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

BY ROBERT E. HERSHEY, LLOYD WILLIAMS, AND B. W. GANDRUD

United States Department of the Interior—August 1955
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. . . . . . . . . . . . . . Report of Investigations 5148

UNITED STATES DEPARTMENT OF THE INTERIOR
Douglas McKay, Secretary
BUREAU OF MINES
J. J. Forbes, Director

Work on manuscript completed April 1955. 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 5148."

August 1955
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 1943 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. It also includes a general assessment of the carbonizing properties of the most important bed and a table of analyses of typical coals from the county.

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 indicate the presence of large reserves of inferred coal in many of these areas, but no estimates of 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 three-eighths 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.

These county reports are being published as rapidly as the available data can be found and analyzed. Later, in cooperation with the Federal 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 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 GRUNDY COUNTY, TENN.

by

Robert E. Hershey,1/ Lloyd Williams,2/ and B. W. Gandrud3/ 

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CONCLUSIONS

Reserves

1. The investigation shows that the Sewanee coal bed is the most important bed in Grundy County and is the only bed that has had any sustained production. There is no production, at the present time, from any of the other coal beds in the county. The Richland (Lower Sewanee or Coke Oven) coal bed has been prospected but has never been developed extensively. The Angel coal bed has been worked to a very small extent near Beersheba Springs, Tenn., for local consumption. The Battle Creek coal bed has been worked sporadically near Monteagle, Tenn.

2. Known measured and indicated reserves in the Sewanee coal bed, based on a minimum thickness of 14 inches and on 1,800 short tons per acre-foot of coal in place, are estimated to be 15 million short tons as of January 1, 1953. Of this total, 10 million tons represents coal 28 inches and more thick. Areas in the bed were omitted from the estimate where available data relative to the bed characteristics are too meager for making 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 are estimated in beds 28 inches and more thick. This recovery is based on the total thickness of coal in the bed (less partings 3/8 inch thick or more) rather than on the thickness of the 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 the Sewanee bed in Grundy County, as determined by this investigation, is 61.3 percent. Based on this, the recoverable reserves of coal in Grundy County are estimated at 6 million tons.

Coal Analyses

Analyses of two typical samples of coal from the Sewanee bed show the coal to be low in sulfur and moderately high in ash. The analyses show that the Sewanee coal from these two samples is of the high-volatile A bituminous rank.

Preparation and Carbonization

Preparation and carbonization tests were not made on coal from Grundy County. However, analyses show that coal from the Sewanee bed in Grundy County could be prepared easily so as to meet the usual requirements for metallurgical coking coal as far as ash and sulfur constituents are concerned.

Carbonization tests have been made on coal from the Sewanee bed, across the county line in Marion County, where the coal is believed to be very similar to
that in Grundy County. Satisfactory grades of metallurgical coke were obtained in these tests.

INTRODUCTION

The investigation to evaluate the reserves of coking coal is being made by the Bureau of Mines in three parts: (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 24th of a series of reports giving the results of studies, by counties, of known minable reserves of coking coal. (See appendix.) This report covers Grundy County in the southern part of the Tennessee coal field.

Grundy County comprises all of Cane Hollow and Burrow Cove 7-1/2-minute quadrangles; parts of Hillsboro, Alto, Sewanee, Monteagle, Tracy City, White City, Palmer, and Savage Point 7-1/2-minute quadrangles; part of the north half of the Altamont 15-minute quadrangle; and part of the McMinnville 30-minute quadrangle. (See fig. 1.)

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. Samples used for analyses were obtained from commercial operations in the county.

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 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 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, in this investigation has been particularly helpful and is greatly appreciated.

The Tennessee Valley Authority, through R.A. Kampmeier, assistant manager of power, and Jack London, chief, Fuel Engineering Section, has made a major contribution to this investigation and the cooperation and assistance of TVA are gratefully acknowledged.
PART I. - ESTIMATION OF KNOWN RECOVERABLE RESERVES

by

Robert E. Hershey and Lloyd Williams

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. All known reserves of coal in the county are considered as coking coal in preparing the reserve estimates. The possibilities of using these coals for metallurgical coke making are discussed in the preparation and carbonization portion of this report.

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 is 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 Grundy County are under less than 700 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, 1953, 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. Include in these losses 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 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 the coal bed in each 15-minute quadrangle was prepared to the scale 1 inch equals 2,000 feet. This scale was adopted as it is the scale of the Tennessee Valley Authority 7-1/2-minute quadrangles, which 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 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 also identified by name.” Names for the 15-minute quadrangles are available only on special Federal Geological Survey index maps for administrative planning. The key map is divided into 7-1/2-minute quadrangles. (See fig. 1.) These quadrangles are identified by the directional quarter of the 15-minute quadrangle number and the 7-1/2-minute quadrangle name. Where 7-1/2-minute quadrangles were not available, 15- or 30-minute quadrangle maps covering the area are used.

Grundy County comprises parts of the following 15-minute quadrangle areas with corresponding 7-1/2- and 30-minute quadrangles:

<table>
<thead>
<tr>
<th>15-minute area</th>
<th>7-1/2-minute quadrangle names</th>
<th>30-minute area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Name</td>
<td>McMinnsville</td>
</tr>
<tr>
<td>93</td>
<td>Pelham</td>
<td>Hillsboro, Alto, Cane Hollow, Burrow Cove</td>
</tr>
<tr>
<td>94</td>
<td>Monteagle</td>
<td>Montegle, Sewanee</td>
</tr>
<tr>
<td>99</td>
<td>Altamont</td>
<td>Tracy City, Palmer</td>
</tr>
<tr>
<td>100</td>
<td>Jasper</td>
<td>White City</td>
</tr>
<tr>
<td>104</td>
<td>Dunlap</td>
<td>Savage Point</td>
</tr>
</tbody>
</table>

Mine workings, locations of drill holes, outcrops and thicknesses of bed, and total clean coal thicknesses were plotted on the base maps. 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 excluded from the estimate but which 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 for each coal bed. On these maps, areas of known coal up to 14 inches thick and 14 to 28 inches thick were combined to show coal less than 28 inches thick, and areas of known coal 28 to 42 inches thick and over 42 inches thick were combined to show coal over 28 inches thick. In Grundy County, pillars have not been recovered generally; therefore, in most areas shown as "mined out" reserves in pillars that remain have not been included in the tabulations.

Description of Coal Measures

Grundy County, Tenn., is in the southern part of the State and mostly within the area known as the Cumberland Plateau. Although the coal measures underlie most of the area in the county, the only productive horizon is limited in extent owing to erosion. All of the coal horizons in the county are in the Lee group of the Lower Pottsville series of the Pennsylvanian system. (See fig. 2). The known coal beds from the uppermost bed in descending order are: Cap Seam, Sewanee (Main Sewanee), Richland (Lower Sewanee or Coke Oven), Angel, and Battle Creek (Nelson). The Richland bed is just above the Sewanee conglomerate in the Whitwell shale. This coal bed has been prospected near Palmer but was not developed because it was too thin. The Angel coal bed occurs at or near the base of the Sewanee conglomerate. The Battle Creek coal bed occurs at the base of the Warren Point sandstone and usually is less than 14 inches thick. In a few small areas the coal thickness is very erratic and the bed has not been mined extensively. This coal bed has been mined to a small extent near Monteagle. The coal beds are more fully described in other publications 2, 6.

Sewanee Bed

(See fig. 3 and table 1)

The Sewanee coal bed occurs in the Whitwell shale, 30 to 60 feet above the Sewanee conglomerate. The formations above the Sewanee conglomerate have been largely eroded in the western part of the county, leaving only scattered hills containing the Sewanee coal bed. In several places, there is very little overburden on the coal bed; consequently, there have been several strip mine operations. The eastern part of the county has not been eroded so extensively, thus leaving a much larger area containing the Sewanee coal bed. In this area, the Whitwell shale is overlain by the Bon Air sandstone.

The Sewanee coal bed begins to separate into two benches at the Palmer mine near Palmer. The interval between the two beds gradually increases westward. At Tracy City and Coalmont, the upper bench is called the Cap Seam and is 30 feet above the lower bench, which, in this area, is called the Main Sewanee coal bed. The Cap Seam is very thin and occurs as a few inches of rath in most places. There are no data available to estimate any possible coal reserves in this bed. The Sewanee is the only coal bed in the county for which coal reserves have been estimated.


Figure 2. - Composite section of coal measures in Grundy County, Tenn.
Figure 3. - Sewanee bed, Grundy County, Tenn., January 1, 1953.
The area around Tracy City and Coalmont has been mined extensively since 1852, but there is not enough information available on the old abandoned mine workings either at Tracy City or Coalmont to estimate coal reserves. Much of the area shown as "excluded from estimate" in the Coalmont area probably is mined out but was not shown on the available mine maps. (See fig. 3.) Considerable evidence of abandoned workings around the outcrop suggests that it is mined out, but no definite information could be obtained so the area was classed in this report as "excluded from estimate." Sections of the bed in the area of recoverable reserves follow:

<table>
<thead>
<tr>
<th>Material</th>
<th>Inches</th>
<th>Material</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>COAL</td>
<td>3</td>
<td>COAL</td>
<td>13</td>
</tr>
<tr>
<td>Bone</td>
<td>1/2</td>
<td>Coal, pyrite streaks</td>
<td>6</td>
</tr>
<tr>
<td>COAL</td>
<td>3</td>
<td>COAL</td>
<td>11</td>
</tr>
<tr>
<td>Bone</td>
<td>3/4</td>
<td>Thickness</td>
<td>30</td>
</tr>
<tr>
<td>COAL</td>
<td>33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thickness</td>
<td>40-1/4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Coal Reserves**

The location and extent of the Sewanee bed in Grundy County is shown in figure 3. Detailed estimates of known measured and indicated reserves in the Sewanee bed as of January 1, 1953, are given in table 1. Total reserves 14 inches and more thick are estimated at 15,348,000 tons. Of this total, 9,940,000 tons represent coal 28 inches and more thick. The weighted average recovery for the Sewanee bed is 61.3 percent. Based on this recovery, the known recoverable reserves 28 inches and more thick in Grundy County, Tenn., are estimated at 6,093,000 tons as of January 1, 1953.

Grundy County has decreased in rank from sixth largest coal-producing county in Tennessee during 1952 to eighth in 1953, when it produced 4.4 percent of the coal mined in Tennessee during that year. The production for 1953 was 237,855 tons,7/ which was a decrease of 137,820 tons from 1952.

The recorded loss of production in Grundy County in 1953 is due to the fact that some mine portals actually in Marion County were recorded as being in Grundy County until 1953, in which year they were listed in Marion County.

A total of 29,459,000 tons of coal has been reported mined in Grundy County between 1852 and January 1953, as compiled from Annual Reports of Tennessee Division of Mines, Bureau of Mines Mineral Market Summaries, and some unpublished records. This production amounts to 8.4 percent of the total coal mined in Tennessee.

**ANALYSES OF GRUNDY COUNTY COAL**

Two typical analyses of samples of Sewanee coal in Grundy County are given in table 2. As most of the original deposit has been mined, these two analyses probably are representative of the remaining reserves.

7/ Bituminous Coal and Lignite in 1953: Bureau of Mines Mineral Market Summary 2339, Dec. 1, 1954, p. 120.
### Table 1 - Reserves in Sewage Bed, January 1, 1953

<table>
<thead>
<tr>
<th>Quadrangle</th>
<th>Area of quadrangle in county, acres</th>
<th>Areas excluded from estimate, acres</th>
<th>Area outside outcrop, acres</th>
<th>Underlain by coal 0&quot; to 14&quot; thick, acres</th>
<th>Coal over 14&quot; thick, in place, originally, acres</th>
<th>Coal over 14&quot; thick, remaining, acres</th>
<th>Measured Indicated</th>
<th>Estimated coal reserves, in tons of 2,000 lb.</th>
<th>Total reserves, in tons of 2,000 lb.</th>
<th>Percentage recoverable, including all mining losses</th>
<th>Estimated recoverable reserves 28&quot; and more thick, thousands of tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>99 Alton</td>
<td>113,683</td>
<td>13,853</td>
<td>91,118</td>
<td>391</td>
<td>8,591</td>
<td>4,979</td>
<td>3,310</td>
<td>1,490 5,408 4,110 747 4,177 4,177 4,177 1,565</td>
<td>5,408 4,110 747 4,177 4,177 4,177 4,177 1,565</td>
<td>2,567 3,520 3,520 3,520 3,520 3,520 3,520 3,520</td>
<td></td>
</tr>
<tr>
<td>93 Pulaski</td>
<td>88,203</td>
<td>107</td>
<td>87,362</td>
<td>-</td>
<td>634</td>
<td>634</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>100 Jasper</td>
<td>3,483</td>
<td>-</td>
<td>2,994</td>
<td>489</td>
<td>489</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Remaining quadrangles</td>
<td>25,600</td>
<td>600</td>
<td>25,000</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>240,269</td>
<td>13,900</td>
<td>226,369</td>
<td>391</td>
<td>9,424</td>
<td>6,102</td>
<td>3,312</td>
<td>1,490 5,408 4,110 747 4,177 4,177 4,177 1,565</td>
<td>5,408 4,110 747 4,177 4,177 4,177 4,177 1,565</td>
<td>2,567 3,520 3,520 3,520 3,520 3,520 3,520 3,520</td>
<td></td>
</tr>
</tbody>
</table>

*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.*
TABLE 2. - Analyses of Grundy County Coal

<table>
<thead>
<tr>
<th>Town and mine</th>
<th>Bed</th>
<th>Rank</th>
<th>Kind of sample</th>
<th>As-received Mois.</th>
<th>Vol. F.C.</th>
<th>Ash</th>
<th>Sul</th>
<th>B.t.u.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palmer</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Tenn. Consol.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 8 ..........</td>
<td>Sewanee</td>
<td>Hvab</td>
<td>M</td>
<td>4.2</td>
<td>30.2</td>
<td>61.0</td>
<td>8.6</td>
<td>0.7</td>
</tr>
<tr>
<td>Palmer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tenn. Consol.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. 16 ........</td>
<td>do.</td>
<td>do.</td>
<td>M</td>
<td>2.5</td>
<td>29.9</td>
<td>60.6</td>
<td>9.5</td>
<td>6</td>
</tr>
</tbody>
</table>

1/ Hvab = high-volatile A bituminous
2/ M = mine sample.

The analyses in table 2, which have been published, vary in sulfur content from 0.5 to 0.7 percent and in ash from 5.6 to 9.5 percent. The volatile matter on a moisture-free basis varies from 29.9 to 30.2 percent, and this coal ranks as high-volatile A bituminous.

PART II. - PREPARATION CHARACTERISTICS AND CARBONIZING PROPERTIES OF GRUNDEY COUNTY COAL

by

B. W. Gandrud

The tests to determine preparation characteristics and carbonization properties of the coal were omitted from the Grundy County Survey; partly because of lack of substantial coal reserves in the county, and partly because the coal in the Sewanee bed in Grundy County is believed to be similar to coal in the same bed across the line in Marion County. Both preparation and carbonization tests have been made on Sewanee-bed coal in Marion County, and the results have been included in the Marion County report.


2/ Williams, Lloyd, Hershey, R.E., and Gandrud, B.W., Estimate of Known Recoverable Reserves and the Preparation and Carbonizing Properties of Coking Coal in Marion County, Tenn.: Bureau of Mines Rept. of Investigations. (In preparation.)
With regard to the preparation characteristics of Sewanee coal in Grundy County, the analyses in table 2 are proof that it would not be difficult to prepare a satisfactory grade of coking coal from the coal represented by these samples as far as the ash and sulfur constituents are concerned. The ash analyses are moderately high but are nevertheless within the range for acceptable metallurgical coal.

Carbonization tests have been made on coal from the Sewanee bed in adjoining Marion County. These tests indicated that satisfactory grades of metallurgical coke can be made from this coal.

APPENDIX

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


Estimate of Known Recoverable Reserves of Coking Coal in Greene County, Pa. Bureau of Mines Rept. of Investigations 5143. (In press.)


Completed reports giving results of studies by counties under part (2) of the investigation follow:


