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STRIPPABLE COAL RESERVES OF ILLINOIS

Part I.— Gallatin, Hardin, Johnson, Pope, Saline,
and Williamson Counties

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ABSTRACT

Strippable coal reserves, defined as coal in beds 18 inches or more thick with overburden not exceeding 150 feet, are being evaluated in a series of reports that summarize both published and unpublished data on the coal fields of Illinois collected by the Illinois State Geological Survey. This first report discusses coal stripping possibilities and salient geologic features of 17 coal beds in six southeastern Illinois counties - Gallatin, Hardin, Johnson, Pope, Saline, and Williamson. The coals range in age from the Caseyville group (lower Pennsylvanian) to the lower part of the McLeansboro group (upper Pennsylvanian).

Maps are included for each of the six principal coals of the area showing outcrops, mined-out areas, thickness of coal, and isopach lines dividing overburden into thickness categories of 0-50, 50-100, and 100-150 feet. Coal reserves in each overburden category have been estimated by township according to variations in coal thickness.

Approximately 1 1/2 billion tons of strippable reserves have been estimated for the six principal coal beds mapped, divided as follows: 697 million tons for Herrin (No. 6) coal, 532 million tons for Harrisburg (No. 5) coal, 135 million tons for Cutler coal, 86 million tons for DeKoven coal, 70 million tons for Davis coal, and 37 million tons for Murphysboro coal. Outcrops and available thickness data are mapped for the Willis, Reynoldsburg, and New Burnside coals. Eight other coals of local occurrence are not mapped, but the report lists available data concerning them.

INTRODUCTION

This is the first of a series of reports undertaken by the Illinois State Geological Survey to summarize our present knowledge of strippable coal reserves in Illinois, and delimit areas favorable for further exploration. As defined in this study, strippable coal includes all coal in beds 18 inches or more thick and with overburden not more than 150 feet thick. Six counties of southeastern Illinois - Gallatin, Hardin, Johnson, Pope, Saline, and Williamson - are dealt with in this report.

Much of the information is embodied on maps that show the outcrops of the coal beds, coal thicknesses, and categories of overburden by thickness (pl. 3).

The general features of the geology and stripping possibilities for each of 17 coal beds in the six-county area are outlined, and for each principal coal bed the strippable reserves are tabulated, by township, at the end of the report (tables 6 and 7).

Acknowledgments

H. B. Stonehouse, former member of the Survey Coal Division, began this project and assembled much of the data used in preparing this report. Jack A. Simon, Head of the Coal Division, helped me become acquainted with the geology of the area and critically reviewed the manuscript and maps. Russell Lennon helped compile maps, Margaret A. Parker prepared the tabulations, and David Reinertsen aided in both field and office research. I am indebted also to the Illinois Strippers Association, to Lou S. Weber for assistance in mapping areas of coal mined out by stripping, and to the mining companies operating in the area of this study, without whose cooperation this report could not have been prepared.

Previous Investigations

Culver (1925), in a preliminary report entitled "Coal Stripping Possibilities in Illinois," discussed the strippable coal deposits of Gallatin, Saline, and Williamson counties. At the time of his study, the No. 5 coal at Ledford, southwest of Harrisburg in Saline County, and the No. 6 coal in the area southeast of Herrin in Williamson County were being strip mined. Both operations used the largest stripping equipment then available - steam-powered shovels of about 6-yard capacity. Coal was hauled from the pits by steam locomotive.

Following Culver's general report, Cady (1927) described in more detail stripping possibilities of southern and southwestern Illinois, and discussed the characteristics of the coal beds and their overburden in some of the more favorable areas. Gallatin County was not included in Cady's 1927 report but was discussed in part by Henbest (1929) in a report entitled "Coal Stripping Possibilities in Saline and Gallatin Counties Near Equality." This included only the part of Gallatin County north of the Shawneetown fault.

In a report on the Shawneetown and Equality quadrangles by Butts (1925), the coal beds in the Eagle Valley syncline of southern Gallatin and eastern Saline counties were mapped on topographic map scale (1:62,500) but little mention was made of stripping possibilities in this region because the terrain was rugged and the coal inaccessible in comparison to the more favorable stripping sites outside the syncline in other parts of these counties.

A number of other publications concerning coals in the area of this study have been used in the present investigation and are listed at the end of the report.

METHODS OF PREPARING RESERVE ESTIMATE

Sources of Information

This report was compiled from data collected by Survey geologists, through the cooperation of the Illinois coal industry, over a period of many years.

Maps of the structure of No. 6 coal from two reports by Cady et al. (1938, 1939) and one by Pullen (1951), with some unpublished revisions, were used for structural control in a large part of Gallatin, Saline, and Williamson counties to delineate strippable coal overburden. The various mining com-

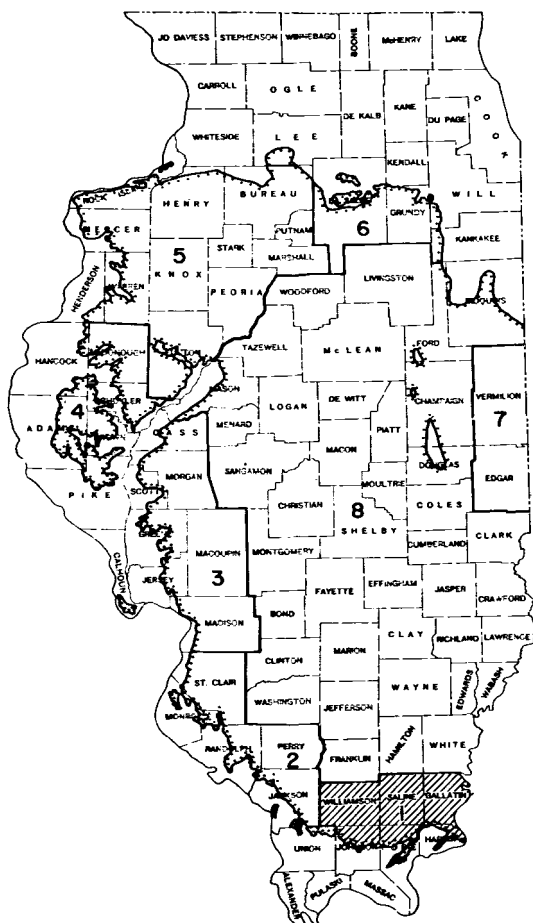


Fig. 1. - Index map showing boundary of the Pennsylvanian rocks in Illinois, location of area of this report (No. 1), and of reports planned (Nos. 2-8) to complete mapping of strippable coal resources of the state.

panies in the area furnished much valuable data. Information regarding outcrops, coal thickness, and extent of past mining was obtained from work maps prepared by members of the Coal Division for a recent over-all inventory of minable coal resources of Illinois (Cady, 1952). Maps showing the extent of coal mined out by stripping were revised to January 1, 1956, from data supplied by the Illinois Coal Strippers Association.

Selection of Unit Areas for Mapping

For this series of reports we have divided the state into eight areas (fig. 1) for which reports and maps of strippable coal resources will be prepared. Areas 1-7 are arranged for convenience in mapping the minable coals of the Tradewater, Carbondale, and lower McLeansboro groups near their

outcrops. The eighth area embraces a large portion of the central part of the Illinois basin where strippable reserves are restricted to occurrence of upper McLeansboro coals that locally attain minable thickness.

The area described in this first report (fig. 1) includes Williamson, Saline, and Gallatin counties and adjacent parts of Johnson, Pope, and Hardin counties. This area of relatively early large-scale strip mining continues to attract much interest in coal lying at strippable depths.

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 extent of glaciation. 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.

In much of Illinois the bedrock is masked by various amounts of glacial deposits, and south of the glacial boundary it is covered by deposits of loess, or wind-blown dust, deposited during the glacial period. In this report the term "outcrop" is 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. 6 and No. 5 coals are comparatively well defined because of the large amount of prospect drilling and mining related to these coal beds. Outcrops of the DeKoven, Davis, New Burnside, Reynoldsburg, and other coals that are exposed south of coals No. 6 and No. 5, and of the Cutler coal that are exposed north of the outcrop of No. 6 coal are not as well defined on the maps in this report as are those of coals No. 6 and No. 5. This is due to the comparative lack of exploratory drilling and field investigations of the economically less important coal beds and because of greater variability in their thickness and lateral persistence.

Because information on the position of coal bed outcrops is very important to strip mine prospecting, considerable effort has been made to map the position of the outcrop or coal extent as accurately as possible. The relative reliability is indicated by means of line symbols on the maps (pl. 3).

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.

Overburden is often mapped, especially in detailed engineering studies, in terms of the ratio of thickness of coal to thickness of overburden. Because of the nature and distribution of data available for these studies it was considered more practical to indicate coal thickness and overburden thickness

separately (pl. 3) rather than in terms of stripping ratios. The table below indicates the relationships of coal thickness and overburden thickness in terms of stripping ratio for coal beds 2 to 6 feet thick.

Table 1. - Relationship of Coal and Overburden Thickness to Stripping Ratio

Coal thickness (feet)	Thickness (ft.) of overburden at stripping ratios of:			
	10 to 1	15 to 1	20 to 1	25 to 1
2	20	30	40	50
3	30	45	60	75
4	40	60	80	100
5	50	75	100	125
6	60	90	120	150

Delineation of Strippable Coal

Overburden isopachs at 50, 100, and 150 feet shown on the maps (pl. 3) were constructed by interpolation between contours on topographic maps and contours on coal structure maps.

Structural data necessary to delineate thickness of overburden was largely based on maps prepared by Cady (Cady et al., 1938, 1939) showing the structure of the Herrin (No. 6) coal. In areas where structural data for the Harrisburg (No. 5) and Cutler coals was insufficient for direct mapping, their structure was mapped by extrapolation from structure of No. 6 coal. Although the structure thus obtained for the Harrisburg and Cutler coals permits less accuracy in delineating thickness of overburden for these coals in comparison with that of the No. 6 coal, the results are believed to be satisfactory because information relating to the interval between the No. 6 coal and the Harrisburg and Cutler beds generally is adequate.

For the Eagle Valley syncline of Gallatin-Saline counties, Butts' structure map on the No. 5 coal furnished the principal source of data (Butts, 1925). For the syncline the structure of No. 6 coal was mapped by extrapolation from No. 5 structure contours using intervals between the No. 5 and No. 6 coals. Structure of the Davis, DeKoven, and Murphysboro coals was mapped by the writer except for Gallatin County where data were not sufficient to prepare an acceptable structural interpretation. The outcrop and thickness of the Davis, DeKoven, and Willis coals of Gallatin County are shown on plate 3 but no attempt has been made to classify their reserves on the basis of overburden thickness.

Categories of Reserves

Categories of reliability are shown for estimates of coal reserves to designate the quality of available data. In this report two classes of reserves are recognized.

Class I or 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 reasonably well.

This class ordinarily includes all coal within two miles of the last point of reliable information of coal thickness, such as 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 there is evidence suggesting uncertainty as to the persistence or thickness of the coal the above defined limits may be modified in making the appraisal.

Class II or secondary reserves. - Class II includes coal lying from 2 to 4 miles from datum points used for delineation of Class I reserves. In addition, coal lying more than 4 miles beyond Class I datum points may be included as Class II on the basis of geologic inference. In these areas the only information about the coal is that obtained from holes drilled for oil and gas or water in which coal thickness data are not judged sufficiently reliable for classifying the coal as primary reserves.

Reserves from 2 to 4 miles from datum points used for establishing Class I reserves were classed as II-A (strongly indicated); and beyond 4 miles as Class II-B (weakly indicated) by Cady (1952) in the report on "Minable Coal Reserves of Illinois." However, in Cady's report and in this report, in areas where the coal is judged to be "lenticular" or erratic in its occurrence, the coal lying one mile or less from points of known thickness may be placed in Class II at the discretion of the appraiser.

The principal value in recognizing the 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 (pl. 3) and where prospecting for strippable coal might advantageously be conducted.

Thickness of the Coal

Thickness of the coal is shown on the map (pl. 3) by isopach lines wherever data points were spaced sufficiently close to permit construction. In areas where construction of isopach lines was not practical, an average value for coal thickness is shown.

Isopach lines are drawn beginning at 18 inches and progressing by 12-inch increments as follows: 18, 30, 42, 54, 66, 78, 90, 102, and 114 inches. Thus the average thickness of coal falling between successive isopach lines is stated in even feet (for example, 18 to 30 inches, 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 in the report by Cady (1952) for calculating the total minable coal reserves of Illinois with the exception of the lowest thickness categories. Whereas 28 inches was defined as the minimum thickness in the study by Cady, in this study of strippable coal reserves the minimum thickness considered is 18 inches.

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 Geological Survey (Cady, 1952, p. 16). The extent of coal mined by stripping in Saline and

Williamson counties was mapped from information furnished by the Illinois Coal Strippers Association and includes strip mining to January 1, 1956. The extent of strip and auger mining in the Eagle Valley area of Gallatin County was mapped by the writer in June 1956. These maps do not, however, indicate the location or extent of workings of many of the small underground mines.

The mined-out coal areas shown on plate 3 are drawn from data available on coal depletion compiled from the sources mentioned. With regard to areas of strippable coal lying between the outcrop and the outer limits of underground works, it should be pointed out that the actual extent of coal depends upon the accuracy with which the line of outcrop and the outer limit of underground workings is shown on the maps. In many of these 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.

GEOLOGIC OCCURRENCE OF COAL BEDS

The Pennsylvanian or "Coal Measures" strata of Illinois are divided into four groups which are, in ascending order, the Caseyville, Tradewater, Carbonale, and McLeansboro (fig. 2). A brief discussion is given of the salient geologic features of the coal beds in each of these four groups together with comments on the character of the associated strata and correlation of the coals.

Caseyville Group

The Caseyville group consists mainly of thick sandstones that contain some conglomerate zones and some interbedded shale with minor amounts of clay and coal (fig. 2). These beds may be seen where they crop out near the southern margin of the Pennsylvanian strata in Illinois. In Gallatin, Hardin, Pope, and Johnson counties the Caseyville strata are exposed but contain only locally developed, relatively minor coal deposits.

The Caseyville group includes all Pennsylvanian sediments below the base of the Grindstaff sandstone (Wanless, 1956, p. 4). The Caseyville group in the area of this report is 300 to 400 feet thick and is composed dominantly of clean, well sorted quartz sandstones that, because of their resistance to erosion, form prominent hills and cliffs. The conspicuous escarpment that borders the outer edge of the Eagle Valley syncline and the prominent southward-facing escarpment that extends westward across Hardin, Pope, and Johnson counties are formed by these basal Pennsylvanian sandstones which overlie rocks of Mississippian age.

The Caseyville group contains occasional nonpersistent coal beds, most of which generally are less than 2 feet thick and commonly cannot be traced laterally for any appreciable distance because they are lenticular and are irregularly distributed within the section dominated by massive sandstone beds. There are a number of occurrences of coals of possible minable thickness, indicated by small mine openings, but for which we have no information on thickness or character. Such of those coals for which some data are known are listed in table A, appendix.

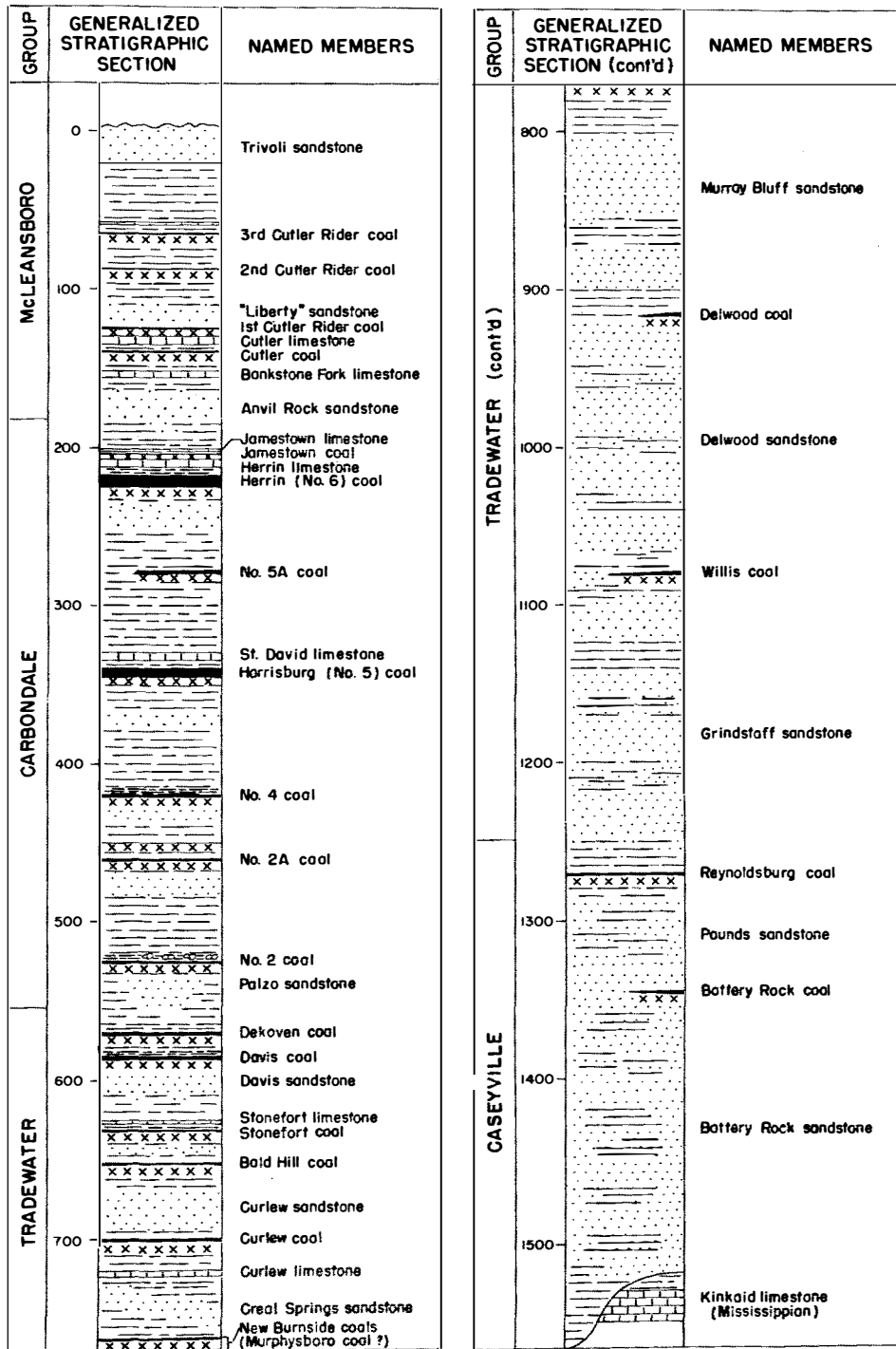


Fig. 2. - Generalized stratigraphic section of the Pennsylvanian system of Gallatin, Saline, and Williamson counties.

In the upper part of the Caseyville group occurs the Battery Rock coal, named from exposures at Battery Rock on the Ohio River bluff in Hardin County (Worthen, 1866) opposite the village of Caseyville, Kentucky. The Reynoldsburg coal near the top of the Caseyville group is probably the only lithologic member in the Caseyville-Lower Tradewater stratigraphic sequence that can be traced laterally for any appreciable distance (Weller, 1940, p. 39).

Tradewater Group

The Tradewater group (Wanless, 1956, p. 4) includes strata from the base of the Grindstaff sandstone to the base of the Palzo sandstone, an interval of 600 to 700 feet (fig. 2, pl. 4). In the part of the Tradewater group below the New Burnside coals the rocks consist dominantly of thick sandstones and shales. Thin nonpersistent coal beds occur within this part of the Tradewater group. Mining has been carried on in relatively small hillside mines in some of these coal beds. Although thick sandstones and shales dominate the uppermost 200 feet of the Tradewater group, coal beds are more numerous and widespread than in the lower two-thirds of the group.

In the upper one-third of the Tradewater group we recognize strata that represent the first persistent and widespread Pennsylvanian environments favorable to coal accumulation.

The lowest coal in the Tradewater group that is known to be minable is the Willis seam, which is mined only in southern Gallatin County. The Willis seam lies above the Grindstaff sandstone and below the Delwood sandstone, both of which generally are prominent cliff-forming sandstones where they crop out. There are isolated occurrences of coals, some of which have been mined locally in Pope and Johnson counties west of the mines in the Willis coal in Gallatin County (pl. 3-A, app., table A). Some of these coals may be the equivalent of the Willis. Others probably are the Delwood coal, which occurs locally above the Delwood sandstone, or the New Burnside coals which occur above the Murray Bluff sandstone.

Near the village of New Burnside in Johnson County (pl. 3-B) the Upper and Lower New Burnside coal beds (Potter, 1957) occur about 10 to 12 feet apart. Both coal beds are overlain by massive sandstones that are locally conglomeratic. Both have been mined underground in a number of small mines in past years and the upper bed recently was being strip mined (pl. 1). These coals are not definitely known to be of minable thickness beyond the vicinity of New Burnside, but it is believed that the coal at New Burnside may be the equivalent of the Murphysboro coal in southwestern Williamson County (pl. 4).

The Upper New Burnside coal is overlain by the Creal Springs sandstone (Potter, 1957), which is prominently exposed in the vicinity of Creal Springs (T. 10 S., R. 3 E.). In this area, the sandstone occurs immediately beneath the Curlew limestone. Two thin coal seams (Curlew coal), with a few inches of clay separating them, occur about 18 feet above the limestone in this area. The position of the Curlew coal in the eastern part of the area is not definitely known (pl. 4).

The Stonefort limestone occurs from 25 to 50 feet above the Curlew coal with shale and sandstone dominating in this interval. The Bald Hill coal occurs about 25 feet below the Stonefort limestone near the town of Stonefort. It is a

nonpersistent coal that has been mined locally on the outcrop in the hills between the towns of Stonefort and New Burnside. The location and other information known about these mines are shown in table A, appendix.

The Stonefort marine limestone, which lies 75 to 110 feet below the top of the Tradewater group in this area, is one of the most widespread and traceable units in the Tradewater group. The Stonefort coal, lying a few feet beneath the Stonefort limestone, is persistent but generally is too thin for mining. At many places the Stonefort coal zone consists mainly of black shale with only a few inches of associated coal. The few known localities where the Stonefort coal has been mined are listed in table A, appendix.

Near the top of the Tradewater group are two economically important coal seams. These are the Davis coal and, 10 to 25 feet above it, the DeKoven coal. Both seams have extensive reserves of strippable coal. Outcrop and overburden thickness for both seams are shown on plate 3. Both coal beds attain minable thickness and are relatively persistent along their line of outcrop from the Williamson-Saline county line eastward across Saline and Gallatin counties, and extending into Kentucky.

The Davis and DeKoven coals were named by Lee (1916) for exposures in Union County, Kentucky. Their stratigraphic position with respect to other coals in the upper Tradewater and lower Carbondale groups is shown on plate 4. There is still an element of uncertainty in the correlation of the Davis and DeKoven coals across the western two-thirds of Williamson County because the beds do not crop out and not many well records are available (pls. 3 and 4).

The DeKoven coal is commonly overlain within a few feet by the Palzo sandstone that underlies coal No. 2. The Palzo sandstone is characteristically a medium-grained massive sandstone, up to 40 feet thick, the base of which marks the boundary between the Tradewater and the overlying Carbondale groups. In some places, however, shale 15 or more feet thick may be found between the top of the DeKoven coal and the base of the Palzo sandstone. At a few places a thin coal and black shale zone has been noted within this interval. This uncorrelated coal is not known to attain minable thickness anywhere in the area.

Carbondale Group

The Carbondale group includes all strata from the base of the Palzo sandstone beneath coal No. 2 to the base of the Anvil Rock sandstone (fig. 2), an interval of about 300 feet. Carbondale strata are characterized by more widespread and generally thicker coal beds than are encountered in underlying strata. Sandstones are less prominent and there is a marked increase in the proportion of shale in the section. Limestones are more numerous and persistent than in the underlying strata.

Coal No. 2 near the base of the Carbondale group is widespread but is not known to attain minable thickness near its outcrop anywhere within the area of this report. The interval between coal No. 2 and coal No. 2A ranges between 25 and 75 feet but commonly is about 50 feet. This interval generally consists of sandstone and shale although several feet of limestone overlie coal No. 2 locally. Coal No. 2A is less persistent than coal No. 2 and generally is thinner (pl. 4).

Coal No. 4 overlies coal No. 2A and is separated from it by a 25- to 50-foot interval, principally shale or sandstone. Coal No. 4 is fairly persistent and although the coal bed varies considerably in thickness its horizon is often conspicuously marked in drill holes and outcrops by the presence of a prominent black shale that overlies the coal. This black shale or "slate" overlying No. 4 coal has been reported to be 6 to 8 feet or more thick and commonly contains thin beds or large lens-shaped nodules of dark gray, dense limestone. The No. 4 coal has been mined in only a few small mines near the outcrop. Table A, appendix, indicates a few small mines that worked a coal bed, probably No. 4, in southeastern Williamson County. Available information is inadequate for mapping possible strippable reserves of this coal bed.

The Harrisburg No. 5 coal overlies the No. 4 coal and is separated from it by an interval 50 to 80 feet thick containing shale and minor amounts of sandstone, nodular limestone, and underclay. The No. 5 coal has been mined extensively near its outcrop by both underground and stripping methods. The coal in this seam is almost everywhere more than 4 feet thick throughout the area mapped in Williamson, Saline, and Gallatin counties.

The interval between the No. 5 and No. 6 coal beds ranges from slightly less than 50 feet in western Williamson County to about 125 feet in eastern Saline County. Where the interval is thin, as indicated by plate 4, shale, limestone, and clay compose the rocks between the two coal beds. Throughout most of Saline and Gallatin counties, where the interval is greater, sandy strata are more common and an intermediate coal occurs. This is No. 5A coal which occurs between No. 6 and No. 5 coals from eastern Williamson County through Gallatin County. Coal No. 5A locally attains thicknesses of 18 to 30 inches in the Eagle Valley area of southern Gallatin County but is very erratic in its thickness. One small mine is known to have operated in this coal (app., table A). Available data from drill records and stripping operations in No. 6 and No. 5 coals indicate that mapping strippable reserves for this coal is not warranted.

The Herrin (No. 6) coal is the most extensively mined coal in the southern Illinois coal field and has the largest known reserves. In the area of this study, the coal has ranged from 8 to 9 feet thick in western Williamson County, where there has been large-scale mining, to less than 4 feet in much of eastern Saline and Gallatin counties. No. 6 coal has been mined much less in the latter areas than has the thicker No. 5 coal that underlies it.

The No. 6 coal lies 25 to 35 feet below the base of the Anvil Rock sandstone, which marks the base of the McLeansboro group. No. 6 coal is commonly associated with the Herrin limestone, which normally ranges from 3 to 5 feet thick in much of this area and is separated from the coal by black or dark gray shale that ranges from a few inches to as much as 6 feet thick.

The Jamestown coal, a thin seam rarely more than 4 to 6 inches thick, occurs in some places. Where present it is found just on top of or within a few feet of the Herrin limestone. The Jamestown coal is overlain by the Jamestown limestone, which closely resembles the Herrin limestone but is not as thick.

McLeansboro Group

The McLeansboro is the uppermost group of Pennsylvanian strata in the Eastern Interior coal basin. It includes all rocks above the base of the Anvil Rock sandstone. Strata in the lower part of the McLeansboro group are widely distributed at the surface or just beneath glacial cover everywhere north of a line defined approximately by the No. 6 coal outcrop in Williamson, Saline, and Gallatin counties as well as in the central part of the Eagle Valley syncline (pl. 3-A). There are a number of coals in the lower part of the McLeansboro group, but except for the Cutler coal, which exceeds the minimum thickness for minability as defined in this study, the McLeansboro coals do not contribute to the known strippable reserves in this area of southern Illinois. The McLeansboro generally is characterized by a larger number and more prominent development of limestones than is found in lower Pennsylvanian strata.

The Anvil Rock sandstone is the lowest member of the McLeansboro group. It commonly ranges from a few feet up to 20 feet thick. Locally, the sandstone has been deposited in channels where it attains thicknesses of more than 60 feet. In some places the channels have cut through the No. 6 coal. Channel cutouts of No. 6 coal are somewhat more common and troublesome in other parts of the state, but they have not resulted in much loss of coal in the area of this study (Hopkins, in preparation).

The Bankston Fork limestone normally occurs 4 to 6 feet above the Anvil Rock sandstone and commonly ranges from 4 to 6 feet in thickness. The Bankston Fork limestone is missing in some areas where the Anvil Rock sandstone reaches maximum thickness. The thin, nonpersistent Bankston coal occurs within a few feet above the Bankston Fork limestone. The Bankston Fork limestone normally is 15 to 20 feet below the Cutler coal.

The Cutler coal lies at an average of about 75 feet above the top of No. 6 coal. The Cutler limestone generally occurs within a few feet over the Cutler coal bed in the western part of the area of this report. The thickness of the Cutler coal is somewhat irregular - although it is in places 18 to 30 inches thick it is not uncommonly thinner.

In the northern and western part of the area of this study, within a distance of 75 feet above the Cutler limestone, three coals have been recognized and called, in ascending order, the First, Second, and Third Cutler Rider coals. The coals generally are thin where present and are not known to occur in minable thickness in the area of this study.

DESCRIPTION OF COAL BEDS AND STRIPPABLE RESERVES

Reynoldsburg Coal

The Reynoldsburg coal lies at the top of the Caseyville group and is immediately overlain by the Grindstaff sandstone, the basal member of the Trade-water group. The approximate position of the Reynoldsburg coal as mapped by Weller (1940) is shown on plate 3-B. The coal takes its name from exposures near the village of Reynoldsburg in sec. 33, T. 11 S., R. 4 E., where it has been mined in a number of small drift mines along Cedar Creek. There are no active mines in the area and nowhere can the coal be seen in outcrop

in thicknesses formerly mined. Available information on record from the mines that formerly worked the Reynoldsburg coal in secs. 31, 32, T. 11 S., R. 4 E., indicate thickness of as much as 36 inches. The coal was reported to be low in sulfur and ash and to have a heat value relatively high for southern Illinois coal.

One and one-half miles east of Reynoldsburg in the NE 1/4 sec. 34 and NW 1/4 of sec. 35, T. 11 S., R. 4 E., is an area in which coaly and canneloid shales, in some places underlain by a few inches of coal, were mined at an early date. These deposits were sampled and described by Barrett (1922) in connection with a study of distillation of bituminous shales that might be a potential source of oil.

Except for the two localities near Reynoldsburg, described above, little is known of the Reynoldsburg coal as apparently there has been very little prospecting for it. There are two small abandoned mines in a coal that probably is equivalent to the coal at Reynoldsburg in an area that lies between two northeast-trending faults in the SE 1/4 SE 1/4 SW 1/4 sec. 2, T. 13 S., R. 5 E. In an abandoned small mine in which the coal can still be seen, the coal was reportedly 42 inches thick, but as it is in a faulted area the extent of the deposit may be quite limited.

Exploration along the projected line of outcrop of the Reynoldsburg coal shown on plate 3-B might lead to discovery of strippable reserves for this coal. Data available, however, are insufficient for calculation of strippable reserves.

Willis Coal

The Willis coal occurs in the lower part of the Tradewater group. It was named by Butts (1925, p. 62) from mines on the Willis farm in sec. 30, T. 10 S., R. 9 E., where it has a thickness of 3 to 3 1/2 feet. The name is restricted to the area of outcrop shown on plate 3-A which is adapted from Butts (1925, pl. I). It has been mined intermittently in sec. 30 from the early 1900's to the present, but only a few observations have been made of it in the area to the west or to the east of the several small mines in the southern part of sec. 30.

Known exposures of the Willis coal are indicated on plate 3-A. The coal dips northward at the rate of 8 to 10 degrees along its outcrop eastward from the Grindstaff fault to a mine in sec. 30. In the area between the two northeast-trending faults in secs. 29, 30, 31, 32, T. 10 S., R. 9 E., and eastward to the Saline River, the position of the outcrop is less definite. The coal is more nearly flat-lying in this area and its outcrop follows along the rather steep valley walls of the streams that dissect it.

Several analyses (app., table B) show the Willis coal to have a relatively high heat value. This is believed to be related to tectonic forces responsible for the folding and faulting in the Eagle Valley syncline in this region. Available data were insufficient for classification of the strippable reserves of the Willis coal.



A. - Strip mining the New Burnside coal near New Burnside, Johnson County.

B. - View of New Burnside coal at the same mine.

New Burnside Coals

In the vicinity of New Burnside, Johnson County, in secs. 3, 4, 5, 8, and 9, occur the Upper and Lower New Burnside coal beds. The extent of mappable outcrop of these beds is shown on plate 3-B together with coal thickness data.

The upper bed has been mined along its outcrop in a number of small drift entries and recently has been strip mined (pl. 1) on a small scale at one locality in the NE 1/4 sec. 8, T. 11 S., R. 4 E., where it had a thickness of 3 to 3 1/2 feet.

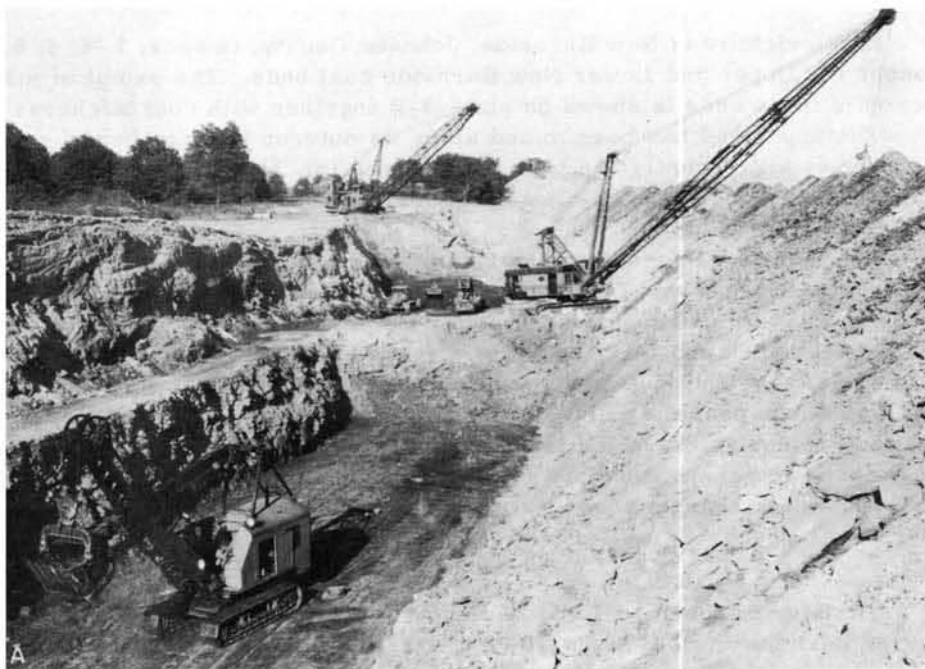
Both coal beds lie within a series of massive sandstones with conglomerate zones near their basal contacts. The upper coal bed generally is about 3 feet thick and is more regular and better in quality than the lower coal which is 2 to 4 feet thick and may contain numerous shale partings and interbedded coaly shale. The New Burnside coal beds have not been definitely correlated beyond the area near the village of New Burnside shown on plate 3-B, but these beds may be equivalent to the Murphysboro coal in southwestern Williamson and Jackson counties. Analyses of New Burnside coal are shown in table B, appendix. No strippable reserves were calculated for the New Burnside coals.

Murphysboro Coal

The Murphysboro coal was named by Worthen (1868, p. 11-12) for exposures near the town of Murphysboro, Jackson County. The extent of known Murphysboro coal potentially minable by stripping within the area of this report comprises only about three miles of definable outcrop in southwestern Williamson County, as shown on plate 3-B. The area underlain by Murphysboro coal has supported a number of small underground mines in years past. The Tregoning mine in the NE 1/4 SW 1/4 sec. 31, T. 9 S., R. 1 E., was the only mine operating when this report was prepared. No strip mining has been undertaken on the Murphysboro coal in Williamson County but it has been strip mined in sec. 36, T. 9 S., R. 1 W., just west of the Williamson-Jackson county line.

The thickness of the Murphysboro coal of this region is quite variable. Lamar (1925) points out that the Murphysboro coal in the area of outcrop shown on plate 3-B should be considered more as a coal zone than a single bed because of the irregularity of the individual beds of coal and parting material. A generalized section of the coal beds encountered in drill holes and mine shafts here and just west of the Williamson County line (Lamar, 1925, p. 107) shows three coal beds, all of which are of minable thickness:

Thickness (ft.)	Thickness (ft.)
Sandstone, friable, fine- to medium-grained, brown and buff in moderately heavy beds (Vergennes sandstone) . . 15+	Coal 4
Shale, gray and dark gray, locally sandy; in rare cases contains limestone lentils 14+	Shale, gray and gray-black . . 22+
	Coal 5-6
	Shale, gray-black 18+
	Coal 6 1/2-7
	Shale, gray, dark gray, or brown; locally highly siliceous. Upper few feet generally fireclay 8+



A. - Strip mining Davis and DeKoven coals, Stonefort Township, Saline County.
B. - Open-cut and auger mining the No. 5 coal, south limb of Eagle Valley syncline near Lemington, Gallatin County.

In the Tregoning mine the bed worked is 6 feet thick and probably is the lower of the three shown in Lamar's section. A 4-foot seam was reported to have been encountered in the slope above the 6-foot bed at the Tregoning mine. Reserves are classified for 36,655,000 tons of Murphysboro coal lying between 0 and 100 feet of overburden depth. These reserves are listed in tables 6 and 7 at the end of this report.

Davis and DeKoven Coals

The Davis and DeKoven coal beds occur in the upper part of the Trade-water group. The interval between them is 15 to 30 feet in Gallatin and eastern Saline counties. In western Saline and eastern Williamson counties, however, these beds are commonly only 10 to 20 feet apart and in some pits are mined by two-seam stripping operations (pl. 2). Because their close association permits two-seam strip mining in a number of areas, the coals are discussed together.

These beds have been worked in several places along their outcrop in Kentucky, and in Illinois along the south flank of the Eagle Valley syncline, westward across Saline County, and into Stonefort township (the southeasternmost township of Williamson County). Beyond this point the Davis and DeKoven coal beds cannot be traced westward through Williamson County with certainty because of lack of drill holes to permit subsurface tracing (pls. 3, 4).

The Davis coal commonly is closely overlain by a black "slaty" shale that may be 4 to 6 feet thick. This conspicuous black, carbonaceous shale apparently overlies the Davis coal so uniformly that it is often used to distinguish the Davis from the DeKoven coal, which typically is overlain either by gray to dark gray shale or by the Palzo sandstone.

There is little difference in the physical or chemical quality of these two coals. Both are typically bright-banded coals that have a prominently developed cleat that results in a large percentage of small-sized pieces in the mined coal. In the vicinity of Palzo, T. 10 S., R. 4 E., Williamson County, a shale parting 30 inches thick occurs just below the middle of the DeKoven coal seam. Also in that area the Davis coal tends to become thinner than it is to the east. To the west, the split in the DeKoven coal may thicken (pl. 4). Chemical properties of the Davis and DeKoven coals, based on an average of the available analyses, are given in table B, appendix.

A summary of the estimated strippable reserves of Davis and DeKoven coals in Saline and Williamson counties is shown (table 2). No strippable reserves were calculated for these coals in Gallatin County.

Gallatin County

Only the approximate outcrops of the Davis and DeKoven coal as mapped by Butts (1925) are shown for these beds in Eagle Valley area of Gallatin County (pl. 3). No attempt was made to map the thickness of their overburden because their line of outcrop is too indefinitely known and because the steepness of dip of the beds toward the axis of the synclinal structure, combined with steepness of slopes in the area of outcrop, prevents mapping the beds

Table 2. - Summary of Strippable Reserves of DeKoven and Davis Coals
(In thousands of tons)

Class I Reserves at overburden depths (ft.)				Class II Reserves at overburden depths (ft.)				Mined Total out 0-150 sq.mi.	
0-50	50-100	100-150	Total	0-50	50-100	100-150	Total		
DEKOVEN COAL									
<u>Saline County</u>									
6,120	14,629	22,195	42,944	-	-	2,186	2,186	45,130	.20
<u>Williamson County</u>									
10,996	6,457	2,455	19,908	3,565	8,542	8,811	20,918	40,826	.45
<u>Total</u>									
17,116	21,086	24,650	62,852	3,565	8,542	10,997	23,104	85,956	.65
DAVIS COAL									
<u>Saline County</u>									
3,806	14,556	23,815	42,177	-	-	1,687	1,687	43,864	.32
<u>Williamson County</u>									
9,483	9,618	7,230	26,331	-	-	-	-	26,331	.48
<u>Total</u>									
13,289	24,174	31,040	68,508			1,687	1,687	70,195	.80

accurately on the scale used in this report. For these reasons only the approximate line of outcrop and the average thickness of the coals are shown on plate 3.

Saline County

In Saline County the Davis and DeKoven coals crop out in T. 10 S., R. 7 E., in an arcuate pattern at the west end of the Eagle Valley syncline (pl. 3). Here the coal is favorable for stripping because the rate of structural dip is considerably less than along the flanks of the syncline to the east in Gallatin County.

West of the syncline in T. 10 S., Rs. 5 and 6 E., the outcrop is better defined. The coal has been mined at a number of places in small underground mines and currently is being rather extensively strip mined. The interval between the two beds in this area generally does not exceed 10 to 15 feet and both seams have been strip mined simultaneously (pl. 2).

Williamson County

In Williamson County strippable reserves of the Davis and DeKoven coals are known only in T. 10 S., R. 4 E. (Stonefort Twp.). These coals are being

strip mined in secs. 13, 14, 23, and 24 and also just west of Palzo in sec. 16. Westward from Stonefort Township the Davis and DeKoven beds cannot be traced with certainty because of lack of drill holes or outcrops. However, a coal bed 48 inches thick, separated by 24 feet of clay and shale from an overlying coal and black shale zone 6 feet thick, formerly mined at a depth of 121 feet in the Ingram mine at the south edge of the city of Marion, may represent the westward continuation of the Davis coal as suggested by Cady (1952, p. 94). Correlation of this coal mined at Marion in the SE corner SE 1/4 SE 1/4 sec. 23, T. 9 S., R. 2 E., either westward into the Carbondale area or southeastward to Stonefort Township, is difficult because information is scarce. Recent studies using electric logs of oil and gas wells in the vicinity supports the belief that the coal mined at the Ingram mine and the coal next above are the same as the Davis and DeKoven coals (pl. 4).

About midway between the westernmost outcrops of the Davis and DeKoven coals in Stonefort Township and the Ingram mine at Marion are three occurrences of coal reported in borings. In these holes the reported elevations and a double-benched character of the coal suggests that they may be equivalent to the Davis and DeKoven seams. The interval separating these coals is as little as 7 feet in sec. 17, T. 10 S., R. 4 E. In one of the borings near New Denison, five miles southeast of Marion in the SW 1/4 SW 1/4 sec. 35, T. 9 S., R. 3 E., 30 inches of coal was reported at a depth of 97 feet and 12 more inches of coal was found 2 feet lower, separated from that above by black shale. In a similar hole in the SW 1/4 NE 1/4 of the same section, 30 inches of coal was encountered at 161 feet separated from 6 inches of coal beneath 2 feet of black shale. Two miles east of New Denison in the SE 1/4 NE 1/4 sec. 36, 42 inches of coal was reported at a depth of 169 feet with a parting of unreported thickness beneath which 2 more feet of coal was reported.

The outcrop for the Davis and DeKoven coals west of Palzo as shown on plate 3 is highly generalized from widely spaced data and will undoubtedly require considerable modification as more data become available. Additional prospecting in the New Denison area and elsewhere between the abandoned mine at Marion and the mines in Stonefort Township to determine coal thickness and define the outcrop of these coals may reveal areas underlain by coal at depths favorable for strip mining.

Harrisburg (No. 5) Coal

The Harrisburg (No. 5) coal has been mined extensively by stripping in Williamson and Saline counties and along the south limb of the Eagle Valley syncline in Gallatin County. As will be seen from examination of plate 3-B, much of the coal in this seam that lay under the thinnest overburden has been removed. Table 3 is a summary of the strippable reserves of No. 5 coal in each of the counties of this report. Estimated reserves are classified for each coal thickness and overburden depth category in tables 6 and 7.

The No. 5 coal throughout the three counties discussed is commonly a bright banded coal lacking any persistent partings. Sulfur in the form of pyrite typically occurs in thin lenses, irregular and discontinuous partings, in thin calcite and pyrite incrustations on the vertical joint faces, and in prominent fractures in the lower part of the seam. The average analysis of No. 5 coal in each county is given in table B, appendix.

Table 3. - Summary of Strippable Reserves of No. 5 Coal
(In thousands of tons)

Class I Reserves				Class II Reserves				Mined	
at overburden depths (ft.)				at overburden depths (ft.)				Total	out
0-50	50-100	100-150	Total	0-50	50-100	100-150	Total	0-150	sq.mi.
<u>Gallatin County</u>									
39,447	74,617	116,291	230,355	-	718	6,681	7,399	237,754	1.64
<u>Saline County</u>									
11,782	24,044	57,596	93,422	-	-	-	-	93,422	10.67
<u>Williamson County</u>									
28,294	59,454	113,360	201,108	-	-	-	-	201,108	7.38
<u>Total</u>									
79,523	158,115	287,247	524,885	-	718	6,681	7,399	532,284	19.69

Gallatin County

The Harrisburg No. 5 coal averages about 5 feet thick in Gallatin County. In the Eagle Valley area this coal has been strip mined and auger mined at several places along its line of outcrop on the south limb of the syncline, as shown on plate 3-B. The amount of strippable coal along its outcrop around the rim of the Eagle Valley syncline is limited because the strata dip into the syncline. Location of the area close to river transportation, however, has made it an area of considerable interest. This coal has been worked for many years in numerous small drift and slope mines along its outcrop and in recent years by small-scale open-cut and auger-mining operations (pl. 2). Probably there are many places along the outcrop where additional small-scale stripping or augering operations might be undertaken, although the most accessible deposits are rapidly being depleted. The amount of No. 5 coal potentially available in Gallatin County, especially in the two higher overburden categories, is impressive (table 3) but because of lack of detailed mapping of the structural dips in this area, together with sparse information from outcrops and drill holes in such a geologically complex area, these reserve estimates should be considered a rough approximation. It is emphasized that considerable detailed exploration would be required to confirm the presence of a sufficient quantity of No. 5 coal at appropriate depths for strip mining.

North of the Shawneetown fault and outside of Eagle Valley, the No. 5 coal crops out at the village of Equality where it was mined underground at both the east and the west edge of the village and at Hickory Hill two miles east of Equality. Coal near the outcrop and adjacent to abandoned underground

workings has been strip mined south of Hickory Hill School in the northern part of sec. 23, T. 9 S., R. 8 E. Elsewhere north of the Shawneetown fault the No. 5 coal lies beneath rather thick deposits of unconsolidated sand, silt, and clay. The coal has been down-dropped by faulting eastward from the Hickory Hill area to the Ohio River and its overburden appears to be generally more than 150 feet thick.

Saline County

At the east border of Saline County, the Harrisburg coal is offset by the Cottage Grove fault, the approximate trace of which is shown on plate 3-B. North of the fault the line of outcrop of the coal is obscured by glacial cover but the coal bed appears to lie at depths favorable to stripping in parts of secs. 11, 12, 13, and 14, T. 9 S., R. 7 E.

South of the Cottage Grove fault, the No. 5 coal has been mined both underground and by stripping in the prominent hill which is an outlier in the south half of secs. 13 and 14 and in secs. 22, 23, and 24, T. 9 S., R. 9 E. Westward from this area to the vicinity of Harrisburg the coal lies beneath unconsolidated material that is more than 50 feet thick.

The No. 5 coal deposits in T. 9 S., R. 6 E. and T. 9 S., R. 5 E., Saline County, have been mined extensively by both underground and strip methods to the extent that most strippable areas have been depleted (pl. 3-B).

Williamson County

Large quantities of Harrisburg No. 5 coal have been strip mined in Williamson County, as shown on plate 3-B. The No. 5 seam has an average thickness of about 4 feet throughout its strippable extent in Williamson County. The overlying No. 6 coal is generally thicker than No. 5 coal in this county. In some areas both No. 5 and No. 6 coals have been strip mined. The interval separating coal beds 5 and 6 decreases markedly from east to west across Williamson County (pl. 4). In the eastern part of the county, this interval is commonly 100 feet or more and often contains the No. 5A coal about 60 feet above the No. 5 coal. In the western part of the county, however, the interval diminishes to around 40 to 50 feet and there seems to be no evidence of coal 5A having been deposited.

Herrin No. 6 Coal

The Herrin No. 6 coal contains the largest potentially strippable reserve of any of the beds described in this report. It tends to become gradually thicker westward from the Ohio River in contrast to the No. 5 coal which thickens generally eastward. For this reason coal No. 6 is considerably thicker in Williamson County than it is in Gallatin or Saline counties. From the standpoint of strippable coal reserves, however, the thinner coal in the eastern two counties is of particular interest because large areas of the thicker coal in Williamson County have been depleted or are being developed in connection with existing mines. In table 4 the strippable reserves of No. 6 coal are summarized. Classified reserves are treated in greater detail in tables 6 and 7.

Table 4. - Summary of Strippable Reserves of No. 6 Coal
(In thousands of tons)

Class I Reserves at overburden depths (ft.)				Class II Reserves at overburden depths (ft.)				Total	Mined out
0-50	50-100	100-150	Total	0-50	50-100	100-150	Total	0-150	sq.mi.
<u>Gallatin County</u>									
37,104	45,035	32,267	114,506	-	718	6,681	7,399	121,905	-
<u>Saline County</u>									
56,125	102,589	125,858	284,572	-	-	-	-	284,572	6.03
<u>Williamson County</u>									
66,461	92,603	131,654	290,718	-	-	-	-	290,718	33.62
<u>Total</u>									
159,690	240,227	289,779	689,796	-	718	6,681	7,399	697,195	39.65

The No. 6 coal does not differ much from the No. 5 coal either physically or chemically as these coals generally cannot be differentiated by chemical properties. The No. 6 coal over virtually its entire area of occurrence is characterized by a persistent clay band, generally about one inch to one and one-half inches thick, that occurs between eighteen inches and two feet above the base of the seam. This parting, commonly referred to as the "blue band," is often used as a means of identifying the Herrin No. 6 coal (Cady 1919, p. 81).

The coal is generally immediately overlain by a black shale which in turn is commonly overlain by the Herrin limestone. The limestone is characteristically a dense dark gray marine limestone that at places lies almost directly on the coal although more commonly it ranges from 4 to 6 feet above the coal. The thickness of the Herrin limestone is variable but it commonly ranges from 3 to 5 feet. The average analysis of No. 6 coal for Gallatin, Saline, and Williamson counties is shown in table B, appendix.

Gallatin County

No. 6 coal in Gallatin County is strippable in two separate areas. One includes the coal in the area north of Equality and west of the Ridgeway fault, and the other south of the Shawneetown fault in the Eagle Valley syncline.

The Eagle Valley area is the more important of the two because the synclinal structure brings the coal near the surface on both the north and south limbs. As shown by overburden lines on plate 3-A there are some rather extensive areas where the No. 6 coal would be strippable at depths of less than 100 feet despite the structural dip of the coal bed toward the axis of the syncline and the relatively rugged topography of the region. Such areas result from the fact that the topographic slope and the structural dip are in the same direction and of the same order of magnitude. It should be emphasized that

only widely spaced drill hole data were available for the Eagle Valley area and that in mapping the overburden lines were interpolated from the very generalized structural and outcrop data of Butts (1925, pl. I) and the surface contours of U. S. Geological Survey topographic maps. Because the sparsity of data permits only generalized mapping of the synclinal structure, the delineation of strippable No. 6 coal on plate 3-A must be regarded as a highly generalized interpretation which suggests areas that warrant more extensive prospecting. One other factor that may materially alter the reserves of strippable No. 6 coal shown on plate 3-A for Eagle Valley is the fact that the extent to which the coal may be eroded beneath the alluvial fill on the valley floor is largely unknown because of insufficient drill hole data.

At the time this report was written (Oct. 1956) part of this area was being drilled by a strip mining company.

Saline County

At the west end of the Eagle Valley syncline in eastern Saline County the No. 6 coal has been strip mined just east of Jones School in the west central part of sec. 12, T. 10 S., R. 7 E. As indicated by the dotted lines on plate 3-A, the No. 6 coal would underlie several square miles in this vicinity at depths of less than 50 feet but in much of this area it may be eroded as there is very little information available on which to estimate the thickness of unconsolidated surficial deposits.

West of Equality, displacement of the strata by the Cottage Grove fault has produced areas in which coal No. 6 is strippable both north and south of the fault (pl. 3-A). It has been mined underground in outliers south of the fault in secs. 22 and 23, T. 9 S., R. 7 E. North of the fault it has been strip mined in the southern part of sec. 10, T. 9 S., R. 7 E., and it appears to be present at favorable depths just north of the fault in parts of secs. 9, 10, and 11.

In the central and western parts of Saline County north of the outcrop of the No. 6 coal there are large areas where the coal lies within the area classified as having overburden 50 to 100 feet thick, yet the coal has not been mined extensively. One particularly large (nearly 10 square miles) area in this classification is located west of Harrisburg where a reduction in the rate of northward structural dip, coupled with denudation of the surface by Bankston Fork and its tributaries, has produced an unusually large area of strippable coal at depths of more than 50 feet.

Williamson County

Large quantities of No. 6 coal, in thicknesses up to 9 feet, lying near the outcrop have been mined underground in Williamson County, and much of the coal left between the underground mines and the outcrop has been removed by stripping. Examination of plate 3-A indicates that the only areas remaining which contain appreciable quantities of strippable No. 6 coal in Williamson County are in the eastern part of T. 9 S., R. 4 E., and much of this coal is adjacent to presently active strip mining operations. Some smaller areas shown on plate 3-A indicate unmined coal near the outcrop that would seem to warrant

investigation. The extent of coal that may be available in such places, however, must be determined by obtaining sufficient drill hole data to map accurately the position of the outcrop where it is concealed beneath glacial deposits. Also a more detailed examination of the map showing extent of underground mine workings would be required to establish the certainty of coal in those areas.

Cutler Coal

Reserves of the Cutler coal are classified only in Saline and Williamson counties because this coal is too thin or too deeply buried everywhere in Galatin County where data are available.

The Cutler coal crops out in a line north of and roughly paralleling the outcrop of No. 6 coal. The interval between the No. 6 and Cutler coals in this area normally ranges between 60 and 90 feet. Available data indicate that in Williamson and Saline counties a large part of the coal in the Cutler seam near the outcrop falls within the strippable limits defined for these studies. In most of the areas shown on plate 3-B the Cutler coal falls within the 18 to 30 inches (av. 24 inches) category of thickness. At only a few places is it reported to be more than 30 inches thick. The estimated strippable reserves of Cutler coal in Saline and Williamson counties are summarized in table 5. More detailed summary of reserves is shown in tables 6 and 7.

Table 5. - Summary of Strippable Reserves of Cutler Coal
(In thousands of tons)

County	Class I Reserves at overburden depths (ft.)			
	0-50	50-100	100-150	Total
Saline	14,169	30,670	33,583	78,422
Williamson	8,116	13,250	35,656	57,022
Total	22,285	43,920	69,239	135,444

The Cutler coal is not known to have been mined anywhere in Saline or Williamson counties and no analyses of it are available. Examination of the drill hole data for this coal suggests that in some places it tends to exhibit rather abrupt changes in thickness.

STRIPPABLE COAL RESERVES

25

Table 6. - Summary of Strippable Coal Reserves by County,
Coal Bed, and Reliability Classification
(In thousands of tons)

Class I Reserves at overburden depths (ft.)				Class II Reserves at overburden depths (ft.)				Total I and II	Mined out sq.mi.
0-50	50-100	100-150	Total	0-50	50-100	100-150	Total		
GALLATIN COUNTY									
No. 6 Coal									
37,104	45,035	32,367	114,506		718	6,681	7,399	121,905	-
No. 5 Coal									
2,343	29,582	83,924	115,849	-	-	-		115,849	1.64
<u>Total</u>									
39,447	74,617	116,291	230,355	-	718	6,681	7,399	237,754	1.64
SALINE COUNTY									
Cutler Coal									
14,169	30,670	33,583	78,422	-	-	-		78,422	
No. 6 Coal									
56,125	102,589	125,858	284,572	-	-	-		284,572	6.03
No. 5 Coal									
11,782	24,044	57,596	93,422	-	-	-		93,422	10.67
DeKoven Coal									
6,120	14,629	22,195	42,944	-	-	2,186	2,186	45,130	.20
Davis Coal									
3,806	14,556	23,815	42,177	-	-	1,687	1,687	43,864	.32
<u>Total</u>									
92,002	186,488	263,047	541,537	-	-	3,873	3,873	545,410	17.22
WILLIAMSON COUNTY									
Cutler Coal									
8,116	13,250	35,656	57,022	-	-	-		57,022	
No. 6 Coal									
66,461	92,603	131,654	290,718	-	-	-		290,718	33.62
No. 5 Coal									
28,294	59,454	112,520	200,268	-	-	-		200,268	7.53
DeKoven Coal									
10,996	6,457	2,455	19,908	3,565	8,542	8,811	20,918	40,826	.45
Davis Coal									
9,483	9,618	7,230	26,331	-	-	-		26,331	.48
Murphysboro Coal									
10,257	26,398	-	36,655	-	-	-		36,655	.05
<u>Total</u>									
133,607	207,780	289,515	630,902	3,565	8,542	8,811	20,918	651,820	42.13
<u>Grand Total</u>									
265,056	468,885	668,853	1,402,794	3,565	9,260	19,365	32,190	1,434,984	60.99

Table 7. - 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
	0-50	50-100	100-150	Total	0-50	50-100	100-150	Total		
COAL No. 6	GALLATIN COUNTY									
8S-8E										
48"	-	-	404	404	-	-	-		404	
60"	-	112	7,678	7,790	-	-	-		7,790	
Twp.	-	112	8,082	8,194	-	-	-		8,194	
9S-8E										
36"	471	202	-	673	-	-	-		673	
48"	2,197	10,716	6,457	19,370	-	-	-		19,370	
60"	15,021	6,726	2,858	24,605	-	-	-		24,605	
Twp.	17,689	17,644	9,315	44,648	-	-	-		44,648	
9S-9E										
48"	-	-	-		-	628	5,650	6,278	6,278	
9S-10E										
48"	-	-	-		-	90	1,031	1,121	1,121	
10S-8E										
36"	2,421	5,313	4,237	11,971	-	-	-		11,971	
48"	14,034	9,775	3,632	27,441	-	-	-		27,441	
Twp.	16,455	15,088	7,869	39,412	-	-	-		39,412	
10S-9E										
36"	1,749	4,977	5,885	12,611	-	-	-		12,611	
42"	-	1,295	1,216	2,511	-	-	-		2,511	
48"	1,211	5,919	-	7,130	-	-	-		7,130	
Twp.	2,960	12,191	7,101	22,252	-	-	-		22,252	
Coal bed	37,104	45,035	32,367	114,506	-	718	6,681	7,399	121,905	

No. 5 COAL										
9S-8E										
	48"	493	4,663	21,926	27,082	-	-	-	27,082	
54	54"	-	303	353	656	-	-	-	656	
	60"	953	5,212	21,858	28,023	-	-	-	28,023	
	Twp.	1,446	10,178	44,137	55,761	-	-	-	55,761	1.27
10S-8E										
	54"	-	454	252	706	-	-	-	706	
	60"	897	13,059	30,265	44,221	-	-	-	44,221	
	Twp.	897	13,513	30,517	44,927	-	-	-	44,927	.02
10S-9E										
	54"	-	3,985	5,347	9,332	-	-	-	9,332	
	60"	-	1,906	3,923	5,829	-	-	-	5,829	
	Twp.	-	5,891	9,270	15,161	-	-	-	15,161	.35
	Coal bed	2,343	29,582	83,924	115,849	-	-	-	115,849	1.64
	COUNTY	39,447	74,617	116,291	230,355	-	718	6,681	7,399	237,754

SALINE COUNTY										
CUTLER COAL										
8S-5E										
	24"	628	1,368	3,811	5,807	-	-	-	5,807	
8S-6E										
	24"	-	3,789	8,048	11,837	-	-	-	11,837	
8S-7E										
	24"	202	2,556	8,138	10,896	-	-	-	10,896	
9S-5E										
	24"	9,730	8,923	9,640	28,293	-	-	-	28,293	
	36"	1,412	-	-	1,412	-	-	-	1,412	
	Twp.	11,142	8,923	9,640	29,705	-	-	-	29,705	
9S-6E										
	24"	1,637	9,842	3,587	15,066	-	-	-	15,066	
9S-7E										
	24"	560	4,192	359	5,111	-	-	-	5,111	
	Coal bed	14,169	30,670	33,583	78,422	-	-	-	78,422	

Table 7. - 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	Total	0-50	50-100	100-150	Total		
SALINE COUNTY (continued)										
No. 6 COAL										
8S-7E										
60"	-	-	2,242	2,242	-	-	-		2,242	
9S-5E										
36"	-	-	235	235	-	-	-		235	
48"	-	1,973	852	2,825	-	-	-		2,825	
60"	23,091	30,097	21,914	75,102	-	-	-		75,102	
72"	2,758	4,103	24,414	31,275	-	-	-		31,275	
84"	-	-	3,374	3,374	-	-	-		3,374	
Twp.	25,849	36,173	50,789	112,811	-	-	-		112,811	6.00
9S-6E										
36"	-	2,320	1,211	3,531	-	-	-		3,531	
48"	-	9,012	7,712	16,724	-	-	-		16,724	
60"	10,649	30,938	28,584	70,171	-	-	-		70,171	
72"	-	-	2,690	2,690	-	-	-		2,690	
Twp.	10,649	42,270	40,197	93,116	-	-	-		93,116	
9S-7E										
36"	235	1,816	3,867	5,918	-	-	-		5,918	
48"	6,367	7,309	8,026	21,702	-	-	-		21,702	
60"	5,268	14,348	20,737	40,353	-	-	-		40,353	
Twp.	11,870	23,473	32,630	67,973	-	-	-		67,973	.03
10S-7E										
48"	7,757	673	-	8,430	-	-	-		8,430	
Coal bed	56,125	102,589	125,858	284,572	-	-	-		284,572	6.03
No. 5 COAL										
9S-5E										
36"	-	-	135	135	-	-	-		135	
48"	-	2,018	3,139	5,157	-	-	-		5,157	
60"	1,906	729	7,342	9,977	-	-	-		9,977	

72"	-	67	1,076	1,143	-	-	-	1,143	
84"	-	-	314	314	-	-	-	314	
Twp.	1,906	2,814	12,006	16,726	-	-	-	16,726	4.94
9S-6E									
48"	90	-	-	90	-	-	-	90	
60"	392	2,466	5,661	8,519	-	-	-	8,519	
72"	471	605	3,027	4,103	-	-	-	4,103	
84"	-	-	863	863	-	-	-	863	
Twp.	953	3,071	9,551	13,575	-	-	-	13,575	4.54
9S-7E									
48"	90	2,959	3,408	6,457	-	-	-	6,457	
60"	3,923	11,658	22,307	37,888	-	-	-	37,888	
Twp.	4,013	14,617	25,715	44,345	-	-	-	44,345	.26
10S-5E									
48"	45	-	-	45	-	-	-	45	
60"	392	-	-	392	-	-	-	392	
Twp.	437	-	-	437	-	-	-	437	.55
10S-6E									
72"	135	135	-	270	-	-	-	270	.32
10S-7E									
48"	3,273	1,838	1,076	6,187	-	-	-	6,187	
60"	1,065	1,569	9,248	11,882	-	-	-	11,882	
Twp.	4,338	3,407	10,324	18,069	-	-	-	18,069	.06
Coal bed	11,782	24,044	57,596	93,422	-	-	-	93,422	10.67
DEKOVEN COAL									
10S-5E									
36"	4,237	10,795	10,425	25,457	-	-	-	25,457	.20
10S-6E									
36"	1,883	3,834	11,770	17,487	-	-	2,186 2,186	19,673	
Coal bed	6,120	14,629	22,195	42,944	-	-	2,186 2,186	45,130	.20

STRIPPABLE COAL RESERVES

Table 7. - Continued

Coal Township Thickness	Class I Reserves at overburden depth (ft.)				Class II Reserves at overburden depth (ft.)				Total I and II	Mined out square miles	
	0-50	50-100	100-150	Total	0-50	50-100	100-150	Total			
SALINE COUNTY - Continued											
DAVIS COAL											
10S-5E											
42"	2,119	11,064	11,417	24,600	-	-	-		24,600	.32	
10S-6E											
42"	1,687	3,492	12,398	17,577	-	-	1,687	1,687	19,264		
Coal bed	3,806	14,556	23,815	42,177	-	-	1,687	1,687	43,864	.32	
COUNTY	92,002	186,488	263,047	541,537	-	-	3,873	3,873	545,410	17.22	
WILLIAMSON COUNTY											
No. 7 COAL											
8S-2E											
24"	673	2,287	14,303	17,263	-	-	-		17,263		
36"	-	404	605	1,009	-	-	-		1,009		
Twp.	673	2,691	14,908	18,272	-	-	-		18,272		
8S-3E											
24"	1,547	3,744	8,407	13,698	-	-	-		13,698		
8S-4E											
24"	-	157	4,641	4,798	-	-	-		4,798		
9S-3E											
24"	2,354	3,071	605	6,030	-	-	-		6,030		
9S-4E											
24"	2,197	3,520	6,053	11,770	-	-	-		11,770		
36"	1,345	67	1,042	2,454	-	-	-		2,454		
Twp.	3,542	3,587	7,095	14,224	-	-	-		14,224		
Coal bed	8,116	13,250	35,656	57,022	-	-	-		57,022		

No. 6 COAL

8S-1E

96"	-	10,223	76,314	86,537	-	-	-	86,537	
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108"	11,198	26,735	3,228	41,161	-	-	-	41,161	
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Twp.	11,198	36,958	79,542	127,698	-	-	-	127,698	10.75
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8S-2E

96"	628	2,780	2,511	5,919	-	-	-	5,919	
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108"	2,119	6,558	10,290	18,967	-	-	-	18,967	
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Twp.	2,747	9,338	12,801	24,886	-	-	-	24,886	10.71
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8S-3E

84"	-	-	1,648	1,648	-	-	-	1,648	
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96"	-	628	1,255	1,883	-	-	-	1,883	
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Twp.	-	628	2,903	3,531	-	-	-	3,531	1.32
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9S-1E

108"	10,795	1,715	-	12,510	-	-	-	12,510	1.12
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9S-2E

96"	717	2,511	359	3,587	-	-	-	3,587	
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108"	3,531	-	-	3,531	-	-	-	3,531	
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Twp.	4,248	2,511	359	7,118	-	-	-	7,118	3.28
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9S-3E

60"	504	1,345	-	1,849	-	-	-	1,849	
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72"	2,892	6,457	8,474	17,823	-	-	-	17,823	
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84"	4,159	5,179	706	10,044	-	-	-	10,044	
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96"	5,112	1,076	2,152	8,340	-	-	-	8,340	
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Twp.	12,667	14,057	11,332	38,056	-	-	-	38,056	4.28
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9S-4E

60"	18,215	18,720	15,301	52,236	-	-	-	52,236	
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72"	6,591	8,676	9,416	24,683	-	-	-	24,683	
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Twp.	24,806	27,396	24,717	76,919	-	-	-	76,919	2.16
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Coal bed	66,461	92,603	131,654	290,718	-	-	-	290,718	33.62
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STRIPPABLE COAL RESERVES

Table 7. - Continued

Coal Township Thickness	Class I Reserves at overburden depth (ft.)				Class II Reserves at overburden depth (ft.)				Total I and II	Mined out square miles
	0-50	50-100	100-150	Total	0-50	50-100	100-150	Total		
WILLIAMSON COUNTY - continued										
No. 5 COAL										
8S-1E 48"	2,735	9,102	43,896	55,733	-	-	-		55,733	.73
8S-2E 48"	135	9,685	12,465	22,285	-	-	-		22,285	.26
9S-1E 48"	7,712	8,474	1,838	18,024	-	-	-		18,024	.31
9S-2E 36"	-	-	874	874	-	-	-		874	
48"	6,995	7,353	4,125	18,473	-	-	-		18,473	
Twp.	6,995	7,353	4,999	19,347	-	-	-		19,347	1.14
9S-3E 48"	10,358	10,178	6,726	27,262	-	-	-		27,262	
60"	-	7,174	13,900	21,074	-	-	-		21,074	
Twp.	10,358	17,352	20,626	48,336	-	-	-		48,336	1.33
9S-4E 48"	269	7,398	25,333	33,000	-	-	-		33,000	
60"	-	-	3,363	3,363	-	-	-		3,363	
Twp.	269	7,398	28,696	36,363	-	-	-		36,363	3.45
10S-4E 48"	90	90	-	180	-	-	-		180	.31
Coal bed	28,294	59,454	112,520	200,268	-	-	-		200,268	7.53
DEKOVEN COAL										
10S-4E 36"	10,996	6,457	2,455	19,908	3,565	8,542	8,811	20,918	40,826	.45
Coal bed	10,996	6,457	2,455	19,908	3,565	8,542	8,811	20,918	40,826	.45

DAVIS COAL										
10S-4E										
36"	9,483	9,618	7,230	26,331	-	-	-		26,331	.48
Coal bed	9,483	9,618	7,230	26,331	-	-	-		26,331	.48
MURPHYSBORO COAL										
9S-1E										
36"	-	1,143	-	1,143	-	-	-		1,143	
48"	-	2,018	-	2,018	-	-	-		2,018	
60"	56	4,372	-	4,428	-	-	-		4,428	
72"	6,591	9,819	-	16,410	-	-	-		16,410	
84"	157	3,060	-	3,217	-	-	-		3,217	
96"	359	5,919	-	6,278	-	-	-		6,278	
Twp.	7,163	26,331	-	33,494	-	-	-		33,494	.05
10S-1E										
72"	3,094	67	-	3,161	-	-	-		3,161	
Twp.	3,094	67	-	3,161	-	-	-		3,161	
Coal bed	10,257	26,398	-	36,655	-	-	-		36,655	.05
COUNTY	133,607	207,780	289,515	630,902	3,565	8,542	8,811	20,918	651,820	42.13

STRIPPABLE COAL RESERVES

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APPENDIX

Table A. - Data Regarding Miscellaneous Coals
in Lower Pennsylvanian Strata

Location Sec. Pt.* T. R.	Type of Exposure	Reported Thickness	Probable Stratigraphic Position	Remarks
SALINE COUNTY				
24 G8 10S 5E	Outcrop	20"	Bald Hill coal	
30 H3 10S 5E	Outcrop	18"	Bald Hill coal	Depth 40' 10"
21 B6 10S 6E	Outcrop	17 1/2"	Bald Hill coal	
27 F4 10S 6E	Abd. mine	15" + 18"	Curlew coal	Two seams separated by 6" of clay
27 F4 10S 6E	Abd. mine	Unknown	Curlew coal	
23 A6 10S 7E	Abd. mine	45"	Willis coal	
POPE COUNTY				
2 A4 11S 5E	Abd. mine	42" (?)	Delwood (?)	Locally called Ice House coal
3 G8 11S 6E	Abd. mine	Unknown	Delwood (?)	Locally called Ice House coal
6 A4 11S 6E	Abd. mine	Unknown	Battery Rock coal	
20 G5 11S 7E	Outcrop	18"	Upper Willis coal	
29 D3 11S 7E	Abd. mine	18"	Upper Willis coal	
14 D8 12S 6E	Abd. mine	24"	Willis coal	
14 F6 12S 6E	Abd. mine	Unknown	Willis coal	
6 E5 12S 7E	Abd. mine	22"	?	
12 B6 13S 5E	Abd. mine	42"	?	
5 B6 13S 6E	Abd. mine	26"	?	
WILLIAMSON COUNTY				
23 D1 10S 2E	Abd. mine	42"	?	
24 C8 10S 2E	Abd. mine	40"	?	Depth 6' +
24 E8 10S 2E	Abd. mine	44"	?	Depth 20' +

Table B. Coal Analyses, County Averages

County, Number of Mines and Coal	Condition	Proximate					Heat Values			
		Moisture	Volatile Matter	Fixed Carbon	Ash	Sulfur	Calories	British Thermal Units	Rank Index	Unit Coal Index
†Gallatin (1 mine) Willis	1	3.4	33.1	53.2	10.3	4.5	7,263	13,070		
	2		34.3	55.1	10.6	4.7	7,517	13,530		
	3	3.9	35.3	60.8			8,261	14,870	149	
	4		36.7	63.3			8,591	15,460		155
†Gallatin (North of Eagle Valley) (3 mines) Harrisburg No. 5	1	4.7	36.0	49.1	10.2	3.3	6,942	12,490		
	2		37.7	51.5	10.8	3.5	7,284	13,110		
	3	5.4	38.8	55.8			7,863	14,150	142	
	4		41.0	59.0			8,312	14,960		150
†Gallatin (Eagle Valley (3 mines) Harrisburg No. 5	1	4.2	34.6	51.0	10.2	3.7	7,074	12,730		
	2		36.1	53.3	10.6	3.9	7,388	13,300		
	3	4.9	37.1	58.0			8,014	14,430	144	
	4		39.0	61.0			8,426	15,170		152
†Gallatin (Eagle Valley) (1 mine) Herrin No. 6	1	4.3	36.1	49.0	10.6	3.7	6,990	12,580		
	2		37.7	51.2	11.1	3.9	7,303	13,150		
	3	5.0	39.0	56.0			7,691	14,330	143	
	4		41.0	59.0			8,377	15,080		151
Johnson (1 mine) New Burnside (upper of two seams)	1	8.4	36.7	49.6	5.3	2.0	7,156	12,881		
	2		40.1	54.1	5.8	2.18	7,816	14,068		
	3	9.0	38.1	52.9			7,620	13,716	137	
	4		41.9	58.1			8,380	15,084		151
Saline (1 mine) Davis	1	5.6	36.3	49.6	8.5	2.8	7,076	12,736		
	2		38.4	52.6	9.0	3.0	7,497	13,495		
	3	6.3	38.6	55.1			7,838	14,109	141	
	4		41.2	58.8			8,366	15,058		151
Saline (1 mine) Dekoven	1	11.8	32.3	47.9	8.0	1.6	6,171	11,107		
	2		36.6	54.3	9.1	1.9	6,993	12,587		
	3	13.0	34.3	52.7			6,771	12,188	121	
	4		39.4	60.6			7,787	14,016		140

* Type of analysis is denoted as follows: 1 - sample as received at laboratory; 2 - moisture-free; 3 - moist mineral-matter-free; 4 - dry mineral-matter-free (unit coal).

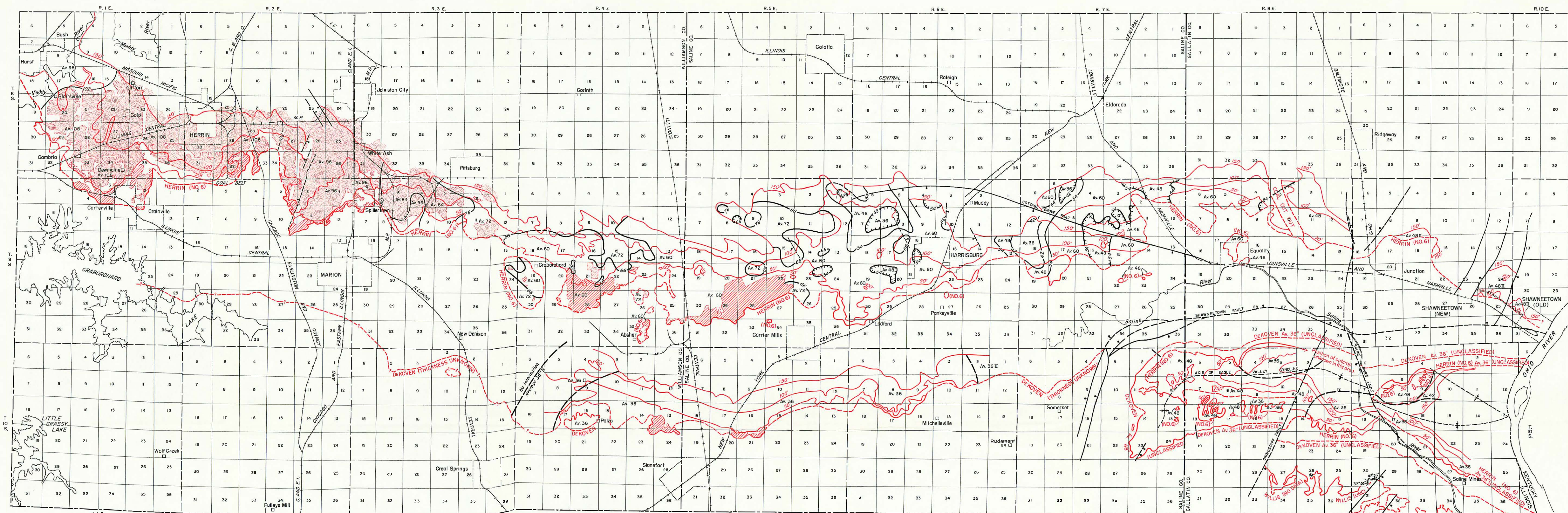
† Data from Cady, Gilbert H., Analyses of Illinois Coals: Supplement to Bull. 62, Illinois Geological Survey, 1948.

Table B. - Continued

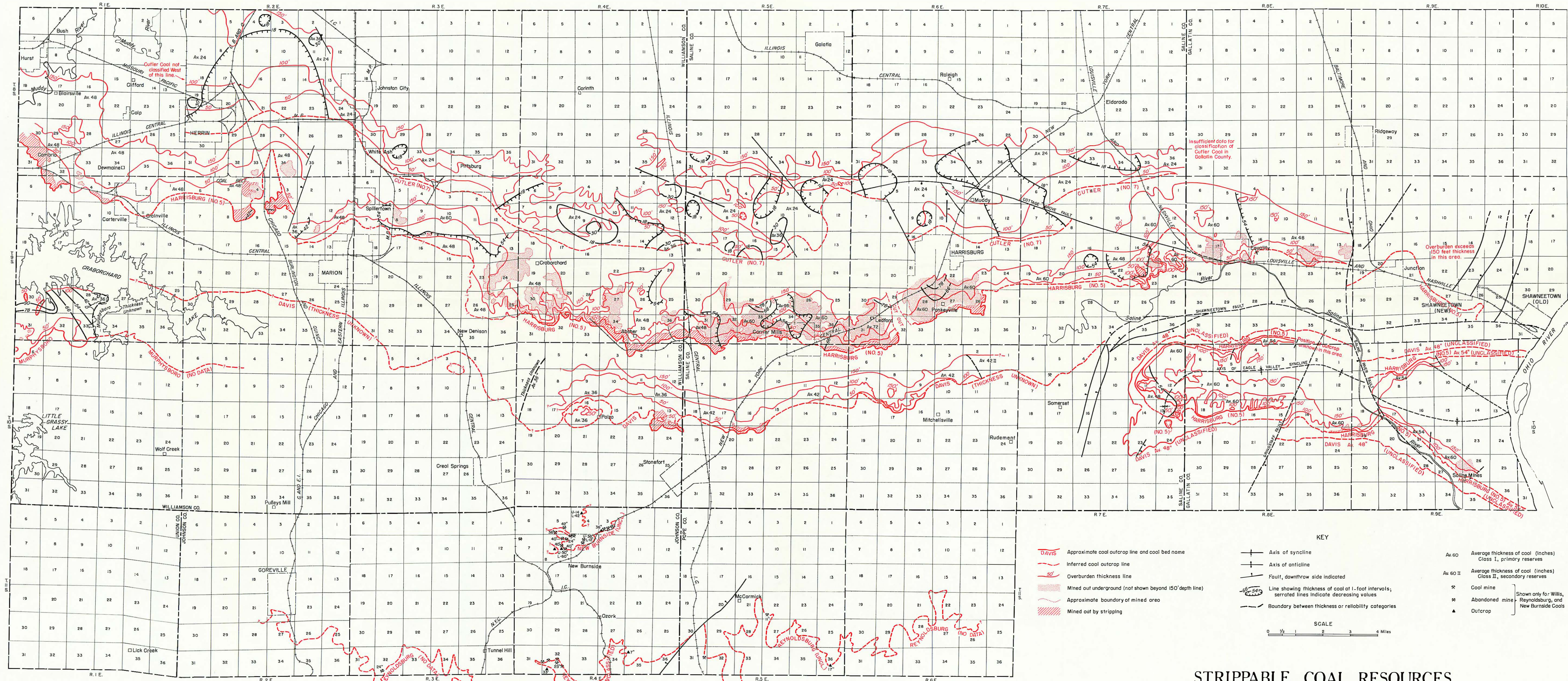
Samples		Proximate					Heat Values			
County, Number of Mines and Coal	Condition	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulfur	Calories	British Thermal Units	Rank Index	Unit Coal Index
†Saline (19 mines) Harrisburg No. 5	1	6.5	34.3	50.5	8.7	2.6	6,880	12,380		
	2		36.7	54.0	9.3	2.8	7,357	13,240		
	3	7.3	36.5	56.2			7,639	13,750	138	
	4		39.4	60.6			8,238	14,830		148
†Saline (1 mine) Herrin No. 6	1	7.1	33.7	49.0	10.2	3.6	6,687	12,040		
	2		36.3	52.7	11.0	3.9	7,197	12,950		
	3	8.2	36.1	55.7			7,570	13,630	136	
	4		39.4	60.6			8,244	14,840		148
†Williamson (1 mine) Harrisburg No. 5	1	7.0	34.0	47.9	11.1	3.5	6,605	11,890		
	2		36.5	51.5	12.0	3.8	7,099	12,780		
	3	8.1	36.9	55.0			7,567	13,620	136	
	4		40.1	59.9			8,232	14,820		148
†Williamson (29 mines) Herrin No. 6	1	8.0	33.6	49.1	9.3	2.2	6,629	11,930		
	2		36.6	53.4	10.0	2.4	7,203	12,970		
	3	9.0	36.0	55.0			7,396	13,310	133	
	4		39.6	60.4			8,125	14,630		146
Williamson (1 mine) Murphysboro	1	5.7	40.1	45.3	8.9	4.52	6,963	12,534		
	2		42.5	48.1	9.4	4.79	7,386	13,295		
	3	6.5	42.8	50.7			7,779	14,002	140	
	4		45.3	54.3			8,316	14,968		150

Table C. - Location of Drill Holes Shown on Plate 4.

Map No.	Location 1/4 sec.-T.-R.	Type of Hole	Year Drilled	Geol. Survey County No.
Williamson County				
1	NE NW SW	17- 9S-1E Core	-	239
2	NW cor. SW SE	29- 8S-1E Core	1912	210
3	NE SE	23- 8S-1E Core	1912	205
4	NE NE NW	16- 8S-2E Core	1921	137
5	NW SW	35- 8S-2E Core	1920	168
6	SE NE SE	23- 9S-2E Mine shaft	-	485
7		6- 9S-3E Core	1903	269
8	NE SE	26- 8S-3E Core	1904	106
9	NE SE SE	25-10S-3E Outcrop	-	-
10	NE NE SE	6- 9S-4E Core	1912	299
11	Cen. S. line, SE NE	13- 9S-4E Core	1904	314
Saline County				
12	NE NW NE	8- 9S-5E Oil test	1923	677
13	SE NE NE	1- 9S-5E Core	1905	337
14	SE cor. SW SW	17- 9S-6E Core	1906	263
15	NW NW NE	23- 9S-6E Core	1923	277
16	W 1/2 NW SW	5- 9S-7E Core	1909	189
17	SE SW NW	11- 9S-7E Core	1909	199
18	Cen. W. line, SE NW	13-10S-7E Core	1912	501
Gallatin County				
19	NE cor. SW SE	15-10S-8E Core	1912	42
20	NW NE SW	1-10S-8E Core	1912	39
21	Cen. N. line, NW	1- 9S-8E Core	-	23
22	NE cor. NW SE	20-10S-9E Core	1912	47
23	SE cor. NW NW	13-10S-9E Core	1912	46
24	Cen. NW NW	36- 9S-9E Core	-	22



A - HERRIN (NO.6), DEKOVEN, AND WILLIS COALS

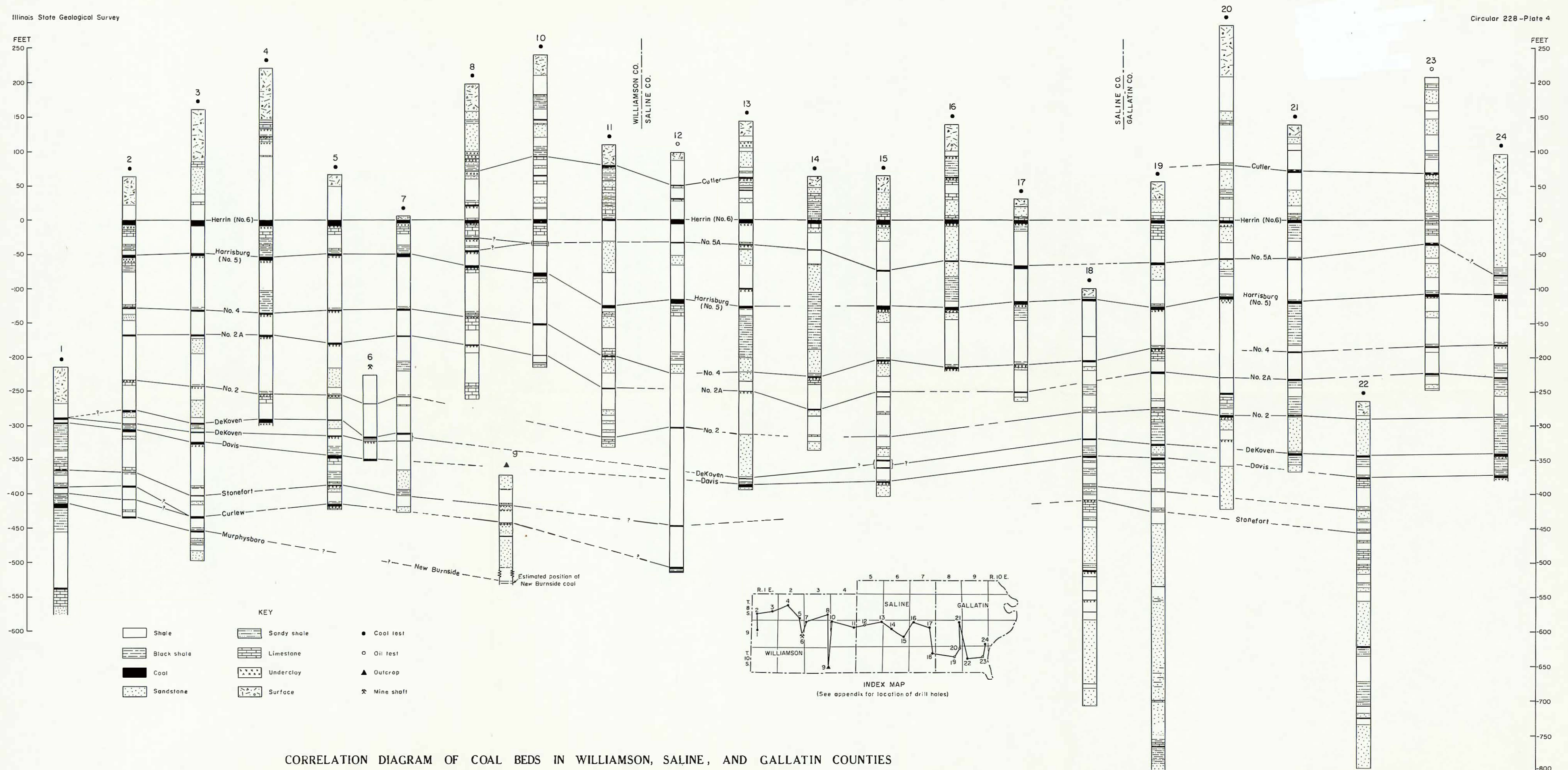


B - CUTLER, HARRISBURG (NO.5), DAVIS, MURPHYSBORO, NEW BURNSIDE, AND REYNOLDSBURG COALS

STRIPPABLE COAL RESOURCES

compiled by
W. H. SMITH and R. B. LENNON
AUGUST 1956

- KEY**
- Approximate coal outcrop line and coal bed name
 - - - Inferred coal outcrop line
 - Overburden thickness line
 - Mined out underground (not shown beyond 150' depth line)
 - Approximate boundary of mined area
 - Mined out by stripping
 - Axis of syncline
 - Axis of anticline
 - Fault, downthrow side indicated
 - Line showing thickness of coal of 1-foot intervals; serrated lines indicate decreasing values
 - Boundary between thickness or reliability categories
 - Av 60 Average thickness of coal (inches) Class I, primary reserves
 - Av 60 II Average thickness of coal (inches) Class II, secondary reserves
 - * Coal mine
 - ▲ Abandoned mine
 - ▲ Outcrop
- SCALE
0 1/2 1 2 3 4 Miles



CORRELATION DIAGRAM OF COAL BEDS IN WILLIAMSON, SALINE, AND GALLATIN COUNTIES



CIRCULAR 228

ILLINOIS STATE GEOLOGICAL SURVEY

URBANA

