Bureau of Mines
Report of Investigations 5234

ESTIMATE OF KNOWN RECOVERABLE RESERVES OF COKING COAL IN BLEDSOE COUNTY, TENN.

BY LLOYD WILLIAMS AND ROBERT E. HERSHEY

United States Department of the Interior — June 1956

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UNITED STATES DEPARTMENT OF THE INTERIOR
Fred A. Seaton, Secretary
BUREAU OF MINES
Thos. H. Miller, Acting Director

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FOREWORD

Since its creation by the 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. 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. 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. 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.

The estimates of coking-coal reserves in these reports were derived from data made available to the Bureau of Mines by coal companies, landowners, 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 may indicate the presence of large reserves of inferred coal in these areas, but no estimates of inferred reserves are presented in these reports. As their titled 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 three-eightss 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 flooding 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.

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 to both industry and State and Federal agencies in more effectively planning and executing coal exploratory and testing investigations.

RALPH L. BROWN
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ESTIMATE OF KNOWN RECOVERABLE RESERVES OF COKING COAL IN BLEDSOE COUNTY, TENN.

by

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CONTENTS

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Report of Investigations 5234

TABLES

ILLUSTRATIONS

CONCLUSIONS

1. Reserves have been estimated for three coal beds in Bledsoe County, Tenn.: Morgan Springs, Lantana, and Sewanee. The Richland and Nelson beds occur in Bledsoe County also, but there was not enough information on them for making an estimate of reserves.

2. Known measured and indicated reserves for all beds, based on a minimum thickness of 14 inches and on 1,800 short tons per acre-foot of coal in place, are estimated at 43 million tons as of January 1, 1954. Of this total, 22 million tons represents coal 28 inches and more thick. Areas in the beds were omitted from the estimate because available data relative to the bed characteristics were insufficient for making an estimate conforming 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 determined by this investigation.

3. Recoverable reserves are estimated for beds 28 inches and more thick. This recovery is based on the total thickness of coal in the bed (less partings three-eights inch thick or more), rather than on the thickness of coal mined. This thickness is about the minimum now being mined by hand loading onto conveyors in the Appalachian region. The weighted average recovery for all beds in Bledsoe County is estimated at 50 percent for this investigation. Based on this, the recoverable reserves of coal in the county are estimated at 11 million tons.

No coal samples were taken for analyses for this study in Bledsoe County.

INTRODUCTION

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

This is the 35th in a series of reports giving the results of studies, by counties, of known minable reserves of coal. (See Appendix.) This report covers Bledsoe County, Tenn., in the south-central part of the Tennessee coal field. The first phase of the investigation is covered in this report.

Bledsoe County comprises all of the Billingsley Gap 7-1/2-minute quadrangle and parts of the Smartt Mountain, Savage Point, Lonewood, Sampson, Brockdell, Mount Airy, Henson Gap, Herbert Domain, Pikeville, Brayton, Soddy, Vandever, Melvine, Morgan Springs, Graysville, Grassy Cove, and Pennine 7-1/2-minute quadrangles. (See fig. 1.)

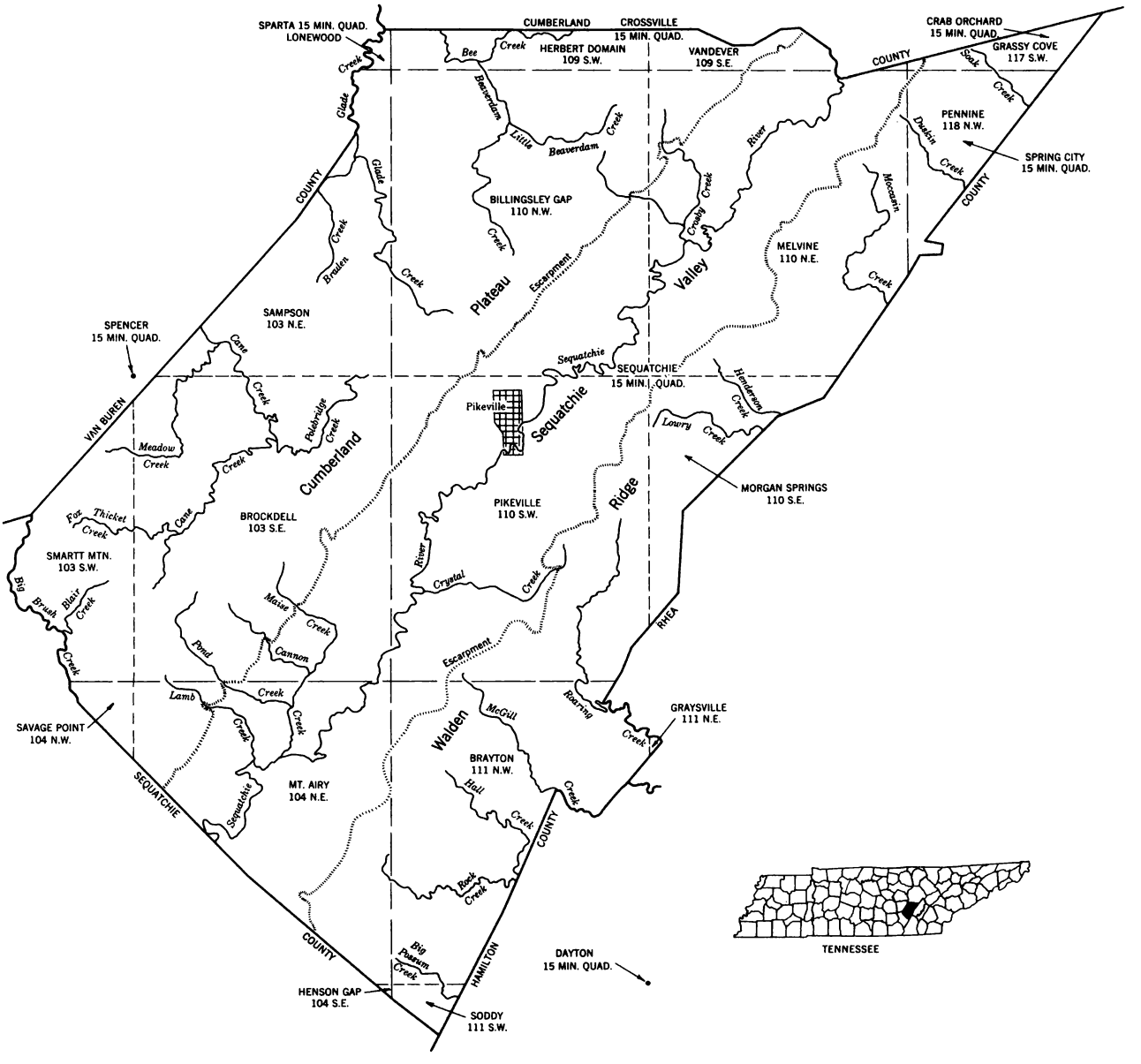

Figure 1. - Key map of Bledsoe County, Tenn.

Data on the coal beds in this county were obtained by personal reconnaissance and from landowners, mine operators, State agencies, and other authentic sources of information.

ACKNOWLEDGMENTS

The information in this report could not have been obtained without the wholehearted cooperation of the officials of the companies and individual landowners whose property records were studied, and their cooperation and courtesies extended are gratefully acknowledged. The advice and assistance of the Coal Resources Committees of both the National Bituminous Coal Advisory Council and the American Institute of Mining and Metallurgical Engineers, members of the staffs of the Tennessee Division of Mines and the Tennessee Division of Geology, and consulting mining engineers are appreciated. The assistance and cooperation of the State geologist, William D. Hardeman, and also C. W. Wilson, Jr., of Vanderbilt University Department of Geology, have been particularly helpful and are sincerely appreciated.

The Tennessee Valley Authority, through R. A. Kampmeier, Assistant Manager of Power, and E. P. Ericson, Chief, Fuels Branch, have made a major contribution to this investigation, and their cooperation and assistance are gratefully acknowledged.

ESTIMATION OF KNOWN RECOVERABLE RESERVES

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, to compare 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 Federal Bureau of Mines and the Federal Geological Survey. The premises and definitions of terms follow:

Coking coal. - All bituminous coals in the Appalachian region are potentially coking and, therefore, until carbonization tests in part 3 of the study are made 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 15-minute topographic quadrangle. All unit area estimates within the county are combined to give the county total estimates.

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.

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 and usually not mined, such bench and partings are omitted in determining the bed thickness.

Measured coal. - Measured coal is coal for which tonnage is computed from dimensions revealed in outcrops, mine workings, and drill holes. The points of observation and measurement are so closely spaced, and the thickness and extent of the coal are so well defined that the computed tonnage is judged to be accurate within 20 percent or less of the true tonnage. 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 one-half mile apart. The outer limit of a block of measured coal, therefore, shall be about one-fourth 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 one-half 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.

Areas excluded from estimate. - In each bed are areas in which coal may be present but for which reserves have not been estimated. 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 correspond approximately to areas of inferred reserves and frequently contain significant quantities of coal.

Overburden. - This includes all of the material that overlies the coal bed. All known reserves in Bledsoe County are under less than 600 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 in computing volume of reserves. A weighted average thickness, in each thickness category, is computed to be used for limited areas, not to exceed a 7-1/2-minute quadrangle.

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 usually is computed for each bed in each 15-minute 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 Tennessee Division 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, 1954, 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 15-minute 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 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 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 by hand-loading onto conveyors. Certain areas in some of the beds in this county may not be considered economically minable at present because of conditions considered adverse today.

Methods Used to Compute Reserves

A base map for each coal bed for each 15-minute quadrangle area was prepared to the scale of 1 inch equals 2,000 feet. This scale was adopted as it is the scale of both the Tennessee Valley Authority and Federal Geological Survey 7-1/2-minute quadrangles that are the latest topographic maps available. A 15-minute quadrangle is composed of four 7-1/2-minute quadrangles, each covering an area 7-1/2 minutes of longitude by 7-1/2 minutes of latitude. The TVA 15-minute quadrangles are identified by number; the corresponding 7-1/2-minute quadrangles are identified by directional quarter of the 15-minute quadrangle number. The 7-1/2-minute quadrangles are identified also by name.3/ (See fig. 1.) Names for the 15-minute quadrangles are available only on special Federal Geological Survey index maps for administrative planning. Where 7-1/2-minute quadrangles were not available, 15- or 30-minute quadrangle maps covering the area were used.

3/ Federal Geological Survey, Index to Topographic Mapping in Tennessee.

Bledsoe County comprises parts of the following 15-minute quadrangle areas, with the corresponding 7-1/2-minute quadrangles:

15-minute area Number	Name	7-1/2-minute quadrangle names
-	Sparta	Lonewood.
103	Spencer	Sampson, Smartt Mountain, Brockdell.
104	Dunlap	Savage Point, Mount Airy, Henson Gap.
109	Crossville	Herbert Domain, Vandever.
110	Sequatchie	Billingsley Gap, Melvine, Pikeville, Morgan Springs.
111	Dayton	Brayton, Graysville, Soddy.
117	Crab Orchard	Grassy Cove.
118	Spring City	Penine.

Mine workings, locations of drill holes, outcrops and thicknesses of bed, and total clean coal thicknesses were plotted on each base map. Isopach lines then were drawn to limit areas of known unmined reserves in beds up 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 that are excluded from the estimate but may contain reserves based only on geologic inference, and areas outside the outcrop were measured by planimeter on the base maps. These areas were adjusted to conform to the theoretical area based on Federal Coast and Geodetic Survey data for each quadrangle. Estimates of total reserves 14 inches and more thick for individual beds were prepared from these data. A map was prepared from the work maps for each bed. On these maps areas of known coal up to 14 inches thick and 14 to 28 inches thick were combined and shown as reserves in beds less than 28 inches thick and areas of known coal 28 to 42 inches thick and over 42 inches thick were combined and shown as reserves in beds over 28 inches thick.

Description of Coal Measures

Bledsoe County, Tenn., is in the south-central part of the Tennessee coal field. It is bounded on the west by Van Buren County, on the north by Cumberland, on the east by Rhea, and on the south by Hamilton and Sequatchie Counties.

The Sequatchie Valley is the most prominent physiographic feature and divides the county into three areas - Cumberland Plateau, Sequatchie Valley, and Walden Ridge. The coal beds underlie the Cumberland Plateau on the west side of the valley and Walden Ridge on the east side.

The vertical relationship of the beds is shown in figure 2. All the beds are in the Lower Pottsville series of the Pennsylvanian system, and the bed names are based on correlations by the Tennessee Division of Geology.

No coal samples were taken for analyses during this study, but analyses for some of the beds occurring in the county have been published.[4] [5]

4/ Fieldner, A. C., Cooper, H. M., and Osgood, F. D., Analyses of Tennessee Coals: Bureau of Mines Tech. Paper 356, 1926, pp. 15-16.

5/ Aresco, S. J., and Haller, C. P., Analyses of Tipple and Delivered Samples of Coal (Collected During the Fiscal Year 1951): Bureau of Mines Rept. of Investigations 4934, 1953, p. 49.

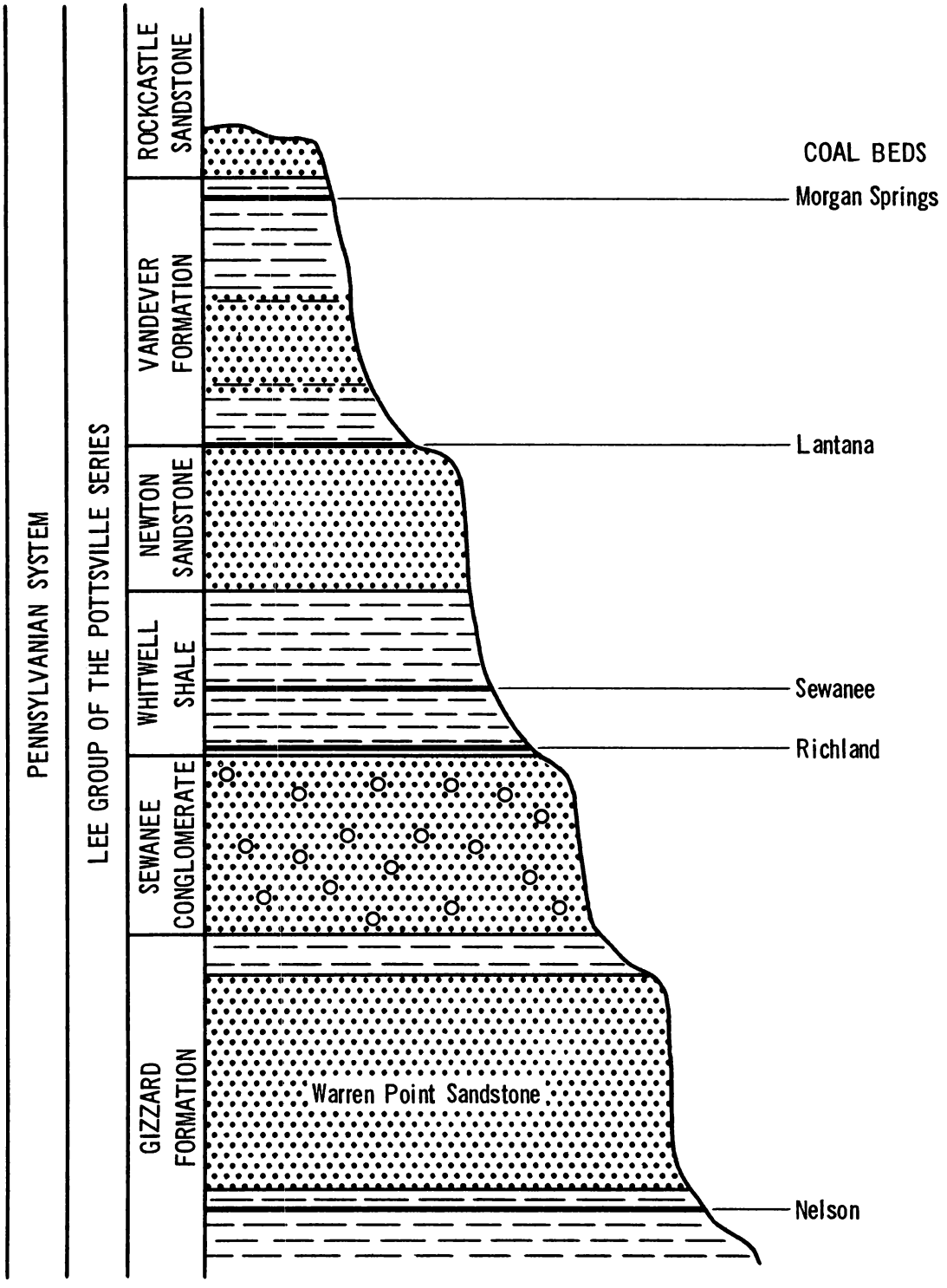

Figure 2. - Composite section of coal measures in Bledsoe County, Tenn.

Reserve estimates were not made for two beds that occur in the county because not enough information is available on the bed characteristics. The Richland bed occurs at or within a few feet of the top of the Sewanee conglomerate. This bed has not been prospected extensively because the few known measurements show only a few inches of coal. The Nelson bed, sometimes called the Bon Air, occurs within a few feet of the base of the Warren Point sandstone. The bed is being mined sporadically at one place near Pond Creek. Not enough information was available on estimating reserves.

Descriptions of the Morgan Springs, Lantana, and Sewanee coal beds follow:

Morgan Springs Bed

(See fig. 3 and table 1)

This bed occurs just under the Rockcastle sandstone that caps a series of hills rising above the general level of the Cumberland Plateau and Walden Ridge. The bed is relatively level, except on Walden Ridge, where it dips steeply away from the edge of Sequatchie Valley. The Morgan Springs is being mined in the vicinity of Pond Creek. Sections of the bed in areas of recoverable reserves follow:

Southern Part of County

Material	Inches
COAL	27
Bone	1/4
COAL	2-1/2
Bone	1-1/2
COAL	6
Bone	12
Thickness	49-1/4

Material	Inches
COAL	30
Thickness	30

Lantana Bed

(See fig. 4 and table 2)

The bed occurs in the Vandever formation usually just above the general level of that part of the Cumberland Plateau within the county. The Lantana has been contour-stripped in scattered areas but the bed is too thin for extensive strip mining. No mines are being operated in the bed at present. Sections of the bed in areas of recoverable reserves follow:

Southern Part of County

Material	Inches
COAL	38
Thickness	38

Material	Inches
COAL	40
Thickness	40

Northern Part of County

Material	Inches
Coal with thin sulfur streaks	58
Thickness	58

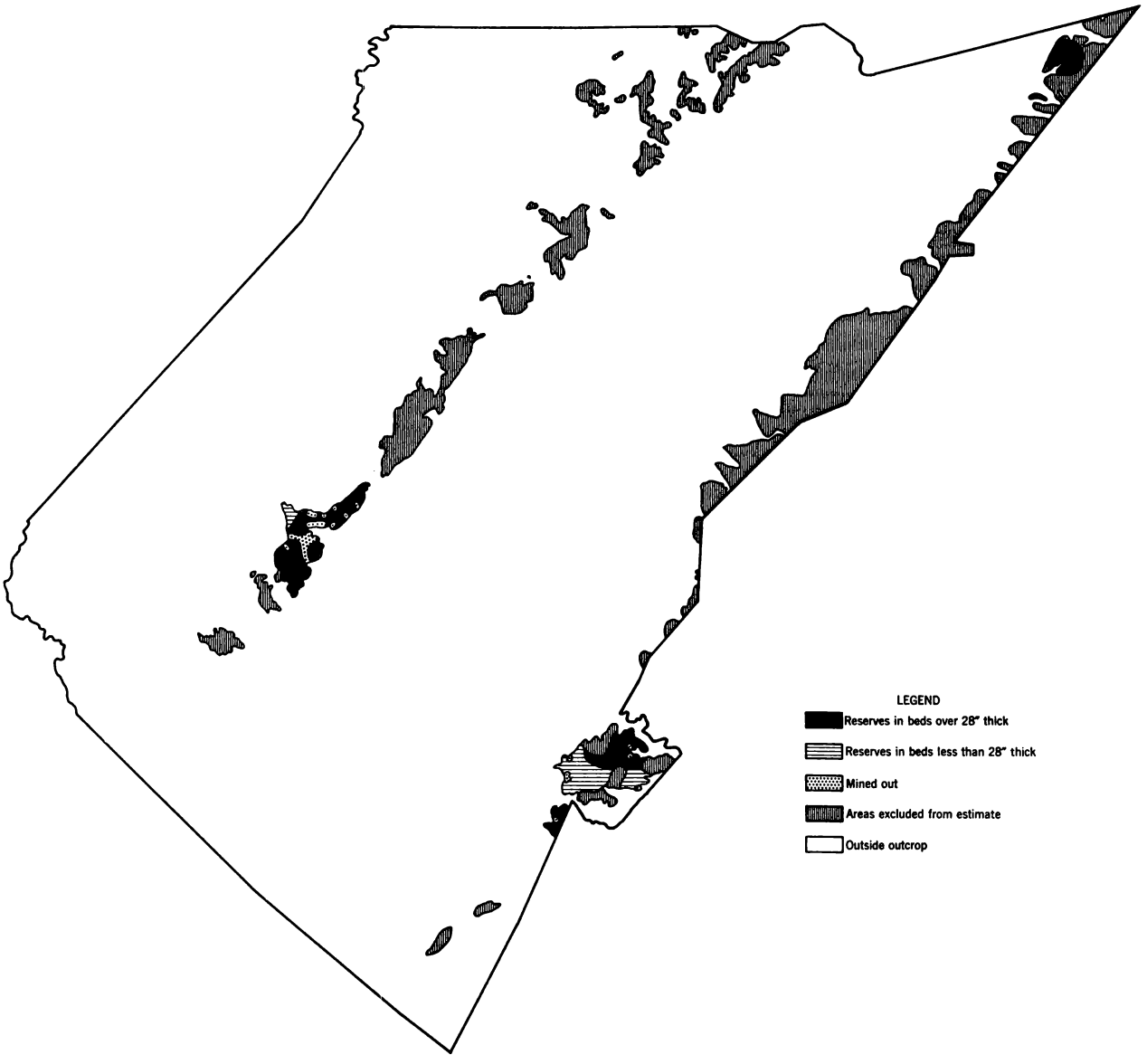

Figure 3. - Morgan Springs bed, Bledsoe County, Tenn., January 1, 1954.

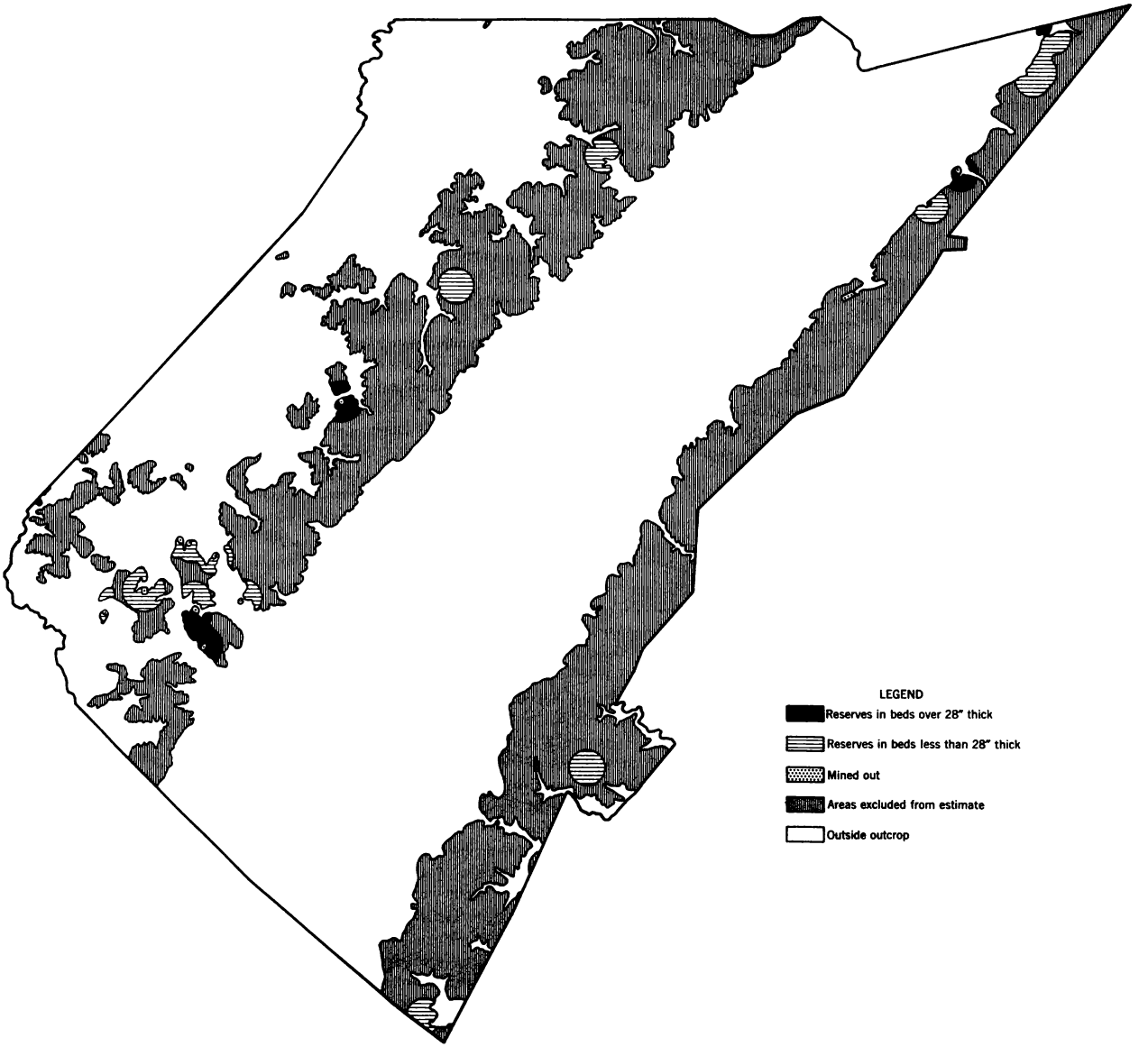

Figure 4. - Lantana bed, Bledsoe County, Tenn., January 1, 1954.

Sewanee Bed

(See fig. 5 and table 3)

This bed is in the Whitwell shale about 30 feet above the Sewanee conglomerate. The bed outcrops along both sides of the Sequatchie Valley and in the area around Glade and Bee Creeks. It is almost vertical at one place near Pikeville and is folded along the northwest edge of the valley.

Only two small mines are operating in the Sewanee at present. The bed was mined extensively in the vicinity of Pond Creek many years ago.

Sections of the bed in areas of recoverable reserves follow:

Northwestern Part of County

Material	Inches	Material	Inches
COAL	42	COAL	30
Thickness	42	Thickness	30

Southeastern Part of County

Material	Inches
Coal with sulfur streaks	36
Thickness	36

Coal Reserves

Detailed estimates of known measured and indicated reserves in Bledsoe County as of January 1, 1954, are given in tables 1 to 3, inclusive. Table 4 is a recapitulation of reserves. Total reserves 14 inches and more thick are estimated at 43,489,000 tons. Of this total, 21,525,000 tons is in beds 28 inches and more thick. The weighted average recovery for all beds in the county is estimated at 50 percent. Based on this recovery, the known recoverable reserves 28 inches and more thick are estimated at 10,764,000 tons as of January 1, 1954.

Bledsoe County has never been a large producer of coal. From 1852 to January 1, 1954, the total production was 1,619,957 tons or 0.5 percent of the total production for the State, as compiled from Annual Reports of Tennessee Division of Mines, Bureau of Mines Mineral Market Summaries, and some unpublished records. In 1953, the production was 51,847 tons,[6/] virtually all from the Morgan Springs bed, and the county ranked 14th in the State in production.

6/ Bureau of Mines, Bituminous Coal and Lignite in 1953: Mineral Market Summary 2339, 1954, p. 120.

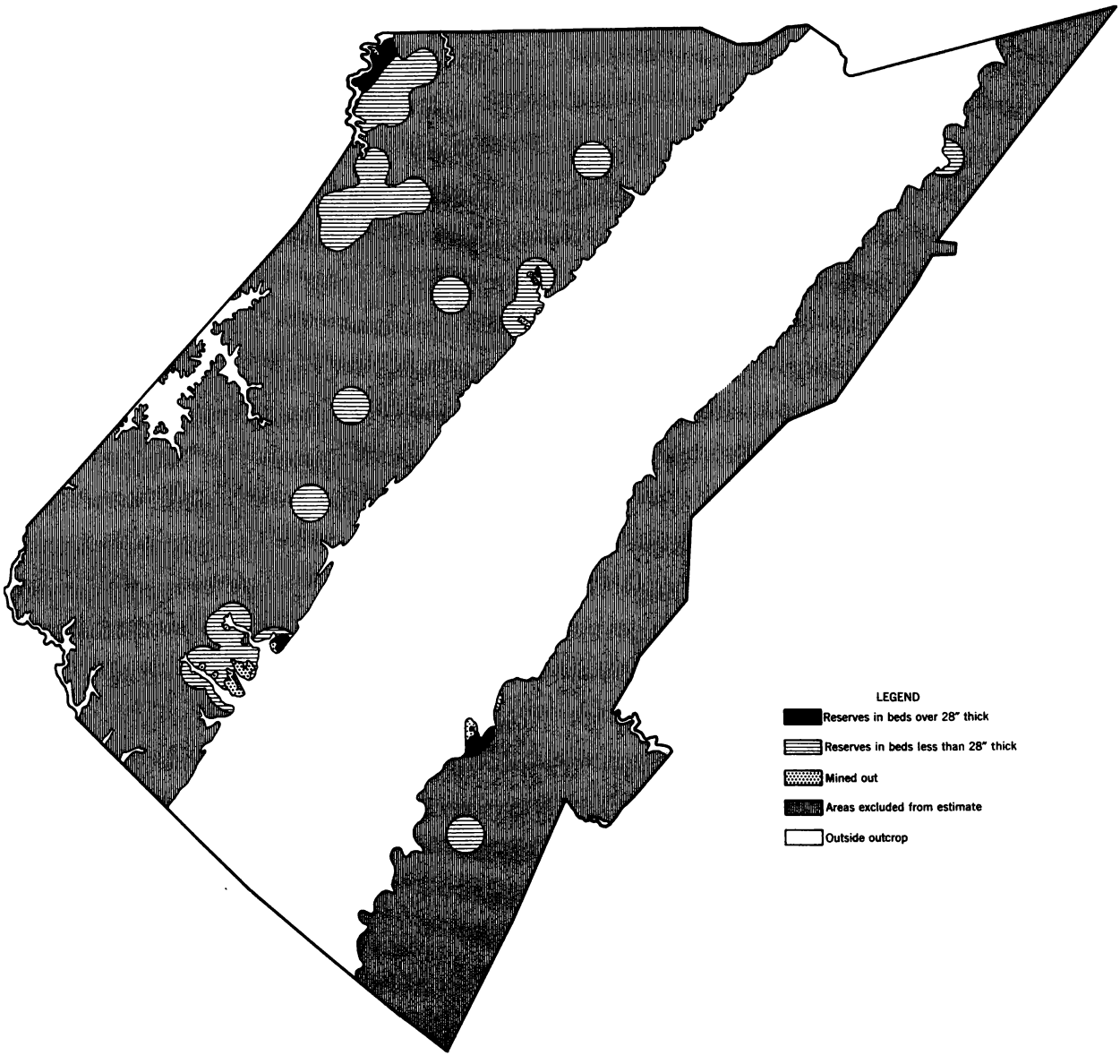

Figure 5. - Sewanee bed, Bledsoe County, Tenn., January 1, 1954.

BLEDSOE COUNTY

TABLE 1.- RESERVES IN MORGAN SPRINGS BED, January 1, 1954

15-minute 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, 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	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		
103 (Spencer)	65,460	992	62,805	66	1,597	344	1,253	Measured	26	82	441	2,479	226	1,523	693	4,084	667	4,002		
								Indicated	23	72	537	2,948	-	-	560	3,020	537	2,948		
								Total	49	154	978	5,427	226	1,523	1,253	7,104	1,204	6,950	2/ 50.0	3,475
111 (Dayton)	26,539	1,006	23,838	-	1,695	17	1,678	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	929	3,344	749	3,424	-	-	1,678	6,768	749	3,424		
								Total	929	3,344	749	3,424	-	-	1,678	6,768	749	3,424	2/ 50.0	1,712
117 (Crab Orchard)	2,474	524	1,556	-	394	-	394	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	-	-	394	1,655	-	-	394	1,655	394	1,655		
								Total	-	-	394	1,655	-	-	394	1,655	394	1,655	2/ 50.0	828
118 (Spring City)	7,320	1,417	5,852	-	51	-	51	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	-	-	51	214	-	-	51	214	51	214		
								Total	-	-	51	214	-	-	51	214	51	214	2/ 50.0	107
Remaining Quadrangles	158,654	9,709	148,945	-	-	-	-	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	-	-	-	-	-	-	-	-	-	-		
								Total	-	-	-	-	-	-	-	-	-	-		
								Measured	26	82	441	2,479	226	1,523	693	4,084	667	4,002		
								Indicated	952	3,416	1,731	8,241	-	-	2,683	11,657	1,731	8,241		
Total	260,447	13,648	242,996	66	3,737	361	3,376	Total	978	3,498	2,172	10,720	226	1,523	3,376	15,741	2,398	12,243	2/ 50.0	6,122

TABLE 2. - RESERVES IN LANTANA BED, January 1, 1954

15-minute 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, 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	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		
103 (Spencer)	65,460	15,044	48,062	-	2,354	51	2,303	Measured	-	-	6	32	-	-	6	32	6	32		
								Indicated	1,406	4,437	891	3,855	-	-	2,297	8,292	891	3,855		
								Total	1,406	4,437	897	3,887	-	-	2,303	8,324	897	3,887	2/ 50.0	1,944
117 (Crab Orchard)	2,474	866	1,201	-	407	-	407	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	371	1,391	36	162	-	-	407	1,553	36	162		
								Total	371	1,391	36	162	-	-	407	1,553	36	162	2/ 50.0	81
118 (Spring City)	7,320	2,624	3,778	264	654	5	649	Measured	-	-	51	230	21	180	72	410	72	410		
								Indicated	426	1,598	151	680	-	-	577	2,278	151	680		
								Total	426	1,598	202	910	21	180	649	2,688	223	1,090	2/ 50.0	545
Remaining Quadrangles	185,193	54,214	129,206	1,764	9	9	-	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	-	-	-	-	-	-	-	-	-	-		
								Total	-	-	-	-	-	-	-	-	-	-		
								Measured	-	-	57	262	21	180	78	442	78	442		
								Indicated	2,203	7,426	1,078	4,697	-	-	3,281	12,123	1,078	4,697		
Total	260,447	72,748	182,247	2,028	3,424	65	3,359	Total	2,203	7,426	1,135	4,959	21	180	3,359	12,565	1,156	5,139	2/ 50.0	2,570

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

BLEDSOE COUNTY

TABLE 3.- RESERVES IN SEWANEE BED, January 1, 1954

15-minute 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, 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	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		
103 (Spencer)	65,460	47,845	11,371	4,257	1,987	276	1,711	Measured	371	1,447	73	307	-	-	444	1,754	73	307		
								Indicated	1,074	4,110	119	648	74	500	1,267	5,258	193	1,148		
								Total	1,445	5,557	192	955	74	500	1,711	7,012	266	1,455	2/ 50.0	728
104 (Dunlap)	27,105	7,763	19,240	-	102	20	82	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	82	320	-	-	-	-	82	320	-	-		
								Total	82	320	-	-	-	-	82	320	-	-	-	-
109 (Crossville)	8,407	6,998	1,008	343	58	-	58	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	27	85	31	149	-	-	58	234	31	149		
								Total	27	85	31	149	-	-	58	234	31	149	2/ 50.0	74
110 (Sequatchie)	122,725	52,565	66,771	1,688	1,701	23	1,678	Measured	173	519	15	68	-	-	188	587	15	68		
								Indicated	1,490	4,474	-	-	-	-	1,490	4,474	-	-		
								Total	1,663	4,993	15	68	-	-	1,678	5,061	15	68	2/ 50.0	34
111 (Dayton)	26,539	21,986	3,781	504	268	40	228	Measured	-	-	77	416	-	-	77	416	77	416		
								Indicated	-	-	151	815	-	-	151	815	151	815		
								Total	-	-	228	1,231	-	-	228	1,231	228	1,231	2/ 50.0	616
Sparta	417	2	113	4	298	16	282	Measured	25	79	177	850	5	32	207	961	182	882		
								Indicated	2	6	73	358	-	-	75	364	73	358		
								Total	27	85	250	1,208	15	32	282	1,325	255	1,240	2/ 50.0	620
Remaining Quadrangles	9,794	6,480	3,004	310	-	-	-	Measured	-	-	-	-	-	-	-	-	-	-		
								Indicated	-	-	-	-	-	-	-	-	-	-		
								Total	-	-	-	-	-	-	-	-	-	-		
								Measured	569	2,045	342	1,641	5	32	916	3,718	347	1,673		
								Indicated	2,675	8,995	374	1,970	74	500	3,123	11,465	448	2,470		
Total	260,447	143,639	105,288	7,106	4,414	375	4,039	Total	3,244	11,040	716	3,611	79	532	4,039	15,183	795	4,143	2/ 50.0	2,072

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 4. - Recapitulation of reserves in Bledsoe County, Tenn., January 1, 1954

Bed	Thousands of tons		Recoverable[1]	
	In beds 14 inches and more thick	In beds 28 inches and more thick	Percentage	Thousands of tons
Morgan Springs	15,741	12,243	[2]50.0	6,122
Lantana	12,565	5,139	[2]50.0	2,570
Sewanee	15,183	4,143	[2]50.0	2,072
Total	43,489	21,525	[2]50.0	10,764

1/ Based on reserves 28 inches and more thick.
2/ Estimated.

APPENDIX

Completed reports giving results of studies by counties:

Estimation of Known Recoverable Reserves

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