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# STRIPPABLE COAL RESERVES OF ILLINOIS

Part 2. — Jackson, Monroe, Perry, Randolph,  
and St. Clair Counties

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### ABSTRACT

Strippable coal reserves, defined as coal in beds 18 inches or more thick and with overburden not exceeding 150 feet, are being evaluated in a series of reports covering the coal fields of Illinois. This, the second report of the series, discusses coal stripping possibilities and salient geologic features of coal beds in five southwestern Illinois counties - Jackson, Perry, Randolph, Monroe, and St. Clair. The coals range from Caseyville (lower Pennsylvanian) to lower McLeansboro (upper Pennsylvanian).

Maps are included for each of the principal coal beds, showing outcrops, mined-out areas, and thickness of the coal at 12-inch intervals. Isopach lines divide the overburden into thickness categories of 0 to 50, 50 to 100, and 100 to 150 feet. The reliability of estimates of strippable coal depends on the relative abundance of data. On this basis the reserves are divided into primary and secondary categories. The quantity of strippable coal estimated within each category of coal thickness, overburden thickness, and reliability of estimate are tabulated by township for each county.

Approximately 3 billion tons of strippable reserves have been estimated for the four principal coal beds mapped, divided as follows: 2 1/2 billion tons in the Herrin (No. 6) Coal, 485 million tons in the Harrisburg (No. 5) Coal, 130 million tons in the Murphysboro Coal, and 12 million tons in the Seahorne Coal. Of the total reserves, 16 percent lie beneath overburden less than 50 feet thick, 43 percent beneath 50 to 100 feet of overburden, and 41 percent beneath 100 to 150 feet of overburden.

Approximately three-fourths of the total estimated strippable coal reserves are in beds having an average thickness of 72 or more inches.

### INTRODUCTION

This is the second of a series of reports planned by the Illinois State Geological Survey to summarize available information concerning strippable coal reserves in Illinois and to delimit areas favorable for further exploration. This second report includes the five southwestern Illinois counties shown on figure 1.

Much of the information is shown on maps (pls. 1-A, 1-B) which indicate outcrops of the coal beds, coal thicknesses, overburden thicknesses, reliability of the estimates, and areas of coal mined out.

In this report strippable reserves are classified and mapped for the Herrin (No. 6), Harrisburg (No. 5), Seahorne, and Murphysboro Coals. Other coal beds that contain minor known strippable reserves are discussed but are not mapped because not enough data are available.

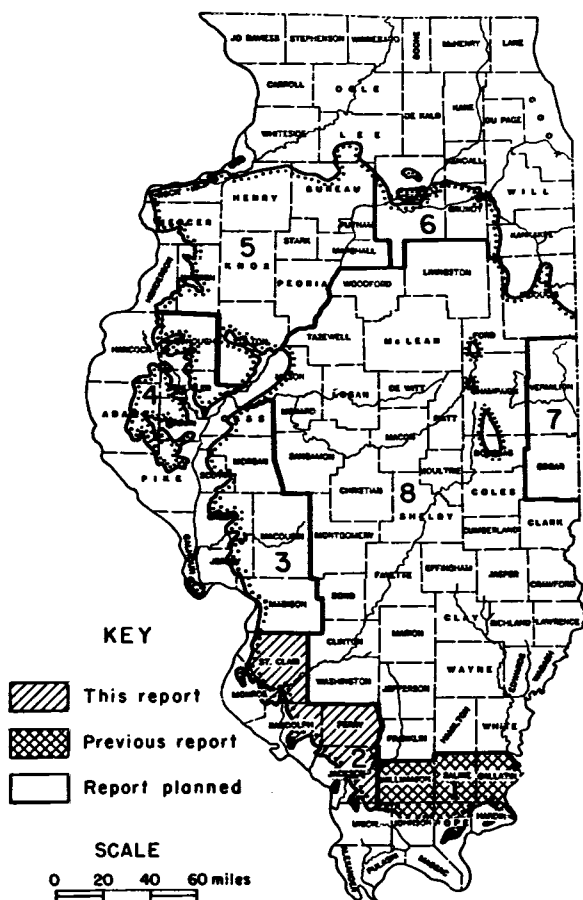


Fig. 1. - Index map showing boundary of the Pennsylvanian rocks in Illinois, location of area of this report, the previous report, and reports planned to complete mapping of strippable coal resources of the state.

### Previous Investigations

Worthen (1866) first described the geology of the coal beds in the area. Kay (1915) presented a comprehensive discussion of the coal resources, and Culver (1925) first described strippable coal deposits in the area. In 1925 steam-powered shovels of about 8-yard capacity were the largest equipment in use, and much of Culver's report was concerned with coal in areas of shallow overburden that are now largely depleted. Cady (1927) gave a more detailed account of areas of strippable coal in southern and southwestern Illinois. His report included a general map showing the outcrop of No. 5 and No. 6 Coals and several detailed maps showing coal structure, mines, and outcrops, in six areas considered to be most promising for strip coal exploration. In a report on the minable coal reserves of Illinois, Cady (1952) considered strippable reserves but did not differentiate strippable reserves in computing the total minable coal reserves.



A number of other publications relating to the geology and coal resources of the area have been used in this investigation and are listed at the end of the report.

#### Acknowledgments

The writer is indebted to the Illinois Coal Strippers Association, particularly to Lou S. Weber of that organization, for information concerning areas of coal mined out by stripping. Mining companies in these counties have been most helpful with their cooperation in furnishing information in their areas of operation. This work was carried on under the general direction of Jack A. Simon, Head of the Coal Section of the Illinois State Geological Survey. Margaret A. Parker assisted by calculating reserves and preparing the tabulations, using International Business Machines. Special thanks are due Russell B. Lennon who did much of the map preparation and to Wilbur F. Near who assisted.

#### METHODS OF PREPARING RESERVE ESTIMATE

##### Sources of Information

The principal source of information used in preparing this report and its accompanying maps was the large number of well logs and maps in the technical files of the Geological Survey. Much of the information had been compiled previously on work maps by members of the Coal Section for use in preparing an inventory of minable coal reserves in Illinois (Cady, 1952). The information contained on these maps, modified to incorporate recent data, furnished the principal basis for mapping strippable reserves.

Structure of the No. 6 Coal was obtained from maps prepared by Cady (1938, 1940) and Payne (1941) that were modified to incorporate new data obtained since their publication. Maps of mined-out coal areas used in the minable coal reserves study (Cady, 1952) were revised to include all coal mined by stripping to July 1, 1956.

##### Selection of Unit Areas for Mapping

The state of Illinois has been divided into eight areas for convenience in preparing reports and maps of strippable coal resources. The report for the first area has been published (Smith, 1957). Figure 1 shows the area covered in this report as well as the six remaining areas. Areas one through seven are arranged for convenience in mapping the minable coals of the Caseyville, Tradewater, Carbondale, and Lower McLeansboro Groups near their outcrops at the margins of the Eastern Interior Coal Basin. The eighth area embraces a large part of the deeper portion of the Eastern Interior Coal Basin where Carbondale coal beds lie at depths too great for stripping. In that area strippable reserves are restricted to McLeansboro coals that attain minable thickness only locally.

##### Definition of Minalbe Coal

In this report strippable coal reserves include coal beds that are 18 inches or more thick and have an overburden not more than 150 feet thick. Evaluation of strippable reserves is based entirely upon thickness of coal and depth of overburden.

Certain of the reserves will not be recoverable because they lie beneath towns, cities, highways, etc. However, the scale on which the coal is mapped in these studies does not permit their omission from the estimate.

In this report, as in earlier reports on coal reserves in Illinois (Cady, 1952; Smith, 1957), the tonnage estimate is based on an assumption of 1800 tons of coal per acre foot, and the estimates are for total coal in place and do not allow for losses during recovery.

#### Delineation of Coal Outcrops

The accuracy with which the outcrop boundary of coal beds can be mapped depends upon the number and distribution of outcrops and test holes, nature of the topography, and amount of unconsolidated material present. Faults and other structural features, erosional cutouts, and areas in which the coal is lenticular or lacks persistence also make it difficult to map the coal outcrop accurately.

In much of Illinois the bedrock is masked by various thicknesses of glacial deposits, and south of the glacial boundary it is covered by deposits of loess (wind-blown dust) deposited during glacial time. The term "outcrop" is herein used broadly to describe the border of a coal bed, whether it is exposed at the surface or concealed beneath unconsolidated surface materials.

The outcrops of No. 5 and No. 6 Coals over much of the area are comparatively well defined because both coals have been explored by prospect drilling and mined commercially. Outcrops of the Murphysboro Coal and other coals which crop out south of the outcrop of No. 5 Coal are not as well defined because of comparative lack of exploratory drilling and a wider range in their thickness and lateral extent.

Because information relating to coal bed outcrops is important in strip mine prospecting, considerable effort has been made to map the position of the outcrop as accurately as possible. The relative reliability of the outcrop shown on the map (pls. 1-A, 1-B) is indicated by means of line symbols.

#### Overburden Categories

Thickness of overburden is shown on the maps by isopach lines representing 50-foot intervals to show thickness categories of 0-50, 50-100, and 100-150 feet. In selecting overburden categories, we realized that, although 100 feet of overburden represents the upper limit for overburden in Illinois strip mining to date, it seemed appropriate to include resources at depths greater than those currently considered strippable so that the results of this inventory may have the broadest possible application. It is beyond the scope of the report to attempt to predict future economic and technologic factors that may govern the extent to which coal reserves classified in this study will ultimately be utilized.

#### Delineation of Strippable Coal

Structural data necessary to delineate thickness of overburden was based largely on maps prepared by Cady (1938, 1940) and Payne (1941) showing the structure of No. 6 Coal. In areas where data were insufficient to prepare a structure contour map of No. 5 Coal, its structure was mapped by extrapolation from the structure of No. 6 Coal. Although the structure thus obtained permits less accuracy in delineating thickness of overburden for No. 5 Coal in comparison with that of No. 6 Coal, the results are believed to be satisfactory because the interval between No. 6 and No. 5 Coals generally is known.

### Classification of Reserves

Coal reserves are divided into categories to designate the relative reliability of the estimate. On the maps and in the tables of this report reserves are divided into primary and secondary classes.

Class I - Primary Reserves. - Class I includes coal in areas where there is sufficient information from outcrop measurements, mine and pit workings, and drill holes to establish the presence of the coal with reasonable certainty. This class ordinarily includes all coal within two miles of the last point of reliable information of coal thickness (mines, outcrops, diamond drill holes, and churn-drill coal-test holes). This is equivalent to the proved (Class I-A) and probable (Class I-B) categories for reserves in the statewide inventory of coal reserves compiled by Cady (1952). Where the evidence suggests uncertainty as to the persistence or thickness of the coal, the above-defined limits have been modified in making the appraisal.

Class II - Secondary Reserves. - In Class II areas, reserves are based on projection of geologic information from the Class I areas outward into areas in which the Survey has only scattered information obtained from holes drilled for oil and gas or water and in which coal thickness data are not considered sufficiently reliable for classifying the coal as primary reserves. Coal in areas where it is judged to be lenticular or erratic in its occurrence, or where other factors mitigate against the regular presence of the coal in the thickness indicated, is included with Class II reserves at the discretion of the author.

The principal value in recognizing Class II reserves is to indicate areas where indirect evidence plus geologic interpretation suggest that coal may be present at the thickness indicated on the maps and where prospecting for strippable coal might advantageously be conducted.

The Class II reserves of this report correspond to those classified by Cady (1952) as II-A (strongly indicated) and II-B (weakly indicated) in the report entitled "Minable Coal Reserves of Illinois."

### Thickness of Coal

Thickness of the coal is shown on the maps (pls. 1-A, 1-B) by isopach lines wherever datum points were close enough together to permit them to be drawn. In areas where construction of isopach lines was not practical, an average value for coal thickness is shown. Average values for coal thickness have been divided along township lines on the maps in this report wherever it was convenient to do so; elsewhere the boundary between thickness categories is indicated by line symbols.

Isopach lines are drawn on the maps at intervals, beginning with 18 inches and progressing by 12-inch increments as follows: 18, 30, 42, 54, 66, 78, 90, and 102 inches. Thus the average thickness of coal reserves falling between successive isopach lines is calculated in even feet (for example, between 18- and 30-inch isopach lines, average 24 inches). These average thickness values were used to calculate the coal tonnage within each of the overburden and reliability classifications defined.

The thickness values given above coincide with those used by Cady (1952) for calculating the total minable coal reserves of Illinois with the exception of the lowest thickness category, which generally was 28 inches in the earlier study.

## Mined-out Coal

The extent of coal mined out by underground methods was taken from maps showing the extent of mining to 1950, compiled by the Illinois State Geological Survey (Cady, 1952). The area of coal mined by stripping was extended from information furnished by the Illinois Coal Strippers Association and includes strip mining to July 1, 1956.

The mined-out coal areas shown on plates 1-A and 1-B are based on data compiled from the sources mentioned. With regard to areas of strippable coal lying between the outcrop and the outer limits of underground mines, it should be pointed out that the actual extent of coal in those places depends upon the accuracy with which the line of outcrop, and the outer limit of underground workings, is shown on the maps. In many areas the data available are insufficient to delineate accurately the outer limit of the coal bed beneath glacial deposits. In such areas more careful examination is required to establish in detail the actual presence of the coal beds at the margins of areas of underground mining.

## GEOLOGIC OCCURRENCE OF COAL BEDS

The counties discussed in this report are located near the southwestern margin of the Eastern Interior Coal Field. Sediments of Pennsylvanian age lie disconformably on an uneven surface that was developed by erosion and deformation of the underlying Mississippian sediments before Pennsylvanian deposition began. Because the area is located near the margin of the basin in which Pennsylvanian deposition occurred, sediments, especially in the Caseyville and Tradewater Groups, are much thinner west of the DuQuoin monocline than to the east in the deeper part of the Eastern Interior Coal Basin (fig. 2).

The Pennsylvanian or coal-bearing strata of Illinois are divided into four groups which are, beginning with the lowest (oldest), the Caseyville, Tradewater, Carbondale, and McLeansboro. The salient geologic features of the coal beds in

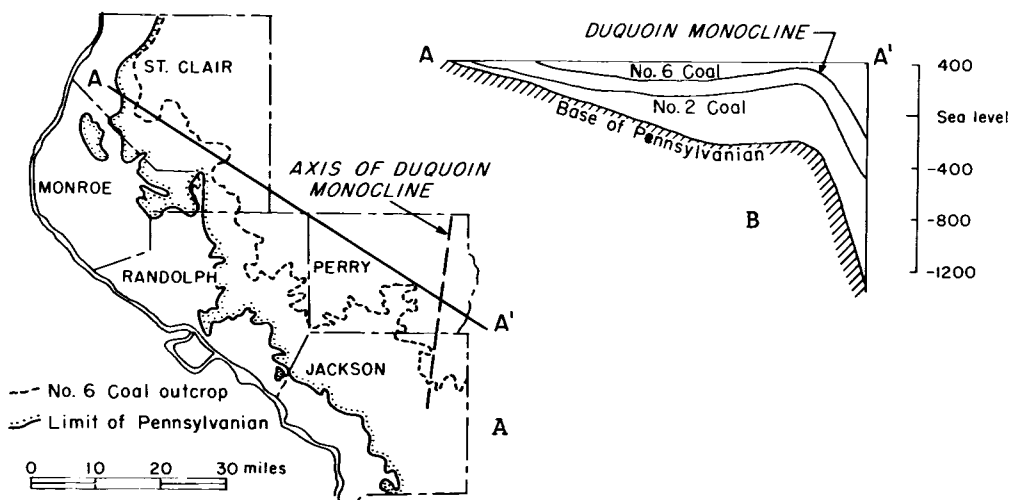


Fig. 2A. - Approximate axis of the DuQuoin monocline, outcrop of Herrin (No. 6) Coal, and distribution of Pennsylvanian rocks.

Fig. 2B. - Cross section showing contrast, in thickness of strata, between the shelf area to the west and the basin area east of the DuQuoin monocline.

each of the four groups are shown in figure 3 and are briefly discussed below with comments on the character of the associated strata and correlation of the coals.

### Caseyville Group

The Caseyville Group contains sandstone, shale, and thin coal beds. Basal Caseyville rocks rest unconformably on Mississippian rocks which had been subjected to considerable erosion prior to Caseyville deposition.

Caseyville strata are thin or absent in St. Clair, Randolph, western Perry, and western Jackson counties. East of the DuQuoin monocline in eastern Perry and eastern Jackson counties, the Caseyville Group attains a thickness of 700 or more feet. In the vicinity of Makanda, in the southeasternmost township of Jackson County, there are coal beds in the Caseyville Group which have been mined at a number of places in small underground mines.

The mines which formerly operated at Makanda were small. The coal beds mined there are lenticular and occur at several stratigraphic levels within strata that contain numerous thick sandstone beds. The area is unglaciated and topographic slopes are generally steep. No attempt was made to map the coal beds at Makanda or to estimate strippable reserves there.

### Tradewater Group

The upper half of the Tradewater Group contains the Murphysboro, DeLong, Seahorne, Wiley, and Greenbush Coals (fig. 3). The DeLong, Seahorne, Wiley, Greenbush, and No. 2 Coals all occur within an interval of less than 50 feet near Campbell Hill, Jackson County. Near Campbell Hill there has been small-scale underground mining in the Seahorne and perhaps one or more of the overlying beds. Reserves in these beds were considered collectively by Cady (1952) as "Campbell Hill Coal." In this report strippable reserves are mapped for only the Seahorne Coal.

The Murphysboro Coal has been mined at several places in Jackson County but was mined most extensively in the vicinity of Murphysboro. Because it is irregular in occurrence and thickness, strippable reserves are largely in the Class II category of reliability.

Correlations of Tradewater coals of this area with coals in other parts of southern Illinois are somewhat uncertain. The Seahorne Coal of the Campbell Hill area is correlated by Wanless (1955) with the Stonefort Coal of Williamson County. The Wiley and Greenbush Coals have been correlated with the Davis and DeKoven

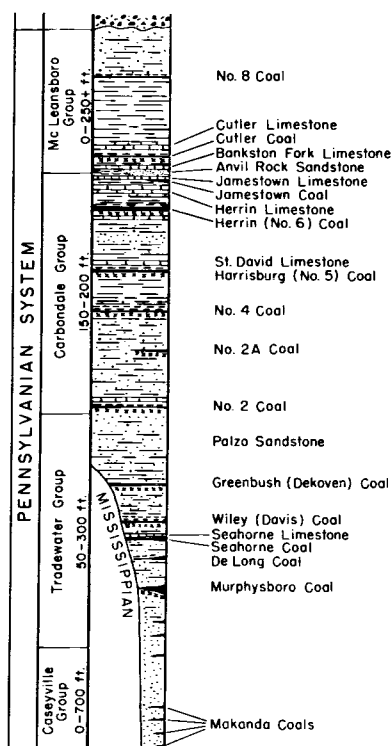


Fig. 3. - Generalized section of Pennsylvanian rocks in Jackson, Perry, Randolph, and St. Clair counties.

Coals, respectively, of Williamson County. Cady (1952) has suggested possible equivalence of Murphysboro Coal with New Burnside Coal in Johnson County. The Murphysboro Coal has been correlated approximately with the Rock Island (No. 1) Coal by Wanless (1955).

#### Carbondale Group

The Carbondale Group includes all strata from the base of the Palzo Sandstone beneath No. 2 Coal upward to the base of the Anvil Rock Sandstone (fig. 3). The thickness of the Carbondale Group ranges from 150 feet or less in St. Clair County to 200 feet or more in Jackson County. The Carbondale Group contains No. 5 and No. 6 Coals, which are the most important seams in the area discussed.

No. 2 Coal near the base of the Carbondale Group attains a thickness of 18 inches or more in a small area near Campbell Hill in northwestern Jackson County. It may have minable thickness but no specific areas are known. No. 2 Coal is remarkably widespread not only in the area of this report but throughout the Eastern Interior Basin. Thus it furnishes a very convenient base of reference for the correlation of many of the less persistent coal beds in the upper part of the Tradewater Group and in the lower part of the Carbondale Group.

No. 4 Coal is not known to have strippable reserves within the area discussed, but in Jackson, Perry, and Randolph counties where it lies 75 to 125 feet below No. 6 Coal it is important as a marker bed. In scattered holes (3, 8, 9, 11, and 16, pl. 2) where No. 4 Coal has been encountered in core drilling, 2 to 3 feet of coal has been reported. It is possible that No. 4 Coal of similar thickness may be present at strippable depths south of the outcrop of No. 5 Coal in northern Jackson and southern Perry counties, but there are insufficient data on which to base an estimate of strippable reserves.

In St. Clair County, No. 4 Coal apparently is widespread in its occurrence (pl. 2). Northwest of Belleville, coal below the No. 6 has been mined locally. This has generally been regarded as No. 5 Coal but at some places it may have been No. 4.

Above No. 4 Coal there is at many places a prominent black "slaty" shale, several feet thick, which contains beds or concretionary masses of dark limestone. The shale often is useful in distinguishing No. 4 Coal in exploratory drilling and is probably responsible for the excessive thickness of No. 4 Coal reported in oil well log number 17 on the cross section, plate 2.

Strippable reserves of No. 5 Coal are present in eastern Jackson County, southwestern Perry County, and a large part of Randolph County. In the area studied the No. 5 Coal is exceeded in importance only by the No. 6 Coal, which overlies it. In St. Clair County, northeastern Randolph County, and in all except the southwestern part of Perry County, No. 5 Coal is not mapped because of insufficient data. The limited data available suggest that at most places in Perry County, No. 5 Coal is either absent or less than 18 inches thick. In those parts of Randolph County and in St. Clair County where No. 5 Coal is not mapped, it is likely that there may be fairly extensive areas where it is present 2 to 3 feet thick at strippable depths. Areas where No. 5 Coal is not mapped but may be present at strippable depths are described in the next part of the report.

Approximately 80 percent of the strippable coal reserves in the area of this report is in No. 6 Coal which attains thicknesses of 7 to 8 feet over wide areas. The rocks overlying No. 6 Coal consist principally of shale and limestone (fig. 4). The boundary separating Carbondale strata from the overlying McLeansboro strata is defined as the base of the Anvil Rock Sandstone, but because the Anvil Rock

Sandstone is absent except at a few places in the counties discussed here, the Carbondale-McLeansboro boundary is, for convenience, placed at the top of the Jamestown Limestone.

#### McLeansboro Group

The McLeansboro Group includes all rocks above the base of the Anvil Rock Sandstone, or, in its absence, above the top of the Jamestown Limestone (fig. 3). Erosion has removed all but the lowest part of the McLeansboro strata from most of the area of these counties. A maximum of about 250 feet occurs in St. Clair and Perry counties, except east of the DuQuoin monocline in eastern Perry County where over 400 feet is present. Strata in the lower part of this group, which includes the Cutler Coal, are widely distributed north and east of a line defined approximately by the No. 6 Coal outcrop.

Although there are a number of thin coal beds in the McLeansboro rocks in the area, the Cutler Coal, about 25 feet above the lower boundary of the group, is the only coal known to attain the minimum thickness for strip mining as defined in this study.

Strippable reserves of Cutler Coal have not been mapped in detail because only in a few isolated areas is there sufficient information to permit evaluation of potentially strippable coal. These areas are discussed on page 20.

#### DESCRIPTION OF COAL BEDS AND STRIPPABLE RESERVES

##### Murphysboro Coal

The Murphysboro Coal was named by Worthen (1868, p. 11-12) for exposures near the town of Murphysboro, Jackson County. The stratigraphic position of the coal is near the middle of the Tradewater Group (fig. 3). Strippable reserves are known only in Jackson County.

In the vicinity of Murphysboro and southeast of Carbondale, Murphysboro Coal was mined extensively during the last half of the 19th century and early part of the 20th century. Records of these mines suggest that the coal thinned and became lenticular at the margins of the extensively mined areas shown on plate 1-B. Small-scale strip mining has been conducted at a few places between the coal outcrop and the limit of old underground works, but no extensive areas of Murphysboro Coal have been strip-mined.

Table 1. - Summary of Strippable Reserves of Murphysboro Coal

County	Class I	Class II	Total	Mined out
Overburden thickness (ft.)	(In thousands of tons)		(sq. mi.)	
JACKSON				
0-50	40,097	44,659	84,756	
50-100	8,832	18,217	27,049	
100-150	1,345	17,128	18,473	
TOTAL	50,274	80,004	130,278	7.64

Plate 1-B indicates areas in Jackson County where additional strippable reserves of Murphysboro Coal may be present. These reserves are summarized in table 1. Most of the coal surrounding the mined-out areas in the vicinity of Murphysboro has been designated class II because its thickness changes markedly

within short distances and at many places it is split into two or more benches (Cady, 1917) by shale partings several feet thick. The coal outcrop in T. 8 S., R. 3 W., shown on plate 1-B, was mapped by Shaw in 1912. Very little information on coal thickness is available for that area, and reserves there have been conservatively estimated on the basis of 24 inches average thickness because the coal may be absent locally.

At outcrops south of Murphysboro and in the Carbondale area the Murphysboro Coal is overlain by black slaty shale as illustrated in the geologic section described below. The coal beds indicated at 24 and 37 feet above the Murphysboro Coal have not been correlated beyond this region. Lamar (1925, p. 103) suggests that at least one of these overlying coals may merge with the Murphysboro Coal to form the very thick coal extensively worked in the mines around Murphysboro.

Section exposed at a strip mine, SE $\frac{1}{4}$  SW $\frac{1}{4}$  sec. 36,  
T. 9 S., R. 1 W., Jackson County

	Thickness		Depth	
	Ft.	In.	Ft.	In.
Pennsylvanian System				
Tradewater Group				
Poorly exposed, probably mostly sandstone	35	0	35	0
Sandstone, buff, and shale, gray, interbedded	15	0	50	0
Coal, much weathered	2	3	52	3
Underclay, light gray, silty	1	6	53	9
Shale and sandy shale, light gray	9	6	63	3
Coal, soft and shaly, lenticular, absent at many places in strip mine mine highwall	1	10	65	1
Underclay, shaly and silty	3	6	68	7
Shale, medium to dark gray, fissile, with siltstone and siderite interlamination	11	0	79	7
Shale, black, slaty, massive, uniform	10	6	90	1
Coal (Murphysboro) blocky, soft, somewhat shaly, some pyritic concretions	7	9	97	10

#### Seahorne Coal

In the vicinity of Campbell Hill (T. 7 S., R. 4 W.), Jackson County, there is an area of about two square miles where a number of small coal mines have operated. Information concerning the mines and studies of outcrops in the area provide a basis for estimating strippable reserves.

Probably not all of the mines in the Campbell Hill area operated in the same bed, but the coal or coals mined there have commonly been designated Campbell Hill Coal (Cady, 1952). It is probable that the Seahorne Coal, which is 3 to 4 feet thick, was encountered in most of the mines (pl. 1-B). Strippable reserves of the Seahorne Coal are noted in table 2. Additional strippable coal reserves

Table 2. - Summary of Strippable Reserves of Seahorne Coal  
(Class I, in thousands of tons)

County	Overburden thickness (ft.)			Total	Mined out (sq. mi.)
	0-50	50-100	100-150		
JACKSON	11,434	448	-	11,882	.08



exist in the Wiley and No. 2 Coals, which are 18 or more inches thick at some outcrops, but commonly thinner. Lack of sufficient information as to thickness prevents mapping them in detail.

Very little is known concerning the extent of the Campbell Hill coals adjacent to the area of reserves shown on plate 1-B. Northeast and east of Campbell Hill the strata are interrupted by faulting (Stonehouse and Wilson, 1955) and there is some uncertainty about the eastward correlation of the coals near Campbell Hill.

#### Harrisburg (No. 5) Coal

Reserves totaling approximately 485 million tons (table 3) have been mapped for No. 5 Coal in the area. Strip mining of No. 5 Coal has been undertaken at only a few places because of competition from the thicker and generally more accessible No. 6 Coal overlying No. 5 Coal.

Table 3. - Summary of Strippable Reserves of No. 5 Coal

County	Overburden thickness (ft.)	Class I (In thousands of tons)	Class II	Total	Mined out (sq. mi.)
JACKSON					
	0-50	18,585	-	18,585	
	50-100	34,424	-	34,424	
	100-150	46,834	-	46,834	
	TOTAL	99,843	-	99,843	1.88
PERRY					
	0-50	33,112	-	33,112	
	50-100	117,156	13,182	130,338	
	100-150	31,162	14,662	45,824	
	TOTAL	181,430	27,844	209,274	.58
RANDOLPH					
	0-50	41,125	196	41,321	
	50-100	86,795	6,283	93,078	
	100-150	32,557	8,934	41,491	
	TOTAL	160,477	15,413	175,890	.88
ALL COUNTIES					
	0-50	92,822	196	93,018	
	50-100	238,375	19,465	257,840	
	100-150	110,553	23,596	134,149	
	TOTAL	441,750	43,257	485,007	3.34

The interval between No. 5 and No. 6 Coals ranges within the area from less than 25 to about 50 feet thick. In the eastern part of the area, in Jackson and Perry counties, the interval is commonly about 35 feet; in the western part, in Randolph and St. Clair counties, it commonly is about 25 feet but at some places is 15 feet or less.

Within this interval the character of the strata varies considerably from place to place. Immediately above No. 5 Coal there is commonly a black carbonaceous shale that may contain ironstone concretions and beds or nodules of limestone. The shale generally is overlain by the St. David Limestone, which

when poorly developed may be a nodular or bedded deposit only a few inches thick, but which typically consists of 6 inches to several feet of dense brownish gray limestone with shale partings.

Above the St. David Limestone there is a variable thickness of shale extending to the base of the underclay of the No. 6 Coal. Where the interval between No. 5 and No. 6 Coals is thin, the underclay of No. 6 Coal may extend down nearly to the top of the St. David Limestone. This underclay varies in thickness and composition from place to place but typically is 5 to 8 feet thick, contains limy nodules in the lower part, and may grade downward to several feet of impure nodular limestone in a clay matrix.

Table 6 lists No. 5 Coal reserves for each township in the counties of this report, and gives a detailed breakdown of reserves within each category of coal thickness and overburden depth. Chemical analyses of the No. 5 Coal in each county are listed in the Appendix.

### Jackson County

In northeastern Jackson County No. 5 Coal averages 4 feet thick and lies about 35 feet below No. 6 Coal. The No. 5 has been strip mined only near its outcrop where overburden was shallow. A large part of the remaining strippable reserves of No. 5 Coal (pl. 1) in this county underlies land from which No. 6 Coal has been strip mined.

### Monroe County

In T. 1 and 2 S., R. 10 W., there is an outlier of about two square miles that contains No. 5 and No. 6 Coals at strippable depth. No. 5 Coal is known from only a few outcrops that indicate it may have an average thickness of about 2 feet. More data are available on No. 6 Coal, which was formerly mined here. It overlies No. 5 Coal at an interval of about 25 feet and is later discussed in some detail. It is possible that some No. 5 Coal near its outcrop would be strippable in conjunction with No. 6 Coal mining in this outlier. However, more thorough exploration of the outcrop and coal thickness would be required for an evaluation of potentially strippable No. 5 Coal in this small area.

### Perry County

Strippable reserves of No. 5 Coal in Perry County are limited to an area of about one township in the southwestern corner of the county. From the vicinity of Elkhaville in northeastern Jackson County to the vicinity of Denmark in southwestern Perry County, No. 5 Coal appears to be absent or so thin that its horizon has not been recognized in drilling. Consequently, the No. 5 Coal outcrop or other data concerning the coal in that area could not be mapped on plate 1-B.

In the vicinity of Pinckneyville the No. 4 Coal, which in some records is two or more feet thick, is reported 70 to 90 feet below No. 6 Coal. Relatively few holes have been drilled below No. 6 Coal in the area south of Pinckneyville, which embraces the valley of Beaucoup Creek, and No. 5 Coal is not reported in any of the available records. The No. 4 Coal may contain strippable reserves near its outcrop, but there are not enough data from which to map its outcrop or thickness. However, the few data available suggest that it may be 18 to 30 inches thick in areas of considerable extent.

South and east of the village of Denmark (T. 6 S., R. 4 W.), at the western boundary of the area where No. 5 Coal was not mapped, from 3 to 4½ feet of

No. 5 Coal appears to lie at depths of less than 50 feet. Here No. 6 Coal lies 20 to 35 feet above No. 5.

#### Randolph County

In southeastern Randolph County a rather large area of No. 5 Coal is mapped near Percy in T. 6 S., R. 5 W., at depths favorable for strip mining. The No. 5 Coal is 25 feet or less below No. 6 Coal. Relatively small amounts of No. 5 Coal have been mined (pl. 1-B). Most of the No. 5 Coal reserves are beneath areas where the much thicker No. 6 Coal has been strip mined.

Another of the principal areas of strippable No. 5 Coal in Randolph County is in an area southwest of Sparta. In this area also, rather thick No. 6 Coal overlies the No. 5 Coal wherever No. 5 Coal lies beneath moderate to heavy overburden.

North and west of Sparta, No. 5 Coal is not mapped, because of lack of data, except in a small area east of Baldwin in north-central Randolph County. There the No. 5 Coal has an average thickness of 28 inches and is overlain at an interval of about 20 to 25 feet by No. 6 Coal that is  $5\frac{1}{2}$  to 6 feet thick. Between Sparta and this area, it is likely that No. 5 Coal may be present at strippable depth in thickness of 2 to 3 feet but no data are available from which to map the outcrop or thickness.

#### St. Clair County

No. 5 Coal was not mapped in St. Clair County because data regarding its depth and thickness are very meager in the parts of the county in which it would be potentially strippable. General information concerning No. 5 Coal is summarized below for three areas of the county.

Millstadt Area. - Near the east edge of the village of Millstadt (T. 1 S., R. 9 W.) 36 inches of No. 5 Coal was reported at a depth of 63 feet, according to the record of a churn test hole drilled in 1916. No. 5 Coal is 34 feet below No. 6 Coal, which is about 6 feet thick and has been mined at several places in the vicinity. Northeast of Millstadt (sec. 1, T. 1 S., R. 9 W., and secs. 34, 35, and 36 of T. 1 N., R. 9 W.), a number of holes drilled in prospecting for No. 6 Coal also penetrated No. 5 Coal. In these drill holes thicknesses of No. 5 Coal ranged between 12 and 36 inches with an average for 18 holes being 25 inches. The data suggest that underlying and surrounding the rather large peninsula-like area of No. 6 Coal near Millstadt (pl. 1-B) considerable No. 5 Coal may be present at strippable depths although much of it may be 24 inches or less thick. South of Millstadt, near the center of sec. 27, T. 1 S., R. 9 W., a small area of No. 5 Coal was reportedly mined in connection with the more extensive mining of No. 6 Coal.

Southern St. Clair County. - East and southeast of Millstadt (Ts. 1, 2, and 3 S., Rs. 6, 7, and 8 W.), for the area bordering No. 6 Coal outcrop (pl. 1-A) where No. 5 Coal would be potentially strippable, only widely scattered data are available. The few records suggest that No. 5 Coal may be thin or absent at some places in the area, but that in most places thicknesses of 2 to 3 feet with local thicknesses up to 4 feet seem to be typical. Undoubtedly the presence of much thicker No. 6 Coal that overlies No. 5 Coal at an interval of 40 to 50 feet has deterred the search for areas that may contain the relatively thin No. 5 Coal.

In southern St. Clair County, strippable reserves of considerable magnitude probably exist in No. 5 Coal in the lower thickness categories but there are

not enough data for compilation of an estimate. In most places the western border of No. 5 Coal should lie about one mile west of the No. 6 Coal outcrop shown on plate 1-B. The depth of overburden along the western margin of No. 6 Coal would suggest that most of the strippable reserves of No. 5 Coal would lie at depths of 50 to 150 feet. The most favorable places for the occurrence of No. 5 Coal under thin to moderate overburden would be west of places where No. 6 Coal (pl. 1-A) is present at depths of less than 50 feet.

Northwestern St. Clair County. - Northwest of Belleville in the northwest part of sec. 3, T. 1 N., R. 9 W., there are two abandoned local mines that operated in No. 5 Coal. The coal in one mine reportedly was 36 inches thick and in the other 26 inches. Southwest of these mines in the SW $\frac{1}{4}$  sec. 9, T. 1 N., R. 9 W., 42 inches of No. 5 Coal is reported to crop out at two places about a quarter of a mile apart. The interval between No. 5 and No. 6 Coals in this area is 20 to 30 feet. These mines and outcrops of No. 5 Coal are located along the Mississippi River bluff. No information is available to suggest how large an area may be underlain by No. 5 Coal of this thickness near its outcrop west of Belleville.

#### Herrin (No. 6) Coal

Large-scale strip mining of No. 6 Coal has been carried on in a number of localities in the area of this report. Also, as is seen in table 4, there are large reserves of strippable No. 6 Coal remaining in these counties. No. 6 Coal is remarkably uniform in thickness throughout wide areas and varies but little in its general character over virtually the entire area of this report except in the split-coal area of northeastern Jackson County where it contains many shale partings. Throughout the area No. 6 Coal generally is 6 or more feet thick and contains only one persistent parting, called the "blue band," which is normally about 18 inches above the bottom of the coal seam.

Table 4. - Summary of Strippable Reserves of No. 6 Coal  
(Class I, in thousands of tons)

County	Overburden thickness (ft.)			Total	Mined out (sq. mi.)
	0-50	50-100	100-150		
JACKSON	26,969	73,264	49,085	149,318	9.47
MONROE	6,726	-	-	6,726	
PERRY	136,037	510,782	249,948	896,767	35.94
RANDOLPH	51,116	102,241	125,782	279,139	8.19
ST. CLAIR*	101,714	409,091	738,318	1,249,123	36.06
Total, coal bed	322,562	1,095,378	1,163,133	2,581,073	89.66

\* Includes 7,958 thousand tons in Washington County.

Normally the overburden immediately above No. 6 Coal consists of a few feet of black slaty shale that is overlain by interbedded gray shale, clay, and limestone beds that commonly extend upward 40 to 60 feet to the overlying Cutler Coal. The Cutler Coal generally is overlain by the Cutler Limestone. Thus the overburden commonly encountered in strip mining No. 6 Coal contains abundant limestone. These limestones, however, present no serious problem to strip

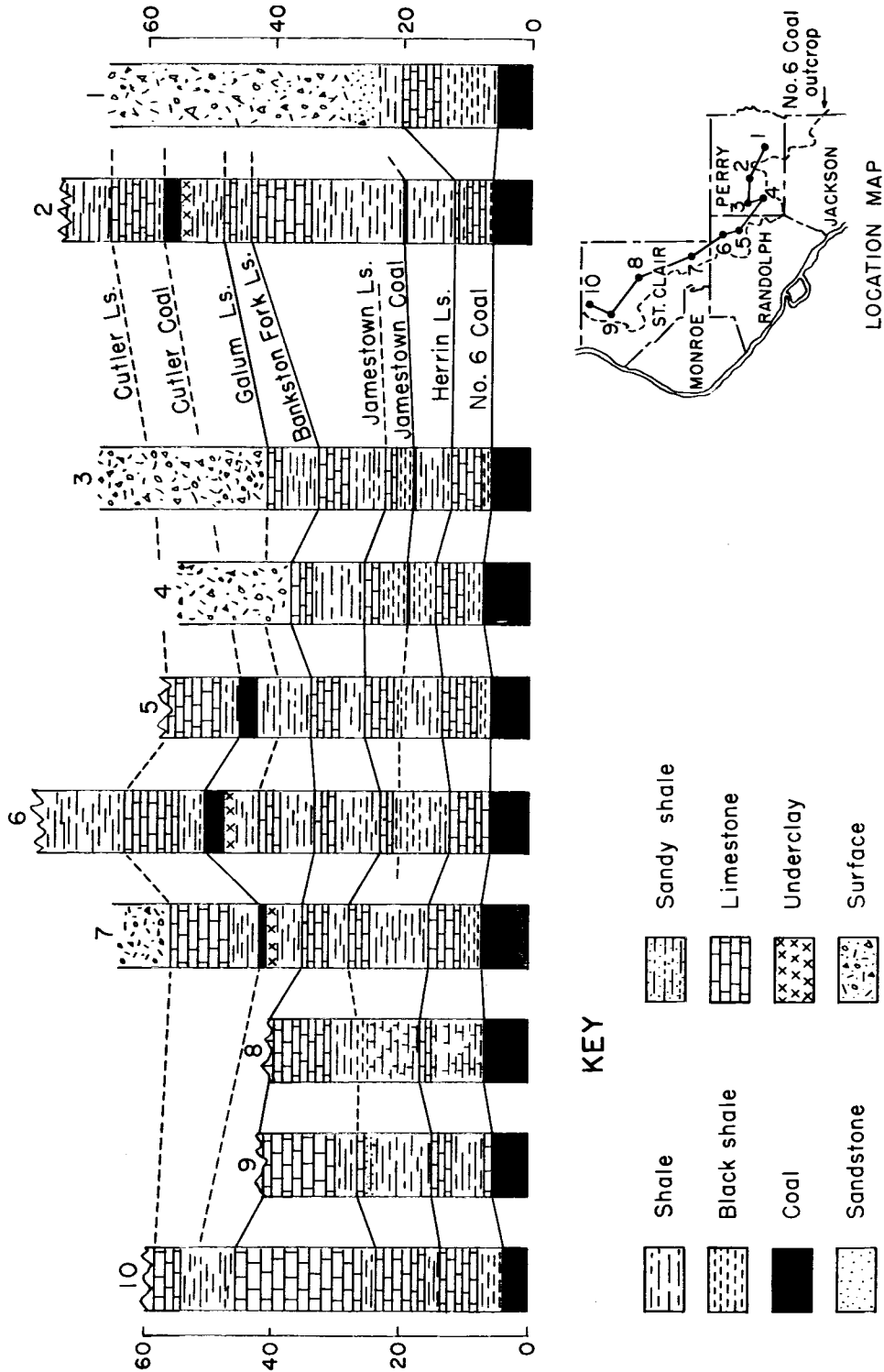


Fig. 4. - Cross section showing the strata overlying No. 6 Coal.

mining because they are dense and can be broken effectively with modern explosives. Figure 4 illustrates the general character and sequence of beds typically encountered above No. 6 Coal in the counties of this report.

Classified reserves of strippable No. 6 Coal in each county are tabulated in tables 4, 5, and 6. The average analysis of No. 6 Coal in each county is shown in the Appendix.

### Jackson County

No. 6 Coal in Jackson County is restricted to the northeast corner of the county where it has been strip mined extensively. In Ts. 7 and 8 S., R. 1 W., there is a north-south belt about three miles wide, designated "split-coal area" on plate 1-A, in which No. 6 Coal is parted by numerous shaly beds. The coal becomes abnormally thick near the margins of the split-coal area, within which as much as 10 to 15 feet of alternating coal and shale have been recorded. These relationships suggest that the split-coal area resulted from deposition in a depression or channelway traversing the basin of coal accumulation.

In the area of split coal (pl. 1-A) relatively few drill records are available, especially for the area between the approximate position of the coal outcrop line and the 150-foot overburden line. Available records suggest that benches of coal 3 to 4 or more feet thick are likely to be encountered. The split-coal area is therefore included in this report as an area of potentially strippable coal, and provisional outcrop and overburden lines have been extended across the split-coal area (pl. 1-A) to indicate its approximate extent. Forty-two inches was somewhat arbitrarily chosen as a conservative thickness for estimating strip-pable No. 6 Coal reserves in the split-coal area on the basis of available information on coal thickness in the area beyond the 150-foot depth line.

### Monroe County

The only known deposit of strippable coal in Monroe County is an area of about  $1\frac{1}{2}$  square miles in Ts. 1 and 2 S., R. 10 W. This is an outlier six miles southwest of Millstadt, St. Clair County, where No. 6 Coal has been downfaulted and thus preserved from the erosion that removed the coal from the surrounding area. At the end of Pennsylvanian deposition, No. 6 Coal and associated strata presumably blanketed this entire area, extending westward beyond the Mississippi River Valley as evidenced by small outliers of No. 6 Coal at St. Louis, Missouri (Knight, 1933).

The No. 6 Coal in the Monroe County outlier has been mined at several places. Data available suggest that the entire outlier of No. 6 Coal occupies only about  $1\frac{1}{2}$  square miles and that within this area the coal averages about 4 feet thick. The coal in this outlier is mapped as being (pl. 1) at depths of less than 50 feet, on the basis of information available. Locally the overburden is known to exceed 40 feet deep and it may exceed 50 feet in a few places.

### Perry County

There are extensive strippable reserves of No. 6 Coal in Perry County totaling approximately 897 million tons. However, except for one tract in the southwestern corner of the county, coal under less than 50 feet of overburden has been nearly exhausted. The distribution of No. 6 Coal and its overburden in Perry County is shown in detail on the maps accompanying this report.

In the eastern part of Perry County, No. 6 Coal has been extensively mined (pl. 3-A). It ranges between 5 and 8 feet thick, and along the axis of the DuQuoin monocline lies relatively close to the surface. The reserves in that area are limited for the most part to remnants lying adjacent to and between mined-out areas. A short distance east of the axis of the DuQuoin monocline the prominent eastward dip of the strata carries the No. 6 Coal below strippable depth (pl. 1-A).

In western Perry County there are large areas of strippable No. 6 Coal. The most accessible coal for stripping is in the extreme southwestern part of the county near Denmark and south of Pinckneyville where extensive areas of coal under very favorable overburden have been mined in years past. In the vicinity of Cutler and Jamestown the coal is generally 5 to 6 or more feet thick and there are extensive areas classified in the 50- to 100-foot overburden category as well as large areas in the 100- to 150-foot category.

#### Randolph County

No. 6 Coal underlies approximately the northeastern quarter of Randolph County. There are abundant reserves of coal in the 50- to 100-foot and 100- to 150-foot overburden classes, but most areas where overburden is less than 50 feet thick have already been strip mined. Along much of the outer margin of the No. 6 Coal area in Randolph County the outcrop is covered by glacial drift 50 or more feet thick.

In Randolph County extensive strip mining has been carried on only in the vicinity of Percy near the east edge of the county and adjacent to the previously described large area of strippable coal in western Perry County. Most of the area near the No. 6 Coal margin in Randolph County has been prospected enough to permit reasonably detailed mapping of the coal and overburden thicknesses on the accompanying map.

#### St. Clair County

Extensive areas of No. 6 Coal in St. Clair County lie at depths favorable to strip mining, and the proximity to the St. Louis industrial area and the Mississippi River has given impetus to widespread mining activity. Plate 1-A and table 4 illustrate that although the most favorable areas of No. 6 Coal in St. Clair County have been exploited, large reserves of relatively accessible coal still remain for strip mining.

Sufficient data were available for mapping the No. 6 Coal overburden and coal thickness in St. Clair County with relatively good detail except in an area near Millstadt in T. 1 S., R. 9 W. The coal outcrop as mapped encloses a prominent peninsula-like area in which coal has been strip mined at a number of places. Records of some of these stripped-out areas indicate that the mines terminated at the outcrop. This would suggest that the mined areas are outliers, or that the coal within the very generalized outcrop of No. 6 Coal shown on plate 1-A was considerably dissected by erosion prior to deposition of the mantle of unconsolidated glacial material. Closely spaced drilling would be required to delineate accurately additional strippable reserves in the Millstadt area. The situation is similar in unmined areas adjacent to the very generalized outcrop shown for the No. 6 Coal west and northwest of Belleville in Ts. 1 and 2 N., R. 9 W.

In view of the fact that in St. Clair County large quantities of coal are present in the higher overburden categories, it is noteworthy that a recently opened



A. - Wheel excavator removing unconsolidated overburden from No. 6 Coal west of DuQuoin, Perry County.

B. - Shovel stripping consolidated overburden, limestone, and shale, from No. 6 Coal following the wheel excavator.



strip mine between Freeburg and Fayetteville is using a stripping shovel with a 70 cubic yard bucket capacity (pl. 4), reportedly the largest in the world. This illustrates the trend toward increased mechanization and larger equipment for strip mining coal under deeper cover as shallow-cover reserves become depleted.

### Cutler Coal

In the counties discussed in this report there are areas where the Cutler Coal exceeds the 18-inch minimum thickness adopted for strippable coal in this study. However, there is not enough reliable information on its thickness to permit mapping of strippable reserves as was done for the Cutler (Smith, 1957) in Saline and Williamson counties. Areas where No. 6 Coal has been extensively drilled are generally the only places for which there is enough information for appraisal of the potentially strippable areas of Cutler Coal.

### Jackson County

In the northeasternmost township of Jackson County (T. 7 S., R. 1 W.) and north and east of the No. 6 Coal outcrop (pl. 1) there are numerous drill holes that encountered 24 to 30 inches of Cutler Coal. In these holes the interval from No. 6 Coal to the Cutler Coal ranges between 60 and 90 feet. West of Dowell there are several holes in which Cutler Coal 24 inches thick is reported at depths of only 25 to 30 feet. This suggests that glacial deposits are thin there and that strippable Cutler Coal lies under shallow cover. The area is limited on the east, however, by the DuQuoin monocline, which carries the beds beneath deep cover within a short distance (pl. 1).

### Perry County

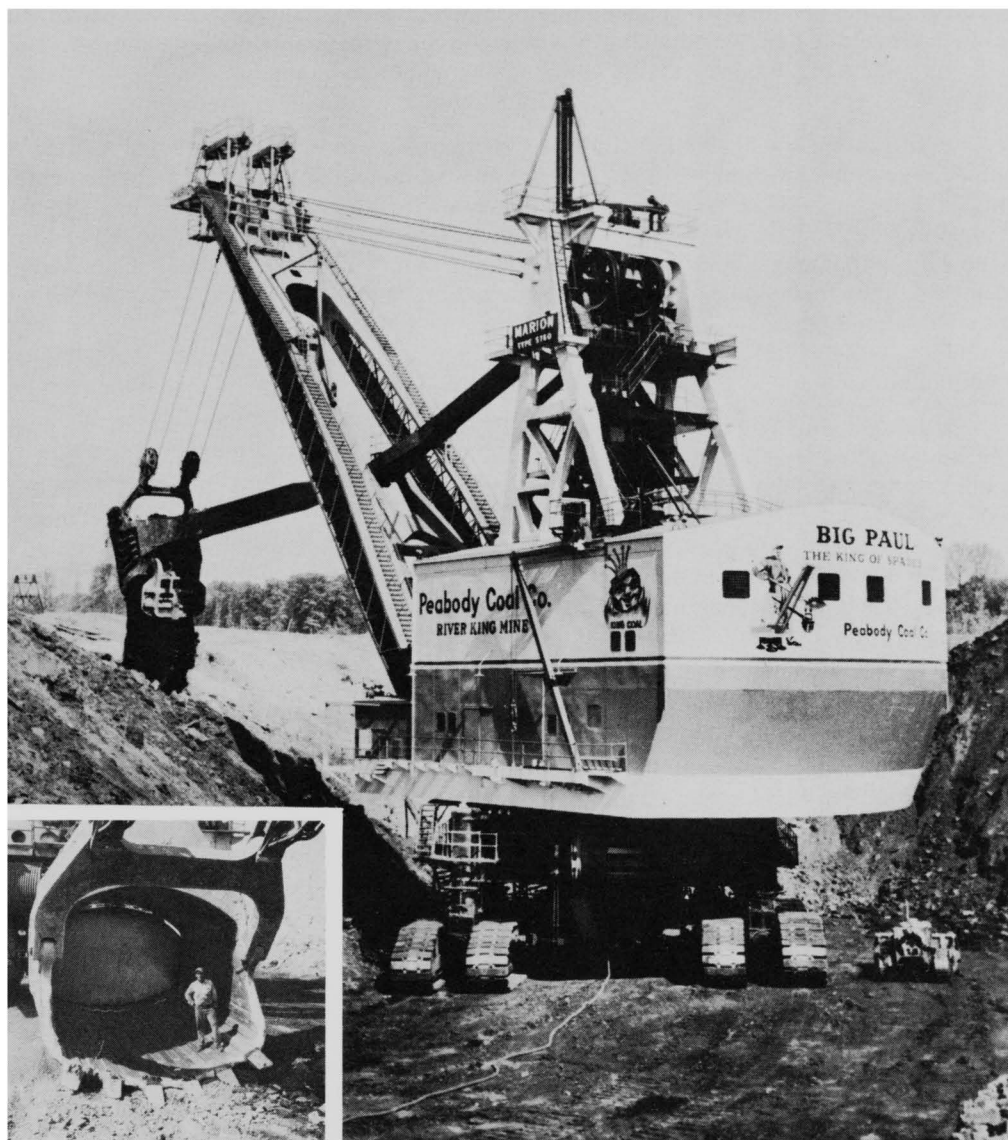
Available data suggest that the Cutler Coal is not present in thicknesses of more than 18 inches or at strippable depth in the eastern half of Perry County except in a small area near the Jackson-Perry county line, which is adjacent to the area near Dowell, Jackson County, described above.

In western Perry County the Cutler Coal is uniformly present in much of the area. It generally lies 45 to 50 feet above No. 6 Coal, so that the thickness of its overburden can be roughly estimated by subtracting the interval thickness from the overburden figured for No. 6 Coal (pl. 1).

A number of drill holes in the northwestern part of Perry County (Ts. 4 and 5 S., Rs. 3 and 4 W.) record about 24 inches of Cutler Coal, indicating that it probably is present over large areas in these four townships. Cutler Coal has not been mined in Perry County to date, but it is likely that there may be areas in the townships mentioned where 24 or more inches would be strippable at depths of less than 50 feet. Other areas of Cutler Coal of like thickness that lie under approximately 50 feet of overburden probably could be recovered during strip mining of the No. 6 Coal 50 feet below the Cutler.

### Randolph County

In northeastern Randolph County in T. 4 S., R. 5 W., and adjacent parts of T. 5 S., R. 5 W., and T. 4 S., R. 6 W., that lie north and east of the 50-foot overburden line for No. 6 Coal (pl. 1), the Cutler Coal ranges between 12 and 36 inches thick. In these areas, it overlies much greater thicknesses of No. 6 Coal, as it does in adjacent parts of Perry County. In northeastern Randolph County



Stripping shovel of 70 cubic yard capacity removing overburden from No. 6 Coal near Freeburg, St. Clair County. Courtesy of Peabody Coal Company.

the Cutler Coal is on the average somewhat thicker than it is in Perry County and lies only 35 to 40 feet above No. 6 Coal.

#### St. Clair County

In St. Clair County the Cutler Coal is often reported in drill holes as a thin seam (12 inches thick or less). There are no known areas where it appears to attain sufficient thickness for strip mining.

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## STRIPPABLE COAL RESERVES

23

Table 5. - Summary of Strippable Coal Reserves by County,  
Coal Bed, and Reliability Classification  
(In thousands of tons)

Coal	Class I Reserves at overburden depths (ft.)			Total	Class II Reserves at overburden depths (ft.)			Total I and II	Mined out (square miles)
	0-50	50-100	100-150		0-50	50-100	100-150		
JACKSON COUNTY									
No. 6 Coal	26,969	73,264	49,085	149,318	-	-	-	149,318	9.47
No. 5 Coal	18,585	34,424	46,834	99,843	-	-	-	99,843	1.88
Seahorne Coal	11,434	448	-	11,882	-	-	-	11,882	.08
Murphysboro Coal	40,097	8,832	1,345	50,274	44,659	18,217	17,128	130,278	7.64
Total	97,085	116,968	97,264	311,317	44,659	18,217	17,128	391,321	19.07
MONROE COUNTY									
No. 6 Coal	6,726	-	-	6,726	-	-	-	6,726	
Total	6,726	-	-	6,726	-	-	-	6,726	
PERRY COUNTY									
No. 6 Coal	136,037	510,782	249,948	896,767	-	-	-	896,767	35.94
No. 5 Coal	33,112	117,156	31,162	181,430	-	13,182	14,662	209,274	.58
Total	169,149	627,938	281,110	1,078,197	-	13,182	14,662	1,106,041	36.52
RANDOLPH COUNTY									
No. 6 Coal	51,116	102,241	125,782	279,139	-	-	-	279,139	8.19
No. 5 Coal	41,125	86,795	32,557	160,477	196	6,283	8,934	175,890	.88
Total	92,241	189,036	158,339	439,616	196	6,283	8,934	455,029	9.07
ST. CLAIR COUNTY									
No. 6 Coal*	101,714	409,091	738,318	1,249,123	-	-	-	1,249,123	36.06
Total*	101,714	409,091	738,318	1,249,123	-	-	-	1,249,123	36.06
GRAND TOTAL									
	466,915	1,343,033	1,275,031	3,084,979	44,855	37,682	40,724	123,261	100.72

\* Includes 7,958 thousand tons in Washington County.

Table 6. - Detailed Summary of Strippable Coal Reserves Showing Overburden Depth, Thickness of Coal, and Reliability Classification, by County and Township  
(In thousands of tons)

Coal Township Thickness	Class I Reserves at overburden depths (ft.)			Class II Reserves at overburden depths (ft.)			Total I and II	Mined out (square miles)
	overburden depths (ft.)			overburden depths (ft.)				
	0-50	50-100	100-150	0-50	50-100	100-150		
JACKSON COUNTY								
No. 6 Coal								
7S-1W								
42"	-	39	13,025	-	-	-	13,064	5.67
84"	471	10,907	706	-	-	-	12,084	
90"	-	2,018	1,093	-	-	-	3,111	
96"	986	10,492	22,867	-	-	-	34,345	
Total	1,457	23,456	37,691	-	-	-	62,604	
7S-2W								
72"	3,901	6,927	-	-	-	-	10,828	2.38
84"	3,923	4,080	-	-	-	-	8,003	
Total	7,824	11,007	-	-	-	-	18,831	
8S-1W								
42"	5,963	6,866	1,530	-	-	-	14,359	1.38
84"	3,923	549	-	-	-	-	4,472	
96"	7,802	31,386	9,864	-	-	-	49,052	
Total	17,688	38,801	11,394	-	-	-	67,883	
8S-2W								
Coal bed	-	-	-	-	-	-	-	.04
	26,969	73,264	49,085	-	-	-	149,318	9.47
No. 5 Coal								
7S-1W								
48"	-	1,031	15,828	-	-	-	16,859	30.882
54"	2,623	5,952	5,448	-	-	-	14,023	
Total	2,623	6,983	21,276	-	-	-	30,882	

## STRIPPABLE COAL RESERVES

25

7S-2W 48"	4,080	12,241	404	16,725	-	-	-	16,725	.35
8S-1W 48"	10,268	15,110	25,154	50,532	-	-	-	50,532	1.35
8S-2W 48"	1,614	90	-	1,704	-	-	-	1,704	.18
Coal bed	<u>18,585</u>	<u>34,424</u>	<u>46,834</u>	<u>99,843</u>	-	-	-	<u>99,843</u>	<u>1.88</u>
Seahorne Coal									
7S-4W 48"	11,434	448	-	11,882	-	-	-	11,882	.08
Coal bed	<u>11,434</u>	<u>448</u>	-	<u>11,882</u>	-	-	-	<u>11,882</u>	<u>.08</u>
Murphysboro Coal									
7S-3W 48"	7,533	1,255	-	8,788	493	-	-	493	9,281
72"	-	-	-	-	28,988	202	-	29,190	29,190
Total	<u>7,533</u>	<u>1,255</u>	-	<u>8,788</u>	<u>29,481</u>	<u>202</u>	-	<u>29,683</u>	<u>38,471</u>
7S-4W 48"	-	-	-	-	1,704	-	-	1,704	1,704
8S-2W 36"	-	-	-	-	471	2,556	8,945	11,972	11,972
8S-3W 24"	-	-	-	-	1,681	4,372	7,017	13,070	13,070
9S-1W 36"	2,455	706	437	3,598	-	-	-	3,598	3,598
48"	11,478	852	90	12,420	-	-	-	12,420	12,420
60"	1,962	336	112	2,410	-	-	-	2,410	2,410
72"	5,112	1,345	202	6,659	-	-	-	6,659	6,659
84"	2,589	706	235	3,530	-	-	-	3,530	3,530
96"	2,242	1,614	269	4,125	-	-	-	4,125	4,125
Total	<u>25,838</u>	<u>5,559</u>	<u>1,345</u>	<u>32,742</u>	-	-	-	<u>32,742</u>	<u>.24</u>

Table 6. - Continued

Coal Township Thickness	Class I Reserves at overburden depths (ft.)			Class II Reserves at overburden depths (ft.)			Total I and II	Mined out (square miles)
	100-150			100-150				
	0-50	50-100	Total	0-50	50-100	Total		
JACKSON COUNTY (continued)								
9S-2W	-	-	-	7,062	6,558	14,696	14,696	
36"	-	-	-	4,260	4,529	8,879	8,879	
48"	6,726	2,018	8,744	-	-	-	8,744	
72"	6,726	2,018	8,744	11,322	11,087	23,575	32,319	2.14
Total	40,097	8,832	50,274	44,659	18,217	80,004	130,278	7.64
Coal bed	97,085	116,968	311,317	44,659	18,217	80,004	391,321	19.07
COUNTY								
MONROE COUNTY								
No. 6 Coal	1,794	-	1,794	-	-	-	1,794	
1S-10W								
48"								
2S-10W	4,932	-	4,932	-	-	-	4,932	
48"	6,726	-	6,726	-	-	-	6,726	
Coal bed	6,726	-	6,726	-	-	-	6,726	
COUNTY								
PERRY COUNTY								
No. 6 Coal	-	-	1,345	-	-	-	1,345	
4S-2W	-	12,241	17,812	-	-	-	30,053	
72"	-	-	4,304	-	-	-	4,304	
84"	-	-	23,461	-	-	-	35,702	
96"	-	12,241	7,847	-	-	-	10,044	
Total	-	2,197	538	-	-	-	538	
4S-3W	-	-	8,385	-	-	-	10,582	
84"	-	-	2,197	-	-	-	10,582	
96"	-	-	8,385	-	-	-	10,582	
Total	-	2,197	8,385	-	-	-	10,582	





Table 6. - Continued

Coal Township Thickness	Class I Reserves at overburden depths (ft.)			Class II Reserves at overburden depths (ft.)			Total I and II	Mined out (square miles)
	0-50	50-100	100-150	0-50	50-100	100-150		
PERRY COUNTY (continued)								
6S-2W								
60"	2,578	168	-	-	-	-	2,746	2,746
72"	28,719	19,101	-	-	-	-	47,820	47,820
84"	4,159	24,952	-	-	-	-	29,111	29,111
96"	628	2,870	-	-	-	-	3,498	3,498
Total	36,084	47,091	-	-	-	-	83,175	8.66
6S-3W								
60"	2,074	18,552	-	-	-	-	20,626	20,626
72"	4,237	10,290	-	-	-	-	14,527	14,527
84"	863	-	-	-	-	-	863	863
96"	538	-	-	-	-	-	538	538
Total	7,712	28,842	-	-	-	-	36,554	5.60
6S-4W								
60"	11,602	4,260	-	-	-	-	15,862	15,862
72"	31,274	87,837	15,940	-	-	-	135,051	135,051
84"	2,354	4,865	4,002	-	-	-	11,221	11,221
Total	45,230	96,962	19,942	-	-	-	162,134	3.47
Coal bed	136,037	510,782	249,948	-	-	-	896,767	35.94
No. 5 Coal								
5S-3W								
36"	-	1,076	-	-	-	-	1,076	1,076
5S-4W								
42"	-	2,472	667	-	-	-	3,139	3,139
48"	-	11,658	2,870	-	3,273	4,125	7,398	21,926
Total	-	14,130	3,537	-	3,273	4,125	7,398	25,065

## STRIPPABLE COAL RESERVES

[illegible]

Table 6. - Continued

Coal Township Thickness	Class I Reserves at overburden depths (ft.)			Class II Reserves at overburden depths (ft.)			Total I and II	Mined out (square miles)
	overburden depths (ft.)			overburden depths (ft.)				
	0-50	50-100	100-150	0-50	50-100	100-150		
RANDOLPH COUNTY (continued)								
No. 5 Coal								
4S-6W								
28"	1,439	7,062	3,688	-	-	-	12,189	
36"	-	-	538	-	-	639	639	1,177
Total	1,439	7,062	4,226	-	-	639	639	13,366
5S-5W								
36"	874	14,427	12,442	-	4,439	4,136	8,575	36,318
42"	5,806	15,222	-	-	-	-	21,028	21,028
Total	6,680	29,649	12,442	-	4,439	4,136	8,575	57,346
5S-6W								
36"	67	4,035	4,103	-	-	-	8,205	8,205
42"	-	-	-	196	1,844	4,159	6,199	6,199
48"	11,299	13,362	2,959	-	-	-	27,620	27,620
54"	8,273	14,427	-	-	-	-	22,700	22,700
Total	19,639	31,824	7,062	196	1,844	4,159	6,199	64,724
6S-5W								.36
54"	13,367	18,260	8,827	-	-	-	40,454	40,454
Coal bed	41,125	86,795	32,557	196	6,283	8,934	15,413	175,890
COUNTY	92,241	189,036	158,339	196	6,283	8,934	15,413	455,029
ST. CLAIR COUNTY								
No. 6 Coal								
1N-6W								
72"	-	-	3,094	-	-	-	3,094	3,094
84"	-	-	1,648	-	-	-	1,648	1,648
96"	-	-	986	-	-	-	986	986
108"	-	-	202	-	-	-	202	202

## STRIPPABLE COAL RESERVES

31

Total	-	-	5,930	-	-	-	5,930
1N-7W							
72"	-	14,931	8,205	-	-	-	23,136
84"	-	30,916	74,307	-	-	-	105,223
96"	-	6,726	47,618	-	-	-	54,344
108"	-	-	18,865	-	-	-	18,865
Total	-	52,573	148,995	-	-	-	201,568
							4.00
1N-8W							
72"	4,035	44,726	13,384	-	-	-	62,145
84"	157	16,870	27,071	-	-	-	44,098
96"	-	179	1,076	-	-	-	1,255
Total	4,192	61,775	41,531	-	-	-	107,498
							11.53
1N-9W							
48"	90	-	-	-	-	-	90
60"	280	448	56	-	-	-	784
72"	2,825	11,165	3,027	-	-	-	17,017
84"	2,197	17,419	7,140	-	-	-	26,756
Total	5,392	29,032	10,223	-	-	-	44,647
							2.98
2N-7W							
84"	-	-	26,992	-	-	-	26,992
96"	-	-	4,215	-	-	-	4,215
Total	-	-	31,207	-	-	-	31,207
							.25
2N-8W							
72"	1,681	8,407	21,724	-	-	-	31,812
84"	314	2,432	7,847	-	-	-	10,593
Total	1,995	10,839	29,571	-	-	-	42,405
							2.24
2N-9W							
72"	538	135	605	-	-	-	1,278
84"	6,670	3,845	7,062	-	-	-	17,577
Total	7,208	3,980	7,667	-	-	-	18,855
							1.13

Table 6. - Continued

Coal Township Thickness	Class I Reserves at overburden depths (ft.)			Class II Reserves at overburden depths (ft.)			Total I and II	Mined out (square miles)
	ST. CLAIR COUNTY (continued)							
	0-50	50-100	100-150	Total	0-50	50-100		
1S-6W								
72"	-	-	1,681	1,681	-	-	-	1,681
84"	-	628	73,680	74,308	-	-	-	74,308
Total	-	628	75,361	75,989	-	-	-	75,989
1S-7W								
72"	-	14,191	18,966	33,157	-	-	-	33,157
84"	7,533	77,211	89,137	173,881	-	-	-	173,881
96"	-	2,601	2,780	5,381	-	-	-	5,381
Total	7,533	94,003	110,883	212,419	-	-	-	212,419
1S-8W								2.66
60"	2,354	-	-	2,354	-	-	-	2,354
72"	9,012	1,614	-	10,626	-	-	-	10,626
84"	3,609	14,124	4,786	22,519	-	-	-	22,519
Total	14,975	15,738	4,786	35,499	-	-	-	35,499
1S-9W								1.47
60"	1,569	-	-	1,569	-	-	-	1,569
72"	35,041	-	-	35,041	-	-	-	35,041
Total	36,610	-	-	36,610	-	-	-	36,610
2S-6W								2.23
72"	-	-	5,381	5,381	-	-	-	5,381
84"	-	-	120,210	120,210	-	-	-	120,210
96"	-	-	9,416	9,416	-	-	-	9,416
Total	-	-	135,007	135,007	-	-	-	135,007
2S-7W								
72"	-	5,381	404	5,785	-	-	-	5,785
84"	7,062	62,851	23,618	93,531	-	-	-	93,531
Total	7,062	68,232	24,022	99,316	-	-	-	99,316
								2.01



Table A. - Coal Analyses, County Averages

Samples		Proximate						Heat Values				
County, number of mines, and coal	Condition <sup>a</sup>	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulfur	Calories	British Thermal Units	Rank	Index	Unit Coal	Index
Jackson (at Murphysboro)(6 mines) <sup>b</sup>	1	9.2	33.9	51.2	5.7	1.3	6,949	12,510				
	2		37.3	56.4	6.3	1.4	7,649	13,770				
Murphysboro Coal	3		39.8	60.2		1.5	8,163	14,690				
	4	9.8	35.4	54.8			7,424	13,360	134			
	5		39.2	60.8			8,233	14,820				148
Jackson (at Carbondale)(2 mines) <sup>b</sup>	1	5.1	35.4	49.4	10.1	4.1	6,952	12,510				
	2		37.3	52.1	10.6	4.3	7,322	13,180				
Murphysboro Coal	3		41.7	58.3		4.9	8,195	14,750				
	4	5.8	38.0	56.2			7,877	14,180	142			
	5		40.3	59.7			8,363	15,050				151
Jackson (1 mine) <sup>b</sup>	1	8.3	36.2	44.5	11.0	3.4	6,485	11,670				
Harrisburg (No. 5) Coal	2		39.5	48.5	12.0	3.7	7,074	12,730				
	3		44.9	55.1		4.2	8,037	14,460				
	4	9.6	39.4	51.0			7,409	13,340	133			
	5		43.6	56.4			8,201	14,760				148
Jackson (3 mines) <sup>c</sup>	1	9.4	34.5	46.2	9.9	2.2	6,461	11,630				
Herrin (No. 6) Coal	2		38.1	51.0	10.9	2.4	7,132	12,840				
	3		42.8	57.2		2.7	8,004	14,410				
	4	10.6	37.3	52.1			7,264	13,080	131			
	5		41.7	58.3			8,129	14,630				146
Perry (west of DuQuoin monocline)	1	10.0	36.1	43.2	10.7	3.4	6,200	11,160				
(13 mines) <sup>b</sup>	2		40.1	48.0	11.9	3.8	6,891	12,400				
	3		45.5	54.5		4.3	7,817	14,070				
Herrin (No. 6) Coal	4	11.6	39.1	49.3			7,048	12,690	127			
	5		44.2	55.8			7,972	14,350				143
Randolph (2 mines) <sup>c</sup>	1	10.7	36.4	42.5	10.4	4.5	6,194	11,150				
Harrisburg (No. 5) Coal	2		40.7	47.7	11.6	5.1	6,939	12,490				
	3		46.1	53.9		5.7	7,849	14,130				
	4	12.4	39.1	48.5			7,029	12,650	127			
	5		44.6	55.4			8,027	14,450				145
Randolph (7 mines) <sup>b</sup>	1	10.2	36.6	41.4	11.8	3.8	6,077	10,940				
Herrin (No. 6) Coal	2		40.8	46.1	13.1	4.3	6,771	12,190				
	3		46.9	53.1		4.9	7,794	14,030				
	4	12.0	40.1	47.9			7,011	12,620	126			
	5		45.5	54.5			7,969	14,340				143
St. Clair (13 mines) <sup>b</sup>	1	11.3	37.7	39.9	11.1	3.7	6,100	10,980				
	2		42.5	45.0	12.5	4.2	6,879	12,380				
Herrin (No. 6) Coal	3		48.6	51.4		4.8	7,864	14,160				
	4	13.2	41.1	45.7			6,977	12,560	126			
	5		47.3	52.7			8,035	14,460				145

Footnotes are on facing page.



Table B. - Location of Drill Holes Shown on Plate 2

Map no.	County	Location		Type hole	Year drilled	Geol. Survey county no.
		Fraction	Sec. Twp. Rn.			
1	Perry	NW NE SW	23-6S-1W	Cored	—	119
2	Jackson	SE SW	3-7S-1W	Cored	—	17
3	Jackson	NE NW	29-7S-1W	Cored	1888	124
4	Jackson	SW SE	16-8S-1W	Cored	—	340
5	Jackson	NE NW	2-8S-2W	Cored	—	1065
6	Perry	NW SW NW	5-6S-1W	Cored	1934	1951
7	Perry	NE	3-6S-2W	Churn-drill	—	1932
8	Perry	SE SW	6-6S-3W	Cored		276
9	Perry	NE SE	34-5S-4W	Cored	1887	6
10	Randolph	NW SW SW	7-5S-5W	Churn-drill	1931	500
11	Randolph	SE NE SW	28-4S-5W	Cored	1950	1717
12	Randolph	NW SE SE	21-4S-5W	Cored	1923	6
13	St. Clair	NW SE SE	36-3S-6W	Cored	—	148
14	St. Clair	NE NE SW	21-3S-6W	Oil test	1911	141
15	St. Clair	NE SE NW	8-2S-6W	Churn-drill	1913	127
16	St. Clair	SE NE SW	22-1S-7W	Cored	1923	70
17	St. Clair	NE NW	6-1S-7W	Churn-drill	—	49
18	St. Clair	SW NW NW	19-1N-8W	Cored	1923	645
19	St. Clair	- - -	31-2N-7W	Oil test	—	8
20	Madison	SE SE SE	3-3N-8W	Cored	1923	98

## Footnotes to Table A

a/ Type of analysis is denoted as follows:

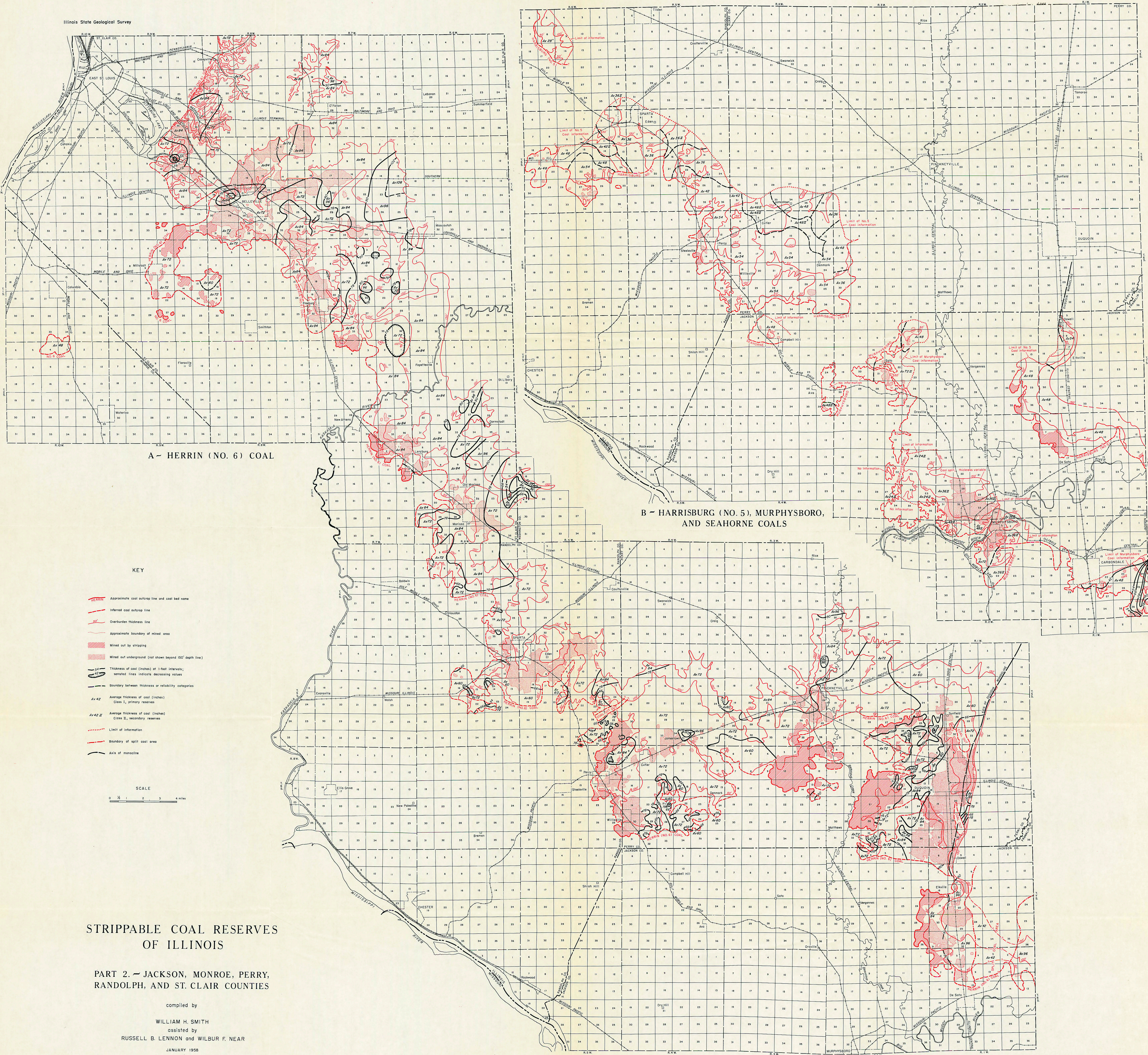
- 1 - sample as received at laboratory.
- 2 - moisture-free.
- 3 - moisture and ash-free.
- 4 - moist mineral-matter-free.
- 5 - dry mineral-matter-free (unit coal).

b/ Data from Cady, Gilbert H., Analyses of Illinois coals: Supplement to Bulletin 62, Illinois Geol. Survey, 1948.c/ Data from Cady, Gilbert H., Classification and selection of Illinois coals: Illinois Geol. Survey Bull. 62, 1936.





Illinois State Geological Survey



## STRIPPABLE COAL RESERVES OF ILLINOIS

PART 2. - JACKSON, MONROE, PERRY,  
RANDOLPH, AND ST. CLAIR COUNTIES

compiled by

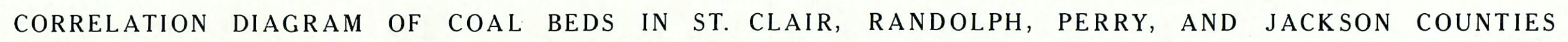
WILLIAM H. SMITH

assisted by

RUSSELL B. LENNON and WILBUR F. NEAR

JANUARY 1958











**CIRCULAR 260**

**ILLINOIS STATE GEOLOGICAL SURVEY**

**URBANA**

