve.

2. Known (measured plus indicated) reserves in all beds, based on a minimum bed thickness of 14 inches and on 1,800 tons per acre-foot of coal in place, are estimated at 943 million short tons as of January 1, 1950. Of this total, 841 million tons are in beds 28 inches and more thick. All known reserves in Fayette County are under less than 2,000 feet of overburden. Areas in each bed, except the Pittsburgh, were omitted from the estimate because available data relative to the bed characteristics are insufficient to make an estimate that conforms with the definitions of measured and indicated coal adopted for this study. Should future drilling or development prove reserves in these areas, such reserves should be added to the total estimated reserves.

3. Recoverable reserves of coal have been estimated in beds 28 inches and more thick. This thickness is about the minimum now being mined by hand-loading onto conveyors in Pennsylvania. The weighted average percentage of recovery for all beds in Fayette County, including all mining losses, as determined by this investigation is 55.41. This recovery is based on the percentage of the total thickness of coal (less partings  $3/8$  inch thick or more) recovered from the mined-out areas in each bed rather than on the percentage of coal recovered from that portion of the bed mined. The highest average percentage of recovery is 66.97 for the Pittsburgh bed in the Brownsville quadrangle. The lowest is 50 percent estimated for the Waynesburg and Brookville-Clarion beds in the county. Based on the weighted average percentage of recovery for all beds in Fayette County, the recoverable reserves are estimated at 460 million short tons as of January 1, 1950.

4. The coals of this county are high-volatile A and medium-volatile bituminous rank.

5. The Fayette County coals generally are coking. However, coal from all beds except the Pittsburgh usually is blended when the coal is used to make metallurgical coke.

## INTRODUCTION

The investigation to evaluate the reserves of coking coal in the United States suitable for the manufacture of metallurgical coke is being made by the Bureau of Mines in three parts: (1) To estimate known (measured plus indicated) recoverable reserves of all coking coal; (2) to upgrade marginal coals through effective preparation; and (3) to study the carbonizing properties of coals and coal blends not now widely used for metallurgical coke making.

This is the sixth of a series of reports giving the results of studies by counties under part (1) of the investigation. (See appendix.) This report covers Fayette County, Pa., which comprises the Uniontown and parts of the Brownsville, Connellsville, Donegal, Waynesburg, Masontown, and Confluence, Pa., Morgantown and Bruceton, W. Va., and Accident, Md., quadrangles. (See fig. 1.) A short résumé of the chemical and carbonizing properties of the coals are included. Data on the coal beds in this county were obtained from mining companies, land companies, individual landowners, and other sources of authentic information.

A base map for each bed in each quadrangle was made to the scale 1 inch equals 1,200 feet. Maps of mines, locations of drill holes, bed and total coal thicknesses, and the outcrop of the bed were plotted on the maps. With all available data plotted, isopach lines were drawn to limit areas of known unmined reserves in beds 0 to 14 inches thick, 14 to 28 inches thick, 28 to 42 inches thick, and over 42 inches thick. These areas of coal reserves also were divided into "measured" and "indicated" categories. All areas in each thickness range and in each category, mined-out areas, areas excluded from the estimate, and areas outside of the outcrop were measured by planimeter on the base maps. Estimates of total reserves 14 inches and more thick and maps for individual beds were prepared from these data.

#### ACKNOWLEDGMENTS

The information contained in this report could not have been obtained without the whole-hearted cooperation of the officials of the companies and individual landowners whose property records were studied, and their cooperation and the courtesies extended are gratefully acknowledged. The advice and assistance of the Coal Resources Committees of both the National Bituminous Coal Advisory Council and American Institute of Mining and Metallurgical Engineers, members of the staffs of the U. S. Geological Survey, Pennsylvania Topographic and Geologic Survey, and Pennsylvania Department of Mines are appreciated. The investigation was under the general supervision of the principal coal mining engineer, Fuels and Explosives Division, Bureau of Mines, and the cooperation of the staff assigned to this study, especially John A. Bowsher, mining engineer who conducted the field work, is acknowledged.

#### PREMISES AND DEFINITIONS OF TERMS USED

An estimate of coal reserves is the opinion of an individual or group of individuals based on certain premises and limitations adopted for that estimate. Therefore, in order to make a comparison between estimates, it is necessary to compare not only the final results but also the premises on which the estimates are based. The definitions "measured" coal and "indicated" coal used in this report have been agreed upon by the Bureau of Mines and the United States Geological Survey. The premises and definitions of terms follow:

Coking coal. - All bituminous coals in the Appalachian region are potentially coking, and therefore, until the carbonization tests in part (3) of the study have been completed to determine the coking quality of the coals, all known reserves of coal in the county are included as coking coal. This should not be construed to mean that all coals included in this report are suitable for the manufacture of metallurgical coke according to present-day standards. However, the general trend is toward the use of lower-quality coals for metallurgical purposes.

Unit area. - The unit area used in estimating reserves is the 5-minute rectangle of the topographic quadrangle. The estimates for the nine 5-minute rectangles of a quadrangle are combined on a county basis.

Bed-thickness range. - Reserves in each coal bed are tabulated in bed-thickness ranges, as follows:

- 14 to 28 inches
- 28 to 42 inches
- 42 inches and more

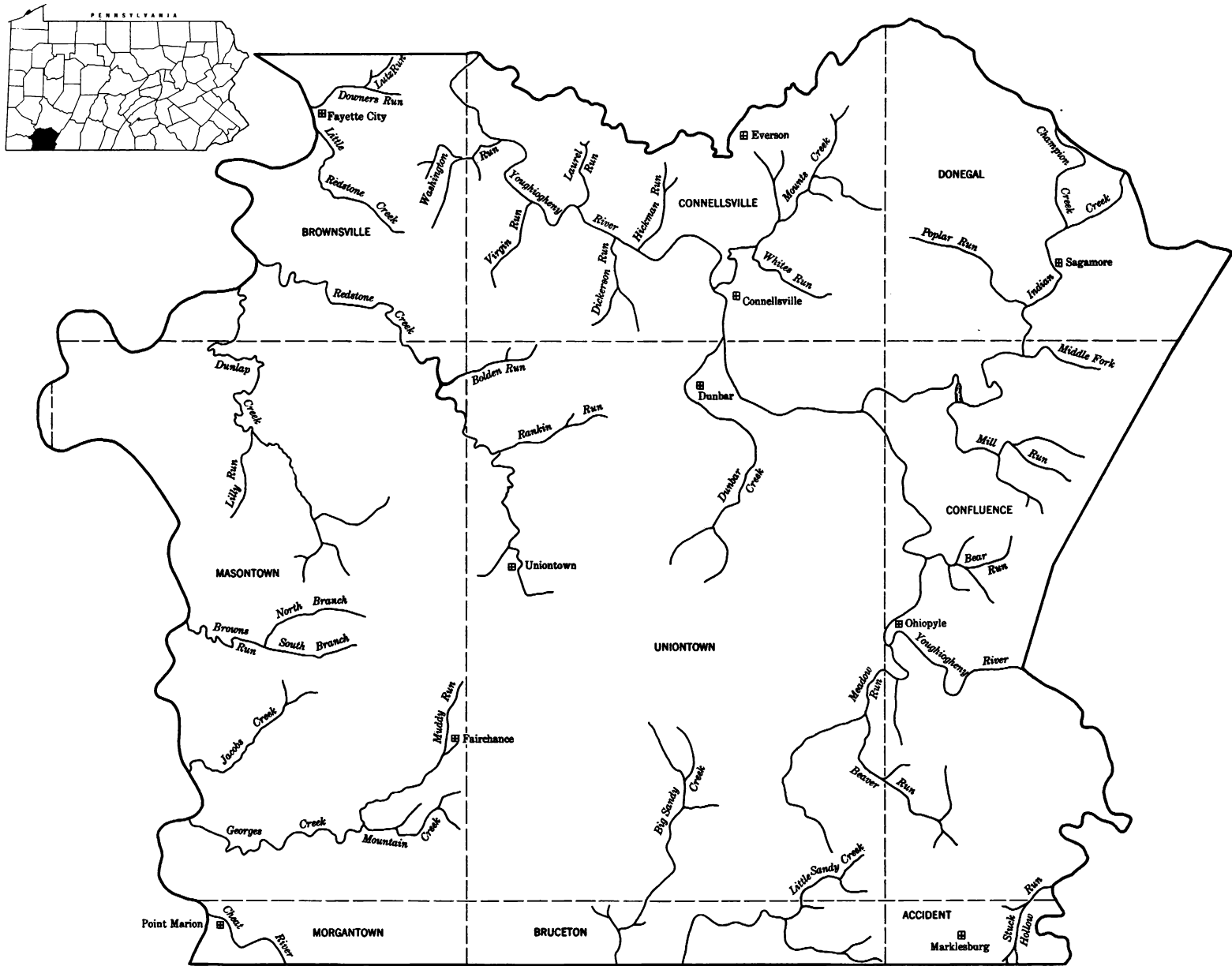


Figure 1. - Key map of Fayette County, Pa.



These measurements represent total bed thickness, including all coal and partings in the bed. If the top or bottom bench of a coal bed is separated from the remainder of the bed by a parting of equal or greater thickness than the bench and usually is not mined, such bench and parting are omitted in determining bed thickness.

Measured coal. - Measured coal is coal for which tonnage is computed from dimensions revealed in outcrops, trenches, mine workings, and drill holes. The points of observation and measurement are so closely spaced, and the thickness and extent of the coal is so well-defined that the computed tonnage is judged to be accurate within 20 percent or less of the true tonnage. The limits of accuracy of the estimate should be stated. Although the spacing of the points of observation necessary to demonstrate continuity of coal will vary in different regions according to the habit of the coal beds, the points of observation are, in general, about 1/2 mile apart. The outer limit of a block of measured coal, therefore, shall be about 1/4 mile from the last point of positive information (that is, roughly, one-half the distance between points of observation).

Where no data are available other than measurements along the outcrop, but where the continuity of the outcrop is measured in miles and suggests the presence of coal at great distances in from the outcrop, a smooth line drawn roughly 1/2 mile in from the outcrop shall be used to mark the limit under cover of a block of coal that can also be classed as measured.

Indicated coal. - Indicated coal is coal for which tonnage is computed partly from specific measurements and partly from projection of visible data for a reasonable distance on geologic evidence. In general, the points of observation are about 1 mile apart but may be as much as 1-1/2 miles for beds of known geologic continuity. For example, if drilling on 1/2-mile centers has proved a block of measured coal of fairly uniform thickness and extent, the area of measured coal, according to the judgment of the estimator, is larger than the actual area of drilling by as much as 1/4 mile on all sides. If, from geologic evidence, the bed is believed to have greater continuity, the area of measured coal is surrounded by a belt of indicated coal, which, according to the judgment of the appraiser, may be as much as 1-1/2 miles wide.

Where no data are available other than measurements along the outcrops, but where the continuity of the outcrop is measured in miles and suggests the presence of coal at great distances in from the outcrop, two lines drawn roughly parallel to the outcrop, one 1/2 mile in from the outcrop and one 2 miles in from the outcrop, define a block of coal that may be classed as indicated.

Inferred coal. - As no estimate of reserves has been made from geologic inference alone, inferred coal is not included in this report. This category would contain the largest reserves.

Areas excluded from estimate. - In each bed are areas where coal may be present but for which no estimates of reserves have been made. There are too few or no bed sections from drill holes, mine workings, or coal outcrops in the area on which to base estimates that would qualify under the definitions of "measured" or "indicated" reserves. These areas may contain additional geologically inferred reserves.

Overburden. - All known reserves in Fayette County are under less than 2,000 feet of overburden.

Thickness of coal. - In computing the volume of reserves in each thickness category for each bed, the total thickness of clean coal in the bed section is used. If the top

or bottom bench of coal described under definition of "bed-thickness range" usually is not mined, the thickness of the bench is not used to compute the volume of reserves. A weighted average thickness in each thickness category for each 5-minute rectangle of each bed is computed.

Weight of coal. - Estimated coal in place is based on 1,800 short tons per acre-foot.

Percentage of recovery. - The weighted average percentage of recovery is computed for each bed in each quadrangle. The total number of tons of coal produced from each mine is obtained from either the mine operator or the published reports of the Pennsylvania Department of Mines. An estimate is made of the tons of coal originally in place in the mined-out area of each mine. The percentage of recovery for each mine is the ratio of the total number of tons produced from a mine (to January 1, 1950, the date of this estimate) to the total tons originally in place in the mined-out area. The weighted average percentage of recovery for all mines in the same bed in a quadrangle is the percentage of recovery used in calculating recoverable reserves for that bed in the quadrangle.

All coal remaining for any reason within the mined-out area of a mine is considered a loss. No distinction is made between avoidable or unavoidable losses. Included in these losses is some coal considered too thin to mine, also coal that legally is required to be left unmined, such as coal under some highways, railroads, and rivers, coal left to protect gas and oil wells, and coal left in barrier pillars between mines and adjacent to property boundaries.

Recoverable reserves. - The recoverable reserves are the estimated tons of unmined coal in beds 28 inches and more thick, as of the date of the estimate, multiplied by the percentage of recovery. Twenty-eight inches is about the minimum thickness of coal being mined mechanically (hand-loaded conveyors) in central Pennsylvania. Some areas in some of the beds in this county may not be considered economically minable at present because of conditions considered adverse today.

#### COAL RESERVES

Detailed estimates of known measured and indicated reserves of coal in Fayette County, Pa., as of January 1, 1950, are given in tables 1 to 7, inclusive.



FAYETTE COUNTY

TABLE 1. - RESERVES IN WAYNESBURG BED, January 1, 1950

Quadrangle	1	2	3	4	5	6	7	8	Estimated coal reserves, in tons of 2,000 lb.						Total reserves, in tons of 2,000 lb.				19 Percentage recoverable, including all mining losses	20 Estimated recoverable reserves 28" and more thick, thousands of tons
	Area of quadrangle in county, acres	Areas excluded from estimate, 1/ acres	Area outside outcrop, acres	Underlain by coal 0" to 14" thick, acres	Coal over 14" thick, in place originally, acres	Mined out, acres	Coal over 14" thick remaining, acres	Measured Indicated	14" to 28" thick			28" to 42" thick			Over 42" thick					
									14" to 28" thick		28" to 42" thick		Over 42" thick		14" and more thick		28" and more thick			
									Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons		
Brownsville ...	39,642	6,890	29,016	326	3,410	-	3,410	Measured Indicated	411	1,119	357	1,929	2,642	17,395	3,410	20,443	2,999	19,324		9,662
								Total	411	1,119	357	1,929	2,642	17,395	3,410	20,443	2,999	19,324	2/50.00	9,662
Connellsville .	63,145	68	61,117	-	1,960	-	1,960	Measured Indicated	33	94	393	1,818	-	-	426	1,912	393	1,818		909
								Total	33	94	1,927	8,261	-	-	1,960	8,355	1,927	8,261	2/50.00	4,131
Masontown .....	111,154	14,713	82,013	181	14,247	33	14,214	Measured Indicated	235	834	1,920	10,496	12,059	108,044	14,214	119,374	13,979	118,540		59,270
								Total	235	834	1,920	10,496	12,059	108,044	14,214	119,374	13,979	118,540	2/50.00	59,270
Uniontown .....	146,379	1,332	132,299	-	12,748	-	12,748	Measured Indicated	529	1,644	3,092	17,411	-	-	3,621	19,055	3,092	17,411		8,706
								Total	757	2,157	8,370	35,154	-	-	9,127	37,311	8,370	35,154		17,577
								Total	1,286	3,801	11,462	52,565	-	-	12,748	56,366	11,462	52,565	2/50.00	26,283
								Measured Indicated	1,208	3,691	5,762	31,654	14,701	125,439	21,671	160,784	20,463	157,093		78,547
								Total	757	2,157	9,904	41,597	-	-	10,661	43,754	9,904	41,597		20,799
Total .....	360,320	23,003	304,445	507	32,365	33	32,332	Total	1,965	5,848	15,666	73,251	14,701	125,439	32,332	204,538	30,367	198,690	2/50.00	99,346

FAYETTE COUNTY

TABLE 2. - RESERVES IN SEWICKLEY BED, January 1, 1950

Quadrangle	1	2	3	4	5	6	7	8	Estimated coal reserves, in tons of 2,000 lb.						Total reserves, in tons of 2,000 lb.				19 Percentage recoverable, including all mining losses	20 Estimated recoverable reserves 28" and more thick, thousands of tons
	Area of quadrangle in county, acres	Areas excluded from estimate, 1/ acres	Area outside outcrop, acres	Underlain by coal 0" to 14" thick, acres	Coal over 14" thick, in place originally, acres	Mined out, acres	Coal over 14" thick remaining, acres	Measured Indicated	14" to 28" thick			28" to 42" thick			Over 42" thick					
									14" to 28" thick		28" to 42" thick		Over 42" thick		14" and more thick		28" and more thick			
									Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons		
Connellsville .	63,145	4,284	55,951	-	2,910	-	2,910	Measured Indicated	262	865	434	2,083	337	1,971	1,033	4,919	771	4,054		2,432
								Total	1,877	5,913	-	-	-	-	1,877	5,913	-	-	2/60.00	2,432
Masontown .....	111,154	32,534	60,379	6,837	11,404	4,479	6,925	Measured Indicated	543	1,831	254	1,411	1,383	12,731	2,180	15,973	1,637	14,142		8,484
								Total	2,867	8,660	672	3,528	1,206	10,444	4,745	22,632	1,878	13,972	2/60.00	8,384
Uniontown .....	146,379	9,103	123,317	5,211	8,748	1,298	7,450	Measured Indicated	1,738	5,498	1,279	6,716	4,433	38,390	7,450	50,604	5,712	45,106		27,064
								Total	1,738	5,498	1,279	6,716	4,433	38,390	7,450	50,604	5,712	45,106	2/60.00	27,064
Morgantown .....	10,639	113	10,424	-	102	-	102	Measured Indicated	-	-	-	-	75	529	75	529	75	529		317
								Total	-	-	-	-	27	191	27	191	27	191	2/60.00	115
								Total	-	-	-	-	102	720	102	720	102	720	2/60.00	432
								Measured Indicated	2,543	8,194	1,967	10,210	6,228	53,621	10,738	72,025	8,195	63,831		38,297
								Total	4,744	14,573	672	3,528	1,233	10,635	6,649	28,736	1,905	14,163		8,499
Total .....	331,317	46,034	250,071	12,048	23,164	5,777	17,387	Total	7,287	22,767	2,639	13,738	7,461	64,256	17,387	100,761	10,100	77,994	2/60.00	46,796

1/ No information available from core drilling, mine workings, or coal outcrops on which to base estimates of measured and indicated reserves. These areas may contain additional geologically inferred reserves.

2/ Estimated

FAYETTE COUNTY

TABLE 3. - RESERVES IN REDSTONE BED, January 1, 1950

Quadrangle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Area of quadrangle in county, acres	Areas excluded from estimate, <sup>1/</sup> acres	Area outside outcrop, acres	Underlain by coal 0" to 14" thick, acres	Coal over 14" thick, in place originally, acres	Mined out, acres	Coal over 14" thick remaining, acres	Measured Indicated	Estimated coal reserves, in tons of 2,000 lb.						Total reserves, in tons of 2,000 lb.				Percentage recoverable, including all mining losses	Estimated recoverable reserves 28" and more thick, thousands of tons
									14" to 28" thick		28" to 42" thick		Over 42" thick		14" and more thick		28" and more thick			
									Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons		
Brownsville ...	39,642	28,324	2,813	308	8,197	10	8,187	Measured Indicated	35	95	181	995	122	304	338	1,394	303	1,299		821
								Total	751	2,030	7,098	37,265	-	-	7,849	39,295	7,098	37,265	63.21	23,554
Connellsville .	63,145	27,639	35,296	32	178	-	178	Measured Indicated	176	544	2	11	-	-	178	555	2	11		7
								Total	-	-	-	-	-	-	-	-	-	-	63.21	7
								Measured Indicated	211	639	183	1,006	122	304	516	1,949	305	1,310		828
								Total	751	2,030	7,098	37,265	-	-	7,849	39,295	7,098	37,265		23,554
Total .....	102,787	55,963	38,109	340	8,375	10	8,365	Total	962	2,669	7,281	38,271	122	304	8,365	41,244	7,403	38,575	63.21	24,382

FAYETTE COUNTY

TABLE 4. - RESERVES IN PITTSBURGH BED, January 1, 1950

Quadrangle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Area of quadrangle in county, acres	Areas excluded from estimate, <sup>1/</sup> acres	Area outside outcrop, acres	Underlain by coal 0" to 14" thick, acres	Coal over 14" thick, in place originally, acres	Mined out, acres	Coal over 14" thick remaining, acres	Measured Indicated	Estimated coal reserves, in tons of 2,000 lb.						Total reserves, in tons of 2,000 lb.				Percentage recoverable, including all mining losses	Estimated recoverable reserves 28" and more thick, thousands of tons
									14" to 28" thick		28" to 42" thick		Over 42" thick		14" and more thick		28" and more thick			
									Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons		
Brownsville ...	39,642	-	6,728	-	32,914	31,935	979	Measured Indicated	-	-	-	-	979	12,920	979	12,920	979	12,920		8,644
								Total	-	-	-	-	979	12,920	979	12,920	979	12,920	66.90	8,644
Connellsville .	63,145	-	47,217	-	15,928	15,625	303	Measured Indicated	-	-	-	-	303	4,091	303	4,091	303	4,091		2,135
								Total	-	-	-	-	303	4,091	303	4,091	303	4,091	52.20	2,135
Masontown .....	111,154	-	41,259	-	69,895	63,785	6,110	Measured Indicated	-	-	-	-	6,110	<sup>2/</sup> 78,169	6,110	<sup>2/</sup> 78,169	6,110	<sup>2/</sup> 78,169		<sup>3/</sup> 44,889
								Total	-	-	-	-	6,110	<sup>2/</sup> 78,169	6,110	<sup>2/</sup> 78,169	6,110	<sup>2/</sup> 78,169	64.51	<sup>3/</sup> 44,889
Uniontown .....	146,379	-	120,242	-	26,137	23,263	2,874	Measured Indicated	-	-	-	-	2,874	36,213	2,874	36,213	2,874	36,213		24,074
								Total	-	-	-	-	2,874	36,213	2,874	36,213	2,874	36,213	66.48	24,074
Morgantown ....	10,639	-	8,952	-	1,687	1,657	30	Measured Indicated	-	-	-	-	30	324	30	324	30	324		209
								Total	-	-	-	-	30	324	30	324	30	324	64.51	209
								Measured Indicated	-	-	-	-	10,296	<sup>2/</sup> 131,717	10,296	<sup>2/</sup> 131,717	10,296	<sup>2/</sup> 131,717		<sup>3/</sup> 79,951
								Total	-	-	-	-	10,296	<sup>2/</sup> 131,717	10,296	<sup>2/</sup> 131,717	10,296	<sup>2/</sup> 131,717	64.90	<sup>3/</sup> 79,951
Total .....	370,959	-	224,398	-	146,561	136,265	10,296	Total	-	-	-	-	10,296	<sup>2/</sup> 131,717	10,296	<sup>2/</sup> 131,717	10,296	<sup>2/</sup> 131,717	64.90	<sup>3/</sup> 79,951

<sup>1/</sup> No information available from core drilling, mine workings, or coal outcrops on which to base estimates of measured and indicated reserves. These areas may contain additional geologically inferred reserves.

<sup>2/</sup> Includes 8,585,000 tons under river.

<sup>3/</sup> Reserves under river excluded, considered not recoverable.

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TABLE 5. - RESERVES IN UPPER FREEPORT (E) BED, January 1, 1950

Quadrangle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Area of quadrangle in county, acres	Areas excluded from estimate, <sup>1/</sup> acres	Area outside outcrop, acres	Underlain by coal 0" to 14" thick, acres	Coal over 14" thick, in place originally, acres	Mined out, acres	Coal over 14" thick remaining, acres	Measured Indicated	Estimated coal reserves, in tons of 2,000 lb.						Total reserves, in tons of 2,000 lb.				Percentage recoverable, including all mining losses	Estimated recoverable reserves 28" and more thick, thousands of tons
									14" to 28" thick		28" to 42" thick		Over 42" thick		14" and more thick		28" and more thick			
									Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons		
Brownsville ...	39,642	32,680	-	-	6,962	-	6,962	Measured Indicated	-	-	-	-	4,693	42,313	4,693	42,313	4,693	42,313		22,396
								Total	-	-	-	-	6,962	61,769	6,962	61,769	6,962	61,769	52.93	32,694
Connellsville .	63,145	44,786	13,252	119	4,988	250	4,738	Measured Indicated	695	2,133	499	2,066	3,544	23,754	4,738	27,953	4,043	25,820		13,666
								Total	695	2,133	499	2,066	3,544	23,754	4,738	27,953	4,043	25,820	52.93	13,666
Donegal .....	43,385	1,026	30,694	512	11,153	-	11,153	Measured Indicated	1,888	6,124	3,327	15,677	283	2,123	5,498	23,924	3,610	17,800		9,421
								Total	3,678	11,453	1,977	8,897	-	-	5,655	20,350	1,977	8,897	52.93	4,709
Uniontown .....	146,379	59,913	75,289	-	11,177	-	11,177	Measured Indicated	-	-	3,526	16,309	4,576	38,627	8,102	54,936	8,102	54,936		29,078
								Total	-	-	2,449	11,532	626	5,165	3,075	16,697	3,075	16,697	52.93	8,838
Confluence ....	71,160	8,360	56,140	-	6,660	-	6,660	Measured Indicated	242	908	4,934	23,827	185	1,166	5,361	25,901	5,119	24,993		13,229
								Total	-	-	1,299	5,846	-	-	1,299	5,846	1,299	5,846	52.93	3,094
Bruceston .....	16,880	5,560	8,487	-	2,833	-	2,833	Measured Indicated	371	1,380	266	1,277	257	2,013	894	4,670	523	3,290		1,742
								Total	1,422	4,479	-	-	517	3,335	1,939	7,814	517	3,335	52.93	1,765
Accident .....	6,984	2,702	1,292	-	2,990	-	2,990	Measured Indicated	-	-	926	5,000	392	2,705	1,318	7,705	1,318	7,705		4,078
								Total	-	-	1,672	8,778	-	-	1,672	8,778	1,672	8,778	52.93	4,646
Total .....	387,575	155,027	185,154	631	46,763	250	46,513	Total	3,196	10,545	13,478	64,156	13,930	112,701	30,604	187,402	27,408	176,857	52.93	93,610
									5,100	15,932	7,397	35,053	3,412	27,956	15,909	78,941	10,809	63,009		33,350
									8,296	26,477	20,875	99,209	17,342	140,657	46,513	266,343	38,217	239,866	52.93	126,960

<sup>1/</sup> No information available from core drilling, mine workings, or coal outcrops on which to base estimates of measured and indicated reserves. These areas may contain additional geologically inferred reserves.

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TABLE 6. - RESERVES IN LOWER KITTANNING (B) BED, January 1, 1950

Quadrangle	1	2	3	4	5	6	7	8	Estimated coal reserves, in tons of 2,000 lb.						Total reserves, in tons of 2,000 lb.				19 Percentage recoverable, including all mining losses	20 Estimated recoverable reserves 28" and more thick, thousands of tons
	Area of quadrangle in county, acres	Areas excluded from estimate, 1/ acres	Area outside outcrop, acres	Underlain by coal 0" to 14" thick, acres	Coal over 14" thick, in place originally, acres	Mined out, acres	Coal over 14" thick remaining, acres	Measured Indicated	14" to 28" thick		28" to 42" thick		Over 42" thick		14" and more thick		28" and more thick			
									Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons		
Connellsville .	63,145	51,130	8,650	124	3,241	-	3,241	Measured Indicated	32	130	3,209	16,519	-	-	3,241	16,649	3,209	16,519		9,043
								Total	32	130	3,209	16,519	-	-	3,241	16,649	3,209	16,519	54.74	9,043
Donegal .....	43,385	3,863	19,646	84	19,792	2,954	16,838	Measured Indicated	1,736	6,250	7,750	40,672	3,435	23,258	12,921	70,180	11,185	63,930		34,995
								Total	1,736	6,250	11,667	60,078	3,435	23,258	16,838	89,586	15,102	83,336	54.74	45,618
Uniontown .....	146,379	100,401	37,224	-	8,754	-	8,754	Measured Indicated	2,694	10,459	4,547	20,864	56	445	7,297	31,768	4,603	21,309		11,664
								Total	4,151	16,130	4,547	20,864	56	445	8,754	37,439	4,603	21,309	54.74	11,664
Confluence ....	71,160	21,026	43,203	80	6,851	-	6,851	Measured Indicated	1,769	6,070	466	2,234	155	977	2,390	9,281	621	3,211		1,758
								Total	6,065	19,602	631	3,076	155	977	6,851	23,655	786	4,053	54.74	2,219
								Measured Indicated	6,231	22,909	15,972	80,289	3,646	24,680	25,849	127,878	19,618	104,969		57,460
								Total	5,753	19,203	4,082	20,248	-	-	9,835	39,451	4,082	20,248		11,084
Total .....	324,069	176,420	108,723	288	38,638	2,954	35,684	Total	11,984	42,112	20,054	100,537	3,646	24,680	35,684	167,329	23,700	125,217	54.74	68,544

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TABLE 7. - RESERVES IN BROOKVILLE-CLARION BED, January 1, 1950

Quadrangle	1	2	3	4	5	6	7	8	Estimated coal reserves, in tons of 2,000 lb.						Total reserves, in tons of 2,000 lb.				19 Percentage recoverable, including all mining losses	20 Estimated recoverable reserves 28" and more thick, thousands of tons
	Area of quadrangle in county, acres	Areas excluded from estimate, 1/ acres	Area outside outcrop, acres	Underlain by coal 0" to 14" thick, acres	Coal over 14" thick, in place originally, acres	Mined out, acres	Coal over 14" thick remaining, acres	Measured Indicated	14" to 28" thick		28" to 42" thick		Over 42" thick		14" and more thick		28" and more thick			
									Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons	Acres	Thousands of tons		
Connellsville .	63,145	55,100	7,685	40	320	-	320	Measured Indicated	298	895	22	99	-	-	320	994	22	99		50
								Total	298	895	22	99	-	-	320	994	22	99	2/50.00	50
Donegal .....	43,385	27,336	15,929	-	120	-	120	Measured Indicated	-	-	63	340	57	479	120	819	120	819		410
								Total	-	-	63	340	57	479	120	819	120	819	2/50.00	410
Uniontown .....	146,379	96,432	47,488	-	2,459	-	2,459	Measured Indicated	101	270	128	647	2,230	19,851	2,459	20,768	2,358	20,498		10,249
								Total	101	270	128	647	2,230	19,851	2,459	20,768	2,358	20,498	2/50.00	10,249
Confluence ....	71,160	34,301	35,128	-	1,731	-	1,731	Measured Indicated	297	1,006	1,363	6,542	71	596	1,731	8,144	1,434	7,138		3,569
								Total	297	1,006	1,363	6,542	71	596	1,731	8,144	1,434	7,138	2/50.00	3,569
								Measured Indicated	696	2,171	1,576	7,628	2,358	20,926	4,630	30,725	3,934	28,554		14,278
								Total	696	2,171	1,576	7,628	2,358	20,926	4,630	30,725	3,934	28,554	2/50.00	14,278
Total .....	324,069	213,169	106,230	40	4,630	-	4,630	Total	696	2,171	1,576	7,628	2,358	20,926	4,630	30,725	3,934	28,554	2/50.00	14,278

1/ No information available from core drilling, mine workings, or coal outcrops on which to base estimates of measured and indicated reserves. These areas may contain additional geologically inferred reserves.

2/ Estimated

Table 8 is a recapitulation by beds in Fayette County. Reserves in all beds 14 inches and more thick are estimated at 942,657,000 short tons as of January 1, 1950. Of this total, 840,613,000 short tons are in beds 28 inches and more thick. Recoverable reserves in beds 28 inches and more thick are estimated at 460,257,000 tons.

TABLE 8. - Recapitulation of reserves, Fayette County, Pa.,  
January 1, 1950

Bed	Thousands of tons		Recoverable <sup>1/</sup>	
	In beds 14 inches and more thick	In beds 28 inches and more thick	Percentage	Thousands of tons
Waynesburg.....	204,538	198,690	2/50.00	99,346
Sewickley.....	100,761	77,994	2/60.00	46,796
Redstone.....	41,244	38,575	63.21	24,382
Pittsburgh.....	3/131,717	3/131,717	64.90	4/79,951
Upper Freeport.....	266,343	239,866	52.93	126,960
Lower Kittanning.....	167,329	125,217	54.74	68,544
Brookville-Clarion.....	30,725	28,554	2/50.00	14,278
Total.....	3/942,657	3/840,613	55.41	4/460,257

<sup>1/</sup> Based on reserves in beds 28 inches and more thick.

<sup>2/</sup> Estimated.

<sup>3/</sup> Includes 8,585,000 tons under river.

<sup>4/</sup> Reserves under river excluded; considered not recoverable.

The weighted average percentage recovery for each bed in the county is shown in tables 1 to 7, inclusive. The highest percentage of recovery is 66.97 for the Pittsburgh bed in the Brownsville quadrangle. The lowest is 50 percent estimated for the Waynesburg and Brookville-Clarion beds. The weighted average percentage of recovery, including all mining losses for all beds in the county, is 55.41. Based on this recovery for all beds, the known recoverable reserves 28 inches and more thick in Fayette County are estimated at 460,257,000 short tons as of January 1, 1950.

Reese and Sisler<sup>5/</sup> estimated coal reserves 18 inches and more thick in 1922 for Fayette County. This estimate was based on 1,687.5 short tons per acre-foot of coal in place and on a recovery of 60.1 percent (recoverable reserves divided by original tons less mined-out and lost tons). Ashley<sup>6/</sup> revised the Reese-Sisler estimates to bring them up to the end of 1942. The revisions were based on studies made after 1922, which were assumed to be characteristic of the bituminous coal field of Pennsylvania as a whole.

One of the studies made after 1922 was by Moyer<sup>7/</sup> on the coal reserves of Fayette County. Ashley used the Moyer estimate as a basis for the revision of reserve estimates for Fayette County in lieu of the Reese-Sisler estimate. Both the Moyer and the Reese-and-Sisler estimates include inferred reserves and, therefore,

<sup>5/</sup> Reese, John F., and Sisler, James D., Bituminous Coal Fields of Pennsylvania. Coal Resources: Pennsylvania Geol. Survey Bull. M-6, pt. 3, 1928, 153 pp.

<sup>6/</sup> Ashley, George H., Pennsylvania's Mineral Heritage: Part 2, Mineral Resources: Commonwealth of Pennsylvania, Department of Internal Affairs, 1944, pp. 81-82.

<sup>7/</sup> Hickok, W. O., IV, and Moyer, E. T., Geology and Mineral Resources of Fayette County, Pennsylvania: Pennsylvania Geol. Survey Bull. C-26, 1940, 530 pp.

each of these estimates show larger areas of reserves than this report shows for Fayette County. Table 9 is a comparison of areas of original reserves in each bed in the Reese-Sisler, the Moyer, and the Bureau of Mines estimates.

TABLE 9. - Comparison of areas of original reserves, Fayette County, Pa.

Bed	Acres		
	Reese and Sisler	Moyer	Bureau of Mines
Waynesburg.....	45,888	51,522	32,872
Sewickley.....	27,456	39,943	35,212
Redstone.....	33,280	27,245	8,715
Pittsburgh.....	143,104	145,471	146,541
Upper Freeport.....	310,528	321,386	47,394
Upper Kittanning.....	19,840	17,500	-
Lower Kittanning.....	57,600	265,582	38,926
Brookville-Clarion.....	-	161,327	4,670
Total.....	637,696	1,029,976	<u>1</u> /314,330

1/ In addition are areas that may contain geologically inferred reserves (column 2, tables 1 to 7, inclusive).

On the basis of acres of reserves in each bed, the estimates show considerable differences, except in the Pittsburgh bed. This bed has been opened in so many places and the bed characteristics are so well-known that the estimates are very close.

The previous estimates are compared with the Bureau of Mines estimate in table 10.

TABLE 10. - Comparison of estimates of reserves, Fayette County, Pa.

Estimate made by.....	Reese and Sisler	Moyer	Ashley	Bureau of Mines
Year made.....	1922	1938	1942	1950
Minimum bed thickness of reserves, inches.....	18	<u>1</u> /26	12	14
Total bed area of reserves, acres.....	637,696	1,029,976	<u>2</u> /1,029,976	<u>3</u> /314,330
Total remaining reserves, millions of tons.....	<u>4</u> /4,330	<u>4</u> /5,633	<u>4</u> /5,565	943
Minimum bed thickness of recoverable reserves, inches.....	18	26	24	28
Recoverable reserves as of date of estimate, millions of tons.....	2,604	3,434	2,805	460
Production, Fayette County, from year of estimate to January 1, 1950, millions of tons	578	228	131	-
Remaining recoverable reserves, January 1, 1950, millions of tons	2,026	3,206	2,674	460

1/ No minimum stated in report, but 26 inches is minimum thickness given in tabulations.

2/ Ashley used the Moyer estimates as basis for Fayette County estimates.

3/ In addition are areas that may contain geologically inferred reserves (column 2, tables 1 to 7, inclusive).

4/ Original deposit less mined out and lost.

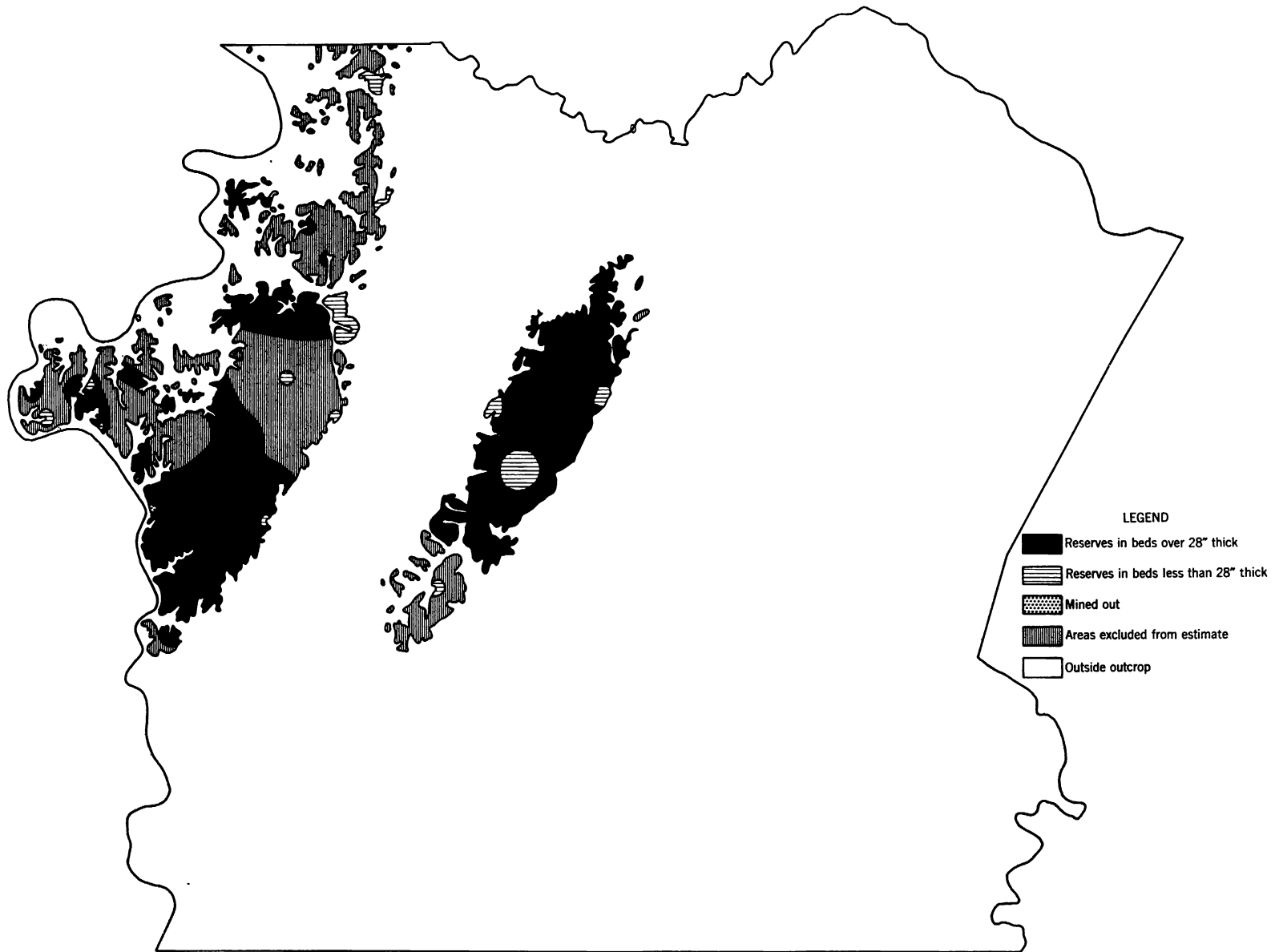


Figure 2. - Waynesburg bed, Fayette County, Pa., January 1, 1950.





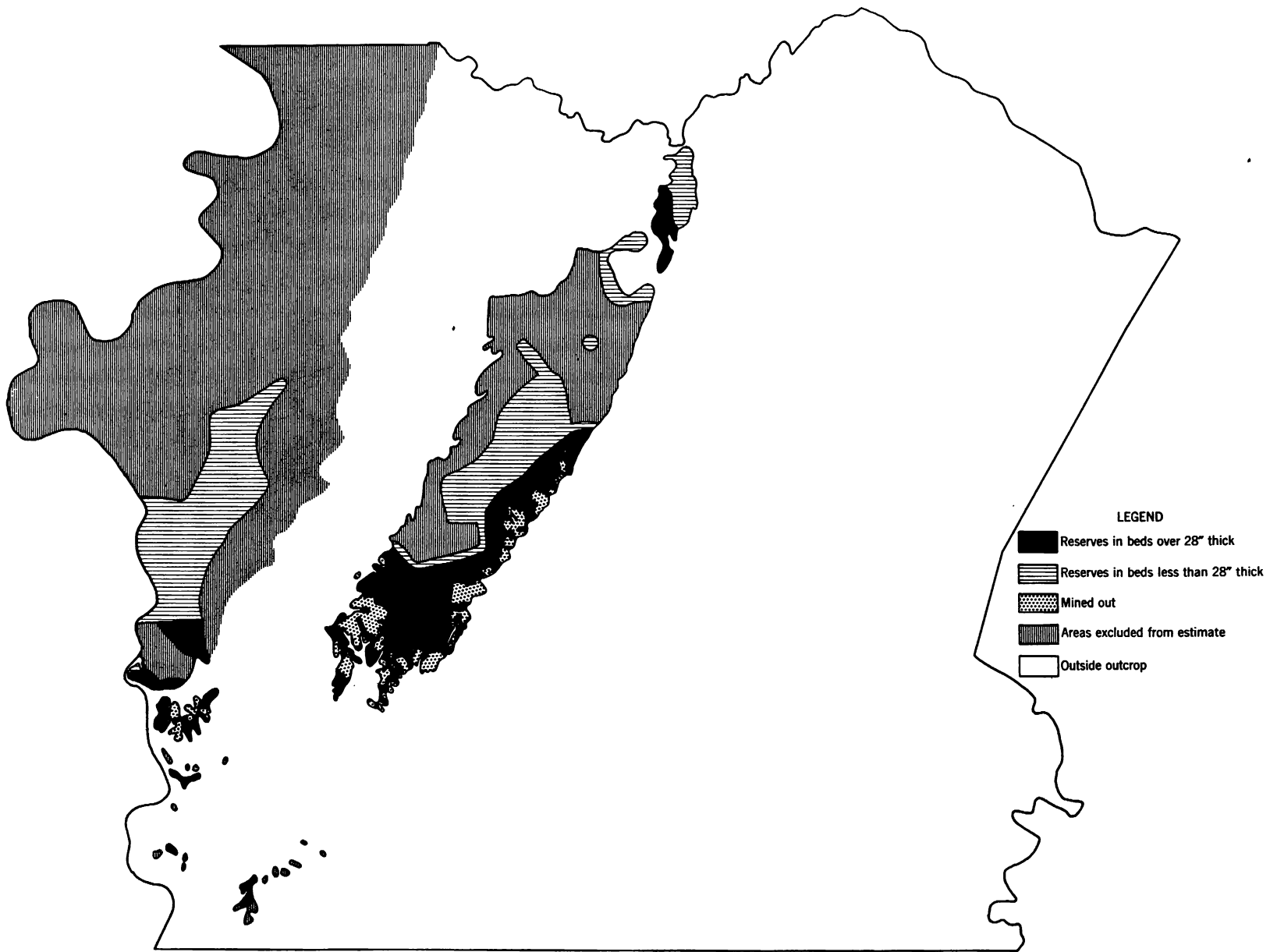


Figure 3. - Sewickley bed, Fayette County, Pa., January 1, 1950.



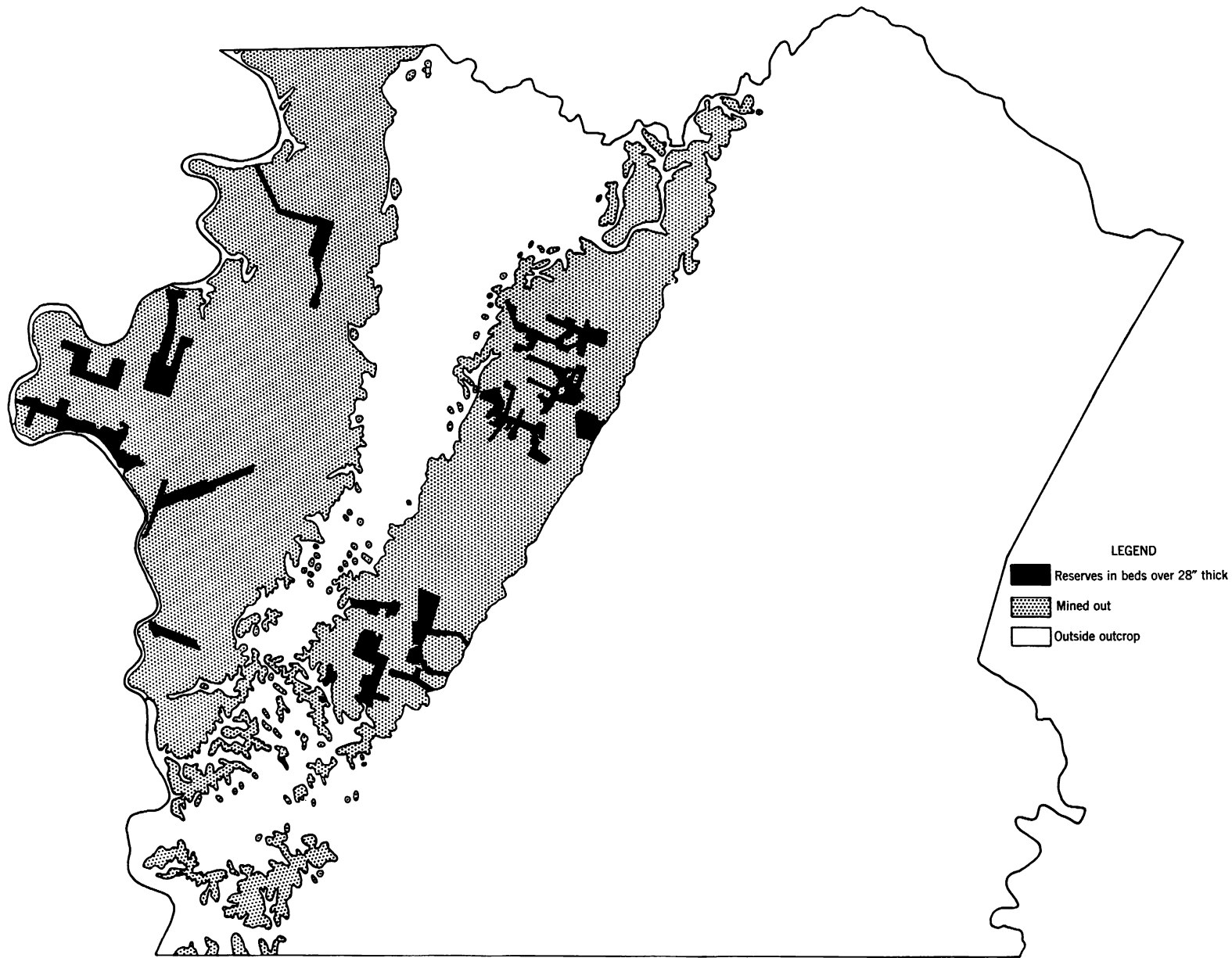


Figure 4. - Pittsburgh bed, Fayette County, Pa., January 1, 1950.



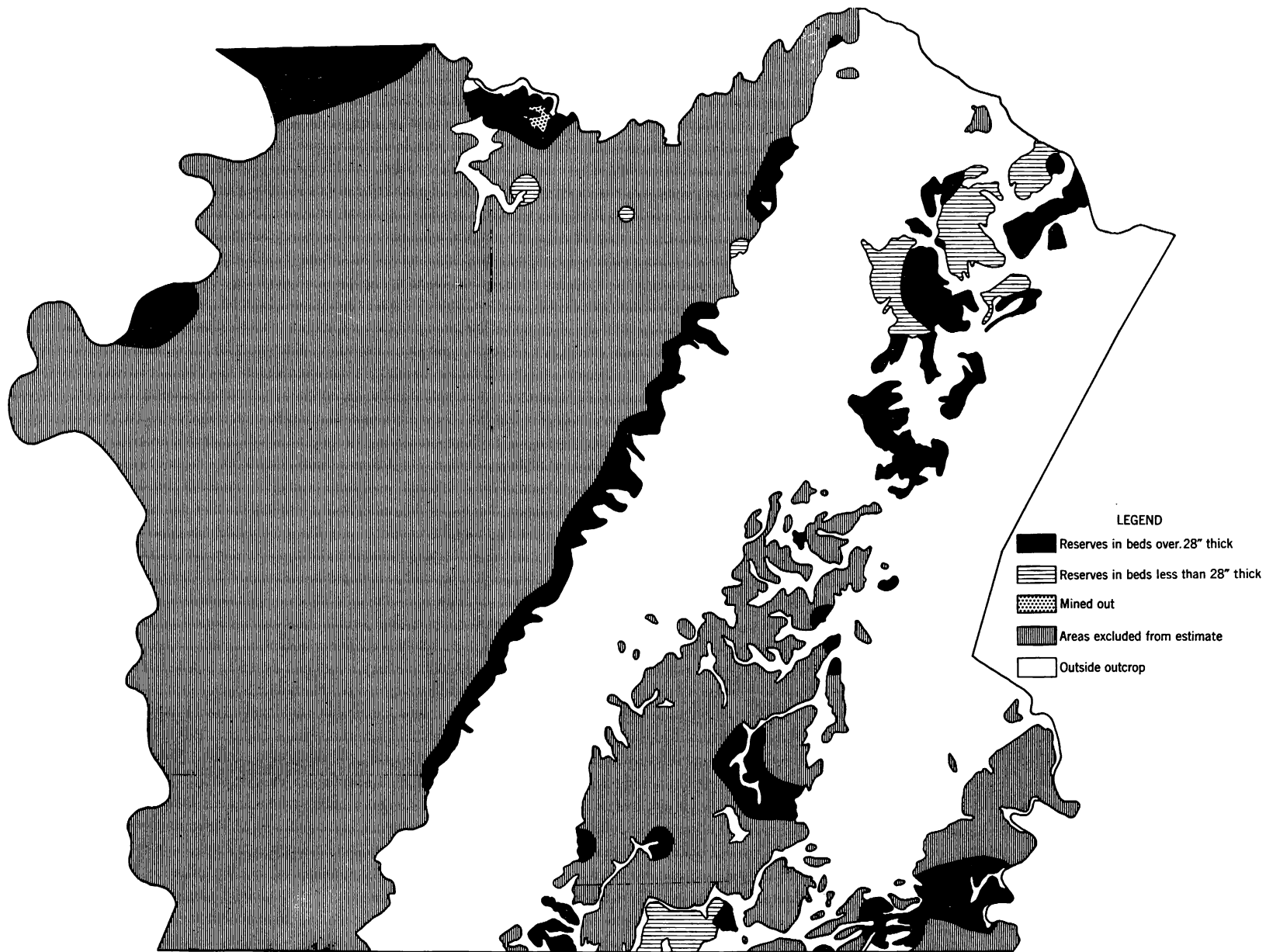


Figure 5. - Upper Freeport bed, Fayette County, Pa., January 1, 1950.



## COAL BEDS

The coal beds occurring in Fayette County in which known recoverable reserves have been estimated are, in descending order:

Waynesburg  
Sewickley  
Redstone  
Pittsburgh  
Upper Freeport  
Lower Kittanning  
Brookville-Clarion

The Pittsburgh and Sewickley beds are of major importance from the standpoint of present production, but the largest remaining reserves are in the Upper Freeport bed. The Waynesburg, Sewickley, Redstone, and Pittsburgh beds are in the Monongahela group, and the other beds are in the Allegheny group, Pennsylvanian period. Coal beds other than those for which estimates have been prepared occur in the county, but sufficient information is not available to make estimates of reserves.

Maps have been prepared for the Waynesburg, Sewickley, Pittsburgh, and Upper Freeport beds. (See figs. 2 to 5.) Maps of the Redstone, Lower Kittanning, and Brookville-Clarion beds were not prepared because too little information regarding the thickness and extent of the beds is available.

The characteristics of the mapped coal beds are shown by bed sections taken from diamond-drill logs, mine maps, and outcrop data furnished by owners and lessees of the coal. Some outcrop bed sections are taken from published reports of the Pennsylvania Geological Survey. All of the bed sections given are within the areas of recoverable reserves 28 inches and more thick (black areas on the maps). They have been selected to show bed characteristics throughout the areas and to indicate the irregularity of the beds.

Descriptions of the coal beds that have been mapped and the selected bed sections follow.

### Waynesburg Bed

(See fig. 2 and table 1.)

The Waynesburg bed, although not important at this time, has been mapped because of the numerous bed sections available. The bed usually occurs as a multiple bed, but the coal is high in ash and sulfur. Areas of reserves are in the central and northwestern parts of the county. Selections of the bed in areas of remaining recoverable reserves follow:

#### Central Part of County

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	17	COAL.....	22
Parting.....	3	Parting.....	3
COAL.....	<u>15</u>	COAL.....	<u>14</u>
Thickness.....	35	Thickness.....	39
COAL.....	<u>36</u>		
Thickness.....	36		

Northwestern Part of County

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	13	COAL.....	18
Parting.....	2	Parting.....	2
COAL.....	28	COAL.....	25
Parting.....	8	Parting.....	12
COAL.....	<u>26</u>	COAL.....	<u>30</u>
Thickness.....	77	Thickness.....	87
COAL.....	27	COAL.....	18
Parting.....	10	Parting.....	12
COAL.....	<u>30</u>	COAL.....	18
Thickness.....	67	Parting.....	42
		COAL.....	<u>24</u>
COAL.....	18	Thickness.....	114
Parting.....	4		
COAL.....	23	COAL.....	10
Parting.....	7	Parting.....	7
COAL.....	<u>5</u>	COAL.....	18
Thickness.....	57	Parting.....	5
		COAL.....	<u>36</u>
COAL.....	10	Thickness.....	76
Parting.....	4		
COAL.....	7	COAL.....	21
Parting.....	1	Parting.....	7
COAL.....	<u>33</u>	COAL.....	<u>15</u>
Thickness.....	55	Thickness.....	43

Sewickley Bed

(See fig. 3 and table 2.)

The Sewickley usually is a two-bench bed occurring from 120 to 180 feet above the Pittsburgh bed. It has been opened by numerous mines in the south-central and southwestern parts of the county. The bed thins to the north both in the central and western areas of reserves. Bed sections taken at the outcrops show thicker coal than sections from shafts and drill holes in from the outcrop.

Sections of the bed in areas of remaining recoverable reserves follow:

South-central Part of County

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	28	COAL.....	22
Parting.....	1	Parting.....	6
COAL.....	<u>36</u>	COAL.....	<u>26</u>
Thickness.....	65	Thickness.....	54



<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	4	COAL.....	37
Parting.....	1	Parting.....	4
COAL.....	28	COAL.....	<u>20</u>
Parting.....	2		
COAL.....	<u>30</u>	Thickness.....	61
Thickness.....	65		

Southwestern Part of County

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	40	COAL.....	35
Parting.....	3	Parting.....	9
COAL.....	<u>20</u>	COAL.....	6
		Parting.....	5
Thickness.....	63	COAL.....	<u>16</u>
		Thickness.....	71
COAL.....	33		
Parting.....	3		
COAL.....	<u>26</u>		
Thickness.....	62		

Pittsburgh Bed

(See fig. 4 and table 4.)

The Pittsburgh bed has been the most important bed in the county for many years. It is thick and is valuable as a source of coal used in the manufacture of metallurgical coke. Virtually the entire area of the bed has been developed by mining, and the remaining reserves are principally unmined pillars left by first-mining. In many areas of the Pittsburgh bed in Fayette County, second and third mining has been done or is now in progress. Thus, in some areas shown as mined out on the map, small production may be obtained for several years after abandonment of large-scale operations.

Sections of the bed in areas of remaining recoverable reserves follow:

Central Part of County

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	56	COAL.....	51
Parting.....	1/2	Parting.....	1/2
COAL.....	2	COAL.....	2
Parting.....	1/2	Parting.....	1/2
COAL.....	<u>36</u>	COAL.....	<u>36</u>
Thickness.....	95	Thickness.....	90

<u>Material</u>	<u>Inches</u>
COAL.....	42
Parting.....	1
COAL.....	3
Parting.....	1
COAL.....	<u>36</u>
Thickness.....	83

<u>Material</u>	<u>Inches</u>
COAL.....	48
Parting.....	1/2
COAL.....	2-1/2
Parting.....	1/2
COAL.....	<u>34</u>
Thickness.....	85-1/2

COAL.....	22
Parting.....	1/2
COAL.....	21
Parting.....	1/2
COAL.....	5
Parting.....	1/2
COAL.....	<u>40</u>
Thickness.....	89-1/2

Western Part of County

<u>Material</u>	<u>Inches</u>
COAL.....	51
Parting.....	1/2
COAL.....	4
Parting.....	1/2
COAL.....	<u>34</u>
Thickness.....	90
COAL.....	47
Parting.....	1/2
COAL.....	2
Parting.....	1/2
COAL.....	<u>31</u>
Thickness.....	81

<u>Material</u>	<u>Inches</u>
COAL.....	45
Parting.....	1/2
COAL.....	5
Parting.....	1/2
COAL.....	<u>35</u>
Thickness.....	86
COAL.....	55
Parting.....	1-1/2
COAL.....	3
Parting.....	1-1/2
COAL.....	<u>30</u>
Thickness.....	91

COAL.....	24
Parting.....	1-1/4
COAL.....	17
Parting.....	1/4
COAL.....	3-1/2
Parting.....	1/4
COAL.....	<u>40-1/2</u>
Thickness.....	86-3/4

COAL.....	50
Parting.....	1/2
COAL.....	2
Parting.....	1/2
COAL.....	<u>36</u>
Thickness.....	89

Upper Freeport Bed

(See fig. 5 and table 5.)

The Upper Freeport bed contains the largest known recoverable reserves of any bed in the county, despite large areas excluded from the estimate because of insufficient information on bed characteristics. In the western part of the county, there has not been enough prospecting by drilling to obtain the necessary data on which to estimate reserves. Outcrop sections of the bed show the Upper Freeport to be variable in thickness. Known reserves in the northwest quarter of the county adjoining Westmoreland and Washington counties are in a bed 5-1/2 to 7 feet thick. Sections of the Upper Freeport in areas of remaining recoverable reserves follow:

Northwest Part of County

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	61-1/2	COAL.....	68
Parting.....	13	Parting.....	10
COAL.....	<u>3</u>	COAL.....	<u>4</u>
Thickness.....	77-1/2	Thickness.....	82
COAL.....	5	COAL.....	<u>66</u>
Parting.....	3	Thickness.....	66
COAL.....	33		
Parting.....	1	COAL.....	39
COAL.....	<u>13</u>	Parting.....	3
Thickness.....	55	COAL.....	13
		Parting.....	2
COAL.....	24	COAL.....	<u>4</u>
Parting.....	12	Thickness.....	91
COAL.....	<u>2</u>		
Thickness.....	38		

Central Part of County

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	17	COAL.....	37
Parting.....	4	Parting.....	2
COAL.....	<u>12</u>	COAL.....	16
Thickness.....	33	Parting.....	1
		COAL.....	<u>6</u>
		Thickness.....	62
COAL.....	24		
Parting.....	2	COAL.....	29
COAL.....	14	Parting.....	2
Parting.....	12	COAL.....	5
COAL.....	10	Parting.....	1
Parting.....	3	COAL.....	<u>4</u>
COAL.....	<u>21</u>	Thickness.....	41
Thickness.....	86		

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	13	COAL.....	17
Parting.....	2	Parting.....	4
COAL.....	9	COAL.....	3
Parting.....	11	Parting.....	1
COAL.....	<u>8</u>	COAL.....	<u>6</u>
Thickness.....	43	Thickness.....	31

Eastern Part of County

<u>Material</u>	<u>Inches</u>	<u>Material</u>	<u>Inches</u>
COAL.....	25	COAL.....	23
Parting.....	7	Parting.....	2
COAL.....	20	COAL.....	18
Parting.....	1	Parting.....	3
COAL.....	<u>3</u>	COAL.....	5
Thickness.....	56	Parting.....	2
		COAL.....	<u>29</u>
COAL.....	20	Thickness.....	88
Parting.....	2		
COAL.....	<u>14</u>	COAL.....	31
Thickness.....	36	Parting.....	6
		COAL.....	<u>12</u>
COAL.....	20	Thickness.....	49
Parting.....	2		
COAL.....	<u>16</u>		
Thickness.....	38		

ANALYSES OF FAYETTE COUNTY COALS

The chemical analyses in table 11 are arranged stratigraphically for the major coal-producing beds. Most of the analyses are of composite samples made by combining three or more mine samples to obtain a mine average. As these are mine samples, the quality of coal indicated generally is higher than that of tippie samples. The coal classified by rank falls into the high-volatile A and medium-volatile bituminous groups. Generally, the coal west of Chestnut Ridge is in the high-volatile A bituminous group, and that east of the ridge is in the medium-volatile bituminous group.

The analyses are arranged alphabetically according to towns for each bed and have, for the most part, been published in Technical Paper 590, "Analyses of Pennsylvania Bituminous Coals." Those published for the first time in this report are indicated by footnote 3 in column 2 of table 11.

TABLE 11. - Analyses of Fayette County coals

Location 1	Bed 2	Rank <sup>1/</sup> 3	Kind of sample <sup>2/</sup> 4	As-	Dry basis					
				received Moist. 5	Vol. 6	F.C. 7	Ash 8	Sul. 9	B.t.u. 10	
Brownsville										
1-1/2 mi. SE. of Dunbar	Waynesburg	Hvab	M	2.1	35.6	50.4	14.0	2.9	12,980	
1 mi. W. of Gates	do.	do.	M	3.2	30.6	46.0	23.4	3.3	11,500	
1/2 mi. E. of Fairchance	do.	do.	M	3.7	33.1	53.2	13.7	1.3	12,850	
Hopwood	Sewickley	do.	M	1.8	35.1	52.7	12.2	3.8	13,310	
1 mi. W. of Lemont Furnace	do.	do.	M	2.8	34.7	54.2	11.1	3.0	13,570	
Masontown	do.	do.	M	1.8	33.3	54.7	12.0	3.4	13,320	
3/4 mi. S. of Morris Crossroads	do.	do.	M	4.1	34.7	51.2	14.1	2.3	13,040	
New Geneva	do. <sub>3/</sub>	do.	M	1.5	31.1	54.6	14.3	2.5	12,800	
1/2 mi. N. of Revere	do.	do.	M	2.1	36.7	53.2	10.1	3.3	13,500	
1/4 mi. E. of Uniontown	do.	do.	M	2.2	34.8	55.2	10.0	3.0	13,630	
1 mi. E. of Masontown	do. <sub>3/</sub>	do.	M	2.5	28.4	57.4	14.2	3.8	13,070	
1/2 mi. S. of Morris Crossroads	Redstone	do.	M	3.2	34.9	56.9	8.2	2.7	13,850	
Star Junction	do. <sub>3/</sub>	do.	M	3.2	31.3	57.7	11.0	1.3	13,550	
Edenbarn	do. <sub>3/</sub>	do.	T	2.1	30.7	53.4	15.9	2.0	12,700	
East Millsboro	Pittsburgh	do.	M	1.8	33.6	59.3	7.1	1.2	14,170	
Fairchance	do.	do.	M	2.5	36.6	55.0	8.4	1.8	14,100	
1-1/2 mi. SW. of Leisenring	do.	do.	M	4.5	31.8	61.0	7.2	1.1	14,150	
Masontown	do.	do.	M	2.4	32.7	56.5	10.8	1.0	13,660	
1 mi. NW. of Mt. Braddock	do.	do.	M	2.5	34.2	57.6	8.2	1.0	14,010	
New Geneva	do.	do.	M	1.6	33.0	58.8	8.2	1.1	14,070	
2-1/2 mi. SE. of Oliphant	do.	do.	M	3.7	36.2	56.9	6.9	2.4	14,140	
Point Marion	do.	do.	M	2.9	31.9	61.7	6.4	1.0	14,300	
1 mi. SE. of 2 mi. N. of Revere	do.	do.	M	2.4	36.6	56.1	7.3	2.1	14,160	
1/4 mi. E. of Waltersburg	do.	do.	M	3.6	35.7	57.6	6.7	2.0	14,140	
1 mi. S. of Dunbar	do.	do.	M	3.4	30.7	60.9	8.4	1.3	14,080	
1/2 mi. S. of 2 mi. SE. of Layton	Upper Freeport	do.	M	2.1	31.6	55.1	13.3	2.5	13,220	
1 mi. N. of Somersfield	do. <sub>3/</sub>	Mvb	M	2.2	24.7	59.2	16.1	2.6	12,760	
1/4 mi. W. of Uniontown	do.	Hvab	M	2.3	34.7	58.4	6.9	2.2	14,230	
3 mi. E. of Whitehouse	do.	Mvb	M	2.1	25.4	57.9	16.7	3.4	12,740	
1/4 mi. E. of Dunbar	do.	Hvab	M	2.7	28.9	56.6	14.5	3.9	12,910	
1/2 mi. E. of 2 mi. SE. of Indian Head	do. <sub>3/</sub>	do.	M	3.7	28.1	55.5	16.4	2.5	12,380	
1 mi. NE. of Ohioyle	Lower Freeport	do.	M	3.0	28.5	58.2	13.3	1.3	13,190	
1 mi. S. of 3 mi. N. of Rodgers Mills	do. <sub>3/</sub>	do.	M	2.0	27.9	55.9	16.2	1.9	12,730	
2-1/2 mi. S. of Whitehouse	do.	do.	M	2.8	25.2	64.2	10.6	3.0	13,750	
1/4 mi. E. of Ohioyle	do. <sub>3/</sub>	do.	M	4.3	26.8	54.3	18.9	0.8	11,930	
1-1/2 mi. NW. of Rodgers Mills	Upper Kittanning	do.	M	2.6	24.4	60.2	15.4	2.4	12,920	
Indian Head	do. <sub>3/</sub>	Hvab	M	2.3	32.5	58.0	9.5	2.9	14,040	
Kaufmann	do.	Mvb	M	2.7	24.8	66.1	9.1	2.3	14,150	
Lake Lynn	do.	do.	M	3.0	24.2	67.6	8.2	1.8	14,340	
Melcroft	do.	Hvab	M	2.8	30.8	62.5	6.7	3.6	14,320	
Ohioyle	do. <sub>3/</sub>	do.	M	1.7	32.7	58.9	8.4	3.3	14,050	
	do.	Mvb	M	3.1	24.8	66.1	9.1	2.3	14,170	
	do.	do.	M	3.0	24.9	63.0	12.1	4.1	13,560	

<sup>1/</sup> Hvab = High-volatile A bituminous; Mvb = Medium-volatile bituminous.

<sup>2/</sup> M = Mine sample; T = tippie sample.

<sup>3/</sup> Published here for the first time.

## COKING PROPERTIES OF FAYETTE COUNTY COALS

Coals of Fayette County, Pa., like most bituminous coals of the Allegheny region, generally are classified as coking. It is claimed that the coking industry of this country originated in Fayette County in 1816-17.<sup>8/</sup> Certainly, the excellent coking properties of Pittsburgh-bed coal from the Connellsville field were recognized more than a century ago.

Although a large proportion of the coal carbonized in this country during the 19th century was mined from the Pittsburgh bed in the Connellsville field, the residual reserves of this bed are important to the coking industry. Their importance is indicated by an estimate of western Pennsylvania coals purchased for the manufacture of byproduct coke in the United States during the 6-year period 1937-1942, which shows that about 87 million tons, or 53 percent of the total, was from the Pittsburgh bed and Connellsville field.<sup>9/</sup> In Fayette County, this coal is chiefly of high-volatile A bituminous rank and contracts during carbonization when charged at normal bulk densities. Generally, it is blended with smaller proportions of coals of higher rank, although it may be carbonized singly in beehive ovens. As a large proportion of the low-ash and low-sulfur coal has been mined, much of the remaining coal must be cleaned before it can be used for making metallurgical coke.

Sewickley coal ranks as high-volatile A bituminous. It should be blended with coals of higher rank for carbonization because it attains a high degree of fluidity and contracts strongly when carbonized singly. Coals from the Upper Freeport bed rank either as high-volatile A or medium-volatile bituminous. The high-volatile coals are blended with 10 to 40 percent low-volatile coal when carbonized in commercial ovens for the production of metallurgical coke. Medium-volatile Upper Freeport coals have variable expanding properties, as shown by tests of samples from widely separated parts of the bed. Those that expand should be so blended that carbonization may be effected without endangering oven walls.

Waynesburg and Redstone coals are of high-volatile A rank. Although these beds lie in the upper part of the coal measures of this coal field, both yield coking coals where the overburden is thick enough to prevent weathering and loss of caking properties. These coals yield highly fissured coke when carbonized singly; they should be blended with higher-rank coals if used for the production of metallurgical coke. Lower Kittanning coal ranks as medium- or low-volatile bituminous; generally it contains more fixed carbon than other Fayette County coals. It cokes strongly but should be blended with coals of lower (high-volatile) rank if carbonized in modern ovens (beehive ovens excepted), because this bed is noted for its exceptional expanding properties.

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<sup>8/</sup> Boileau, John W., Coal Fields of Southwestern Pennsylvania: 1907, p. 52.

<sup>9/</sup> Davis, David H., and Griffen, John, The Pittsburgh Coal Seam in Pennsylvania - Its Reserves, Qualities and Beneficiation: Trans. Am. Inst. Min. Eng., vol. 157, 1944, pp. 22-66.

## APPENDIX

Completed reports giving results of studies by counties under part (1) of the investigation follow:

Dowd, James J., Turnbull, Louis A., Toenges, Albert L., Cooper, H. M., Abernethy, R. F., Reynolds, D. A., and Fraser, Thomas. Estimate of Known Recoverable Reserves of Coking Coal in Cambria County, Pa. Report of Investigations 4734, Bureau of Mines, 1950, 25 pp.

Dowd, James J., Turnbull, Louis A., Toenges, Albert L., Cooper, H. M., Abernethy, R. F., Reynolds, D. A., and Crentz, William A. Estimate of Known Recoverable Reserves of Coking Coal in Indiana County, Pa. Report of Investigations 4757, Bureau of Mines, 1950, 22 pp.

Dowd, James J., Turnbull, Louis A., Toenges, Albert L., Abernethy, R. F., and Reynolds, D. A. Estimate of Known Recoverable Reserves of Coking Coal in Pike County, Ky. Report of Investigations 4792, Bureau of Mines, 1951, 34 pp.

Dowd, James J., Turnbull, Louis A., Toenges, Albert L., Abernethy, R. F., and Reynolds, D. A.: Estimate of Known Recoverable Reserves of Coking Coal in Armstrong County, Pa. Report of Investigations 4801, Bureau of Mines, 1951, 16 pp.

Dowd, James J., Turnbull, Louis A., Toenges, Albert L., Abernethy, R. F., and Reynolds, D. A. Estimate of Known Recoverable Reserves of Coking Coal in Westmoreland County, Pa. Report of Investigations 4803, Bureau of Mines, 1951, 16 pp.







