STATE OF ILLINOIS
ADLAI E. STEVENSON, *Governor*
DEPARTMENT OF REGISTRATION AND EDUCATION
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DIVISION OF THE
STATE GEOLOGICAL SURVEY
M. M. LEIGHTON, *Chief*
URBANA

REPORT OF INVESTIGATIONS—NO. 148

SUBSURFACE GEOLOGY AND COAL RESOURCES OF THE PENNSYLVANIAN SYSTEM IN CERTAIN COUNTIES OF THE ILLINOIS BASIN

INTRODUCTION
GILBERT H. CADY

CLAY COUNTY
HEINZ A. LOWENSTAM

EDWARDS COUNTY
HENRY L. SMITH AND GILBERT H. CADY

GALLATIN COUNTY
M. WILLIAM PULLEN

HAMILTON COUNTY
MARY BARNES ROLLEY

RICHLAND COUNTY
RAYMOND SIEVER AND GILBERT H. CADY

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URBANA, ILLINOIS

1951

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Topographic Mapping in Cooperation with the United States Geological Survey.

This report is a contribution of the Coal Division.

May 15, 1950

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PLATE *(In pocket)*

May 31, 1951

Dr. Leighton:

In footnote 2, line 4 McLeansboro should be changed to Carbondale.

ACB

SUBSURFACE GEOLOGY AND COAL RESOURCES OF THE PENNSYLVANIAN SYSTEM IN CERTAIN COUNTIES OF THE ILLINOIS BASIN

INTRODUCTION

BY

GILBERT H. CADY

THE PRESENT VOLUME contains the second of a series of reports that deal with the subsurface geology and coal resources of the Pennsylvanian strata in the various counties (fig. 1) in the Illinois basin. The first report was issued in 1944.[1] The general history and purposes of the investigation were set forth by M. M. Leighton in the introduction to the first series of papers. The methods used in the studies were also described in a separate paper in that report.

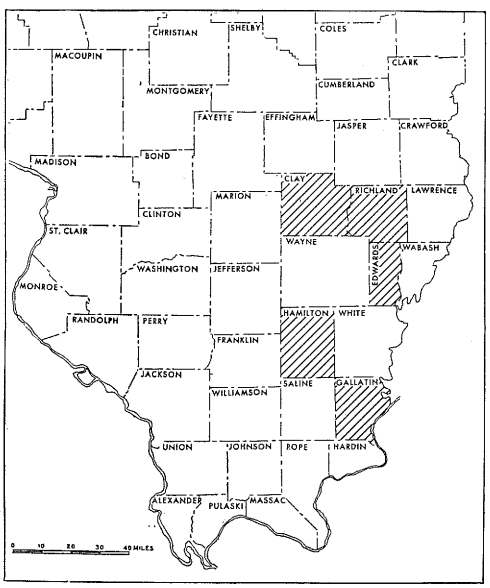

FIG. 1.—Index map of areas studied in this report.

[1] Progress reports on subsurface studies of the Pennsylvanian system in the Illinois basin: Illinois Geol. Survey Rept. Inv. 93, 87 pp., 1944.

It seems desirable to present here certain general explanations in regard to items that otherwise would have to be explained in each paper. These have to do particularly with the matter of key beds, the selection and use of beds as a basis for structure maps, the methods of construction of such maps for this series of reports, and acknowledgments to those who assisted in the work of the project.

KEY BEDS

In these investigations a key bed signifies one whose identity is reasonably definite over large areas in the Illinois basin. It is a bed by reference to which the position of other less widespread beds can be conveniently defined.

The stratum which satisfies this definition of a key bed most satisfactorily in the Illinois coal field as a whole, as well as in the Illinois basin, is the Herrin (No. 6) coal bed, the top of which is used in this report as the boundary between the McLeansboro and Carbondale groups, the coal bed being in the Carbondale group.[2] This coal bed is not universally present in the Illinois coal field but it is present in a large portion of the field, particularly in the southern part.

Where No. 6 coal bed is not present there is generally no other bed of comparable usefulness for reference, and its absence makes

[2] Because the cyclothem division as used by the Illinois State Geological Survey has not been considered appropriate to the plan of description in this report, the top of the McLeansboro group has been placed at the top of the Herrin (No. 6) coal in the present publication, rather than at the top of the cyclothem containing the Herrin (No. 6) coal, as accepted by the Survey.

difficult the stratigraphic correlation and classification in such areas. The No. 6 coal bed is very nearly continuous in the Illinois basin, particularly in the southern half of the basin which includes the counties represented in the accompanying series of reports. This coal bed is used in all the accompanying reports as the predominant key bed.

The Herrin limestone, the caprock of the No. 6 coal bed, is commonly so closely associated with the coal bed that together they constitute what might be regarded as dual key beds. This limestone is known as the Brereton limestone in western Illinois[3] and as the Providence limestone in western Kentucky,[4] from which area the use has spread more or less into southwestern Indiana and southeastern Illinois.

In some parts of southern Illinois, particularly in western Franklin and Williamson counties, the No. 6 coal bed and the caprock are separated by as much as 60 feet of shale or siltstone, and this separation of the beds may make the identification of both somewhat uncertain.

Other stratigraphic units that are used as key beds in the Illinois basin, or in large portions of the basin, lack the widespread distribution of the dual key beds, Herrin (No. 6) coal bed and limestone. Four such units are the Millersville limestone, the Shoal Creek limestone, the West Franklin limestone, and Harrisburg (No. 5) coal bed. Another unit of somewhat less certain position and identity is the "No. 7" coal bed.

The Millersville limestone[5] is one of the thickest (30 to 50 feet) Pennsylvanian limestones in the northern part of the Illinois basin. South of Effingham County it becomes thinner or disappears entirely, thus losing its value as a key bed. Its position is approximately 600 feet above No. 6 coal bed.

The limestone designated as Shoal Creek is believed to be the same as the Shoal Creek limestone that crops out along the stream of that name in Clinton County.[6] It ranges from 450 feet above No. 6 coal bed in the southern part of the basin to about 280 feet in Clay County, and lies 150 to 200 feet below the Millersville limestone. There are fairly wide variations in these intervals, probably in the order of 50 feet. The Shoal Creek limestone underlies the west side of the Illinois basin fairly continuously, but toward the east side of Clay, Wayne, and Hamilton counties it becomes thin or disappears. In the areas where the Shoal Creek limestone is only locally present it does not provide a satisfactory key bed. Where characteristically developed in the Illinois basin, it is usually 5 to 10 feet thick. It generally overlies a black shale, with a thin coal bed commonly present 20 to 40 feet below.

The West Franklin limestone lies about 250 feet above the No. 6 coal bed and about 200 feet below the position of the Shoal Creek limestone. However, the two limestones do not appear to be coextensive, the western margin of the recognizable West Franklin limestone being not far from the eastern margin of the recognizable Shoal Creek limestone. Consequently both limestones are not usually available as key beds in the same counties, or at least not in the same parts of an individual county. The West Franklin limestone thickens to the east, and in southern Indiana it commonly consists of three beds with intervening shale of variegated coloring.[7]

In drill holes in the Illinois basin one, two, or three benches may be penetrated or reported in the logs, and when only one or two benches are reported it is impossible to know with certainty which ones are represented. The middle bench is usually the thickest where three benches are present, so a single bench or the thickest of two benches is generally regarded as representing the middle bench. Red shale is thought to be more characteristic of the interval between the two lower benches than of the interval between the two upper benches or

[3] Savage, T. E., Significant breaks and overlaps in the Pennsylvanian rocks of Illinois: Amer. Jour. Science, 5th ser., vol. 14, pp. 307-316, 1927.

[4] Glenn, L. C., Geology and coals of Webster County: Kentucky Geol. Survey, ser. 6, vol. 5, p. 98, 1922.

[5] Taylor, Earle F., and Cady, Gilbert H., Structure of the Millersville limestone in the north part of the Illinois basin: Illinois Geol. Survey Rept. Inv. 93, p. 22, 1944.

[6] Udden, Jon A., Notes on the Shoal Creek limestone: Illinois Geol. Survey Bull. 8, pp. 117-126, 1907.

[7] See "Subsurface geology of Gallatin County," for description at two localities in southern Indiana, this report, p. 69.

of the strata below the lower bench, but this criterion should be used cautiously.

The "No. 7" coal bed is a thin stratum lying within 75 feet—usually less—of the No. 6 coal bed. It usually lies at the base of a monotonous succession of shales and siltstones that give, in the electric log, a shale pattern of prevailing low relief, usually rising to less than 30 ohm-meters in the "normal" curve. At the top of this succession is the West Franklin limestone member. Between "No. 7" and No. 6 coal beds are several relatively thin beds of limestone, shale, "slate," and sandstone which produce a markedly irregular electric log pattern, as described in the earlier report of this series.[8] The position of the "No. 7" coal bed, when electric logs are correlated with carefully prepared stratigraphic logs, is usually found to mark the position of change from a condition of prevailing low resistivity to one of variable resistivity (10 to 50 ohm-meters, AM = 18″) extending down to the position of Herrin limestone and No. 6 coal bed. The actual position of the bed is usually marked by a definite fluctuation in the pattern, but there is no uniformity, the normal curve indicating a resistivity in some logs less, in others greater, than the average shale value.

The coal bed is designated "No. 7" because its correlation with the Danville (No. 7) bed, although it seems probable, has not been definitely established. The Danville (No. 7) bed is thought to be the same as the bed known as Indiana VII. It is hoped that studies of coal spores as index fossils, now under way, will result in definitely establishing the relationship of these beds, as well as the relative position of the Cutler[9] coal bed of southern Illinois which also may represent the Danville (No. 7) bed.

Harrisburg (No. 5) coal bed seems to have a wide but not a continuous distribution in the Illinois basin. In places it seems to be thicker than No. 6 coal bed.[10] It commonly lies about 100 feet below No. 6 coal bed but it may be as near as 25 feet below and as far as 125 feet below the upper bed. In the electric logs its position is usually marked by a fairly strong pattern in the normal curve (AM = 18″) consisting of a single symmetrical peak (see footnote 8) extending to about the 50 ohm-meter line.

Between No. 5 and No. 6 coal beds, the thin Briar Hill (No. 5A) coal bed usually occupies a position midway to two-thirds of the distance below No. 6 bed. This is not regarded as a typical key bed, however.

At the present time no beds other than those described above can be regarded as suitable widespread key beds in the Pennsylvanian system. Outcrops of beds below No. 5 coal bed in southern Illinois are relatively poor down to the top of the Tradewater formation. Below that position, although there are numerous outcrops, the structural relationships are difficult to decipher so as to produce a clear picture of the stratigraphic succession, a difficulty which is enhanced by the lenticular nature of most of the beds of the Tradewater and Caseyville groups. There has been relatively little core drilling through this part of the Pennsylvanian succession. Further studies of the cuttings obtained from drill holes logged in the course of this investigation will be necessary before it will be suitable to use any of these beds as key horizons.

STRUCTURE MAPS

Construction of structure maps.—In this series of reports the structure maps are constructed with close adherence to the engineering limitations provided by irregularly distributed datum points represented by drill holes. Because the key beds do not crop out, the delineation of structure is based upon information supplied by drilling, and it is assumed, except where faults are known to exist, that the slope of the datum bed is uniform between any two adjacent drill holes. The contours are spaced on the basis of this assumption.

The data upon which the reports are based consist of occasional limestone or coal

[8] Taylor, Earle F., Pullen, M. William, Jr., Sims, Paul K., and Payne, J. Norman, Methods of subsurface study of the Pennsylvanian strata encountered in rotary-drill holes: Illinois Geol. Survey Rept. Inv. 93, pp. 16-19, 1944.

[9] Bell, Alfred H., Ball, Clayton, and McCabe, Louis, Geology of the Pinckneyville and Jamestown areas, Perry County, Illinois: Illinois Geol. Survey Illinois Petroleum 19, p. 3, 1931.

[10] Sims, Paul K., Payne, J. Norman, and Cady, Gilbert H., Pennsylvanian key beds in Wayne County, etc.: Illinois Geol. Survey Rept. Inv. 93, pp. 28-29, 1944.

bed outcrops, mine shaft records, and drill hole records of four kinds: diamond-drill hole records, in most instances compiled by the driller; a few churn-drill hole records; the electric logs of rotary-drill holes; and records compiled by Survey field parties of control drill holes. A Survey field party recorded one- or two-foot drilling time logs for each of the control drill holes and collected cuttings at two- or five-foot or rarely ten-foot intervals. These cuttings were studied in the laboratory and the resulting descriptions, combined with the drilling time records and occasionally with the electric logs, comprise the record of the control drill holes. These records and the records of diamond-drill holes particularly provided a basis for interpreting electric logs of other rotary-drill holes in the immediate vicinity.

The resulting maps, in spite of considerable smoothing, have a somewhat mechanical aspect, but the author believes that this method gives closer adherence to actuality than attempting to forecast the actual form of irregular slopes. In some places a local structural pattern may be known which justifies some modification of the contour lines from a pattern representing strict adherence to engineering relationships; but in general the contours have been determined in accordance with the conditions indicated.

Data are available in the tabulations accompanying the reports to enable geologists and engineers to construct maps with more liberal interpretations.

Structure of the Pennsylvanian beds.— The primary purpose of these subsurface studies of the Pennsylvanian system is the determination of the position of the workable coal beds underlying the Illinois basin so that they can be properly protected when drill holes and oil wells are abandoned. Because No. 6 coal bed is important in its own right and is also important as a key bed in determining the position of other coal beds, the position of this bed throughout the basin is of prime importance. Its position in each county is therefore indicated by a structure contour map showing the altitude of the top of the coal bed with respect to sea level. In several counties the No. 6 coal bed is continuously below sea level, so that contour designations are all negative. When this is so, the depth to the coal bed is obtained by adding the surface altitude to the figure representing the negative altitude of the coal bed. If the contour designation is positive, the altitude of the coal bed is subtracted from the surface altitude to obtain the depth of the bed.

Structure contour maps, such as those prepared for No. 6 coal bed and other key beds, are also useful in the search for geological structural conditions favorable for the accumulation of oil and gas. In general, however, maps made primarily for this purpose tend to be more interpretive of structural conditions than maps in which there is close adherence to engineering limitations.

Structure maps are also useful in various other ways, such as assisting in the interpretation and identification of isolated exposures of surface beds known to lie at definite distances above key beds, and in the planning of coal exploration and development projects.

To improve the understanding of the Pennsylvanian system, structure maps have also been prepared for some counties using the Shoal Creek or West Franklin limestones as datum beds. These maps, when compared with the structure map of No. 6 coal bed, may reveal departures from parallelism. Although it seems probable that the map of No. 6 coal bed delineates the structure of the Pennsylvanian beds more accurately than the maps of higher beds, allowance must be made for the possibility that some of the irregularities in this coal bed may be of depositional origin. Certainly not all the differences between the structure of two beds separated by 200 to 400 or more feet of strata can be assigned to structural deformation.

WORKABLE COAL BEDS

Since October 18, 1945, workable coal beds that require protection when oil wells are abandoned have been defined as "beds or seams 30 inches or more in thickness,

less than 1000 feet below the surface."[11] Earlier editions of the Rules and Regulations defined the lower limits of workability of a coal bed as a bed 30 inches thick at a depth of 1000 feet, but extended the limits of workability of beds 36 inches or more thick indefinitely. Plugging has presumably been carried on in line with these definitions. Actually coal beds 3 feet or more in thickness have not been found in the Illinois basin below depths of 1523 feet.

In the first report of this series,[12] an estimate of the coal resources in the Illinois basin was presented based upon observations on 140 rotary-drill holes, the so-called "control" wells or drill holes partially logged by the Survey (table 2). The total reserve in the 17 counties represented was estimated at about 30 billion tons. Only the No. 5 and No. 6 coal beds were considered in the estimate.

Because a considerable part of the Illinois coal field has a surface altitude between 500 and 600 feet, the structure contour line representing 500 feet below sea level for the No. 6 coal bed shown on any of the maps becomes a critical line in determining the areas in which it is necessary to provide protection for coal beds of workable thickness. In general such workable beds lie below No. 6 coal bed but rarely more than 400 feet lower. Occasional coal beds 30 inches or more in thickness are found at various positions above No. 6 coal bed. In much of the Illinois basin the No. 6 coal bed lies more than 500 feet below sea level.

Since the first estimate was made, 78 additional drill holes[13] have been logged by the Survey (table 3). Fifty of these drill holes were located in one or another of the following counties of the Illinois basin: Clay, Coles, Cumberland, Edwards, Effingham, Hamilton, Jasper, Jefferson, Richland, Wayne, and White. Four holes were located in Lawrence County. Many encountered one or more coal beds between 3, 9, and possibly 12 feet thick at depths below 1000 feet. Coal 4 feet thick was encountered in 34 drill holes; 5 feet thick in 20; 6 feet thick in 5; 7 feet thick in two; and 8 to 10 feet in five drill holes. In the first 140 wells drilled (the basis of the estimate of reserves), coal beds 4 feet or more in thickness were encountered at a depth below 1000 feet in 49 wells.

In general, logging of the first 140 drill holes was not continued below No. 5 coal bed, whereas in the last 66 wells logging commonly was continued to the base of the Pennsylvanian system. Hence the earlier data do not include figures on lower beds which subsequent observation discovered. Had observation continued to the base of the Pennsylvanian system, undoubtedly beds lying below 1000 feet would have been reported many more than 49 times. At any rate it is quite apparent that a very large reserve of coal is present in the Pennsylvanian rocks at depths between about 1000 and 1500 feet.

The assumption that a coal bed becomes unworkable at a depth exceeding 1000 feet, irrespective of its thickness, needs the thoughtful consideration of those interested in conserving the coal resources of the State. Undoubtedly mining men will have a very respectful attitude toward the great difficulties involved in large-scale mining operations 1000 to 1500 feet in depth, particularly so long as considerable supplies of average-grade coal are available at much shallower depths. Yet if evidence should indicate that relatively thick low-ash and low-sulfur coal is available at the greater depths, the relative scarcity of such coal in the State would tend to attract serious attention to the deeply buried reserves. Unfortunately the information available concerning the ash and sulfur content of the deep-lying coal beds is not very satisfactory, because of the difficulty of obtaining samples of such coal beds that are truly representative. In most cases, but not in all, such samples appear to indicate that the coal beds are relatively high in ash and sulfur rather than otherwise (table 1). However, it is possible that the cuttings collected tend to represent the denser portions of the coal because the lighter portions are more apt to escape in the overflow.

[11] Rules and Regulations, Illinois Department of Mines and Minerals, adopted and approved Oct. 18, 1945. Rule 15, p. 15. Mimeographed.
[12] Rept. Inv. 93, p. 44, 1944 (as of May 30, 1943).
[13] As of Sept. 30, 1945.

In the accompanying analyses (table 1), moisture values are not representative because the samples were subjected to high gravity separation liquids to remove rock impurities and to several stages of washing and drying to remove traces of the drilling mud. In general these coals display a relatively high fixed carbon content which is associated with a fairly high unit coal heat value. These are characteristics that might indicate coal of relatively high rank, particularly when unit coal B.t.u. values exceed 14,700 which is generally higher than the B.t.u. value of the coal mined anywhere in the State except in Saline and Gallatin counties.

Because of the very small amount of information available in regard to the coal beds penetrated in the Illinois basin, the Survey would be glad, so far as our facilities allow, to analyze samples of coal cuttings representing beds of workable thickness, irrespective of depth, penetrated in cable-tool or rotary-drill holes in the Illinois basin or in Edgar, Crawford, Clark, or Lawrence counties. The sample should weigh not less than about one-half pound, consisting of coal that will float on liquid having a specific gravity of 1.5.

Use of electric logs in determining coal-bed thickness.—After much study of the electric logs of rotary-drill holes of the standard form, including normal and third resistivity curves and potential curves, and of the records of the cores of diamond-drill holes and electric logs of the same holes, it is apparent that the electric logs do not generally provide a satisfactory record of coal-bed thickness or of the thickness of accompanying thin beds of black shale, limestone, and underclay. In the present series of reports, therefore, estimates of coal-bed thickness are based solely upon information obtained at the drill holes logged by the Survey field parties. Detailed mapping of variations in thickness of No. 6 and/or No. 5 bed, as was done for Wayne County,[14] is not attempted.

[14] Rept. Inv. 93, pp. 30, 31, 1944.

ACKNOWLEDGMENTS

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Tabulation of surface and other data, including determination of stratigraphic intervals and other statistical information, was carried on first by Mrs. H. E. Kramers and later by Margaret A. Parker by the use of the International Business Machines punched-card system.

TABLE 1.—ANALYSES OF COAL CUTTINGS FROM ROTARY DRILL HOLES IN ILLINOIS BASIN AND IN CRAWFORD AND LAWRENCE COUNTIES

Lab. No. (See below)	Moisture %	Vol. matter %	Fixed carbon %	Ash %	Sulfur %	B.t.u. as received	B.t.u. dry
C–2698	7.1	35.6	44.1	13.2	2.71	11,609	12,498
C–2699	9.5	36.9	45.9	7.7	2.69	12,071	13,332
C–2755	5.0	39.8	48.4	6.8	2.45	12,803	13,477
C–2756	6.1	39.8	44.7	9.4	2.32	12,405	13,211
C–2857	12.8	32.0	38.0	17.2	2.43	10,071	11,546
C–2858	13.2	31.8	37.4	17.6	1.90	9,956	11,468
C–2866	5.3	40.4	45.8	8.5	3.57	12,651	13,363
C–2906	2.5	39.0	47.0	11.5	3.74	12,713	13,039
C–3710	3.6	35.8	53.3	7.3	2.67	12,496	12,959
C–3842	8.0	32.2	54.3	5.5	0.86	12,375	13,458
C–4288	5.1	33.7	52.3	8.9	3.54	12,175	12,829
C–4289	3.8	33.1	47.3	15.8	2.43	11,445	12,897
C–4290	4.2	34.9	53.3	7.6	2.01	12,816	13,378
C–4291	3.0	36.6	51.7	8.7	2.54	12,966	13,367
C–4430	3.1	—	—	11.2	2.72	12,272	12,665
C–4431	4.8	—	—	7.9	3.10	12,529	13,161
C–4432	2.4	—	—	7.9	2.38	13,087	13,409
C–4433	2.1	—	—	7.8	3.18	13,148	13,430
C–4434	1.7	—	—	8.8	2.77	13,241	13,470
C–4435	1.9	—	—	8.4	3.59	13,125	13,379
C–4436	1.8	—	—	9.0	4.17	13,057	13,296
C–4437	2.1	—	—	12.8	3.09	12,365	12,630
C–4438	1.7	—	—	9.7	4.07	13,014	13,239

KEY TO TABLE 1

	Source of coal analyzed	Coal at depth feet
C–2698	Hole No. 111. Roy-Lee Miller No. 1, Sec. 11, T. 14 N., R. 14 W., Richland Co.	1,000–1,006
C–2699	Hole No. 111	1,013–1,018
C–2755	Hole No. 121. Ralph C. Halbert-Proctor No. 1, Sec. 17, T. 3 S., R. 14 W., Edwards Co.	855–858
C–2756	Hole No. 121	796–798½
C–2857	Hole No. 145. Ohio Oil Co.-Conrad No. 25, Sec. 15, T. 5 N., R. 11 W., Crawford Co.	498–508
C–2858	Hole No. 145	566–573
C–2866	Hole No. 147. Livingston-Holtz No. 1, Sec. 17, T. 2 N., R. 14 W., Richland Co.	1,363–1,372
C–2906	Hole No. 160. Lloyd-Stevenson No. 1, Sec. 8, T. 9 N., R. 9 E., Cumberland Co.	1,457–1,462
C–3710	Hole No. 34. Carter Oil Co.-Crawford No. 14, Sec. 11, T. 8 S., R. 10 E., Gallatin Co.	311–316
C–3842	Hole No. 189. Engle-Waddle No. 1, Sec. 27, T. 2 S., R. 13 W., Wabash Co.	704–708
C–4288	Hole No. 204. Pure Oil Co.-Bergbower No. B-1 Sec. 3, T. 6 N., R. 10 E., Jasper Co.	517–521
C–4289	Hole No. 204	557–562
C–4290	" " "	992–996
C–4291	" " "	1,266–1,272
C–4430	Hole No. 213. Big Four-Smith No. 1, Sec. 18, T. 3 N., R. 12 W., Lawrence Co.	571–573
C–4431	Hole No. 213	598–608
C–4432	" " "	683–688
C–4433	" " "	793–795
C–4434	" " "	867–872
C–4435	" " "	875–880
C–4436	" " "	886–890
C–4437	" " "	1,006–1,010
C–4438	" " "	1,059–1,063

TABLE 2.—CONTROL DRILL HOLES IN CLAY, EDWARDS, GALLATIN, HAMILTON, AND RICHLAND COUNTIES

County No.	Control well No.	Sec.	T.	R.	Company and farm	Crew on well	Cuttings studied by
					Clay County		
25	18	4	2N	5E	Carter Oil Walker No. 1	P. K. Sims A. F. Agnew A. L. Brokaw	A. L. Brokaw
30	87	23	5N	5E	National Petr. John Smith No. 1	D. F. Kent R. R. Reynolds A. Eddings R. F. Smith	D. F. Kent R. R. Reynolds
59	5	5	5N	7E	Gulf Ref. Storck	E. F. Taylor P. K. Sims A. L. Brokaw	E. F. Taylor H. L. Smith
60	90	20	5N	7E	Texas Co. A. L. Hardin	D. F. Kent R. R. Reynolds	D. F. Kent
61	78	26	4N	6E	Gulf Ref. McCollum	D. F. Kent R. R. Reynolds	D. F. Kent
62	45	25	3N	5E	Lain Oil Co. Haynes Con.	P. K. Sims A. L. Brokaw	
63	47	3	3N	7E	McBride Inc. McNeely	A. F. Agnew D. F. Kent	P. K. Sims
64	9	1	2N	6E	A. H. Gibson Valbert	E. F. Taylor P. K. Sims	
65	54	10	2N	7E	Pure P. Baylor	A. L. Brokaw D. F. Kent	A. L. Brokaw
66	17	3	2N	8E	Pure Mosely	P. K. Sims A. L. Brokaw A. F. Agnew	A. F. Agnew
119	148	4	4N	8E	Sinclair-Wyoming Hinterscher	J. N. Payne A. Eddings	M. A. Parker
120	166	34	4N	7E	McBride Busby, G.	H. L. Smith T. Karlstrom R. Siever	H. A. Lowenstam
121	179	14	5N	5E	Shell L. Moss	M. W. Pullen R. Siever H. A. Lowenstam	H. A. Lowenstam
377	191	10	4N	5E	Krohn C. Smith	M. W. Pullen H. L. Smith H. A. Lowenstam	M. E. Barnes
378	205	20	4N	5E	Wm. Krohn King	M. W. Pullen H. A. Lowenstam R. Ellingwood	H. A. Lowenstam
402	200	3	5N	7E	Ohio Oil Webster	M. W. Pullen G. Wilson H. A. Lowenstam	H. A. Lowenstam
403	203	5	2N	6E	Sinclair-Wyoming L. C. Haupt	M. W. Pullen G. Wilson H. A. Lowenstam	M. E. Barnes
495	197	30	3N	6E	J. J. Lynn Deain	M. W. Pullen H. L. Smith H. A. Lowenstam	H. A. Lowenstam
					Edwards County		
1	30	6	1N	14W	Sinclair-Wyoming Bierhaus No. 1	M. W. Pullen J. A. Simon G. M. Wilson Allen Agnew	M. W. Pullen Allen Agnew
2	118	16	1S	10E	Stanolind-Reid No. 1	M. W. Pullen E. F. Taylor R. R. Reynolds	M. W. Pullen H. L. Smith
3	33	7	1S	11E	Magnolia-Gould	Allen Agnew D. F. Kent	A. L. Brokaw Allen Agnew
4	123	8	2S	10E	Nelson Dev. Co. Cam Bunting No. 1	M. W. Pullen R. R. Reynolds H. L. Smith	H. L. Smith

TABLE 2.—Continued

County No.	Control well No.	Sec.	T.	R.	Company and farm	Crew on well	Cuttings studied by
5	15	19	5S	10E	Sun-McKibben No. 1	P. K. Sims A. L. Brokaw	P. K. Sims A. L. Brokaw
6	51	8	3S	10E	Sinclair-Wyoming Perkins No. 1	A. L. Brokaw P. K. Sims	A. L. Brokaw
7	121	17	3S	14W	Halbert-Proctor No. 1	M. W. Pullen E. F. Taylor H. L. Smith R. M. Kosanke	H. L. Smith
8	162	20	2S	14W	Kingwood-Cowling No. 1	M. W. Pullen A. L. Smith T.N.V. Karlstrom	M. E. Barnes
9	151	18	1N	10E	Midstates-McKinley No. 1	A. L. Eddings G. M. Wilson N. Payne	H. L. Smith
10	143	13	3S	10E	Ashland-Midstate Coal No. 1	M. W. Pullen T.N.V. Karlstrom H. L. Smith	H. L. Smith
11	156	10	1N	14W	Magnolia-Matthes No. 1	J. N. Payne A. L. Eddings T.N.V. Karlstrom	H. L. Smith
34	172	35	2N	10E	Texas Densmore No. 2	M. W. Pullen R. Siever H. L. Smith	H. L. Smith
91	177	28	1S	14W	Superior-L. Lippon No. 4	H. A. Lowenstam R. Siever H. L. Smith M. W. Pullen	M. E. Barnes
106	171	36	2S	10E	Lewis Ina Dunk No. 1-A	M. W. Pullen R. Siever H. L. Smith G. M. Wilson	H. L. Smith M. E. Barnes
					Gallatin County		
119	55	21	7S	8E	Carter Oil Co. Vinyard No. 2	P. K. Sims A. F. Agnew	P. K. Sims
123	22	24	7S	8E	Sinclair Wyoming Cox, Isaac No. 1	J. N. Payne J. M. Schopf	J. N. Payne
133	56	22	7S	9E	Duncan Inc. Knight No. 1	P. K. Sims A. F. Agnew	A. F. Agnew
136	58	33	7S	10E	Kinkaid Schmidt No. 1	A. F. Agnew	A. F. Agnew
169	95	15	8S	9E	Gulf Ref. Co. Bahl, L. No. 1	M. W. Pullen R. R. Reynolds	M. W. Pullen
200	34	11	8S	10E	Carter Oil Co. Crawford No. 1-A	M. W. Pullen J. M. Schopf K. Gutschick	M. W. Pullen
292	155	30	8S	10E	Ryan Oil Co. Tate No. 1	M. W. Pullen A. Eddings H. L. Smith	M. A. Parker
314	146	1	9S	10E	Magnolia Logsdon No. 1	M. W. Pullen H. L. Smith T. Karlstrom R. Siever	M. A. Parker R. Siever
341	193	15	9S	9E	Phillips Ford No. 1	M. W. Pullen H. L. Smith R. Ellingwood	
342	195	35	8S	9E	Continental Maloney No. 1	M. W. Pullen H. L. Smith H. A. Lowenstam	R. C. Honea
361	202	24	9S	9E	Rucker-Boehn Oldhem No. 1	M. W. Pullen E. P. DuBois	M. W. Pullen

TABLE 2.—Concluded

County No.	Control well No.	Sec.	T.	R.	Company and farm	Crew on well	Cuttings studied by
					Hamilton County		
42	8	30	3S	5E	Seaboard Kiefer No. 1	E. F. Taylor M. W. Pullen	P. K. Sims
43	96	22	3S	6E	Midcontinent Rubin No. 1	R. F. Smith P. K. Sims A. Eddings	P. K. Sims
44	93	24	3S	7E	Cherry Kidd Gardner No. 3	M. W. Pullen R. R. Reynolds	R. R. Reynolds
45	130	1	4S	5E	Texas Co. Rawls No. 1	M. W. Pullen A. Eddings R. M. Kosanke	M. A. Parker
46	137	33	4S	6E	Wiser Oil Co. Echols No. 1	M. W. Pullen G. M. Wilson A. Eddings	M. A. Parker
47	32	20	4S	7E	Texas Co. Minton No. 1	E. F. Taylor D. F. Kent	E. F. Taylor
48	69	11	6S	6E	Texas Co. McDonald No. 6	A. F. Agnew M. G. Caplan	A. F. Agnew
49	52	5	6S	7E	Shell Oil Co. Kern No. 1	A. F. Agnew D. F. Kent	P. K. Sims
50	71	35	6S	5E	Ohio Oil Co. Moore No. 6	P. K. Sims A. L. Brokaw	P. K. Sims
51	107	34	6S	6E	Texas Co. Johnson No. 5	R. R. Reynolds R. F. Smith A. Eddings R. Kelly	
52	149	27	6S	6E	Pierson Lee No. 3	M. W. Pullen H. L. Smith T. Karlstrom R. Siever	M. A. Parker
478	183	26	4S	7E	Ohio Oil Co. York No. 2	G. Wilson H. L. Smith R. Ellingwood R. F. Strete	M. E. Barnes
479	184	19	5S	5E	Magnolia Pet. Matheney No. 1	H. A. Lowenstam R. Ellingwood R. F. Strete	M. E. Barnes
498	194	15	5S	7E	Nat. Assoc. PC Rubenacker No. 1	M. W. Pullen H. L. Smith R. F. Strete	M. E. Barnes
499	196	33	6S	7E	Indiana Farm Seymour No. 1	H. L. Smith R. Ellingwood R. F. Strete	M. E. Barnes
					Richland County		
1	40	35	5N	10E	Gulf Refining Co. Ritter No. 1	P. K. Sims A. L. Brokaw	A. L. Brokaw
2	20	27	4N	9E	Pure Oil Co. Murvin No. b-2	P. K. Sims A. L. Brokaw A. F. Agnew	A. L. Brokaw
3	39	22	4N	10E	Texas Company Hasslinger No. 1	M. W. Pullen A. F. Agnew	A. F. Agnew
4	111	11	4N	14W	Lee R., Trustee Miller No. 1	P. K. Sims R. R. Reynolds R. F. Smith R. Kelly	R. R. Reynolds
5	135	31	3N	9E	Pure Oil Co. Myers No. 1	M. W. Pullen R. M. Kosanke H. L. Smith	M. A. Parker
6	88	10	3N	9E	Carter Oil Co. Winters No. 2	D. F. Kent R. F. Smith A. Eddings	D. F. Kent
7	7	32	3N	14W	Seaboard Kimmel No. 1	P. K. Sims A. L. Brokaw	
8	147	17	2N	14W	Livingston Holtz No. 1	J. N. Payne A. Eddings	M. A. Parker
9	168	19	3N	11E	Sohio Oil Co. Heap No. 1	H. L. Smith T. Karlstrom R. Siever	R. Siever

TABLE 3.—DATA ON WORKABLE COAL BEDS PRESENT IN ROTARY-DRILL HOLES STUDIED BY THE COAL DIVISION, JUNE 1, 1943, TO OCTOBER 1, 1945

Coal Division No.	Surface elevation (instrumental) Datum sea level ft.	Coal No.	Depth to top coal bed ft.	Elevation top coal bed Datum sea level ft.	Sedimentary succession[b, c] based on laboratory study of drill cuttings			
					Above coal bed (thickness in ft.)	Coal bed ft.	Coal bed in.	Below coal bed (thickness in ft.)
		Christian County			**Christian County**			
165	608		466	142	Gray shale 17; black shale 3	3	0	Gray shale 19
		Clark County			**Clark County**			
198	581		353	—228	Siltstone 48; black shale 1	3	0	Underclay 1; siltstone 1; sandstone 10
		Clay County			**Clay County**			
148	469	"7"	1056	—587	Gray shale 19; black shale 1	3	0	Gray shale 19; siltstone 11
166	445		478	— 33	Limestone and shale 2; black shale 1	3	0	Underclay 2; gray shale 7
		6	986	—541	Gray shale 3; black shale 1; shale and limestone	5	0	Underclay 4
179	524		450	74	Gray shale 44; limestone 1; black shale 1	2	6	Underclay 3; sandstone 20
		"7"	855	—331	Shale 44; black shale 1	3	6	Underclay 1; gray shale 8
		5	916	—392	Limestone 6; black shale 1	3	0	Underclay 1; gray shale 7
			1141	—617	Sandy shale 6; black shale 1	3	0	Underclay 2; sandy shale 14
191	529	5	982	—453	Limestone 4; black shale 2	2	6	Underclay 1; gray shale 15
197	513	6	950	—437	Limestone 2; black shale 5	3?	0	Underclay 2; sandstone 15
200	521	6	1026	—505	Limestone 5-7; black shale 3	4	6	Underclay and gray shale 5
203	518	5	1071	—553	Gray shale 3; black shale 2	3	0	Underclay 1; calcareous shale 4
205	527		1362	—835	Carbonaceous shale 7; sandstone 5; black shale 2	3	6	Underclay and clay shale 5
			1448	—921	Gray shale 5; black shale 7	3	0	Underclay 5
		Clinton County			**Clinton County**			
214	432		336	96	Gray shale 9; black shale 4	3	0	Underclay 2; limestone 8
			362	70	Gray shale 6; pyritic shale 2	5	0	Underclay and limestone 3; siltstone 10
[a]182	468		372	96				
			429	39				
			509	— 41				
		Coles County			**Coles County**			
144	733		426	307	Gray shale 4; black shale 1	3	0	Underclay 3; black shale 2
152	744		948	—204	Limestone 1; black shale 2	3	0	Underclay 1; shale 4
		Crawford County			**Crawford County**			
145	550		454	96	Gray shale 14; black shale 1	4	0	Underclay 4; shale 5
		6	498	52	Shale 13; black shale 1	10	0	Underclay 2; gray shale 2
		5	566	— 16	Sandstone 5; shale 5	6	0	Underclay 5; siltstone 35
176	515		801	—286	Gray shale 17; black shale 1	5	0	Shale 4; siltstone 7

		Cumberland County		
160	585		725	—140
			731	—146
			1130	—545
			1458	—873
		Edwards County		
143	483		964	—481
			971	—488
151	394		1317	—923
156	413	6	800	—387
			916	—503
		5	1163	—750
162	467		927	—460
			1021	—554
171	518		1029	—511
			1111	—593
172	460	6	1000	—540
		5	1081	—621
177	398		791	—393
			828	—430
			930	—532
			1208	—810
		Effingham County		
150	543	6	1043	—500
153	573		No workable coals	
173	555		1045	—490
			1083	—528
			1419	—864
185	564		963	—399
			1015	—451
201	576		1052	—476
			1074	—498
			1109	—533
215	603		1041	—438
			1069	—466
			1272	—669
		Fayette County		
154	541		564	— 23
			820	—279
			884	—343
			899	—358

Cumberland County			
Gray shale 23; black shale 1	3	0	Shale 2; black shale 1
Gray shale 2; black shale 1	3	0	Underclay 2; siltstone 4
Limestone 4; ? 4	4	0	Underclay 2; shale 24
Shale 10; black shale 1	4	0	Shale 12; black shale 2
Edwards County			
Limestone 2; black shale 2	3	0	Sandstone 3; black slate 1
Sandstone 3; black slate 1	4	0	Underclay 3
Siltstone 11; shale 2	5	0	Shale 28
Limestone 5; black shale 1	4	0	Underclay 2; sandstone 10
Shale 4; black shale 2	3	0	Underclay 2; sandstone 47
Siltstone 30; black shale 1	4	0	Underclay 1; sandstone 6
Limestone 4; black shale 3	3	0	Underclay 3; shale 3
Gray shale 11; black shale 5	4	0	Underclay 3; sandstone 78
Limestone 7; black shale 1	3	0	Underclay 2; gray shale 10
Limestone 4; black shale 3	3	9	Underclay 2; sandstone 44
Gray shale 10; limestone 2	5	0	Underclay 2; sandstone 37
Limestone 2; black shale 2	4	0	Underclay 2; limestone 3
Shale 39; black shale 1	3	0	Underclay 2; shale 11
No sample 4; black shale 1	3	0	Underclay 1; sandstone 59
Shale 9; black shale 1	4	0	Underclay 1; gray shale 21
Gray shale 13; black shale 3	3	9	Underclay 1; gray shale 19
Effingham County			
Limestone 3; black shale 5	3	6	Underclay 2; shale 4
Limestone 1; black shale 1	3	0	Underclay 2; sandstone 10
Limestone 3; black shale 1	4	0	Underclay 5; shale 64
Limestone 2; black shale 4	4	6	Underclay 2; shale 10
Gray shale 8; black shale 1	3	0	Underclay 1; shale 5
Gray shale 14; black shale 1	3	0	Underclay 1; shale 4
Gray shale 42	3	0	Underclay 3; shale 7
Limestone 2; black shale 1	4	6	Underclay 1; shale 6
Sandstone 6; black shale 1	3	0	Shale 8
Limestone 4; black shale 2	4	0	Clay shale 3; sandstone 2
Gray shale 16; black shale 3	5	0	Underclay 3; calcareous shale 23
Limestone 2; calcareous shale 12	6	0	Black shale 1; calcareous sandstone 2; shale 9
Fayette County			
Shale 1; black shale 1	3	0	Underclay 1; limestone and shale 1
Limestone 2; black shale 2	4	0	Underclay 1; limestone 5
Limestone 2; black shale 1	3	0	Underclay 1; limestone 6
Limestone 6; shale 5	3	0	Underclay 1; siltstone and sandstone 13

[a] Drill cuttings studied in field only.

[b] Black shale includes black "slate."

[c] Siltstone is a very fine-grained sandstone.

TABLE 3.—Continued

Coal Division No.	Surface elevation (instrumental) Datum sea level ft.	Coal No.	Depth to top coal bed ft.	Elevation top coal bed Datum sea level ft.	Sedimentary succession based on laboratory study of drill cuttings			
					Above coal bed (thickness in ft.)	Coal bed ft.	Coal bed in.	Below coal bed (thickness in ft.)
		Franklin County						
178	411	6	680	—269	Limestone 8; black shale 1	7	0	Underclay 2; sandstone 5
		5	756	—345	Gray shale 7; black shale 4	4	0	Underclay 3; limestone 1; siltstone 6
209	438	6	636	—198	Limestone 8; black shale 2 (black shale parting)	8	0	Underclay 2; sandstone 4
			694	—256	Black shale 6; gray shale 2; black shale 2	4	0	Underclay 2; sandstone 7
		Gallatin County						
146	351	6	302	49	Limestone 5; gray shale 2; black shale 2	3	0	Underclay 2; gray shale 3
		5	430	— 79	Gray shale 30; black shale 3	5	0	Gray shale 4; shale and limestone 2
			675	—324	Gray shale 11; black shale 1	4	0	Underclay 2; limestone 2
			696	—345	Gray shale 13; black shale 1	3	0	Underclay 2; gray shale 5
155	346	5	461	—115	Gray shale 27; black shale 1	3	0	Gray shale 4; limestone 3
		[d]Da	739	—393	Gray shale 13; black shale 3	3	0	Underclay 3; shale 3; sandstone 9
[a]193	356		263	93		5	0	
			538	—182		3	0	
195	370	6	372	— 2	Limestone 1; gray shale 3	6	0	Underclay 2; sandstone 10
		5	482	—112	Limestone 3; black shale 1	4	0	Underclay 3; limestone 4
			750	—380	Black shale 6; black slate 2	4	0	Underclay 3; sandstone 1; shale 6
[a]202	401		165	236		10	0	
			286	115		6	0	
		Hamilton County						
149	385	6	643	—258	Limestone 5; black shale 2	5	0	Underclay 2; gray shale 1; sandstone 5
		5	745	—360	Gray shale 50	3	0	Underclay 1; gray shale 4; limestone 4
			870	—485	Gray shale 26; black shale 1	3	0	Underclay 1; siltstone 25
183	421	6	956	—535	Limestone 3; black shale 6	4	0	Underclay 1; sandstone 13
		5	1046	—625	Siltstone 4; gray shale 2; black shale 2	4	0	Gray shale 10
184	447	6	870	—423	Limestone 3; black shale 6	4	0	Underclay 3; siltstone 6
		5	960	—513	Limestone 1; black shale 8	5	0	Siltstone 2; sandstone 16
		"4"	1057	—610	Gray shale 12; black shale 1	3	0	Siltstone 9
		[e]DK	1303	—856	Gray shale 20; black shale 2	3	0	Underclay 2; gray shale 9
194	488	6	988	—500	Limestone 5; gray shale 3; black shale 3	4	0	Underclay 1; sandstone 12
			1085	—597	Silty shale 25; black shale 3	5	0	Underclay 1; gray shale 5
196	366	6	651	—285	Sandstone 34; limestone 3; black shale 3	4	0	Underclay 1; gray shale 3; sandstone 20
		5	764	—398	Gray shale 7; black shale 3	5	0	Shale 4; siltstone 16

Jasper County

159	584		554	30
			719	—134
			768	—184
			1160	—576
169	567		1253	—686
			1524	—957
181	528		1168	—640
			1279	—751
204	502		340	162
			516	— 14
			556	— 54
			938	—436
			992	—490
			1027	—525
			1117	—615
			1266	—764
208	557	6	1087	—530
		5	1118	—561
			1340	—783
			1972	—1415
210	478	6?	1133	—655
		5?	1178	—700
			1241	—763
			1412	—934
			1620	—1142
[a]211	523		426	97
			454	69
			497	26
			538	— 15
			558	— 35
			670	—147

Jefferson County

192	531		No workable coals	
174	517		960	—443
190	513	6	648	—135
			684	—171
			1008	—495
199	520	6	725	—205
			758	—238

Jasper County

Siltstone 11; black shale 1	4	0	Underclay 2; shale 5
Gray shale 14; black shale 1	3	0	Underclay 1; shale 14
Limestone 5; black shale 3	3	0	Underclay 1; gray shale 4; sandstone 4
Gray shale 2; limestone 1; black shale 1	3	0	Underclay 1; sandstone 1; limestone 1
Limestone 4; black shale 3	3	0	Underclay 1; sandy siltstone 4
Coal 1; gray shale 2; black shale 2	3	6	Underclay 1; gray shale 4; limestone 1
Limestone 6; gray shale 1; black shale 2	3	0	Underclay 3; shale 11
Limestone 1; black shale 1	3	0	Underclay 3; siltstone 12
Siltstone 3; limestone 1	3	0	Underclay 3; siltstone 18
Shale 20	5	0	Underclay 4; shale 30
Shale 30	6	0	Underclay 2; siltstone 4
Shale 34	3	0	Underclay 1; siltstone 4
Coal 1; underclay 2; limestone 6	4	0	Underclay 3; siltstone 4
Shale 23	3	0	Underclay 1; shale 23
Gray shale 30; black shale 3	5	0	Underclay 2; shale 5
Shale 20	5	0	Underclay 1; shale 28
Limestone 3; gray shale 7; black shale 3	4	0	Underclay 1; gray shale 17
Black shale 2; limestone 5; black shale 1	4	0	Underclay 2; shale 6
Siltstone 14; black shale 1	3	0	Underclay 2; gray shale 16
Siltstone 10; black shale 2	3	0	Underclay 1; siltstone 14
Limestone 7; black shale 1	4	0	Underclay 1; gray shale 12
Gray shale 6; limestone 1; black shale 1	4	0	Underclay 1; gray shale 7
Sandstone 10; black shale 1	3	0	Underclay 1; gray shale 5
Gray shale 7; black shale 1	5	0	Underclay 1; shale 17
Sandy shale 11; black shale 2	5	0	Underclay 2; sandy shale 25

Jefferson County

Gray shale 9; black shale 1	3	0	Underclay 1; gray shale 3
Limestone 7; gray shale 5; black shale 1	5	0	Underclay 1; siltstone 13
Sandstone 13; black shale 1	3	0	Underclay 3; shale 8
Gray shale 50; black shale 1	3	0	Underclay 1; shale 28
Siltstone 12; clay shale 5; (clay partings)	8	0	Underclay 1; limestone 1; underclay 2
Black shale 5; limestone 1; black shale 4	4	0	Underclay 3; sandstone 6

[a] Drill cuttings studied in field only.

[d] Davis coal.

[e] Dekoven coal.

TABLE 3.—Continued

Coal Division No.	Surface elevation (instrumental) Datum sea level ft.	Coal No.	Depth to top coal bed ft.	Elevation top coal bed Datum sea level ft.	Sedimentary succession based on laboratory study of drill cuttings			
					Above coal bed (thickness in ft.)	Coal bed ft.	Coal bed in.	Below coal bed (thickness in ft.)
			Lawrence County					
142	436		421	15	Limestone 4; shale 5 (clay partings)	3	0	Underclay 4; limestone 4
			433	3	Underclay 4; limestone 4	3	0	Underclay 2; shale 8
			735	—299	Gray shale 9; black shale 1	3	0	Underclay 1; gray shale 13
186	492		1419	—927				
187	406		No workable coals					
213	500		189	311	Shale 24; black shale 1	3	0	Underclay 2; shale 18
		6	599	— 99	Limestone 2; limey shale 18	9	0	Underclay 2; shale 4; sandstone 6
		5	682	—182	Limestone 3; shale 2	5	0	Underclay 2; shale 2
		[f]III	866	—366	Shale 7; black shale 1	5	0	Underclay 1; shale 2
		[f]III	874	—374	Underclay 1; shale 2	6	0	Underclay 1; gray shale 4; black shale 1
		[f]III	886	—386	Shale 4; black shale 1	5	0	Underclay 1; siltstone 12
			Madison County					
180	534	6	410	124	Limestone 4; black shale 2	3	0	Underclay 1; shale 5
		5	480	54	Gray shale 16; black shale 1	4	0	Underclay 1; siltstone 9; sandstone 2
217	571		No workable coals					
			Marion County					
141	542		No workable coals					
			Montgomery County					
206	687		No workable coals					
			Richland County					
147	490	"7"	938	—448	Gray shale 44; black shale 2	4	0	Underclay 2; gray shale 8
		6	1000	—510	Gray shale 4; limestone 7; black shale 1	4	0	Underclay 2; gray shale 1; siltstone 10
			1368	—878	Gray shale 21; black shale 5	4	0	Underclay 3; siltstone 3
168	493	6	1073	—580	Limestone 4; black shale 3	3	0	Underclay 3; limestone 3; sandstone 4
			1359	—866	Gray shale 17; black shale 2	3	0	Underclay 2; gray shale 5; sandstone 11
			1426	—933	Sandstone 11; black shale 3	3	0	Underclay 1; gray shale 4

Sangamon County					**Sangamon County**			
212	580	5	390	190	Gray shale 14; black shale 1	3	0	Underclay 1; gray shale 6
Wabash County					**Wabash County**			
164	467	"7"	782	—261	Gray shale 24; black shale 1	3	0	Underclay 1; shale 3; limestone 3
		6	760	—293	Limestone 2; shale 5; limestone 3; shale 2	4	0	Underclay 4; shale 10
		5	850	—383	Gray shale 16; black shale 2	4	0	Underclay 2; gray shale 6
188	498	"7"	691	—193	Gray shale 22; black shale 1	3	0	Underclay 1; gray shale 12
			1106	—608	Sandstone and siltstone 13; black shale 1	4	0	Siltstone 17
189	388	"7"	546	—158	Gray shale 16; black shale 1	3	0	Gray shale 11
		5	705	—317	Siltstone 4; shale 4	3	0	Siltstone 6; sandstone 6
			948	—560	Shale 14	4	0	Shale 10
Washington County					**Washington County**			
175	447		No workable coals					
207	455		304	151	Gray shale 1; black shale 4	3	0	Underclay 4; limestone 6
Wayne County					**Wayne County**			
158	449		921	—472	Gray shale 40; black shale 2	3	0	Underclay 1; gray shale 8
			981	—532	Gray shale 20; limestone 3; black shale 1	5	0	Underclay 1; gray shale 1; sandstone 33
167	380		904	—524	Gray shale 12; underclay 1; gray shale 4	4	0	Shale and limestone 1; sandstone 10
170	383		1221	—838	Siltstone 19; black shale 1	5	0	Underclay 2; siltstone 4; sandstone 8
			1275	—892	Gray shale 12; black shale 1	3	0	Underclay 3; siltstone 10
White County					**White County**			
157	375		No workable coals					
161	372	6	693	—321	Shale 2; limestone 3; black shale 2	7	0	Sandstone 10; siltstone 5
		5	770	—398	Shale 23; black shale 5	4	0	Underclay 2; limestone 4; sandstone 20
163	446	6	870	—424	Shale 3; limestone 5; gray shale 2	4	0	Underclay 4; sandstone 16
		5	944	—498	Gray shale 23; black shale 1	3	0	Underclay 1; shale 24
		[e]DK	1031	—585	Limestone 1; limey shale 3; black shale 1	3	0	Shale 6; sandstone 20
			1060	—614	Sandstone 20	3	0	Gray shale 4; sandstone 2
			1366	—920	Gray shale 2; limestone 2; black shale 1	3	0	Sandstone 2; gray shale 20
216	382		911	—529	Limestone 6; black shale 1	5	0	Underclay 1; sandstone 10
			1019	—637	Gray shale 41 (shale parting)	5	0	Shale 2; sandy shale 8
			1238	—856	Gray shale 33; black shale 1	3	0	Underclay 2; siltstone 2; sandstone 20
218	504	"7"	798	—294	Gray shale 40; black shale 1	3	0	Underclay 1; gray shale 6; limestone 2
		6	848	—344	Gray shale 9; black shale 1; limestone 4	5	0	Gray shale 2; sandstone 12
		[d]Da	1176	—672	Siltstone 10; black shale 1	3	0	Gray shale 2; siltstone 4

[d] Davis coal. [e] Dekoven coal. [f] Indiana No. 3 coal.

SUBSURFACE GEOLOGY OF CLAY COUNTY

BY

HEINZ A. LOWENSTAM

INTRODUCTION

The Clay County investigation is based entirely on information from drill holes. A total of 508 drill records have been examined, most of which consisted of, or were accompanied by, electric logs. A small number of records based on the study of drill cuttings by company geologists and a few driller's logs were also used.

Stratigraphic control was established with the aid of the records of 15 drill holes, designated as control drill holes, for which drilling time was obtained and cuttings were secured and studied by various members of the Coal Division. Of the seven holes logged by the Coal Division since the first progress report[1] was prepared, three provide records for the entire Pennsylvanian sequence at the positions of the holes, but the remaining logs extend through the major coal-bearing strata only as far down as either the Caseyville or the Tradewater groups.

The tabulated data showing location and altitude of datum points, depth and altitude of certain coal beds and limestones, and thicknesses of the coal beds, are given in the appendix.

Acknowledgments

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KEY BEDS

Because of the dominant reliance on electric logs in subsurface studies in the Illinois basin, stratigraphic markers must be thick enough to produce an identifying pattern in the electric logs, as well as essentially continuous beds of uniform and distinctive lithology.

Of the established useful key beds,[2] the Shoal Creek limestone and "No. 7" coal bed in the McLeansboro group and No. 6 and No. 5 coal beds in the Carbondale group can be considered as reliable stratigraphic markers in Clay County.

The Millersville limestone, which forms a prominent key bed in the upper part of the McLeansboro group in the northern part of the Illinois basin,[3] is known to thin rapidly southward and has not been definitely identified in Clay County. A limestone at the approximate position of the Millersville limestone, and possibly this bed, lies about 572 to 656 feet above Coal No. 6 and is well developed in the northwestern part of Clay County (T. 5 N., R. 5 E.). It thins rapidly to the south and east, or becomes argillaceous and sandy, so that it cannot be recognized in electric logs over most of Clay County and consequently cannot be regarded as a key bed.

The West Franklin limestone in the lower part of the McLeansboro group is a persistent stratigraphic marker along the eastern border of the state from Gallatin to Richland County, but it is quite variable in lithology and thickness in Clay County. It can be recognized in electric logs of drill holes only in scattered, widely separated areas of limited extent where the West Franklin has typical thickness and lithology. The West Franklin limestone has been included among the key beds because it is recognizable in electric logs in several oil pool areas.

Shoal Creek Limestone

The Shoal Creek limestone forms the uppermost key bed of the Pennsylvanian strata of Clay County. It occurs from 520

[1] Progress report on subsurface studies of the Pennsylvanian system in the Illinois basin: Illinois Geological Survey Rept. Inv. 93, pp. 9-21, 1944.

[2] Idem.

[3] Taylor, F. F., and Cady, G. H., Structure of the Millersville limestone in the northern part of the Illinois basin: Illinois Geol. Survey Rept. Inv. No. 93, pp. 22-26, 1944.

to 730 feet below the surface but is generally encountered in wells at depths between 550 and 650 feet. The interval between the Shoal Creek limestone and No. 6 coal bed ranges from 283 to 455 feet. The Shoal Creek limestone is continuous except in the southeastern part of the county where it is cut out in small areas by a sandstone which, in the immediate area, commonly overlies the limestone.

In drill cuttings the Shoal Creek limestone appears white to buff, finely crystalline, and dense. In several drill holes, the basal part of the limestone is grayish brown to light brown and in one hole was found to be slightly glauconitic. Fossils, distributed sparingly through the cuttings, commonly consist of calcareous foraminifera, skeletal elements of crinoids and occasionally of fenestelloid bryozoa. The thickness of the limestone ranges from 5 to 8 feet. It is always underlain by 1 to 4 feet of black sheety shale, which in turn rests on underclay or clay shale that is gray to greenish gray in color, slip-fractured, and occasionally slightly pyritic. A thin coal, as much as one foot thick, lies between the underclay and black shale in several wells.

The Shoal Creek limestone is readily recognizable in electric logs by a narrow high peak in the normal resistivity curve and a high negative self-potential. A re-entrant in the normal resistivity curve is commonly shown in the position of the black shale and underlying underclay which represents an additional feature in the recognition of the Shoal Creek pattern. At some drill holes in the cut-out areas the electric logs indicate that a locally developed sandstone, noted above, rests directly on the black shale.

West Franklin Limestone

The West Franklin limestone occurs generally from 180 to 230 feet below the Shoal Creek limestone. The interval between the West Franklin and No. 6 coal bed ranges from 103 to 233 feet. The West Franklin limestone is a less reliable stratigraphic marker than the Shoal Creek limestone because its identification is possible only in electric logs of drill holes in scattered, widely separated areas.

Drill cuttings from areas where the West Franklin limestone cannot be identified in electric logs reveal the presence, at its appropriate position, of a thin limestone or of a marine shale which may contain abundant limestone nodules. The lithologic variability at the West Franklin horizon in Clay County is well illustrated in the two cross-sections (pls. 1 and 2). Despite the limited areal development of the typical West Franklin sequence, the horizon is continuous over most of the county. The lithologic variations represent marginal facies changes along the western border of the main area in which the limestone is characteristically developed.

In the areas of characteristic West Franklin development, the electric logs show the presence of one, rarely of two, well-developed limestone benches. In several drill holes logged by the Coal Division in these areas, the sequence consists of a single upper bench, 6 to 13 feet thick, which is separated by shale from a lower bench only one foot thick. Only the position of the upper bench is distinguishable in the electric logs.

The local presence of a double rather than a single upper bench is indicated by drilling time and by cuttings from wells in the Iola oil pool. A slight drop in the drilling time within the formation, combined with the occurrence of some black shale in hole No. 30 and greenish argillaceous limestone in hole No. 121, suggests that the West Franklin limestone may consist in places of as many as three benches. In drill cuttings the lithology of the limestone is similar throughout and cannot be used to identify the individual benches.

In the drill cuttings the limestones are commonly buff to white, finely crystalline, dense, rarely light brown or gray and more coarsely crystalline, or greenish gray and argillaceous. Fossils, distributed sparingly, consist of calcareous foraminifera, crinoidal skeleton remains, brachiopod fragments, and gastropods.

The interbedded shales are variable in lithology and range from 2 to 10 feet in

thickness. The shales are commonly variegated green, red, and orange; they are commonly calcareous and resemble in physical appearance typical underclays. In the cuttings from one well, limestone nodules were found in the shale, and both the shale and the limestone nodules contain marine fossils. In one of the control drill holes (No. 121) in the Iola oil pool, the interbedded shale is dark gray to black, noncalcareous and nonfossiliferous.

The lithologic sequence underneath the limestones is also variable. It consists either of marine variegated shales, which are dominantly red and contain occasional limestone nodules, or of gray noncalcareous shales. In drill hole No. 25 the variegated shale underlying a single limestone bench was found to be 40 feet thick. A thin coal bed capped by black sheety shale occurs sporadically about 6 feet below the limestone where the variegated shales are absent.

The West Franklin limestone is commonly overlain by a prominent sandstone of variable thickness (pls. 1 and 2). In a drill hole in the Bible Grove oil pool (No. 402) where the sandstone is thin, a coal streak capped by a marine fossiliferous shale and a limestone stringer occur 30 feet above the West Franklin limestone. In the Krohn-Smith No. 1 well (No. 377, sec. 10, T. 4 N., R. 5 E.), one foot of black shale and coal underlain by a streak of underclay were encountered 11 feet above the West Franklin horizon. These are the only records in Clay County of a coal bed that may represent the Ditney bed.

Outside the area of prominent limestone development, the West Franklin is represented by strata varying from a single thin limestone bed to calcareous shales. In holes located marginally to the prominently developed limestones, a single one-foot bench of dark gray to grayish brown argillaceous limestone is commonly present. In places this limestone is capped by variegated shales up to 35 feet thick. With increasing distance from the areas of recognizable West Franklin, the limestone was found to be represented more and more commonly by light green and gray, red and purple calcareous shales with thin interbedded limestone stringers or limestone nodules. The limestones are buff to light gray, finely crystalline, dense, having the usual lithology of the West Franklin limestone. In some drill holes the shales and limestone nodules are fairly fossiliferous, containing calcareous foraminifera, crinoidal remains, bryozoa and ostracods. The shale zones range from 5 to 25 feet in thickness.

In its extreme marginal aspect, the West Franklin limestone is thought to consist either of a localized calcareous shale zone (as encountered in some drill holes) or a marine calcareous caprock of a thin coal bed which in other holes occurs at the stratigraphic position of the West Franklin. This interpretation has been tentatively adopted in the north-south cross-section through the western part of the county (pl. 1), but needs further corroboration. In order to work out the trends of lateral facies changes, it will be necessary to carry out a systematic study of all available sample sets from wells in the areas where the West Franklin cannot be identified in the electric logs.

Where well-developed, the limestone benches are identified in electric logs by a high peak in the normal resistivity curve and a moderately high negative self-potential. For the West Franklin, the self-potential negative peak is commonly slightly less than that of the Shoal Creek limestone. An unusually high negative self-potential is shown, however, in most of the electric logs of drill holes in T. 5 N., R. 7 E., and T. 5 N., R. 8 E. Had the drill cuttings not been studied the limestone benches in these townships might have been incorrectly identified as calcareous sandstones (pl. 2, Nos. 165, 402, 139).

"No. 7" Coal Bed

"No. 7" coal bed forms the lowest key bed in the McLeansboro group and is a persistent stratigraphic marker throughout the county. The bed lies from 796 to 1096 feet below the surface. The interval between "No. 7" and No. 6 coal beds ranges from 20 to 50 feet, being least along the northwestern border of the county and widening progressively to the south (pls.

1 and 2). Drilling-time logs and sample studies indicate that the coal bed and overlying black sheety shale combined are from 1 to 6 feet thick. The drilling time as a rule shows no appreciable change as a basis for estimating the shale and coal-bed ratio. In only one hole (No. 108) did the drilling time provide a satisfactory basis for separating the two strata, to show a coal-bed thickness of 2 feet.

The beds between the West Franklin limestone and "No. 7" coal bed range from 80 to 180 feet in thickness; they consist predominantly of shale and subordinately of interbedded siltstones and sandstones. Coal beds are usually absent. In a single well logged by the Coal Division (No. 495) a thin plant-bearing shale with coal partings and an underclay were noted 46 feet above "No. 7" coal bed.

Absence of a caprock limestone is a usual characteristic of the succession above "No. 7" coal bed in this county.

In electric logs the position of "No. 7" coal bed is commonly indicated by a small but abrupt increase in resistivity as shown in the normal resistivity curve as compared with the overlying low-resistivity shales. Because of its relative thinness, the "No. 7" coal bed is always indicated by a negative deflection of the third resistivity curve. A negative self-potential peak is common. For many holes in which the coal and black shale are less than 18 inches thick, the electric logs show a negative peak in the normal resistivity curve. This bed is tentatively correlated with the Danville (No. 7) coal bed.

No. 6 Coal Bed

Herrin (No. 6) coal bed forms the youngest key bed of the Carbondale group. It lies from 816 to 1143 feet below the surface in Clay County. Because of its relative ease of identification and commercial importance, No. 6 coal bed has been used as a principal stratigraphic marker in most of the previous stratigraphic and structural studies of the Pennsylvanian deposits in the Illinois basin. It also forms the datum plane for reference to other key beds in the overlying and underlying Pennsylvanian strata.

No. 6 coal bed is widespread in Clay County except in T. 5 N., R. 5 E., where it is almost wholly absent. The two control drill holes in this township encountered in one well a thin streak of black shale less than one foot thick, and in the other a streak of coal probably 6 inches thick. Electric logs indicate the sporadic development of black shale and coal from less than 18 inches up to 4 feet thick in this area. The position of the horizon throughout the township can be determined, however, from the position of the persistent Herrin limestone, the base of this limestone being used as the datum plane in the structure map of No. 6 coal bed (pl. 3) in the township.

Because No. 6 coal bed forms the principal datum plane for reference to other key beds, the evidence on which its identification is based is briefly summarized. Control was established by matching the logs secured and compiled by the Coal Division in southern Clay County with those of northern Wayne County, where the horizon had been definitely identified[4] by subsurface tracing from the southern Illinois mining districts. Furthermore, the examination[5] of the microspore assemblages found in coal cuttings from two drill holes (Nos. 377 and 30) definitely identified Nos. "7", 5A, and 5 coal beds. The spore assemblage from a thin coal bed thought to be No. 6 in sec. 10, T. 4 N., R. 5 E. (No. 377), although not quite characteristic, was nevertheless thought best referable to No. 6 coal. The stratigraphic position of this coal bed with reference to "No. 7" above and Nos. 5A and 5 coal beds below is in agreement with the interpretation adopted. This correlation substantiates the interpretation that No. 6 coal bed is cut out in most of T. 5 N., R. 5 E., and is thinly developed in a large part of the adjacent township to the south (T. 4 N., R. 5 E.) (fig. 7).

In all of the control drill holes situated outside the cut-out area, the coal is overlain by black shale. In the few holes in which the drilling time permitted separation of

[4] Simon, Paul K., et al. Rept. Inv. 93.
[5] By R. M. Kosanke.

the two strata, the thickness of the coal bed ranged from 1 foot to 4½ feet. In others, the combined thickness of coal and roof shale ranges from 2 to 8 feet.

In electric logs the coal bed thickness was estimated in the following way: If the caprock limestone was distinguishable by a separate peak (pls. 1 and 2) in the normal resistivity and self-potential curves, the total thickness indicated by the single peak immediately below was divided equally between the roof shale and the coal bed. If the pattern consisted of a single peak across the positions of both the caprock and the coal bed in normal and "third" resistivity curves and also in the self-potential curve, the thickness indicated by the peak was equally divided between the limestone and the coal bed. This procedure seemed generally justifiable, as it was found in the control drill holes that an undifferentiated electric pattern normally marked either the absence of the caprock or its presence as only a thin layer not more than one foot thick. The thicknesses obtained from electric logs by this method are roughly similar to those determined in the nearest control drill holes.

The Herrin limestone, which forms the caprock of the coal, is widely distributed but discontinuous. It ranges in thickness from 1 to 5 feet. As shown in drill cuttings the lithology is quite variable. The limestone is brown, brownish gray to dark gray, rarely buff or black, slightly granular, commonly argillaceous, carbonaceous, and slightly pyritic. Glauconite is rarely present. Fossils, occasionally pyritized, occur abundantly in the cuttings and consist of fusulines, brachiopods including productids, and crinoidal skeleton elements.

The roof shale of the coal bed is commonly dark gray to black, pyritic and sparingly fossiliferous at the top, and becomes black and sheety immediately above the coal.

Underclay is always present beneath the coal bed and is from 2 to 5 feet thick. The underclays are medium to light gray, slip-fractured, slightly pyritic, and are commonly calcareous near the base. Carbonaceous plant fragments of the stigmaria type are occasionally present. The underclays commonly grade downward into greenish-gray clay, shale, or gray calcareous siltstones.

An underclay limestone is rarely developed at the base of the underclay; where present it consists of one to 2 feet of light gray dense nonfossiliferous limestone.

The patterns by which coal No. 6 is determined in electric logs are the same as those described in the Wayne County report.[6]

Black shale and a thin coal bed up to 2 feet thick rest locally on the Herrin limestone. In one control well (No. 402) the coal is capped by 2 feet of brown finely crystalline fossiliferous limestone which carries fusulines and is underlain by a thin streak of underclay. This sporadic coal lies at the position of the Jamestown coal of southwestern Illinois.[7]

Harrisburg (No. 5) Coal Bed

Harrisburg (No. 5) coal bed is widespread in Clay County. Its identification is definite in practically all electric logs so that it can be considered as the most reliable key horizon of the Pennsylvanian strata in the area studied, being preferred even to No. 6 coal bed in this respect. The No. 5 coal bed lies from 855 to 1184 feet below the surface; it is from 34 to 74 feet below No. 6 bed, and is commonly encountered between 38 and 65 feet below No. 6.

A black roof shale was penetrated in all control wells. The drilling-time logs show that the combined thickness of the coal bed and roof shale ranges from 2 to 7 feet. It was not possible to differentiate the coal thickness except in two control wells where it is at least 2 or 3 feet thick (table 4).

The caprock of No. 5 coal bed, the St. David limestone, is only locally developed. Where present it is from 2 to 8 feet thick. In drill cuttings the limestone is dark brown, rarely dark gray, granular, slightly argillaceous, pyritic, and glauconitic. In the five control wells studied by the writer the St. David limestone was found to be glauconitic, which makes it appear that in Clay County this lithologic feature may aid

[6] Sims, Paul K. et al, op. cit., p. 29.
[7] Bell, A. H., Ball, C., and McCabe, L., Geology of the Pinckneyville and Jamestown areas, Perry County, Illinois: Illinois Geol. Survey, Ill. Pet. 19, p. 3, 1931.

to distinguish the caprock of No. 5 coal bed from the Herrin limestone, which was found to be slightly glauconitic in only one of the wells. Fossils, fairly abundant in the cuttings, consist of calcareous foraminifera, including fusulines, crinoidal remains, brachiopods, and ostracods.

The roof shale is black, sheety, and pyritic. The upper part of the roof shale is locally calcareous, and occasionally pyritic, or glauconitic, and commonly carries fusulines.

The coal bed is underlain by 1 to 4 feet of underclay, which is light gray to greenish gray, commonly calcareous, partly pyritic, and contains siderite in the form of individual spherules or spherulitic aggregates. An underclay limestone is occasionally developed either in the form of nodules or as a solid bed. The limestone is buff to white, dense, and reaches a thickness of 2 feet. Ostracods were observed in some of the limestone cuttings.

The electric log pattern of No. 5 coal bed is characterized by a fairly high peak in the normal resistivity curve, a reverse peak in the third resistivity curve, and a fairly high negative self-potential. The presence of the caprock is commonly indicated by a more pronounced peak in the normal-resistivity curve which is separated either by a reverse peak or by only a slight negative indentation from the coal bed peak (pls. 1 and 2).

OTHER PROMINENT BEDS

In the control drill holes, particularly those which penetrated all Pennsylvanian deposits, a number of coal beds or coal-bed markers and some limestones were encountered in addition to the prominent key beds. As a rule they are thin, ranging from 6 inches to 2 feet thick, and rarely as thick as the prominent stratigraphic markers. Most of these thinly developed beds occur either above the Shoal Creek limestone in the McLeansboro group or below "No. 2" coal bed in the Tradewater and probably uppermost Caseyville groups.

In order to determine their areal persistence and identification in electric logs, two cross-sections were prepared for those parts of the county where either the entire or the greater part of Pennsylvanian sequence had been logged and samples had been studied. The drill holes represented in the north-south cross-section (pl. 1) are located in the western tiers of townships, T. 5 N., R. 5 E., to T. 2 N., R. 6 E., and those in the east-west cross-section (pl. 2) are in the northern tiers of townships, T. 5 N., R. 5 E., to T. 5 N., R. 7 E. The control drill hole Shell-Moss No. 5 in sec. 14, T. 5 N., R. 5 E. (No. 121) is common to both diagrams.

Five closely spaced control drill holes, extending with one exception through the entire local McLeansboro succession, permit the tracing from north to south (pl. 1) of coal beds above the Millersville (?) limestone. The correlations in the east-west cross-section (pl. 2) are based on the logs of two control drill holes (Nos. 121, 402), of which only one included the upper beds of the local McLeansboro succession (No. 402). For this reason no attempt has been made to correlate beds higher than the Millersville (?) limestone in this cross-section. Although the correlations shown in the two cross-sections are only tentative, they indicate the possibilities of a better stratigraphic analysis using the sort of information made available as a result of these investigations.

The following data on the stratigraphic position, lithologic character, thicknesses, and distribution of the beds discussed are in general obtained from the records upon which the cross-sections are based.

McLeansboro Group

1.) The Omega limestone, found in scattered exposures in northwestern Clay County, has previously been used as a structure datum.[8] It has been penetrated in a single control drill hole in sec. 10, T. 4 N., R. 5 E. (No. 377), where logging was started at a depth of 70 feet below the surface. According to the driller, a 5-foot limestone was encountered at a depth of

[8] Weller, J. M., and Bell, A. H., The geology and oil and gas possibilities of parts of Marion and Clay counties: Illinois Geol. Survey Rept. Inv. 40, pp. 29-32, 1937.

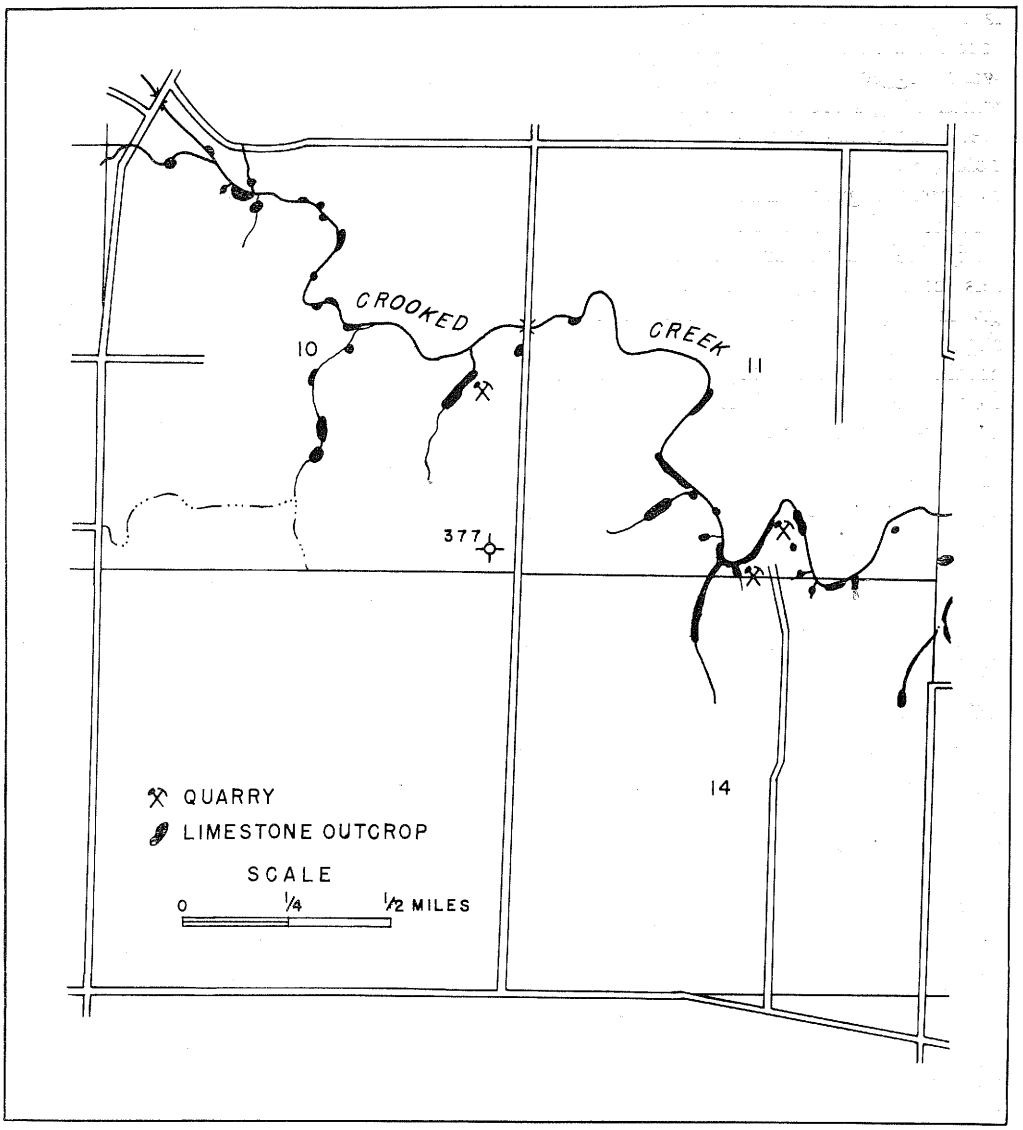


FIG. 2.—Distribution of outcrops of Omega limestone in secs. 10, 11, 14, T. 4 N., R. 5 E., Clay County, in relation to position of drill hole No. 377. (From Illinois Geol. Survey Rept. Inv. 65.)

60 feet. The character of the cuttings from the limestone and its position in the drill hole point to identity with the Omega limestone, which is exposed in numerous outcrops along Crooked Creek and its tributaries with a radius of 1/3 to 1/2 mile[9] (fig. 2). The Omega limestone in this drill hole lies 552 feet above the Shoal Creek limestone and 875 feet above No. 6 coal bed.

[9] Grogan, R. M., and Lamar, J. E., Agricultural limestone resources of Cumberland, Effingham, Clay, Richland, and Jasper counties: Illinois Geol. Survey Rept. Inv. 65, pp. 26-32, fig. 6, 1940.

2.) The highest recognizable group of strata in the McLeansboro group consists of a thin coal bed, an underclay, and a prominent underclay limestone, which occur persistently in all but the most northern of the drill holes in the north-south cross-section (pl. 1) at a position from 448 to 472 feet above the Shoal Creek limestone. However, this group of strata, if present, cannot be identified in the east-west cross-section.

The coal bed ranges from a few inches to 2 feet in thickness and is commonly over-

lain by black sheety roof shale less than a foot thick in three out of the four control wells logged. The underclay limestone, which ranges from 3 to 7 feet thick, immediately underlies the coal bed except at hole (No. 377) where 4 feet of light gray to greenish gray calcareous underclay intervenes. The limestone is light gray to buff, finely crystalline to sublithographic, less commonly light brown, or mottled greenish gray from clay inclusions, and slightly granular. Ostracods, which according to C. L. Cooper are freshwater forms, are sparingly distributed through the cuttings. In one control well (No. 378) the coal bed is capped by a marine limestone that is 2 feet thick, buff to light brown, mottled greenish gray, dense, argillaceous, and contains marine invertebrate fossils.

3.) A thin coal bed, 75 to 96 feet below the prominent underclay limestone described in paragraph 2, is present in the control drill holes of the north-south cross-section (pl. 1). The coal bed is less than a foot thick and, like the bed above, is capped by black sheety shale up to 1 foot thick. In one of the control wells (No. 403) the coal bed appears to be absent but black roof shale is present. An underclay is sporadically developed and is light gray to greenish gray, calcareous, pyritic, and slightly silty.

In the Kenner oil pool (pl. 1, Nos. 495, 398), correlation from well to well is uncertain because of the local presence in this general zone of three coal beds lying about 10 feet apart. The upper bed is represented by 1 foot of bony coal and black shale, the lower one by 2 feet of coal with a thin light gray silty clay shale underneath, and the intermediate bed has the appearance of the single bed usually present in this zone. The close spacing, limited areal extent, and the absence of evidence of intervening marine deposits suggest local splitting of a single bed.

4.) Also in the same north-south section (pl. 1) a coal bed was encountered in drill holes from 56 to 78 feet below the bed described in paragraph 3. This bed ranges from 1 to 2 feet in thickness and is also commonly overlain by 1 foot of black sheety roof shale. A marine impure caprock limestone and an underclay were noted in one drill hole (No. 378). The caprock consisted of 3½ feet of dark gray to black calcareous pyritic and glauconitic shale in which densely crowded fossil aggregates form limestone lenses. The fossils include crinoidal skeleton elements and brachiopods. The underclay is gray, soft, and smooth, and apparently less than 2 feet thick.

A coal bed 2 to 2½ feet thick with black roof shale was found from 41 to 44 feet above the last described coal horizon in drill holes Nos. 377, 378, T. 4 N., R. 5 E., but not elsewhere. In one of the holes (No. 378) the coal bed is from 18 inches to 2 feet thick and is underlain by light to dark gray slip-fractured underclay which contains carbonaceous plant rootlets.

In the three southernmost wells (Nos. 495, 398, 403) of the north-south cross-section (pl. 1), a Cordaites-shale 1 foot thick, with coaly laminae and coal streaks, which lies from 14 to 19 feet below the main coal horizon described in this section, possibly represents a coal bed.

5.) The next lower horizon that can usually be recognized is represented by beds lying below the coal bed described in paragraph 4. The larger interval is believed to be due to the local presence of a thick relatively non-compactable sandstone in the intervening strata. In four logs (Nos. 377, 378, 495, 403) of the north-south cross-section (pl. 1), 6 inches to 1 foot of coal is present, the bed being capped in two wells by a black shale from 6 inches to 2 feet in thickness. In one of the control wells (No. 495) the sandstone overlying the coal bed is calcareous, conglomeratic in the basal five feet, and contains marine fossils, as is indicated by the presence of crinoidal columnals and articulate brachiopods. The pebbles of the conglomerate consist of buff dense fossiliferous limestone, green clay, and siderite. In another drill hole (No. 378) the coal bed is underlain by a limestone two feet thick, which is buff to gray, earthy, and contains ostracods of the fresh-water type. In the southernmost well (No. 403) a buff finely crystalline fossiliferous limestone 3 feet thick is be-

lieved to represent this general stratigraphic position.

6.) The highest stratigraphic marker which was generally penetrated in the control drill holes of both cross-sections is a thin limestone bed which is correlated with some doubt as Millersville.[10] In the drill holes of the north-south cross-section (pl. 1), this limestone is encountered between 16 and 33 feet below the coal horizon described in the preceding paragraph. In the control drill hole No. 377 in sec. 10, T. 4 N., R. 5 E., the Millersville (?) limestone occurs 300 feet below the Omega limestone. In general the interval between the Millersville (?) limestone and the Shoal Creek limestone ranges between 189 and 253 feet. The average interval in the north-south cross-section (pl. 1) is 250 feet; in the east-west section (pl. 2) the interval decreases progressively although irregularly eastward from 250 to 189 feet.

The limestone is 2 to 6 feet thick in the northwest part of the county, and it produces a moderately prominent peak in the normal-resistivity curve in electric logs. It cannot be traced eastward in electric logs beyond the center of T. 5 N., R. 6 E., and in the next tier of townships south to beyond the northern half of T. 4 N., R. 5 E. Eastward the limestone becomes progressively thinner, and its position in the electric logs is probably obscured by overlying or underlying sandstones. Studies of cuttings from the closely spaced control wells of the north-south cross-section reveal a gradual southward thinning of the bed.

In the two control wells in T. 4 N., R. 5 E. (Nos. 378 and 377) the Millersville (?) limestone is represented by a bed 2 feet thick in one and 6 feet thick in the other, and is overlain by 18 and 10 feet, respectively, of marine fossiliferous shale with sideritic and calcareous concretions. This variation in thickness appears to represent a southward thinning of the limestone as a result of a lateral facies change, the greater part of the limestone bench being replaced by shale. The lateral transition of prominently developed, but areally limited, limestones (such as the Millersville (9) and West Franklin) into shale is a common phenomenon among Pennsylvanian limestones. A typical example of such a lateral facies change can be seen in outcrops of the LaSalle limestone and has been described in detail by G. H. Cady.[11] In the wells to the south and east of the shaly transition zone the Millersville (?) limestone is represented by a limestone bed 2 to 3 feet thick.

In drill cuttings the limestone is commonly gray to buff, occasionally light brown, and finely crystalline. Where the limestone is thin, it was found to be ferruginous, sandy or slightly argillaceous, and pyritic. Fossils are common and consist of calcareous foraminifera, corals, crinoids, and ostracods. The overlying shale is light to dark gray, calcareous, micaceous, and has commonly the consistency of a clay shale. Fossils, abundant in the shale, include crinoids, fenestelloid bryozoa, minute gastropods, and ostracods.

A coal bed 1 foot thick was found beneath the limestone in one of the control wells (No. 378).

7.) A coal bed of variable thickness, lying 34 to 53 feet below the Millersville (?) limestone, appears in both cross-sections. The interval to the limestone is quite irregular in the northern part of the county (pl. 2), ranging from 16 to 45 feet, but widens progressively to the south from 34 to 53 feet on the west side of the county (pl. 1). The coal bed is always capped by black shale. The combined thicknesses of the coal and black shale range from less than 1 foot to 30 inches. Underclay, locally present beneath the coal bed, consists of 2 to 3 feet of light gray micaceous clay which is locally calcareous and contains sideritic spherules. In one of the control wells (No. 377) a marine fossiliferous limestone 1 foot thick immediately underlies the underclay. The limestone cuttings are light gray to buff, finely crystalline, and glauconitic. A caprock 1 foot thick was encountered in one well (No. 378). The limestone is dark

[10] Taylor, E. F., and Cady, G. H., Structure of the Millersville limestone in the north part of the Illinois basin: Illinois Geol. Survey Rept. Inv. 93, p. 22, 1944.

[11] Cady, G. H., Geology and mineral resources of the Hennepin and LaSalle quadrangles: Illinois Geol. Survey Bull. 37, p. 67, 1919.

gray, very argillaceous, and contains crinoidal skeleton elements and bryozoa in abundance. These beds display no consistent pattern on electric logs.

8.) In the Ohio-Webster No. 3 drill hole (sec. 3, T. 5 N., R. 7 E., No. 402) a caprock limestone, marine shale, black shale, coal bed, and underclay were found in the order named beginning 23 feet below the coal bed described in paragraph 7. These beds can be identified in all electric logs represented in the east-west cross-section for they produce (at the appropriate position) a pronounced peak opposed by a small re-entrant in the normal resistivity curve (pl. 2).

The caprock consists of 3 feet of limestone which in the upper part is buff to brown, finely crystalline, and highly fossiliferous. The fossils consist of encrusting calcareous algae and crinoidal skeleton elements which are crowded together in coquina-like fashion. The basal part of the limestone is gray to greenish gray, argillaceous, and includes bryozoa in addition to algae and crinoids. The limestone is underlain by 3 feet of gray, calcareous, and very fossiliferous shale that contains trilobite fragments and crinoidal remains. This is followed below by 3 feet of dark gray to black sheety roof shale with pyritic trails and ganoid scales, which is underlain by 2 to 3 feet of bony and then clean coal. The coal bed is underlain by 2 feet of medium to dark gray calcareous micaceous and pyritic clay shale that contains medium to dark gray pyritic limestone nodules. In the southernmost well of the north-south cross-section (pl. 1), in which this zone was identified (No. 377) a total of less than 18 inches of black shale and coal was logged. The black shale and coal bed can be traced in the north-south cross-section southward to the center of T. 4 N., R. 5 E. (pl. 1, Nos. 121, 377). It may be represented in the Kenner oil pool wells (pl. 1, Nos. 495, 398) by a shale 2 feet thick with coaly plant remains found 38 feet below the coal horizon described in paragraph 7.

9.) A coal bed with overlying black shale is widespread throughout the areas covered by the two cross-sections (pls. 1 and 2), lying generally between 60 to 80 feet below the bed described in paragraph 8, and 130-140 feet below the Millersville (?) limestone. In the east-west cross-section the interval decreases to the east. In the north-south cross-section the interval to the next coal bed above (Paragraph 8) widens to the south in the area underlain by the overlying coal zone, as far as the coal zone extends. The black shale and coal bed together range in thickness from 1 to 3 feet. In one well (No. 495), however, the combined thickness of the coal and roof shale amounts to 4 feet, of which 2 feet appear to be coal, judged on the basis of the drilling time. A thin caprock limestone 1 foot thick is locally present, being encountered in three of the six control wells. The limestone is buff, brown or gray, finely crystalline, and locally argillaceous. Fossils, noted in the cuttings from all three drill holes, consist of calcareous foraminifera, corals, brachiopods, and ostracods. The coal bed is commonly underlain by an underclay or clay shale which is from 2 to 10 feet thick, gray to greenish gray, locally calcareous, and occasionally contains limestone nodules and siderite spherules.

A limestone 1 to 6 feet thick is found in three of the drill holes (Nos. 377, 495, 403) of the north-south cross-section (pl. 1) from 10 to 16 feet below the coal. The limestone is buff, light gray to greenish gray, rarely orange, finely granular in some cuttings and coarsely crystalline in others, and occasionally argillaceous. The lithologic character of the cuttings studied by the writer from one of the wells is that of underclay limestones, an identification substantiated by the absence of fossils.

10.) A thin coal bed occurs from 36 to 66 feet below the coal bed described above (paragraph 9). In the east-west cross-section (pl. 2), the interval widens progressively to the west from 36 to 52 feet, and in the north-south cross-section (pl. 1), it increases quite irregularly to the south from 52 to 66 feet. This coal bed is better identified as the first one above the Shoal Creek limestone, from which it is separated by an interval ranging from 43 to 65 feet.

In four of the six control drill holes, the coal and black roof shale have a combined thickness of 1 foot. Of the two remaining drill holes, 1 foot of coal and 1 foot of black shale were logged in one (No. 403), and in the other (No. 402) the combined thickness of the coal and black shale amounted to 3 feet; the thickness of the coal bed alone could not be determined.

Underclay ranging from 1 to 10 feet thick commonly underlies the coal bed. The underclay is light gray, greenish gray and green, micaceous, and although rarely calcareous locally contains limestone nodules. In one drill hole (No. 377) the underclay is separated from the coal by 10 feet of gray shale that is very micaceous and slightly carbonaceous. In the electric logs of the east-west cross-section (pl. 2) a narrow unusually high peak in the self-potential curve commonly marks the position of the coal bed. The identification of this coal bed in the three southernmost drill holes of the north-south cross-section (pl. 1) is somewhat uncertain because of the presence in these holes of two coal beds about 14 feet apart, each 1 foot thick and each with an associated black shale, in what is believed to be the general correlated zone. The correlation indicated (pl. 1) is the one that seems most probable. This occurrence and the presence of a black shale and coal bed 1 foot thick underlain by a foot of underclay 18 feet above the correlated horizon in one of the control drill holes to the north (pl. 1, No. 377) indicate that there are actually two beds, one of which is discontinuous.

11.) The first distinctive strata below the Shoal Creek limestone consist of a thin black shale and an underlying thin coal bed which are present in most of the control drill holes. These beds, lying between the Shoal Creek and the West Franklin limestones, can be recognized in all drill holes in both cross-sections (pls. 1 and 2). The interval between the Shoal Creek and the black shale ranges from 33 to 82 feet. The interval widens with much irregularity to the east from 33 to 73 feet (pl. 2) but remains essentially uniform between 35 and 40 feet from north to south (pl. 1). The cuttings from five of the six control holes consisted of black sheety shale that drilling time indicated is 1 to 2 feet thick. In all but one well (No. 121) a coal bed, believed to be less than a foot in thickness, was penetrated. In this hole, coal partings through two feet of shale mark the stratigraphic position of this coal bed. A gray to greenish-gray slip-fractured underclay, 2 feet thick, commonly underlies the coal bed. In one drill hole (No. 402) the underclay was found to be calcareous and 8 feet thick. In the same well, a caprock limestone 1 foot thick overlies the black shale. The limestone is brown to brownish gray, finely crystalline, argillaceous, and fossiliferous.

12.) The next traceable bed consists of a black shale zone rarely as much as 2 feet thick which lies from 19 to 40 feet below the black shale described in paragraph 11. This shale zone, although less widespread than some of those described, can be recognized in logs in the east-west cross-section (pl. 2) as far east as the east line of T. 5 N., R. 6 E. (No. 133), and in logs in the north-south cross-section (pl. 1) as far south as the north half of T. 4 N., R 5 E. It then becomes discontinuous, as is shown by its local appearance in two additional control wells (Nos. 495, 403) in T. 3 N., R. 6 E., and T. 2 N., R. 6 E. A coal bed 1 foot thick is found at the position in one of the control wells (No. 121).

Along the west border of the county south of T. 5 N. a black shale, locally with a thin coal bed 6 inches in maximum thickness, lies between 20 and 28 feet below the black shale just described. This lower shale and coal are more continuous than the upper black shale in this part of the county. The two range from 6 inches to 2 feet in thickness and lie 57-64 feet below the black shale described in paragraph 11. Coal was found at this position in control wells Nos. 378 and 495. A light gray and greenish underclay or clay shale with sideritic granules and aggregates is commonly developed (Nos. 377, 378 and 495). Beneath these beds and continuing to or nearly to the West Franklin limestone is generally a massive widespread sandstone.

13.) "Bankston Fork" limestone. A limestone averaging 2 feet in thickness is commonly encountered between "No. 7" coal and the Herrin limestone; where the Jamestown coal bed is developed, it lies between the Jamestown and "No. 7" coal beds. The limestone zone is discontinuous but occurs in widely scattered drill holes throughout the area studied. This limestone is thought to be equivalent to the Bankston Fork, since "No. 7" coal bed has been tentatively correlated with the Cutler coal bed of southwestern Illinois. The interval between the "Bankston Fork" limestone and "No. 7" coal bed ranges from 3 to 14 feet. The limestone lies from 8 to 28 feet above coal No. 6. This interval widens locally, owing to the presence of a lenticular sandstone, thought to represent the Anvil Rock sandstone of southern Illinois.

In well cuttings the limestone is buff, less commonly light gray to brown, finely crystalline or slightly granular, and contains calcareous foraminifera including fusulines, brachiopods, and ostracods.

Carbondale Group

1.) No. 5A coal bed is commonly encountered between coal No. 6 and coal No. 5. The combined thickness of the coal and black roof shale ranges between 1 and 2 feet. A thin light to greenish-gray underclay is always present below the coal. In the control drill hole No. 377 (sec. 10, T. 4 W., R. 5 E.) a split of the No. 5A coal bed is possibly represented by two thin beds separated by 5 feet of light gray shale (pl. 1). The upper bed consists of undifferentiated coal and black shale roof, 1 foot thick, which rests on underclay 2 feet thick. The lower bed consists of a coal bed, 1 foot thick, accompanied by overlying black shale 1 foot thick and underclay 3 feet thick. The underclay rests immediately on top of the St. David limestone. This is the only drill hole where two beds have been found at this position. The relative position of No. 5A coal bed varies considerably, ranging from 2 to 20 feet above No. 5. Where the coal bed is close to the top of the St. David limestone, the sequence from No. 5A through No. 5 coal bed closely resembles the succession from the Jamestown through No. 6 coal bed. In T. 2 N., R. 6 E., the interval between No. 5A and No. 5 coal beds reaches 42 feet, part of which is represented by a lenticular sandstone 25 feet thick. In the Krohn-King No. 1 well (sec. 20, T. 4 N., R. 5 E., No. 378) the No. 5A coal bed is capped by dark gray calcareous shale containing glauconite pseudomorphs of foraminifera, crinoid columnals, and ostracods.

2.) Sixty to 85 feet below No. 5 coal bed a thin coal bed, "No. 4," was encountered in all six control wells of the two cross-sections (pls. 1, 2). The widespread extent of this coal bed in Clay County is further indicated by its presence in the eight additional control drill holes which have been logged to sufficient depth. In general the interval between No. 5 and "No. 4" coal beds ranges from 60 to 90 feet. Black shale, 6 inches to 2 feet thick, is found in all control wells; the shale is underlain by a coal bed ranging from 6 to 18 inches thick in 12 of the 15 drill holes logged. In drill hole No. 261 (sec. 3, T. 3 N., R. 7 E.), drilling time indicated the presence of 2½ feet of coal. One to 2 feet of white to gray underclay, occasionally sideritic, calcareous, and slightly pyritic, is commonly present. In control drill hole No. 402, the underclay is 8 feet thick and is underlain by 2 feet of buff, finely crystalline, slightly pyritic, underclay limestone. An underclay limestone was noted in two additional control wells. A caprock limestone is unusual, but in drill holes Nos. 495 and 199 such a limestone is 1 to 2 feet thick. The limestone cuttings from drill hole No. 495 are brown, fine-grained, slightly ferruginous, glauconitic, and contain calcareous foraminifera, crinoidal skeleton elements, and brachiopods.

This coal bed is correlated with the Summum (No. 4) coal bed of western Illinois[12] only because its general stratigraphic position with reference to No. 5 coal bed is similar. It is the same as the "No. 4" coal bed described in accompanying

[12] Wanless, H. R., Pennsylvanian cycles in western Illinois: Illinois Geol. Survey Bull. 60, pp. 82-184, 1931.

reports on the subsurface Pennsylvanian succession in Gallatin, Hamilton, Edwards, and Richland counties. Where the lithologic sequence includes limestone and black shale and exceeds in thickness the electrode spacing, the normal resistivity curve shows the typical double-peak electric log pattern that is characteristic of the "No. 4" coal bed in Gallatin County (see Gallatin County report).

"No. 4" coal bed cannot be considered as a satisfactory key bed in Clay County because it cannot always be identified in electric logs.

3.) A thin coal bed accompanied by 1 to 2 feet of overlying black shale was penetrated in four control wells, and 1 foot of black shale in the two remaining control wells in a zone 45 to 95 feet below "No. 4" coal bed, and from 110 to 150 feet below No. 5 bed. This coal bed, where present, is not known to be more than 1 foot thick, except in control drill hole No. 109 where the coal bed and roof shale combined were 4 feet thick. One to 2 feet of gray (rarely greenish gray) and calcareous underclay commonly underlie the coal bed. Because the coal bed as a rule is less than 18 inches or only black shale is present, the horizon cannot be satisfactorily identified in many electric logs. In logs of drill holes where the coal bed is known to be present the electric log pattern shows a negative peak in the normal resistivity curve and a slight negative peak in the self-potential curve.

4.) A thin coal bed or black shale or both, which can be traced across both cross-sections (pls. 1 and 2), occurs from 28 to 41 feet below the coal bed described above (paragraph 3). The interval between this zone and No. 5 coal bed ranges from 147 to 188 feet, widening progressively from the northwest to the south and east. In three of the six control drill holes (Nos. 377, 495, 403), the position of the zone is indicated only by 1 to 2 feet of black roof shale. In the three remaining drill holes, pyritic coal partings were found in the black shale of one drill hole (No. 378) and a bed of coal less than 6 inches thick beneath the black shale in the two other holes (Nos. 121, 402). Light to medium gray underclay, 1 foot thick, occurs sporadically. There is some uncertainty as to the accuracy of the correlation of these beds from hole to hole in the western half of the east-west cross-section (pl. 2, Nos. 121 and 134), owing to the apparent presence, as indicated by the electric log of drill hole No. 134 at 1144 feet, of a thin coal or black shale bed 18 feet above the correlated zone.

The stratigraphic relationships of the two last described coal beds which underlie "No. 4," and whether either is "No. 2" coal bed, remain uncertain. Hence these beds at present provide no basis for determining the position of the base of the Carbondale group. The boundary between the Carbondale and Tradewater groups has been established at the base of the Palzo sandstone,[18] but it has not been possible to identify as the Palzo any one of the lenticular sandstones found in this general part of the succession (pls. 1 and 2).

Tradewater-Caseyville Groups

In the strata which intervene between the last described coal horizon and the base of the Pennsylvanian system a total of six to nine coal beds have been logged, nine being the most in any one drill hole (No. 378). Of these, at least seven lie within the upper 200 to 300 feet of this interval. A tentative correlation of these uppermost beds is suggested in the cross-sections (pls. 1 and 2). The correlations are restricted to the individual cross-sections, because the stratigraphic relationship in the single drill hole common to both charts (Shell-Moss No. 5, No. 121) is not fully understood.

The difficulties in matching the prominent beds of the Tradewater and higher Caseyville deposits arise from three causes: 1) The coal beds in places seem to have split into two benches, which may have diverged as much as 9 feet in the wells logged; 2) additional thin coal or black shale beds or both, with or without underclay, may locally appear among the more widespread coal beds, particularly in the upper part of the succession; 3) the strata intervening

[18] Weller, J. M., Henbest, L. G., and Dunbar, C. O., Pennsylvanian fusulinidae of Illinois: Illinois Geol. Survey Bull. 67, pp. 15, 17, 1942.

between the coal beds, particularly the sandstones, vary laterally in lithologic composition and thickness so that they produce variable electric log patterns which fail to establish the position of coal beds.

Some of these beds appear to have good thickness. The total thickness of the roof shale and the coal combined in four of these coal zones is known to range from 3 to 6 feet (Nos. 121, 378, 402) with coal-bed thicknesses which appear to run up to at least 4 feet. As shown in the cross-sections, however, the thickness of these coal beds is irregular and they appear to have the lenticular characteristic of coal beds of these groups elsewhere, particularly in the outcrop areas in the Eastern Interior province. The coal beds may, in short distances, decrease in thickness to less than 2 feet, and their positions may be indicated simply by roof shale or underclay, or they may be split into thin benches.

The locations, thicknesses, and intervals to coal No. 5 of these thicker beds are as follows: In Shell-Moss No. 5 (No. 121), 5 feet of coal and roof shale were logged, of which 4 are probably referable to the coal proper. This bed occurs 227 feet below coal No. 5 at a depth of 1141 feet. At an additional depth of 102 feet, a bed of coal having a black shale roof, with a combined thickness of 4½ feet, was encountered. The black shale is capped by a fusuline bearing limestone 2 feet thick. This coal bed occurs 329 feet below No. 5 coal bed at a depth of 1243 feet.

In Ohio-Webster No. 3 (No. 402), what is regarded as a split coal occurs 202 feet below No. 5 coal bed at a depth of 1268 feet below the surface. The upper and lower benches are each 3 feet thick and are separated by 3 feet of underclay. On the basis of the drilling time there may be only 1 foot of coal in the upper bench and 2 feet of coal in the lower bench. Twenty-seven feet further down in the same drill hole were beds of black shale and coal which together were 4 feet thick, of which 3 feet represents the coal bed on the basis of the drilling time. This bed occurs 229 feet below coal No. 5 at a depth of 1295 feet. At a depth of 1522 feet below the surface, a 3-foot layer of undifferentiated roof shale and coal was logged in the same hole. The interval between this coal bed and coal No. 5 is 456 feet.

The tentative correlations of these thicker coal beds encountered in the two control drill holes (Nos. 121 and 402) of the east-west cross-section are shown in plate 2. The close association of the two coal beds (the upper one at 1118 and 1268 feet respectively in holes Nos. 121 and 402, and the lower one at 1141 and 1295 feet), indicates that these may be the Dekoven and Davis beds. Such a correlation is further supported by the occurrence of a marine fusuline-bearing limestone as the caprock of the next underlying coal bed, which occupies a position similar to that of the Stonefort limestone and coal of southeastern Williamson county.[14] The eastward widening of the interval between coal No. 5 and the coal beds tentatively correlated with the Dekoven and Davis beds conforms to the regional thickening of the Pennsylvanian deposits in this direction.

The coal and black shale zone 4½ feet thick which occurs 329 feet below coal No. 5 in drill hole No. 121 (Shell-Moss No. 5) is tentatively correlated with a 1-foot coal and black shale zone 371 feet below coal No. 5 in drill hole No. 402 (Ohio-Webster No. 3) (pl. 2). The lowermost thick coal logged in drill hole No. 402, 456 feet below coal No. 5, was not reached in the Survey logging of drill hole No. 121. A general decrease in thickness of this coal zone between drill holes Nos. 121 and 402 is indicated, however, by the electric logs of intervening drill holes, which in some cases fail to show a prominent coal-bed peak at the appropriate stratigraphic position.

The only other control drill hole of the north-south cross-section (pl. 1) in which coal beds of important thickness were encountered is No. 378 (Krohn-King No. 1). In this drill hole a split coal bed was logged at a depth of 1265½ feet below the surface and 238 feet below coal No. 5. The upper

[14] Henbest, L. G., Fusulinellas from the Stonefort limestone member of the Tradewater formation: Jour. Paleo., vol. 2, pp. 70-71, 1928.

18-inch band is separated by 1 foot of shale from the lower 4-foot band. The coal and roof shale ratio cannot be determined from variable drilling time log. At an additional depth of 96½ feet (total depth of 1362 feet) 5½ to 6 feet of roof shale and coal were logged, of which 3½ to 4 feet can be assigned to the coal on the basis of the drilling time. This coal bed occurs 336 feet below coal No. 5. Some 86 feet deeper another coal bed was encountered at a depth of 1448 feet. The interval between this coal bed and coal No. 5 amounts to 422 feet. According to the undifferentiated drilling time a combined thickness of 3 to 3½ feet can be assigned to the coal and the roof shale.

The highest of these three coal beds, at 1265½ feet, noted in this drill hole, is tentatively correlated with the "Dekoven" coal of the east-west cross-section (pl. 2). All three coal beds thin laterally or are represented by only black roof shale in the adjoining control wells of the north-south cross-section (pl. 1).

STRUCTURE OF NO. 6 COAL BED

The principal features delineated by the structure map of the No. 6 coal bed (pl. 3) are: (1) a part of the western flank of the Illinois basin; (2) the uneven floor of the deepest part of the Illinois basin.

The western basin flank is shown in the northwestern part of the area by fairly uniform dips to the southeast, and is roughly bounded on the southeast by the —475-foot contour line. On the floor of the deep part of the basin two important structures are shown. One is a north-northeast trending syncline, which is roughly bounded by the —600-foot contour line, and which plunges northeastward into Jasper County. This is the most prominent synclinal structure indicated in the Pennsylvanian beds on the basin floor and is here designated the Bogota-Rinard syncline. The syncline extends from the east-central part of Wayne County across the eastern part of Clay and the bordering part of Richland counties into eastern Jasper County, where it reaches its greatest depth of about 700 feet below sea level in the area of the Bogota oil pool. The other important structure is the Clay City anticlinal belt which parallels the syncline to the southeast. The rise of the coal bed in the southeastern part of the area delineates that part of the western flank of the Clay City anticlinal belt which lies in Clay County. As shown by the regional structure of coal No. 6, this fold forms a prominent plunging anticline that extends from the LaSalle anticline in northeastern Jasper County in a south-southwest direction across the basin floor to about the Cisne oil pool in north-central Wayne County.

The southeastward regional dip of the basin flank and the major trends of the basin floor are modified by numerous minor structures consisting of domes, anticlinal noses, and synclines. The distribution and the axes of the small Xenia, Kenner, and Flora domes and of the large Sailor Springs dome, have a general northeast trend and comprise a secondary minor anticlinal belt of cross folding. The interrupted synclinal basin structures on the north are in general parallel alignment with this belt. Both the anticlinal and synclinal belts appear to transect the Bogota-Rinard syncline.

DIVERGENCE OF PENNSYLVANIAN KEY BEDS

The thickness of the Pennsylvanian deposits in Clay County increases from an average of 1600 feet in the northwestern part of the county to 2050 feet in the southeastern part of the county. These average thicknesses represent only thicknesses where Pennsylvanian deposits overlie lower and middle Kinkaid beds. Thicknesses locally increase to as much as 2165 feet over the troughs in the pre-Pennsylvanian surface. The regional increase in thickness of the Pennsylvanian deposits to the east-southeast is reflected in the divergence of the top and bottom horizons of the intervals mapped.

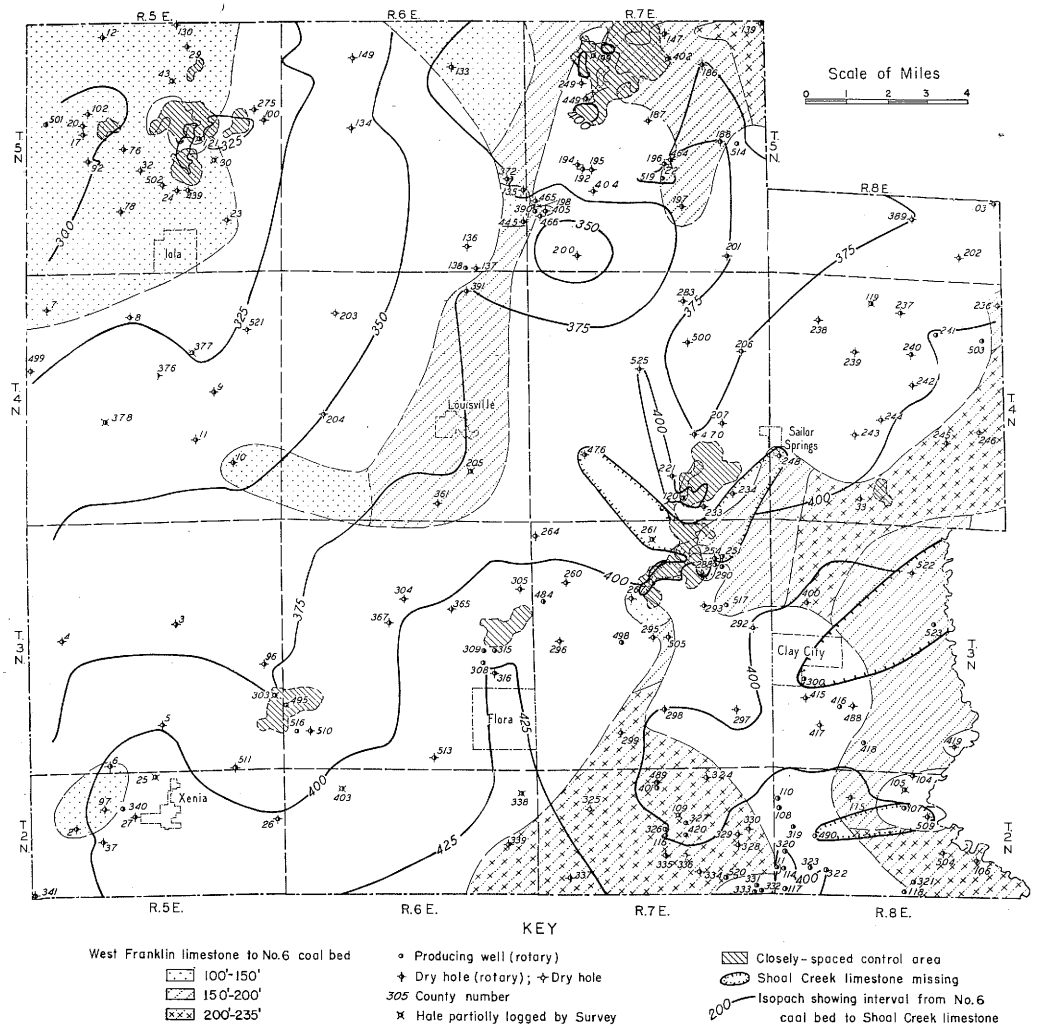


FIG. 3.—Distribution in Clay County of West Franklin limestone where it produces characteristic pattern in electric logs, variations in interval between West Franklin limestone and No. 6 coal bed, and variations in interval between Shoal Creek limestone and No. 6 coal bed.

INTERVAL BETWEEN THE SHOAL CREEK LIMESTONE AND NO. 6 COAL BED

The interval between Shoal Creek limestone and No. 6 coal bed ranges from 283 to 455 feet within the county (fig. 3). It is least in the northwestern part of the county and increases fairly uniformly to the southeast across the basin flank. Within the basin floor area the interval increases irregularly to the southeast, with a maximum interval of 455 feet being recorded near the center of the south line of the county. The interval decreases locally and slightly over the Clay City anticline in the southeastern part of the county. In general the local variation in interval appears to be related to the variations in thickness of a prominent sandstone which overlies the West Franklin limestone.

INTERVAL BETWEEN THE WEST FRANKLIN LIMESTONE AND NO. 6 COAL BED

The typical West Franklin limestone is present only in scattered areas in Clay County (fig. 3). In such areas the interval between it and No. 6 coal bed ranges from

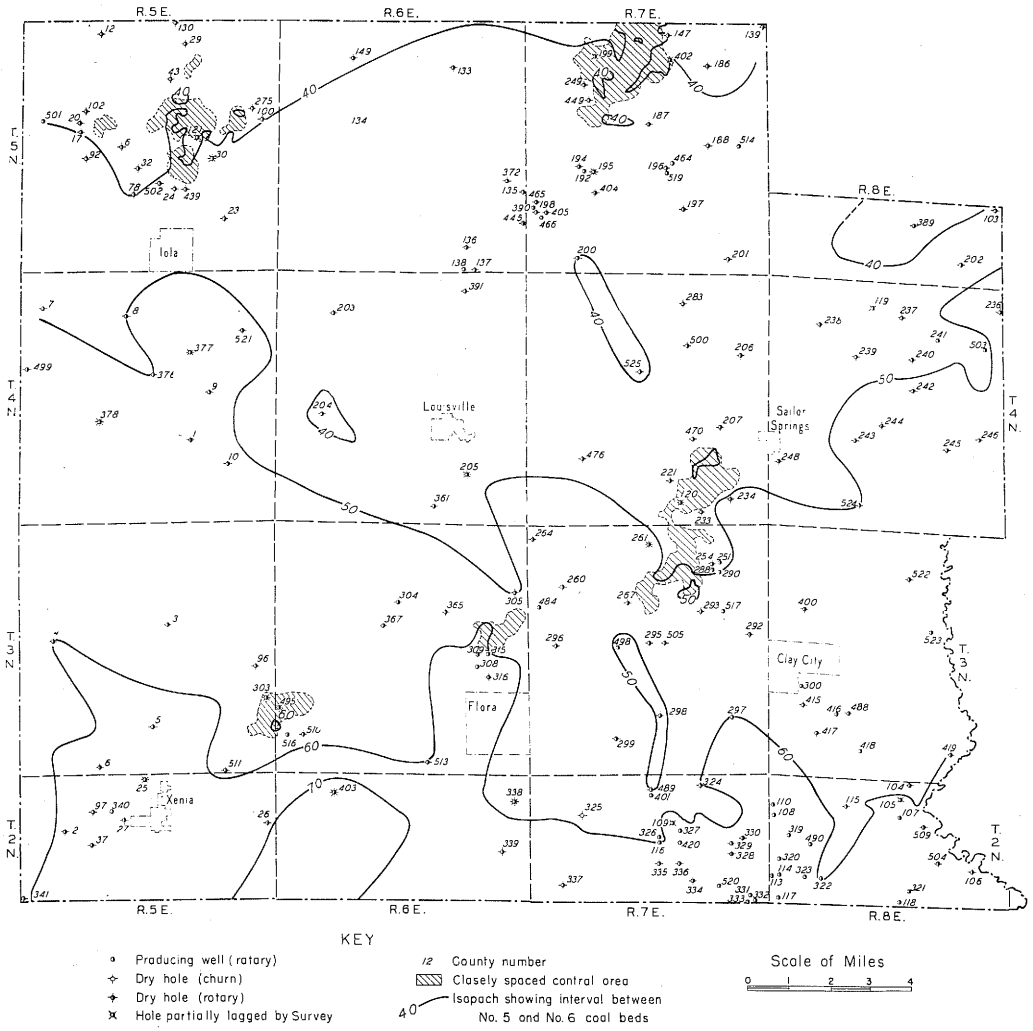


FIG. 4.—Isopach map showing variation in interval between No. 5 and No. 6 coal beds in Clay County.

103 to 233 feet, a variation even more pronounced than that of the interval between the Shoal Creek limestone and No. 6 coal bed. The two beds diverge very irregularly to the east, but (like the Shoal Creek-coal No. 6 interval) there is a reversal of trend along the southeastern border of the county with convergence over and near the flank of the Clay City anticline.

INTERVAL BETWEEN NO. 5 AND NO. 6 COAL BEDS

The interval between No. 6 and No. 5 coal beds ranges from 34 to 74 feet. The direction of maximum divergence trends roughly from north to south, across the county (fig. 4). There is less irregularity in the variations in interval than between overlying key beds and No. 6 coal bed.

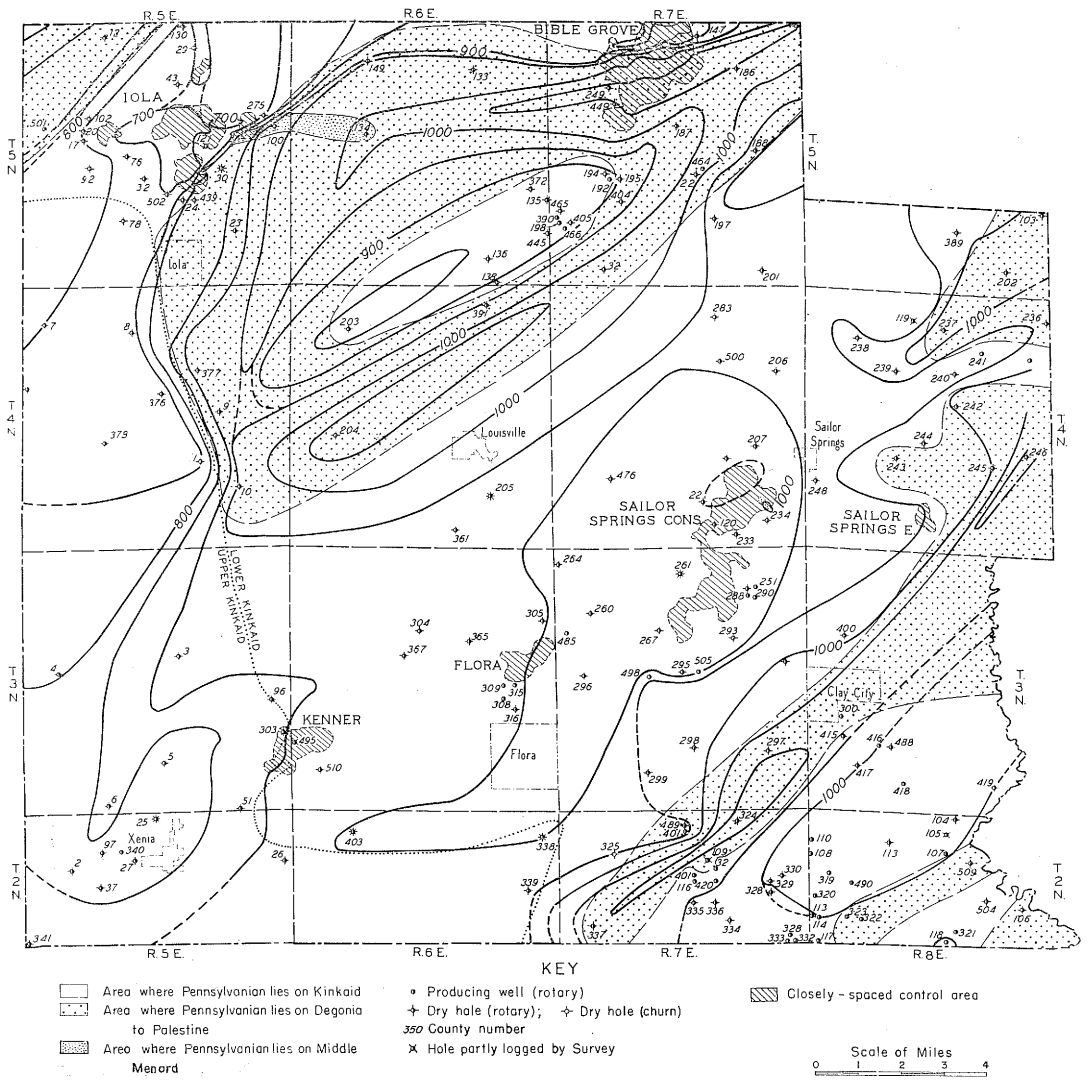


FIG. 5.—Isopach map showing variation in interval between No. 6 coal bed and the base of the Pennsylvanian system and pre-Pennsylvanian areal geology in Clay County.

STRATIGRAPHIC RELATIONS OF THE BASAL PENNSYLVANIAN

The stratigraphic relations of the basal Pennsylvanian beds are shown by a map which combines the pre-Pennsylvanian areal geology and isopachs showing the variation in interval from the base of the Pennsylvanian to No. 6 coal bed (fig. 5).

The geological map shows the Pennsylvanian beds overlapping Chester beds from the top of the Menard limestone (middle part of the Menard formation) to the upper Kinkaid limestone, with a total relief on the Chester surface of about 280 feet. The Chester formations which occur in contact with the base of the Pennsylvanian have been grouped together on the map as follows: 1) upper Kinkaid, 2) middle and lower Kinkaid, 3) Degonia, Clore, and Palestine, 4) Menard.

Several significant features are revealed. The upper Kinkaid is shown as confined to a narrow continuous area lying along the

western and southwestern margin of the county. To the north and east of this area is a series of roughly parallel northeast-southwest trending belts of variable width consisting of middle and lower Kinkaid alternating with pre-Kinkaid beds. In the most prominent of the pre-Kinkaid belts which is located in the northern half of the county, a narrow outlying remnant of middle and lower Kinkaid strata trends parallel with and lies just south of the axis of the belt, dividing it roughly into two parts. The southern belt may continue in a southwesterly direction into Marion County where two drill holes, one in sec. 9 and the other in sec. 16, T. 3 N., R. 4 E., show the Pennsylvanian resting on Degonia and Palestine respectively. Drilling between hole No. 378 in T. 4 N., R. 5 E., and holes Nos. 4 and 3 in T. 3 N., R. 5 E., will be necessary to determine whether or not this pre-Kinkaid belt interrupts the upper Kinkaid area as shown on the map.

A small sinkhole-like area of pre-Kinkaid beds along the northeastern border of the Sailor Springs Consolidated pool has an exceptional northwest-southeast trend.

The erosional origin of these pre-Kinkaid belts is clearly indicated by the profiles which show the relation of the base of the Pennsylvanian to the Menard (pls. 1, 2).

The isopachs showing the interval between No. 6 coal bed and the base of the Pennsylvanian reveal variations in thickness of the pre-McLeansboro Pennsylvanian deposits. These arise from two causes: 1) there is a regional thickening to the east-southeast comparable to the thickening noted for the other isopach intervals; and 2) there is a definite relationship between the isopach patterns and the pre-Pennsylvanian surface. The greatest thicknesses of the pre-McLeansboro deposits occur along topographic depressions in the pre-Pennsylvanian surface. The latter relationship is most clearly demonstrated in the northern part of the county where the western border of a prominent topographic depression extends across the southeast edge of the closely spaced wells of the Iola oil pool. The rapid thickening of the pre-McLeansboro beds along the boundary between the Kinkaid and the lower beds shows that the topographic depression is bordered by a steep Kinkaid escarpment. The escarpment-like character of this boundary is further corroborated by the occurrence of displaced lower Kinkaid slump blocks which appear to have originated from undercutting by erosion of the less resistant shales and sandstones underneath the border limestone bench of the lower Kinkaid along the escarpment. Another indication of the presence of the escarpment is found in the abundance of Kinkaid limestone pebbles mixed with red shale in the basal Caseyville deposits penetrated in one drill hole (No. 377), which is located less than a mile northeast of the upper Kinkaid escarpment. The Kinkaid detritus which occurs in the depression below the level of the bordering upper Kinkaid escarpment is interpreted as part of the talus fan along the upper escarpment front. The only two depressions where local thickening of the overlying pre-McLeansboro strata have not been discovered occur in the southeastern corner of the county. These comparatively shallow depressions do not yield data on the pre-McLeansboro thicknesses.

The channel-like character of the parallel-trending depression belts which cut across the flats of the lower to middle Kinkaid beds in front of the upper Kinkaid escarpment suggests some form of drainage pattern on the pre-Pennsylvanian surface and attendant depositional facies. The increase in thickness of the pre-McLeansboro strata over the depression belts is largely accounted for by thick sand bodies in the basal Caseyville section which generally occur below the level of the surrounding upland. These basal Caseyville sands are coarser than the stratigraphically higher widespread sands which blanket both the depressions and upland topography. A quartz pebble conglomerate with metamorphic pebbles has been recovered in cores from the basal Caseyville sandstones in the deepest part of the channel which cuts across the Bible Grove oil pool, sec. 9, T. 5 N., R. 7 E. (fig. 6). This conglomerate is found in well cuttings and its position can be recognized in electric logs (pl. 2, No.

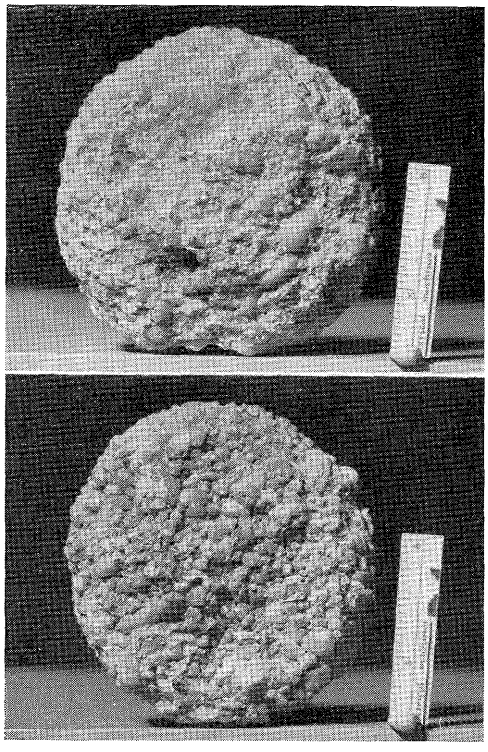


FIG. 6.—Photograph of a core-section of the Caseyville conglomerate between 1901 and 1999 feet from Kingwood Oil Co., Addison Lewis SWD-1 rotary-drill hole in sec. 9, T. 5 N., R. 7 E., Clay County.

402) by a narrow high peak in the normal resistivity curve. As far as can be ascertained from the isopach pattern, drainage on this pre-Pennsylvanian surface was to the northeast.

The previously mentioned small northwest-trending sinkhole-like area at the northeastern edge of the Sailor Springs Consolidated pool may, however, ultimately prove to be the headwaters of a branch of the major channel to the east.

The data presented establish that the pre-Pennsylvanian surface was modified by erosion, producing a Kinkaid plain, which was traversed by parallel northeast-trending depressions. The suggestion that the direction of the drainage was to the northeast within the county is tentative, and alternative interpretations may be preferred since a study of the pre-Pennsylvanian surface throughout the Illinois basin would be required to clarify regional drainage relations and the importance of pre-Pennsylvanian deformation as a factor controlling pre-Pennsylvanian erosion.

The regional thickening of the pre-McLeansboro deposits from the northwestern part of the county, where they are thinnest over the lower to middle Kinkaid upland (T. 5 N., R. 5 E.), is to the east-southeast. This is shown by the widening of the interval above the middle to lower Kinkaid upland surface segments from 660 to 1040 feet in this direction. The regional thickening from 725 to 880 feet due south along the western border of the county across the upper Kinkaid is less pronounced.

EXPLORATION FOR OIL AND GAS

A certain amount of similarity in the structure of No. 6 coal bed (pl. 3) and that of the deeper-lying Chester beds is indicated by the fact that the closed structural highs and anticlinal noses coincide with the oil pools, even the small ones. However, since the correspondence of the coal bed structure and the structure of the Chester beds is not complete, and, since many more datum points are available in Clay County for Chester than for Pennsylvanian beds, the coal-bed map does not represent a satisfactory substitute for a map of the structure of a Chester bed in the search for oil in this county.

COAL RESOURCES

The occurrence of a considerable number of coal beds in the Pennsylvanian deposits of Clay County has been ascertained from the control wells which have been logged by the Coal Division. In the three drill holes (Nos. 378, 402, and 495) in which the entire Pennsylvanian sequence has been logged, a total of 22 to 31 coal horizons were encountered. The coal horizons are distributed among the Pennsylvanian groups as follows: 11 to 18 in the McLeansboro group, 5 to 6 in the Carbondale group, and from 7 to 9 in the undifferentiated Tradewater-Caseyville groups.[15]

[15] See p. 11.

The majority of the coal beds in Clay County are thin, in part locally represented only by black shale and in part discontinuous. The thicknesses of these thin coal beds range from 6 inches to 2 feet. An average thickness of less than 18 inches is indicated in numerous electric logs by the reverse peak of the normal resistivity curve. A small number of these generally thin coal beds attain locally, however, maximum thicknesses of 6 feet for the roof shale and the coal combined. Some coal thicknesses up to 4 feet have been determined from the drilling time (table 4).

Coal beds of possibly mineable thickness are rare and commonly local in occurrence, with the exception of coal No. 6, coal No. 5, and possibly coal "No. 7." As shown in table 4, the latter are developed over wider areas in which the beds appear to attain workable thicknesses. It should be emphasized, however, that of these three coal beds, coal No. 6 is the only one at present for which a workable thickness is reasonably assured by means of the drilling time from two control wells (Nos. 261, 402). Of the remaining coal beds in which the combined thickness of the coal and roof shale logged exceeds 30 inches, the coal thickness proper is uncertain with few exceptions (table 4), because of insufficient differentiation of the drilling time for the coal and roof shale. The value of these coal beds must be regarded as unproved.

McLeansboro group.—In the control wells, a number of coal beds were encountered in the McLeansboro strata above the Shoal Creek limestone which may attain locally workable thicknesses. The drill holes in which these beds were logged, as well as their depth below the surface and their thicknesses, are found in table 4.

In the strata intervening between the Shoal Creek limestone and No. 6 coal bed, "No. 7" coal bed represents the only bed which appears to attain mineable thicknesses at any place.

"No. 7" coal bed.—The areal distribution of the recorded thicknesses of the coal and the roof shale combined of "No. 7" coal bed in the control wells indicates a regional thickening of the bed from the west to the east across the county. In the western half of the county the thickness of the roof shale and the coal combined ranges from 12 to 30 inches in nine of the eleven control wells in which the bed was encountered. In the eastern half of the county, their combined thickness ranges from 4 to 6 feet in the seven control wells, which are distributed over this area. In the control wells the coal bed occurs here from 942 to 1050 feet below the surface. Because of insufficient differentiation of the drilling time for the roof shale and the coal, the actual coal thickness is not known. Coring will be required to determine whether or not the coal attains workable thicknesses in the eastern half of the county.

Carbondale group.—No. 6 and No. 5 coal beds represent the most important coal beds in the county since they possibly maintain mineable thicknesses over wider areas in the county than any other bed. Of the remaining coal beds of the Carbondale group, coal "No. 4" and coal "No. 2" attain (only in a single control well) a combined thickness of 4 feet of coal and black shale (table 4). As previously pointed out, these beds are thin in all the remaining control wells.

No. 6 coal bed.—No. 6 coal bed is the highest coal bed which appears to attain workable thicknesses over considerable areas in the county. The bed is widespread throughout the county except for the "cut-out" area in T. 5 N., R. 5 E. Even in this area the bed is locally present in limited areas. In 10 of the 15 control wells which were logged to sufficient depth outside the "cut-out" area, the total thickness of the roof shale and the coal bed combined ranges from 4 to 8 feet, and amounts to more than 5 feet in seven of these wells (table 4). In two of the control drill holes here (Nos. 261 and 402) the drilling time indicates a coal-bed thickness of from 3 to 4½ feet.

The map showing the areal variations of estimated coal thickness (fig. 7) is based on control well data and estimates from electric logs by means of the method previously mentioned. The bed has an estimated thickness of between 3 and 4½ feet over the greater part of eastern Clay County and

TABLE 4.—DATA ON POSSIBLY WORKABLE COAL BEDS IN CLAY COUNTY

County No.	Control well No.	Location T.	R.	sec.	Company and farm name and No.	Total depth logged	Coal bed No.	Depth ft.	Thickness Coal and roof shale ft.	Thickness Coal ft.
25	18	2N	5E	4 G1	Carter-Walker No. 1	1127	6	1053	6	–
							5	1115	4	–
338	9	2N	6E	1 D4	Gibson-Valbert No. 1	1010	No coal beds of workable thickness			
403	203	2N	6E	5 E6	Sinclair-Haupt No. 1	1393	6	998	4	2–2½
							5	1072	4	–
109	54	2N	7E	10 G3	Pure-Bayler No. A-1	1400	–	326	4	–
							"7"	974	4	–
							6	1008	6	–
							"2"?	1206	4	–
105	17	2N	8E	3 E5	Pure-Moseley No. B-5	1166	"7"	942	4	2
							5	1040	5	–
303	45	3N	5E	25 G2	Lain-Haynes-McConnel No. 1	1110	6	967	8	–
							5	1023	6	–
495	197	3N	6E	30 E8	Lynn-Deain No. 3	1928	6	950	6	–
							5	1005	6	–
261	47	3N	7E	3 E7	McBride-McNeely No. 1	1200	"7"	970	5	–
							6	1006	5	3
							5	1058	7	–
							"4"	1150	4	2½
377	191	4N	5E	10 A1	Krohn-Smith No. 1	1670	5	982	4	2–3
378	205	4N	5E	20 D2	Krohn-King No. 1	1760	5	1026	4	–
							?Dekoven	1265½	split 1½–4	–
							–	1362	5½–6	3½–4
							–	1448	3–3½	–
205	78	4N	6E	26 B4	Gulf-McCollum No. 1	1096	–	384	4	–
							–	490	4	2+
							–	622	4	–
							"7"	1017	5	–
							6	1050	4	–
120	166	4N	7E	34 E1	McBride-Busby No. 2	1753	–	502	5	–
							"7"	978	6	–
							6	1015	7	–
							5	1063	3½	–
119	148	4N	8E	4 C1	Sinclair-Hinterscher No. 1	1180	"7"	1050	4	–
							5	1140	5	–
121	179	5N	5E	14 B8	Shell-Moss No. 5	1415	5	914	3½–4	–
							?Davis	1141	5	4
							–	1243	4½	–
30	87	5N	5E	23 F5	Nat. Pet.-Smith No. 1	1074	No coal beds of workable thickness			
402	200	5N	7E	3 A3	Ohio-Webster No. 3	2058	–	492	5–6	2–3
							"7"	990	4	–
							6	1026	5½	4½
							5	1066	5	–
							–	1295	4	3
199	5	5N	7E	5 B2	Gulf-Storck No. 1	1200	5	1092	4	–
195	90	5N	7E	20 D2	Texas-Hardin No. 1	1184	6	1023	6	–
							5	1068	4	2+

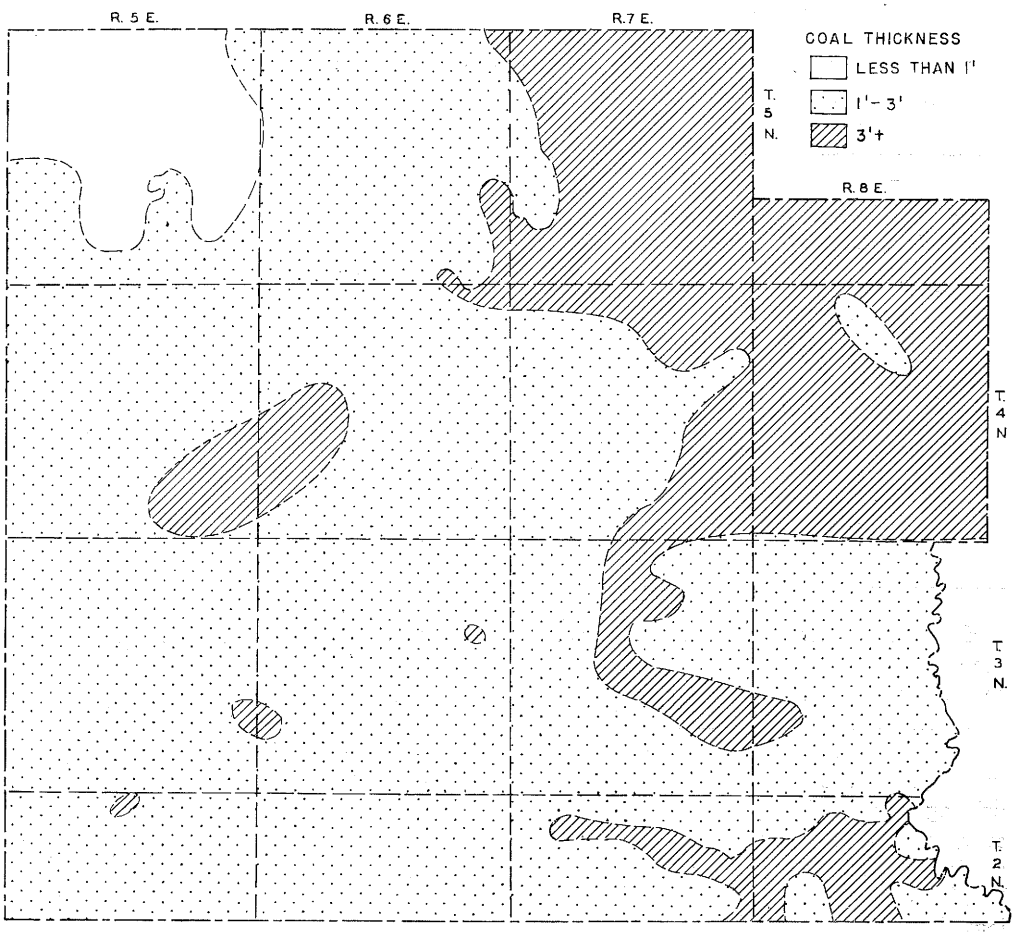


FIG. 7.—Map showing variations in estimated thickness of No. 6 coal bed in Clay County.

in limited areas in the center and western half of the county. In these areas, the bed lies between 950 and 1140 feet below the surface, and is found at a depth of less than 1000 feet in T. 4 N., R. 5 E.; T. 4 N., R. 6 E.; T. 3 N., R. 5 E., sec. 30, T. 3 N., R. 6 E., and in secs. 3 and 11 of T. 2 N., R. 8 E. Assuming that an average of 3½ feet of coal is present in these areas totaling about 120 square miles, the mineable resources of No. 6 coal bed amount to 420 million tons, at the conservative rate of one million tons per square mile per foot of coal.

Elsewhere in the county, the bed is generally less than 30 inches thick. Locally, however, the combined thickness of the roof shale and the coal reaches 5 feet, according to estimates from electric logs. Should future test boring establish that the true coal thickness is more than 30 inches, as estimated by means of the conservative method applied, the areal extent of workable thickness for the bed will be slightly greater than indicated on the map (fig. 7).

No. 5 coal bed.—No. 5 coal occurs from 34 to 74 feet below coal No. 6. The bed is persistently developed throughout the county. The combined thickness of the roof shale and the coal ranges from 2 to 7 feet in the 15 control wells which were logged through coal No. 5. In 14 of these control wells, the combined coal and roof-shale thickness is from 3½ to 7 feet and amounts to 5 feet or more in six wells (table 4). In these control wells the coal lies at depths from 914 to 1140 below the

TABLE 5.—DEPTHS OF POSSIBLY WORKABLE COAL BEDS IN CLAY COUNTY
(In feet)

Location T. R.	Coal No. "7"		Coal No. 6		Coal No. 5	
5N - 5E	796	906	816	927	855	965
6E	936	1020	961	1055	1000	1103
7E	973	1070	1005	1105	1045	1148
8E	1055	1096	1104	1143	1140	1184
4N - 5E	895	986	915	1004	965	1063
6E	898	1017	934	1050	972	1098
7E	904	1020	992	1059	1040	1103
8E	1000	1066	1038	1116	1092	1172
3N - 5E	906	1077	940	1105	997	1170
6E	913	1034	925	1072	982	1134
7E	960	1052	997	1088	1043	1143
8E	923	1090	963	1126	1023	1183
2N - 5E	954	970	958	1053	1017	1120
6E	965		998	1088	1072	1150
7E	958	1035	1001	1076	1062	1137
8E	922	1060	960	1096	1016	1160

surface. The actual coal thickness has not been satisfactorily ascertained in any of the control wells because of insufficient differentiation of the drilling time for the roof shale and the coal. In two of the control wells (Nos. 195 and 377), in which the drilling time is slightly differentiated, however, coal thicknesses of at least 2 to 3 feet are indicated. Estimates of coal thicknesses based on the examination of 406 electric logs, by means of the conservative method used for coal No. 6, indicate that the coal reaches thicknesses from 3 to 4 feet in widely scattered limited areas of the county, as in the Iola, Bible Grove, and Sailor Springs Consolidated oil pools. The electric logs show, however, random thinning of the bed to less than 30 inches for the coal and roof shale combined, within the areas of possible workable thickness. Coring will be required to determine true coal thicknesses in order to delineate the areal extent of workable thickness for No. 5 coal bed. Because of great uncertainty in regard to the thickness of No. 5 bed, no estimate is made of the quantity of coal present. Despite the variation in thickness, it is recommended that the bed be protected over the entire county for future possible utilization by means of underground gasification.

Tradewater-Caseyville groups.—The occurrence of four coal beds in the undifferentiated Tradewater and Caseyville deposits, which attain local thicknesses of 3 to 6 feet of combined roof shale and coal, has been discussed in the section on other prominent beds. No additional records of thicker coal beds are available outside the wells noted there. Reference to their occurrence, depth, and thickness will be found in that section and in table 4.

The uncertainty of the coal thickness of practically all beds of possibly mineable thickness does not now warrant an estimate of the total coal reserves of the county.

PROTECTION OF COAL BEDS

No. 6 coal and No. 5 coal are the only coal beds which should be protected by means of plugging of abandoned drill holes in those areas where mineable thicknesses have been established or estimated. The structure map of coal No. 6, the map showing the interval between No. 6 and No. 5 coals, the thickness map of coal No. 6, the tabulations, and tables 4 and 5 are to be used as a guide for the proper placing of the plugs.

SUBSURFACE GEOLOGY OF EDWARDS COUNTY

BY

HENRY L. SMITH AND GILBERT H. CADY

THIS REPORT describes the position, distribution, and character of certain key beds and other prominent members of the Pennsylvanian system in Edwards County, presents structure maps of the Herrin (No. 6) coal bed and the West Franklin limestone (pls. 4 and 5), and discusses the structural features and evaluates the resources of workable coal beds. The use of the structure maps in the exploration of the oil resources is considered briefly.

The sources of information upon which the study is based are three logs of cable-tool drill holes, 317 electric logs of rotary-drill holes, including among them the logs of 14 control drill holes (figs. 8, 9, 10),[1] the drilling of which through part or all of the Pennsylvanian strata, as the case might be, was observed and timed by Survey field parties. There has been no diamond-drill exploration of the coal beds in this county.

The names of the individuals composing the field parties that observed the drilling of the various holes during the years 1942, 1943, 1944, and 1945, and the names of those persons who studied the cuttings may be found in the table accompanying the introductory paper of this series. (See table 2, page 17.)

The tabulated data for this county will be found in the Appendix.

[1] The graphic geological logs shown in these charts were compiled from a study of cuttings, with depth controls determined by reference to the drilling-time logs that were compiled as the holes were being drilled. The electric log was not available as the geological log was being compiled. At many points therefore the two logs may not appear to be in agreement. To obtain such an agreement the geological log must be shifted up at some places and down at others, which would result in uncertain accuracy. For this reason it seems preferable to show both logs as originally recorded, with the correlation lines run to points on the electric log. Corresponding points on the geologic log are usually obvious and suggest correlations between the two types of records without making necessary adjustments in thickness on the geological log, the positions of which would be difficult to determine.

PENNSYLVANIAN KEY BEDS[2]

The key beds which can be differentiated most accurately in the logs of drill holes in Edwards County are the West Franklin and Herrin limestones and the "No. 7," No. 6, and No. 5 coal beds. A sedimentary zone about 350 feet thick near the middle of the Pennsylvanian system in this county includes all these beds. The two limestones and "No. 7" coal bed are found in the lower part of the McLeansboro group, which here is about 1100 feet thick; No. 6 and No. 5 coal beds lie in the upper part of the Carbondale group, which in this county is about 300 feet thick, with the Palzo sandstone as the basal member. About 1000 feet of Tradewater and Caseyville beds of the Pennsylvanian system underlie the Carbondale group.

Other beds, some at higher and others at lower positions in the succession, may eventually acquire importance as key beds when information about them in this and adjoining counties becomes available. Undoubtedly they will be coal and limestone beds, because of their greater continuity and the usually greater ease of identification, but some sandstone members of the Carbondale and McLeansboro groups appear to be widely present at fairly definitely established positions.

Only about 200 feet of the upper McLeansboro beds are in the eroded zone and outcrops are uncommon, discontinuous, and lithologically monotonous, and hence are difficult to correlate. For the remaining some 2000 feet of beds, knowledge depends on rotary drilling and upon information supplied by inference from observation in counties at some distance where these lower beds may outcrop.

[2] See p. 9 for explanation of key beds.

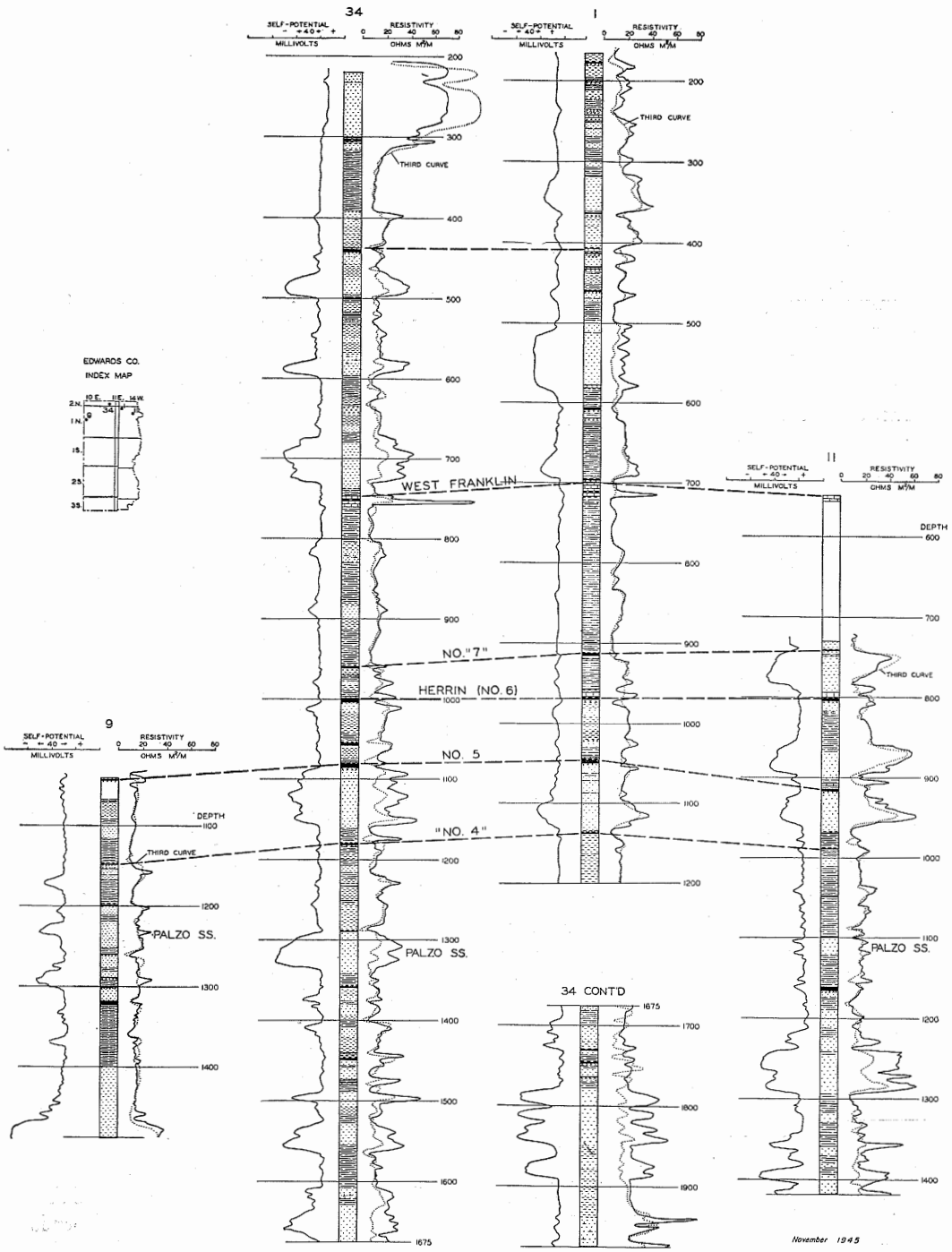


FIG. 8.—Graphic logs of control drill holes in the northern part of Edwards County.

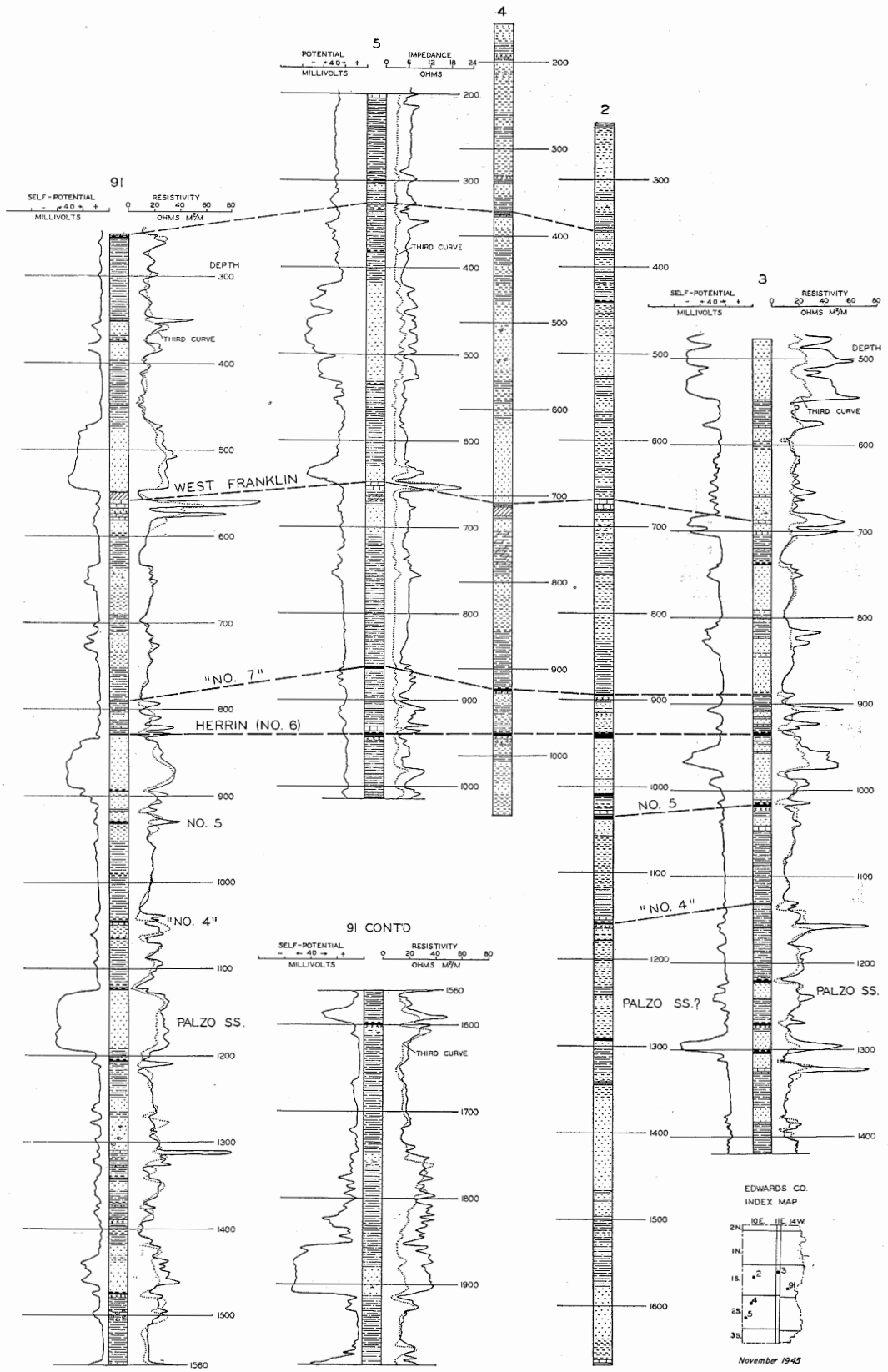


FIG. 9.—Graphic logs of control drill holes in the central part of Edwards County.

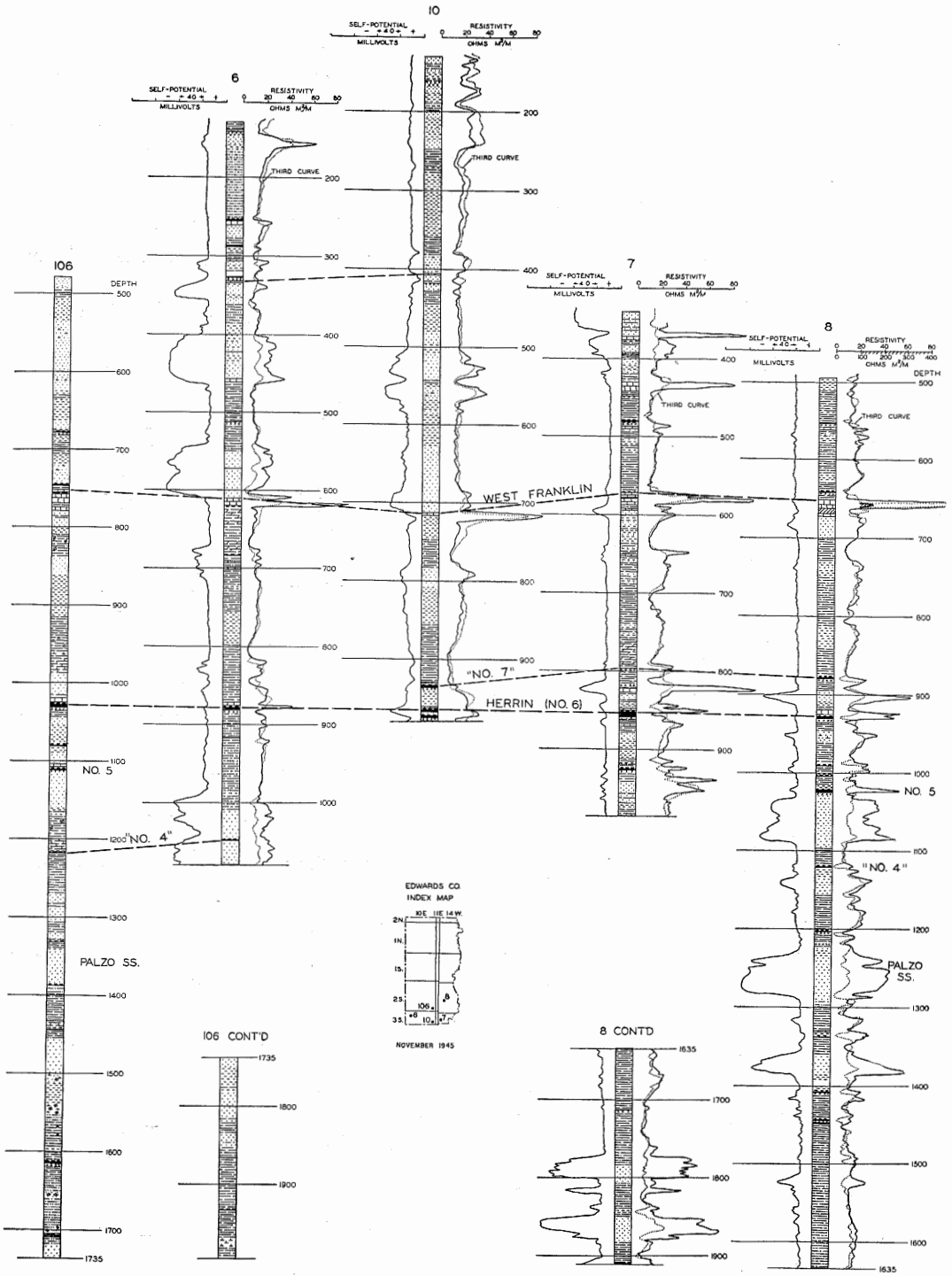


FIG. 10.—Graphic logs of control drill holes in the southern part of Edwards County.

No records of diamond-drill holes in Edwards County are available in the Survey files, although it is probable that structure test core holes have been drilled by oil companies here and there.

Should diamond-drill cores of considerable thickness of the Pennsylvanian system eventually become available for study they would provide a much improved understanding of the stratigraphic succession and also make usable as key beds strata in the upper part of the McLeansboro group above the West Franklin limestone and other strata in the Tradewater and Caseyville groups. Even for the present report certain of these strata are helpful in establishing the position of faults, although they cannot be identified with certainty throughout the county.

West Franklin limestone.—In the 14 control drill holes in this county (figs. 8, 9, 10), the West Franklin member, whether in one, two, or three benches, has been found from an examination of the cuttings to consist of light gray, buff, or brown fossiliferous very finely crystalline limestone, and of various kinds of associated shale, and is not particularly different from several other McLeansboro limestone beds. The upper bench is commonly 3 to 4 feet thick, and is separated from the middle bench by 1 to 2 feet of light gray carbonaceous and micaceous shale. The middle bench has an average thickness of about 10 feet, and the lower bench is usually 3 to 5 feet thick. The interval between the two lower benches is usually 5 to 10 feet and is occupied by shale which, at least in some places, is variegated-reddish, green, gray, and yellow. It is usually of an unctious, slip-fracture type, similar to underclay. Variegated clay shale of much the same character is also present in some places for a few feet below the lower bench of limestone. In one control drill hole (No. 91, fig. 9) variegated shale was reported above the upper of two limestone benches and clay shale between the benches. The position of the red shale is therefore not a completely reliable criterion for the identification of the individual benches of the limestone in this county.

In the logs of two of the control drill holes (No. 3, fig. 9; No. 6, fig. 10) there are indications that the benches of the West Franklin limestone may be more widely separated than usual. In hole No. 3 the distance from the top of the top bench to the base of the bottom bench is 45 feet, and in hole No. 6 possibly as much as 98 feet. In the latter hole a thick shale, variegated near the top and bottom, lies between the two lower benches. It is, of course, possible that this lower limestone actually lies below the West Franklin.

At least seven of the control drill holes (Nos. 1, 34, fig. 8; Nos. 2, 91, fig. 9; Nos. 7, 8, 106, fig. 10) found the Ditney coal bed[3] or black shale at the same general horizon, a few feet above the West Franklin limestone. When three limestone benches are reported the Ditney coal bed occurs within about 5 feet above the limestone (Nos. 7 and 106, fig. 10); when two benches of limestone are reported the coal bed is within about 5 feet of the limestone (No. 1, fig. 8), or it may be separated from the limestone by an interval that exceeds 10 feet (No. 34, fig. 8; No. 91, fig. 9; No. 8, fig. 10). The coal bed does not seem to be present in holes in which only one bed of limestone was reported (No. 11, fig. 8; No. 5, fig. 9; No. 6, fig. 10).

At the position of the West Franklin limestone electric logs usually show one pronounced resistivity peak in the normal curve, with minor peaks above and below, one or both of which may be absent. Four logs (Nos. 1, 3, 5, 8, figs. 8, 9, 10) show a single peak, although in holes Nos. 1 and 9 two benches of limestone were reported. Two holes (Nos. 34, 91, fig. 8) show two peaks corresponding to the two limestones recorded. In one hole (No. 34, fig. 8) the lower peak is the higher, and in No. 91 the upper peak is the higher. In both holes the higher peak is opposite the position of the thicker limestone. Hole No. 8 (fig. 10) shows a single peak opposite the thicker of two limestone benches. For the single hole with the three limestone benches (No. 9 fig. 10) for which an electric log is available, there are three peaks on the normal curve with the highest peak opposite the thickest limestone bench. In general the

[3] Fuller, M. L., and Ashley, G. H., U. S. Geol. Survey Geol. Atlas, Folio No. 84, Ditney, Ind., p. 2, 1902.

TABLE 6.—INTERVALS BETWEEN TOP OF NO. 6 COAL BED AND TOP OF VARIOUS OTHER KEY BEDS IN EDWARDS COUNTY

Location T.	Location R.	West Franklin Limestone: Range of interval, bed to top of No. 6 coal, ft.	West Franklin Limestone: Average interval, bed to top of No. 6 coal, ft.	West Franklin Limestone: No. datum points	West Franklin Limestone: No. wells within 10 ft. ± av.	"No. 7" Coal: Range of interval, bed to top of No. 6 coal, ft.	"No. 7" Coal: Average interval, bed to top of No. 6 coal, ft.	"No. 7" Coal: No. datum points	"No. 7" Coal: No. wells within 10 ft. ± av.	No. 5 Coal: Range of interval, bed to top of No. 6 coal, ft.	No. 5 Coal: Average interval, bed to top of No. 6 coal, ft.	No. 5 Coal: No. datum points	No. 5 Coal: No. wells within 10 ft. ± av.
1N	10E	241–281	257	39	32	34–51	39	42	39	75–116	82	41	38
1N	11E	257–268	263	2	2	35–36	36	2	2	84– 85	85	2	2
1N	14W	234–264	251	19	14	36–62	51	19	14	80–118	94	18	9
2N	10E	251–252	252	2	2	40	40	2	2	80– 81	81	2	2
2N	14W	238–249	245	18	18	50–60	55	18	18	80– 90	84	17	17
1S	10E	265–296	276	9	7	42–50	47	9	9	70–112	94	10	7
1S	11E	226–296	271	22	10	35–55	45	22	22	84–118	96	23	18
1S	14W	254–293	265	20	16	28–54	36	20	16	76–120	99	20	10
2S	10E	226–300	276	[a]44	38	26–80	55	39	23	74–122	92	41	33
2S	11E	190–289	274	[a]40	35	26–62	48	40	33	78–103	93	31	29
2S	14W	244–283	267	26	15	33–50	44	26	25	83–144	103	21	12
3S	10E	242–299	278	[b]15	7	30–82	62	15	9	90–141	105	[b]13	10
3S	11E	275–282	279	2	2	55–83	69	2	0	90–108	99	2	2
3S	14W	264–281	272	9	9	40–55	49	8	8	74–111	91	9	6

[a] 1 in fault zone.
[b] 2 in fault zone.

electric logs indicate the position of the thicker or thickest limestone bench when two or three benches are present. The thicker of two benches may be at the top or at the bottom.

Where there has not been stratigraphic shortening as a result of faulting, the top of the West Franklin limestone is between 234 and 299 feet above the Herrin (No. 6) coal bed—that is, the base of the McLeansboro group (table 6). In the northern two tiers of townships the township average interval declines to between 245 and 263 feet, as compared with 268 and 279 feet in the part of the county south of the base line.

"No. 7" coal bed.—The thin coal designated as "No. 7" lies 200 to 225 feet below the West Franklin limestone. The intervening beds are a more or less monotonous succession of dark gray, carbonaceous and micaceous siltstones and shales in the control drill holes (figs. 8, 9, 10). Across this part of the succession electric logs usually show low resistivity, indicative of uniformly shaly beds. At the position of the "No. 7" bed there is usually a slight peak in the normal curve and a recession of the third curve. The opposing patterns of the normal and third curves combine characteristically at this postion and are in evidence in several of the logs of the control drill holes (Nos. 1, 34, fig. 8; Nos. 3, 9, fig. 9; Nos. 8, 10, fig. 10). On the basis of observations at control drill holes and from the study of the pattern of electric logs, the "No. 7" coal bed is in general believed to be not more than 2 to 3 feet thick. Black shale or "slate" 1 to 3 feet thick is reported above the coal bed in 6 of the control drill holes.

The interval between "No. 7" and No. 6 coal beds in the twelve townships of the county from which information is available is between 26 and 83 feet, with township averages varying from 36 to 69 feet, being slightly greater south of the base line (table 6). "No. 7" coal bed was not reported in control drill hole No. 106 (fig. 10), perhaps because the observer failed to discover it. Occasionally, however, it appears to be missing in drill holes for which electric logs are the best records available.

Herrin limestone and Herrin (No. 6) coal bed.—The recorded depth to the Herrin (No. 6) coal bed in 320 drill holes in Edwards County is generally between 766 and 1024 feet, depending upon the surface altitude and the altitude of the coal bed. The thickness of this bed, as determined from drilling-time observations and cuttings studies of the 14 control drill holes, is believed to be between 3 and 5 feet. The bed appears generally to be overlain by 1 to 3 feet of black shale "slate," above which lies usually 3 to 5 feet of impure, dark gray to black, earthy limestone, the Herrin limestone. It is ordinarily impossible, on the basis of the rate of drilling, to differentiate the black "slate" and the coal bed. In general, thicknesses must be estimated roughly by the amount of coal obtained in the cuttings, but at best the estimate is not satisfactory. In an electric log, it is generally assumed that a swing to the right of the third curve indicates a thickness of the bed greater than the electrode spacing of 53 inches. In most electric logs of drill holes in Edwards County the third curve shows a peak pointing to the right. There is an area of about two square miles in sec. 36, T. 2 S., R. 10 E., and in secs. 1, 2, 11, and 12, T. 3 S., R. 10 E., where No. 6 coal bed appears to be absent (pl. 4).

The electric-log pattern is variable.[4] Two peaks on the resistivity curve of some logs (Nos. 3, 5, 91, fig. 9; Nos. 7, 8, fig. 10) made it possible to differentiate the limestone above and the black "slate" and coal bed below. On the other hand in some logs (Nos. 1, 34, fig. 8; No. 8, fig. 10) a single peak appears to mark the position of the combined limestone, black "slate," and coal bed. In such logs the base of the limestone is placed at a depth representing a reasonable compromise between the position of maximum resistance (the peak of the normal curve) and the position of the maximum millivolts of negative self-potential (the peak of the opposed self-potential curve) if the two points are not at the same depth. If the two depths agree, the position of the base of the limestone is known.

[4] Taylor, Earle F., Pullen, M. William, Sims, Paul K., and Payne, J. Norman, Methods of subsurface study of the Pennsylvanian strata encountered in rotary-drill holes: Illinois Geol. Survey Rept. Inv. 93, pp. 16-19, 1944.

Harrisburg (No. 5) coal bed.—No. 5 and No. 6 coal beds are separated by 74 to 144 feet (table 6) of strata, consisting mainly of shale and sandstone and commonly including one bed of coal. The township average interval varies from 81 to 105 feet, the average being below 95 feet north and above 91 feet south of the base line. The No. 5 coal bed varies from about 2 to about 4 feet in thickness in the control drill holes. A brownish to brownish-gray, finely textured limestone, the St. David (or Absher) limestone, 2 to 5 feet thick, lies on or a short distance above No. 5 coal bed, usually with a bed of black "slate" intervening between the limestone and the coal bed. The St. David limestone is not present at the position of two control drill holes (Nos. 7, 8, fig. 10) or was not recognized by the observers.

In the electric logs the position of No. 5 coal bed is generally marked by a relatively conspicuous resistivity peak in the normal curve (No. 9, fig. 8; Nos. 5, 91, fig. 9; No. 8, fig. 10), which, however, is not as pronounced as that at the position of the Herrin limestone and coal beds. It is usually opposed by a small negative peak on the self-potential curve. The "third" curve may follow the normal curve or be reversed, presumably because the bed is thinner than the electrode spacing of 53 inches. This is not usually the case, as probably in most drill holes the limestone, black "slate," and coal bed are all represented by the pattern. In some of the control drill holes (Nos. 1, 11, 34, fig. 8; No. 3, fig. 9) the position of the highest resistivity peak at this general position fails to occur at the recorded depth of the No. 5 coal bed. In some holes this may be due to inaccurate depth measurement during drilling (Nos. 11, 34, fig. 8; No. 3, fig. 9; No. 7, fig. 10), and in other holes to the presence of a resistant bed below the underclay, probably an underclay limestone (No. 1, fig. 8). In interpreting electric logs the position of No. 5 coal is generally regarded as coincident with at least the lower part of the prominent peak in the normal curve at the appropriate interval below No. 6 coal bed, with suitable consideration of the records of adjacent control drill holes.

The underclay of No. 5 bed appears to have the usual low resistivity of such beds.

OTHER PROMINENT PENNSYLVANIAN BEDS

McLeansboro Group

Beds above the West Franklin limestone.—The limestone member of the McLeansboro group referred to as Shoal Creek in the present series of studies is probably an equivalent of the one designated as Shoal Creek and used as a key bed in neighboring Wayne County.[5] In parts of that county it lies 450 to 475 feet above No. 6 coal bed (200-225 feet above the West Franklin limestone), but on the east side of the county it becomes unrecognizable in the drill records.

Of the 14 control drill holes in Edwards County only three (No. 91, fig. 9; Nos. 6, 7, fig. 10) are reported to have penetrated a limestone between 450 and 475 feet above No. 6 bed. Correlation of these limestones with the Shoal Creek limestone of Wayne County is not too remote a possibility.

All of the control drill holes passed through thin limestones, black shales, coal beds, and underclays above the West Franklin limestone. In some holes only one member of such a group was penetrated, in others two, and in still others an entire "cyclical" sequence, but usually at only one or two positions. In general the beds are thin, and it is quite possible that some occurrences might have escaped observation during logging of the well and also in the examination of drill cuttings.

At a position about 565 feet (± 25 feet) above No. 6 coal bed and about 200 feet above the West Franklin limestone, most of the control drill holes (Nos. 1, 34, fig. 8; Nos. 2, 4, 5, 9, fig. 9; Nos. 6, 10, fig. 10) penetrated a thin bed of limestone lying on, or a short distance above, a thin coal bed, usually with an intervening black shale. This group of beds appears to be generally present throughout the county. Its position

[5] Sims, Paul K., Payne, J. Norman, and Cady, Gilbert H., Pennsylvanian key beds in Wayne County, etc.: Illinois Geol. Survey Rept. Inv. 93, p. 27, 1944.

with respect to the No. 6 coal bed and the West Franklin limestone is similar to that of the limestone outcropping near a locality known as Reel's Corners northwest of Mt. Carmel near the center sec. 8, T. 1 S., R. 12 W.[6] This appears to be the most continuous and characteristically developed group of beds in the control drill holes above the West Franklin limestone in Edwards County. In the electric logs its position is generally indicated by low resistivity peaks in both normal and third curves.

In drill hole No. 7 (fig. 10) what appears to be the same thin limestone noted in the preceding paragraph was encountered only about 475 feet above No. 6 coal bed. A thick bed of limestone (15 feet) was penetrated about 50 feet lower—possibly the Shoal Creek. Such a stratigraphic arrangement is strongly suggestive of shortening by faulting between the West Franklin and Reel limestone, although faulting is not generally suspected in this area.

Of the seven control drill holes which show the geologic succession above the thin limestone noted in the two preceding paragraphs, several show a number of thin limestone, coal, and black shale beds at different positions. Because the records of the cuttings of these drill holes lack uniformity of arrangement, it has not been possible to correlate the beds. Some of the drill holes penetrated beds 700 to 800 feet above No. 6 coal bed, and it seems probable that such members of the McLeansboro group as the Friendsville coal bed and the Millersville (and possibly even the Omega) limestone may be represented.

Electric logs of drill holes in the same pool display a similarity of pattern above the position of the West Franklin limestone that indicates continuity of certain relatively thin layers, but correlation over the entire county and with definite beds encountered in control wells has not been very satisfactory. Usually the surface casing of the drill holes in the Illinois basin extends to some fairly persistent and relatively thick limestone bed, but this does not seem to be the case in Edwards County.

[6] "No. 19. Hard bituminous limestone 1 to 3 feet." A. H. Worthen, Geol. Survey of Illinois, vol. VI, p. 56, 1875.

Beds below the West Franklin limestone.—The usual monotonous succession of shale and siltstone beds lying between the West Franklin limestone and "No. 7" coal bed includes in some places beds of sandstone (No. 3, fig. 9), the positions of which are marked by opposite peaks in the normal and potential curves. In four control wells (Nos. 3, 5, fig. 9; Nos. 6, 7, fig. 10) a thin bed of limestone was reported about 150 feet above the base of the McLeansboro group. It is unaccompanied by black shale or a coal bed. The somewhat remote possibility that the limestone at this position in drill hole No. 6 (fig. 10) may represent the lower bench of the West Franklin limestone has been mentioned.

In five control drill holes (Nos. 1, 34, fig. 8; Nos. 2, 3, fig. 9; No. 7, fig. 10) a limestone 5 feet or less in thickness was encountered from 5 to 35 feet below the "No. 7" coal bed. Well cuttings are described as buff to brown, and as dense to argillaceous in texture and composition. The bed is underlain by shale, siltstone, or sandstone, and not by the sequence of black shale and coal beds usually found beneath Pennsylvanian limestones. The position and relationship are those characteristic of the Bankston Fork limestone of Saline County.[7] The Bankston Fork limestone is found throughout a wide area in southern Illinois, but it is by no means continuous, for it is known to pinch out within short distances from an area of average thickness. In electric logs its position is usually marked by its relatively high resistivity and low potential strength, a short distance below "No. 7" coal bed.

Between the Bankston Fork limestone and the Herrin limestone (see control drill holes Nos. 11, 34, fig. 8; Nos. 2, 91, fig. 9; Nos. 7, 8, 106, fig. 10) there is commonly a massive sandstone member thought to be the equivalent of the Anvil Rock sandstone of western Kentucky,[8] which is also widely distributed in Saline and Gallatin counties in Illinois. This sandstone in places rests upon an uneven eroded surface which cuts down into, and even across, the Herrin

[7] Cady, G. H., Areal geology of Saline County: Trans. Illinois Acad. Sci. vol. 19, p. 261, 1927.

[8] Owen, D. D., Kentucky Geol. Survey, vol. 1, 1856.

limestone and coal beds. This may account for the local absence of No. 6 coal in Edwards county (T. 2 and 3 S., R. 10 E.), just as it does for local absence of the coal bed in Saline County.[9] The electric-log pattern of the Anvil Rock sandstone is typical of Pennsylvanian sandstones, with a fairly high resistivity and potential strength.

The composite pattern produced in electric logs by "No. 7" coal bed, the Bankston Fork limestone, the Anvil Rock sandstone, and the Herrin limestone and coal beds in the Illinois basin has been previously described,[10] although the Bankston Fork limestone is shown in none of the diagrams. In control well No. 7 (fig. 8) it is believed that both the Bankston Fork limestone and Anvil Rock sandstone are present.

Since both the Bankston Fork limestone and the Anvil Rock sandstone are discontinuous, their places often being occupied by shale, the pattern of electric logs shows great variability between "No. 7" coal bed and the Herrin limestone.

Carbondale Group

No. 5A coal bed.—The Briar Hill[11] or No. 5A coal bed lies between No. 6 and No. 5 coal beds, usually between 25 and 30 feet above the lower bed, but there is a good deal of variation. It has a thickness of 1 to 3 feet and is overlain by 1 to 2 feet of black "slate." A limestone caprock above this coal bed or "slate" is a rare occurrence. The No. 5A coal bed is recorded in 8 control drill holes (No. 34, fig. 8; Nos. 2, 5, 91, fig. 9; Nos. 6, 7, 8, 106, fig. 10). Inspection of available electric logs of these holes shows that the position of the coal bed is commonly marked by a low peak in the third curve, a reverse peak in the third curve opposite a low bulge in the self-potential curve (No. 34, fig. 8; Nos. 7, 8, fig. 10). The recurrence of this combination of patterns at the appropriate position in many electric logs of Edwards County drill holes indicates that this thin coal bed is rather widespread. In some logs the pattern of the normal curve is less characteristic and may merge with that of beds above and below, but the reentrant of the third curve is almost invariably in evidence (No. 34, fig. 8). The position of No. 5A bed between No. 6 and No. 5 coal beds detracts from its importance as a key bed.

Between No. 6 and No. 5A coal beds there is usually a massive sandstone (Nos. 9, 11, 34, fig. 8; Nos. 3, 91, fig. 9; No. 8, fig. 10) well developed in outcrop at the same stratigraphic position near Absher Post Office in southeast Williamson County and in the town of Equality, Gallatin County.

Beds below No. 5 coal bed.—The graphic logs of the control wells (Nos. 9, 11, 34, fig. 8; Nos. 2, 91, fig. 9; Nos. 8, 106, fig. 10) show at least three fairly prominent beds in the lower part of the Carbondale group. Of these the upper two are thin coal beds about equally spaced, 75 to 125 and 160 to 220 feet below No. 5 coal bed. The upper of these has been designated "No. 4" in the present series of studies.

The "No. 4" coal bed, which is apparently not over 3 feet thick and probably generally less, is overlain by black "slate" and in some places by a thin bed of limestone. In electric logs these beds usually have a very characteristic double-peak pattern (Nos. 3, 91, fig. 9), apparently because of the association of thin limestone and coal. In some logs the pattern is a single peak on the normal curve and a reverse third curve peak similar to that of coal 5A (No. 34, fig. 8; No. 8, fig. 10). The frequent presence of such a pattern at the appropriate position in electric logs indicates that these beds are generally present in this county. This bed, although occupying a position approximately the same as that of the Summum (No. 4) coal bed of western Illinois and that of No. IV coal bed in Indiana, has not been proved equivalent to either.

The second coal bed, about 50 to 100 feet lower, is characteristically marked. It was encountered in 8 of the control drill holes (Nos. 9, 11, 34, fig. 8; Nos. 2, 3, 91, fig. 9; Nos. 8, 106, fig. 10), and its position in

[9] Cady, G. H. Coal resources of District V (Saline and Gallatin counties): Illinois Geol. Survey Min. Inv. Bull. 19, p. 21, 1919.

[10] See footnote 4.

[11] Lee, Wallace, Geology of the Kentucky part of the Shawneetown quadrangle: Kentucky Geol. Survey, p. 35, 1916.

electric logs is generally indicated by a fairly sharp reverse peak in both the normal and the third resistivity curves (Nos. 9, 11, 34, fig. 8; Nos. 3, 91, fig. 9; No. 8, fig. 10). This coal bed is believed to occupy approximately the stratigraphic position of the LaSalle (No. 2) coal bed of northern and western Illinois,[12] and in these reports it is referred to as "No. 2," with the understanding that it may not always be applied to the same bed. Spores isolated from coal cuttings from coal beds at 1200 feet in hole No. 9 (fig. 8) and at 1125 feet in hole No. 91 (fig. 9) included forms characteristic of the LaSalle (No. 2) coal bed.[13]

The Palzo sandstone is the third of the prominent members of the Carbondale group mentioned above. This sandstone marks the base of the Carbondale group, and is usually 20 to 70 feet thick. In some localities it is so thin as to be difficult to spot, or it may be absent. When the sandstone is very thick it probably possesses channel form with an uneven base that truncates lower beds. At the type locality, the Palzo sandstone extends to, or nearly to, the top of the Dekoven coal bed in the upper part of the Tradewater group.[14] However, in some places it appears to extend below the position of this bed down to, or nearly to, the top of the Davis coal bed. On the other hand, in localities where the Palzo sandstone is thin and less channel-like a considerable thickness of shale intervenes between the base of the sandstone and the Dekoven coal bed. Furthermore, in localities where the Palzo sandstone is thin, additional coal beds seem to occur at one and possibly more positions between the coal bed regarded as "No. 2" and the Dekoven bed. It is not always certain whether or not such beds lie above or below the Palzo sandstone.

Identification of the Palzo sandstone in electric logs is in general based upon the position of a strong indentation of the normal resistivity curve about 100 feet below the "No. 4" coal bed or about 200 feet below the No. 5 bed. In general this indentation in the curve appears to mark the position of the "No. 2" coal bed, but not in all drill holes (see No. 9, fig. 8). The top of the Palzo sandstone lies 525 to 620 feet (average 560-570 feet; see page 63 for detailed data) below the top of the West Franklin limestone, or about 300 feet below No. 6 coal bed. It is usually well defined in the geological records prepared from drill cuttings (see figs. 8, 9, 10), and its presence is usually well marked in electric logs by a relatively conspicuous pattern indicative of sandstone. This sandstone member and the massive sandstone lying between No. 6 and No. 5A coal beds are the two most conspicuous sandstone members of the Carbondale group.

Tradewater and Carbondale Groups

The base of the Carbondale group has been defined as the base of the Palzo sandstone.[15] No definition has been given for the top of the Tradewater group, and as the Palzo sandstone lies upon an uneven surface of Tradewater beds, these may extend a considerable number of feet above the Dekoven coal bed in some places. It is possible that, like most Pennsylvanian sandstone members, there are localities where there is a complete sedimentary transition from the Tradewater to the Carbondale group.

The Dekoven and Davis coal beds and various other members of the Tradewater and Caseyville groups, including both thin coal and thin limestone members, are not yet definitely identified in Edwards County.

STRUCTURE OF THE PENNSYLVANIAN BEDS

Herrin (No. 6) coal bed.—The accompanying map of Herrin (No. 6) coal bed (pl. 4) shows that the structure of the Pennsylvanian beds in Edwards County is dominated by the regional eastward rise of

[12] White, David. Paleobotanical work in Illinois in 1908: Illinois Geol. Survey Bull. 14, p. 293, 1909.
[13] Personal communication from R. M. Kosanke.
[14] Weller, J. Marvin, Geology and oil possibilities of extreme southern Illinois: Illinois Geol. Survey Rept. Inv. 71, p. 36 (footnote 13), 1940.
[15] Weller, J. Marvin, Henbest, Lloyd G., and Dunbar, Carl O., Stratigraphy of the Fusuline-bearing beds of Illinois (in Pennsylvanian Fusulinidae of Illinois by Carl O. Dunbar, and Lloyd G. Henbest): Illinois Geol. Survey Bull. 67, p. 10, 1942.

the beds from the trough of the Illinois basin in Wayne County toward the southward extension of the LaSalle anticline. This rise continues beyond the county with some interruptions eastward across Wabash County, as studies in that county have shown. The general regional rise of the strata to the east is modified by a terrace-like flattening of the structure in a north-south belt one to two miles wide that extends along a zone a little east of the center of the county. The terrace is characterized by some reversals in dip, and, at one position, in T. 2 and 3 S., R. 10 and 11 E., differences in altitude are undoubtedly the result of normal faulting.

Albion fault zone.—This fault zone can be traced with considerable certainty by the use of electric logs of drill holes located in secs. 1 and 12, T. 3 S., R. 10 E., in sec. 36, T. 2 S., R. 10 E., and in secs. 30 and 31, T. 2 S., R. 11 E., and possibly as far north as hole No. 138 in the SW¼, sec. 18, T. 2 S., R. 14 W. The position of the fault zone can be fairly definitely established by noting the variation in altitude of No. 6 coal bed (or No. 5 coal bed where No. 6 is absent) (fig. 11), and by noting the distribution of drill holes in which short intervals occur between West Franklin limestone and Palzo sandstone, or between the Palzo sandstone and the Glen Dean limestone of the Chester series. In general the No. 6 coal bed west of the fault line has an altitude of about 400-410 feet, whereas to the east it lies 75 to 100 feet lower. The faulting is somewhat complex, as in most electric logs evidence of displacement is indicated by shortening of the intervals at more than one level, but in general these positions are fairly closely spaced. The fault plane dips toward the east, the fault zones cutting across the drill holes progressively lower from west to east. In drill holes along the west margin of the fault zone only the upper Pennsylvanian beds are faulted, whereas only the Chester beds, or at least pre-Palzo beds, are faulted in drill holes on the east side of the zone.

The width assigned to the fault zone represents the projection of the fault plane onto the plane of the horizontal down to approximately the position of the Glen Dean formation of the Chester series.

Actual determination could be made if the identity of the individual fault planes could be established from hole to hole. An approximate dip of about 60 degrees and a throw of 125 to 150 feet seem to characterize the displacement in the southern part of the Albion oil pool.

The authors are aware of the presence of a fault having a throw of more than 100 feet, which crosses the NW¼ of sec. 21, T. 3 S., R. 14 W., near Grayville, White County. It may extend northeastward across an intervening portion of Wabash County (sec. 16, T. 3 S., R. 14 W.) and pass into Edwards County somewhere between drill holes Nos. 146 and 7 (secs. 9 and 17), but as there is no definite evidence of the extension of the fault into Edwards County, it is not mapped.

Detailed delineation of the structure of the No. 6 coal bed is possible only where drilling is closely spaced and where the coal bed is present. Undoubtedly the "lay" of the bed in those parts of the county where the drill holes are widely spaced is actually more irregular than can be shown from available information.

PARALLELISM OF PENNSYLVANIAN BEDS

The rough parallelism that characterizes successive groups of coal beds and limestones in the Pennsylvanian system in the Illinois coal field is maintained in Edwards County.

West Franklin limestone.—The West Franklin limestone is continuous enough in Edwards County to be mapped (pl. 5). The structure parallels that of No. 6 coal bed (pl. 4; table 6). By using the position of the West Franklin limestone, the approximate position of the "No. 7," No. 6, and No. 5 coal beds can be fairly closely determined.

Position of the Palzo sandstone.—Studies of the interval between the West Franklin limestone and the Palzo sandstone show variations in interval and average intervals for the various townships as follows:

Township		Intervals		
T.	R.	Min.	Max.	Av.
1 N.	10 E.	545	600	573
1 N.	11 E.	570	572	571
1 N.	14 W.	545	598	572
2 N.	10 E.	541	558	554
2 N.	14 W.	542	568	555
1 S.	10 E.	559	590	575
1 S.	11 E.	525	586	556
1 S.	14 W.	526	611	569
2 S.	10 E.	528	605	566
2 S.	11 E.	556	591	574
2 S.	14 W.	548	588	568
3 S.	10 E.	558	620	589
3 S.	11 E.	555	556	555
3 S.	14 W.	527	571	549

The average interval for the county is between 560 and 570 feet and is about the same both north and south of the base line, but with a slight tendency toward an increase in interval toward the southwest. Variations from the average are in the order of about 40 feet, except for T. 3 S., R. 10 E., in which it is about 50 feet. In spite of some difficulty in identifying the exact position of the top of the Palzo sandstone from electric logs, and of the possibility of important variations in interval between beds more than 600 feet apart, the beds must be considered essentially parallel.

WORKABLE COAL BEDS

In Edwards County the No. 5 and No. 6 coal beds should be protected from danger of invasion by oil, gas, and water by properly placed plugs when dry holes or oil wells are abandoned. The No. 6 coal bed in the 317 drill holes tabulated lies at depths ranging between 766 and 1029 feet. In only 16 holes was this coal bed found at depths of 1000 feet or more. The No. 5 coal bed lies at depths ranging between 886 and 1110 feet, with slightly more than half the holes showing a depth more than 1000 feet.

Because in only one township, T. 2 S., R. 14 W., the interval between the No. 5 and No. 6 coal beds exceeds 122 feet (table 6), both beds can be protected by a plug extending from 50 feet above to 175 feet below No. 6 coal bed. This length of plug is probably sufficient for most drill holes, even in T. 2 S., R. 14 W. Indeed, a plug extending from 50 feet above to 150 feet below No. 6 coal bed will probably be adequate to protect both coal beds in the majority of drill holes.

The structure map of No. 6 coal bed gives the altitude of the bed in feet below sea level. If the hole to be plugged is on or very near a structure contour, the depth to the coal bed is obtained by adding to the surface altitude the altitude shown on the contour line. The altitude of the coal bed at holes lying between structure contour lines can be estimated by assuming an even slope between the two nearest contour lines through the position of the drill hole.

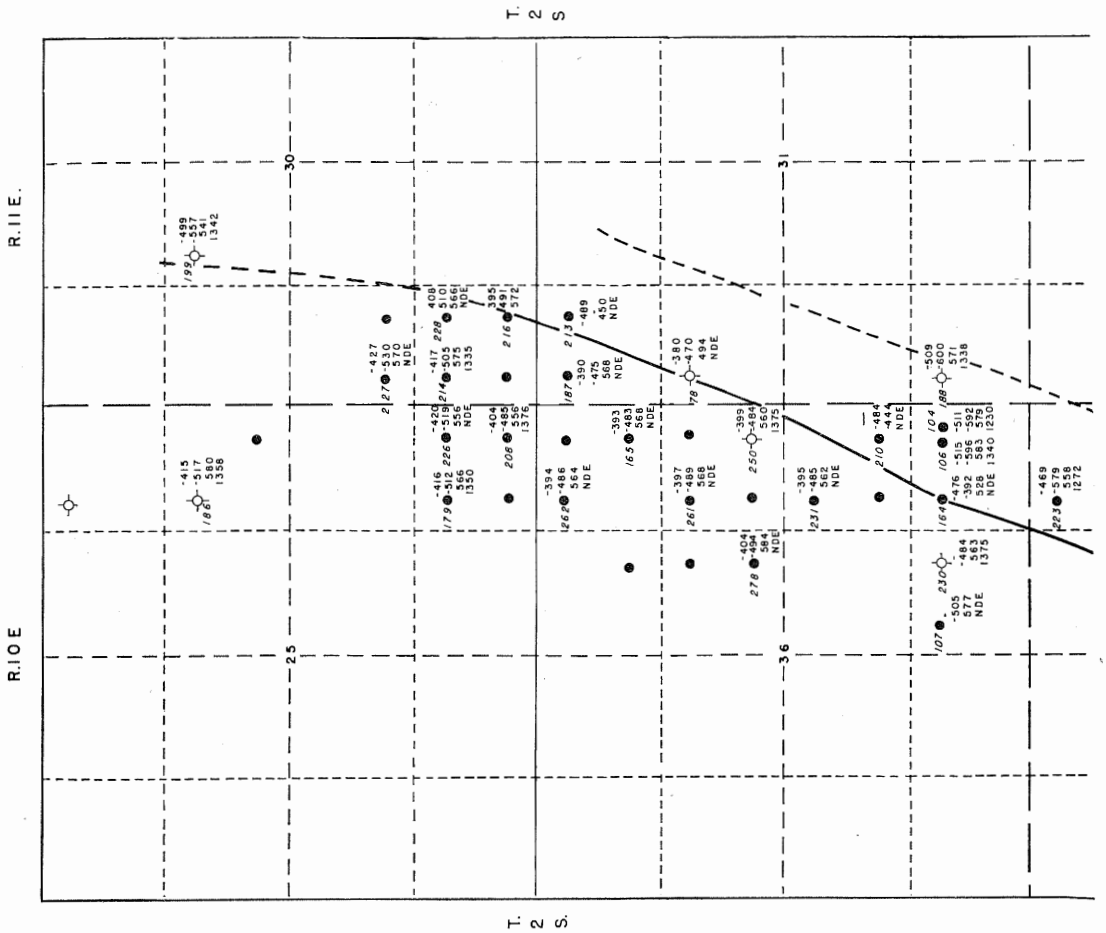
There is some indication of the presence of coal beds 3½ feet or more thick 300 to 400 feet below No. 6 bed. Evidence, however, does not warrant recommendation of their protection.

COAL RESOURCES

In the first report of this series[16] it was estimated, on the basis of information provided by seven control drill holes, that the coal resources of Edwards County represented by No. 5 and No. 6 coal beds amounted to about 1.2 billion tons. Since that estimate was made six additional control wells have been logged by Survey field parties. The data now available in regard to coal beds 3 feet or more thick are summarized in table 7.

"No. 7" coal bed.—In six of the 13 control drill holes the coal bed regarded as "No. 7" was reported as 3 feet thick. The bed ranges from 26 to 83 feet above No. 6 coal bed. It has a black shale cover 1 to 2 feet thick, above which is a considerable thickness of gray shale. The succession is quite similar to that characteristic of the Danville (No. 7) coal bed of Vermilion County, Illinois, and to that of Indiana VII bed in western Indiana. Although the bed is absent, or at least not reported, in about half the control drill holes, and the extent of distribution must therefore be regarded as uncertain, the presence of a coal bed or some stratum that produces a similar pattern at the appropriate position in the elec-

[16] Cady, Gilbert H., Coal resources based upon information obtained from rotary drilling Feb. 1, 1942 to May 31, 1943: Illinois Geol. Survey Rept. Inv. 93, p. 41, 1944.


R.10E
R.11E.
T. 2 S.
T. 2 S
25
30
31
36

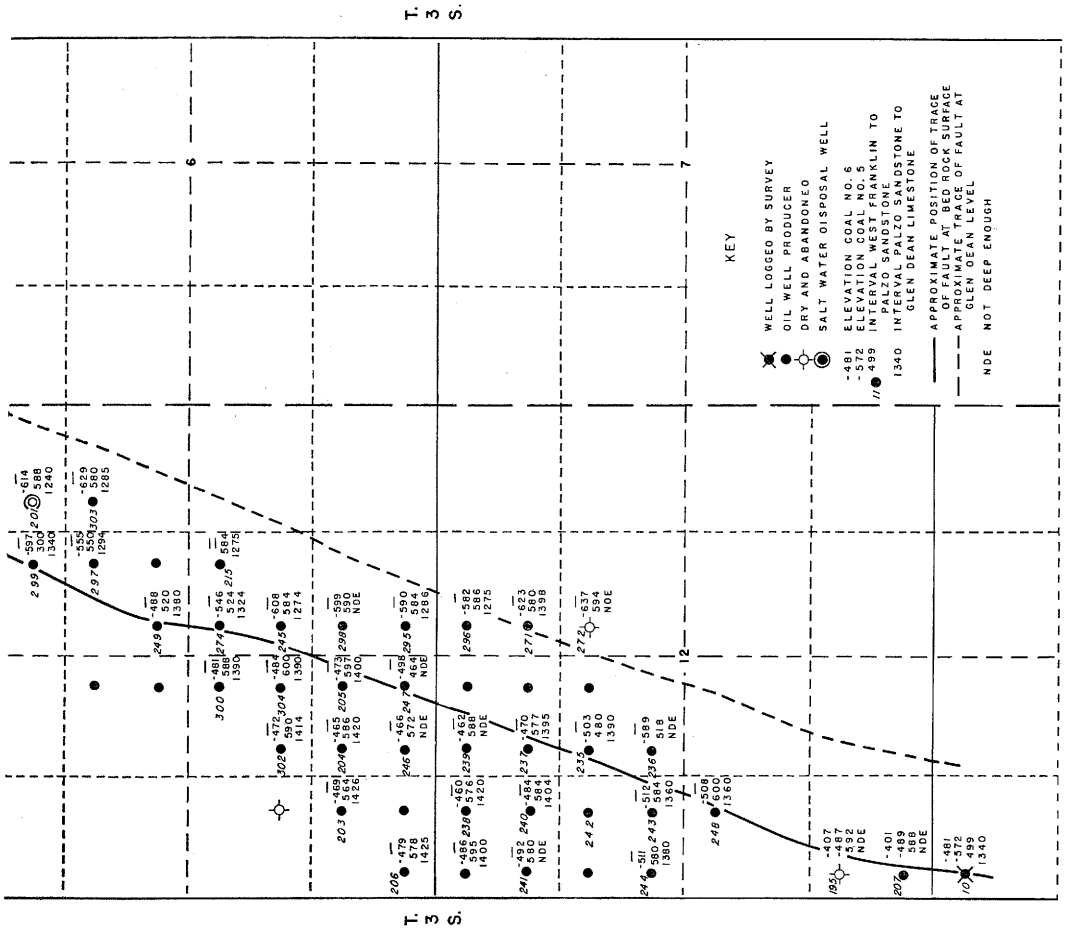


FIG. 11.—Albion fault zone as shown by the altitude of No. 5 and No. 6 coal beds and the interval between West Franklin limestone and Palzo sandstone and between Palzo sandstone and Glen Dean limestone.

TABLE 7.—DATA ON POSSIBLY WORKABLE COAL BEDS IN EDWARDS COUNTY
February 1942 to September 1945

County No.	Control well No.	Location T.	R.	Sec.	1/64[a] sec.	Company and farm name and No.	Coal bed No.	Depth ft.	Total depth logged ft.	Thickness ft.
5	15	2S	10E	19	A1	Sun Oil Co.			1014	
						McKibben No. 1	"7"	862		3
							6	938		5
1	30	1N	14W	6	D3	Sinclair-Wyoming			1197	
						Bierhaus, A No. 1	"7"	913		3
							6	966		4
							5	1046		4
3	33	1S	11E	7	G6	Magnolia			1442	
						Gould, E No. 1	6	936		4
							5	1020		4
							"4"	1136		4
								1159		3
							Dekoven	1270		4
							Davis	1303		3
6	51	3S	10E	8	B2	Sinclair-Wyoming			1068	
						Perkins, H No. 1	6	878		4
2	118	1S	10E	16	E7	Nelson-Develop.			1737	
						Reid, A No. 1	"7"	893		3
							6	940		5
							5	1034		4
							Dekoven	1289		4
7	121	3S	14W	17	H1	Halbert			985	
						Proctor No. 1	6	855		6
4	123	2S	10E	8	E7	Nelson-Develop.			1071	
						Bunting, C.A. No. 1	"7"	918		3
							6	974		4
10	143	3S	10E	13	H8	Midstates Oil Co.			988	
						Coad, M No. 1	6	964		3
							6?	971		4
9	151	1N	10E	18	D2	Midstates Oil Co.			1500	
						McKinley No. 1	Davis?	1317		5
11	156	1N	14W	10	F1	Magnolia			1426	
						Matthes No. 1	6	800		4
							5	916		3
							Dekoven?	1163		5
8	162	2S	14W	20	A6	Kingwood			1919	
						Cowling No. 1	"7"	878		3
							6	926		3
							5	1021		4
106	171	2S	10E	36	B1	Lewis Prod.			2277	
						Dunk I. No. 1A	6	1029		4
34	172	2N	10E	35	G6	Texas Co.			2439	
						Densmore No. 1	6	1000		5
							5	1081		4
91	177	1S	14W	28	D8	Superior			2157	
						Lipper No. 4	"7"	791		3
							6	828		3
							5	930		4

[a] See tabulations in Appendix for explanation of abbreviation designation for 10-acre tracts in section.

tric logs is very general throughout the county. No estimate of the resources in the "No. 7" bed is attempted.

No. 6 coal bed.—The Herrin (No. 6) coal bed was reported in 13 out of the 14 control drill holes (figs. 8, 9, 10). It appears to be absent in an area of about 2 square miles in sec. 36, T. 2 S., R. 10 E., and secs. 1, 2, 11, and 12, T. 3 S., R. 10 E. In the control drill holes in which the bed was found, the thickness was reported as between 3 and 5 feet. From an inspection

of 300 to 400 electric logs of drill holes located in the county it appears that the No. 6 coal bed is generally present.

Black shale ("slate"), not more than about 2 feet thick, is generally reported above the coal bed. No black shale was reported in the record of the drill hole (No. 34, fig. 8) showing 5 feet of coal. Difficulty in differentiating black "slate" and coal while the holes are being logged is acknowledged. Some of the thickness may be "slate," but the presence of "slate" is usually revealed in the cuttings, and this is considered in the estimates.

Above the black "slate" there is usually a limestone caprock. Aside from the depth and thickness of the bed, mining conditions would probably be favorable. For some time to come these important factors will stand in the way of commercial exploitation of the No. 6 coal bed. Diamond drilling may some day prove that the present estimates are too conservative.

The data at hand seem to indicate that No. 6 coal bed has an average thickness of at least 3 feet for the area of the county (238 square miles), representing a tonnage of approximately 714 million tons, on the basis of one million tons per square mile per foot. The depth of the bed ranges from 800 to 1050 feet.

Harrisburg (No. 5) coal bed.—The No. 5 coal bed was penetrated in eight control drill holes between 82 and 116 feet below No. 6 (figs. 8, 9, 10). In seven of these holes the bed was 4 feet thick, in the remaining one, 3 feet. It was apparently present in all the control drill holes that were logged through the lower McLeansboro and upper Carbondale beds. The thickness of the No. 5 bed seems to be somewhat greater than that of No. 6 and the bed also seems to be more widespread. A caprock limestone is reported only occasionally. Black shale, 1 to 5 feet thick, is usually present above the coal bed, and above this there is usually a considerable thickness of shale or siltstone. Assuming that the bed has an average thickness of at least 3 feet, for which there seems to be good evidence, the reserves represented by this bed amount to almost 714 million tons. Thus the estimated amount for the two beds agrees with the former estimate of 1.2 billion tons.

The depth of the No. 5 coal bed ranges in the control holes from 916 to 1136 feet. At this depth it has been assumed that a coal bed should have a thickness of 3½ feet to be workable. It is possible that the thickness of No. 5 bed usually attains this minimum.

Coal beds below No. 5.—Data have been presented (table 7, figs. 8, 9, 10) showing that beds of coal believed to be 3 to 4 feet thick have been penetrated in drilling at various levels below No. 5 bed. On earlier pages the "No. 4," "No. 2," Dekoven, and Davis beds have been described or mentioned, but better evidence of their thickness and distribution awaits improved methods of drilling or recording thicknesses of Pennsylvanian beds in rotary-drill holes or core drilling. The amount of coal in these deep-lying beds is not estimated.

Quality of the Coal

Two analyses have been made of coal samples collected from rotary-drill hole No. 121 in Edwards County (table 1). As stated in the introduction, these analyses are not strictly comparable with those made from standard face samples of coal collected in a mine.[17] When delivered to the laboratory, the sample is roughly separated from foreign material by using a separating liquid of 1.50 sp. gr. The float material, which is largely coal, is then washed to remove the film of drilling mud, dried, and then delivered to the chemical laboratory for analysis. The material analyzed is therefore a relatively clean and somewhat air-dried coal and may be equivalent to fairly well-prepared coal. The analysis probably shows somewhat lower moisture, ash, and sulfur contents than are present in the coal beds, and higher "as received" and "moist, mineral-matter-free" B.t.u. values. The unit coal values may be more nearly correct, and these are relatively high, resembling those of No. 5 coal bed in Saline County. Sulfur values are of particular interest and are relatively high. It has been pointed out (p. 13) that

[17] Holmes, J. A., The sampling of coal in the mine: U. S. Bur. Mines, Tech. Paper No. 1, 1918.

the heavier portions of the coal are likely to concentrate in the samples and thus may have a higher sulfur content than the coal as a whole. The fairly high sulfur content of these samples probably indicates a relatively high sulfur content in the bed.

OIL AND GAS RESOURCES

Although the structure maps accompanying this report provide a general picture of the "lay" of the coal-bearing strata in Edwards County, they are not designed to delineate oil and gas structures. In the first place, not all available data were used, and in the second place, the structure has been delineated according to engineering methods, without the liberties in interpretation that usually characterize oil and gas structure maps. Consequently the structural irregularities shown, although they may correspond in some places with the position of oil and gas pools, can scarcely be expected to do so consistently, and the maps are not regarded as particularly suitable for forecasting the position of undiscovered oil and gas accumulations.

CONCLUSION

In this study of the Pennsylvanian beds of Edwards County emphasis has been placed upon the coal beds and limestones in the McLeansboro and Carbondale groups. The stratigraphic logs compiled from cuttings carefully collected from control wells at close intervals and drilling time records of the same drill holes have been the principal source of information. They have provided a means of interpreting electric logs of adjacent drill holes. Study has been made of about 330 such electric logs and of the logs and cuttings from two cable-tool holes. Much more detailed information in regard to the stratigraphic succession in the McLeansboro and Carbondale groups is available in the cuttings that have been collected from the control wells than was possible or necessary to assemble for the purposes of the present report. This is particularly true of the beds above the West Franklin limestone and those below the Palzo sandstone.

SUBSURFACE GEOLOGY OF GALLATIN COUNTY NORTH OF THE SHAWNEETOWN FAULT

BY

M. WILLIAM PULLEN

INTRODUCTION

GALLATIN COUNTY occupies a position almost at the southeastern tip of the Illinois coal field. Eastward across the Ohio lies the coal field of western Kentucky, and across the Wabash in the northeastern part of the county is the extreme southern end of the Indiana field. The coals of Gallatin County rank highest among the Illinois coals, particularly the coals found in the area south of the Shawneetown fault.

This investigation has been restricted to the approximate five-sevenths of the county north of the Shawneetown fault, because the geology of the southern part of the county has been described before.[1]

Gallatin County is composed topographically of about five-sevenths of rolling prairie country of low relief in the north and two-sevenths of hilly country in the south which forms part of the area sometimes designated as the Illinois Ozarks. The southern part is commonly known as Eagle Valley, and it consists of a rather deep structural basin with rocks rising from the basin in a concentric manner to form fairly high hills around its margin. Separating Eagle Valley from the area to its north is the Shawneetown fault, along which a strong dislocation producing an uplift of not less than 3500 feet on the south occurred.[1] When the water is low along the Ohio River the trace of this fault is clearly exposed in the bed of the river.

The northern part of Gallatin County has been a much more important coal-producing region than at present. Several companies formerly shipped by rail from mines located near Equality and near Hickory Hill. Fifty years ago or more a mining village of some importance was located a short distance west of Equality, and a good deal of the coal was used in the evaporation of brine produced from salt wells situated near Equality. Mining fell off by 1920 as a result of the competition created by the development of a large mining industry in Saline, Williamson, and Franklin counties; and there have been no shipping mines in operation for about 20 years.

The same coal beds underlying and mined in Saline County and counties to the west are present in Gallatin County, but in general are somewhat thinner, somewhat higher in ash and sulfur, and of somewhat higher rank than other coals in southern Illinois.[2]

PURPOSE OF THE REPORT

This report describes the stratigraphic and structural features of the Pennsylvanian or coal-bearing rocks of the northern part of Gallatin County and evaluates the coal resources of the same area. The significance of the structural features of the Pennsylvanian beds and their relationship to oil and gas accumulations are considered briefly. To achieve these ends it was necessary to study and interpret the records of diamond and rotary holes drilled in the area. A number of control rotary-drill holes were logged by Survey field parties, with drilling time recorded at 1-, 2-, or 5-minute intervals. Drill cuttings were collected at intervals no greater than 5 feet and subsequently studied and recorded in the laboratory. Control drill holes and a few records of diamond-drill holes provided the key for the interpretation of electric logs, which were the only reliable records of many rotary-drill holes. The stratigraphic studies were based mainly on the recognition of certain key beds. Certain key beds of coal and limestone were used

[1] Butts, Charles, Geology and mineral resources of the Equality-Shawneetown area: Illinois Geol. Survey Bull. 47, 1925.

[2] Cady, G. H., Classification and selection of Illinois coals: Illinois Geol. Survey Bull. 62, p. 29, 1935.

as datum planes in the delineation of the structure of the Pennsylvanian rocks. It is expected that the information assembled will assist those officials who are responsible for protecting the workable coal beds against encroachment of any kind through abandoned drill holes, that it will be of service to those interested in the exploration and exploitation of the coal resources of the region, and that it will provide structural information which may aid in oil and gas exploration. Finally, and more academically, we hope that it will result in an improvement in the understanding of the stratigraphic succession of the Pennsylvanian system in the southern part of the Illinois coal field.

Acknowledgments

In addition to the individuals mentioned in the introductory paper, special acknowledgment is made of the assistance in correlations and in structural interpretations given by David H. Swann and E. P. DuBois of the Oil and Gas Division, H. A. Lowenstam of the Coal Division, and in the interpretation of electric logs by Carl A. Bays of the Groundwater and Geophysical Exploration Division.

PENNSYLVANIAN KEY BEDS

The widespread Pennsylvanian key beds of the Illinois basin discussed in the introductory paper (pp. 9 to 26)—Shoal Creek limestone, West Franklin limestone, "No. 7" coal bed, Herrin limestone and Herrin (No. 6) coal bed, and the Harrisburg (No. 5) coal bed—are all present in that part of Gallatin County described in this report. However, much of the area is underlain only by beds older than the Shoal Creek limestone, so that it is a key bed in only a relatively small part of the area. The West Franklin limestone and "No. 7" coal bed are not continuous and are recognizable only in limited areas, so that they also serve little purpose as key beds. Certain coal beds, particularly "No. 4," "No. 2," and the Davis bed, are sufficiently widespread and definitely recognizable in both control drill holes and in the electric logs of other drill holes to be useful as local key strata.

McLeansboro Group

Shoal Creek limestone.—The Shoal Creek limestone outcrops in the town of New Haven in northwest Gallatin County (Loc. No. 9). It appears equivalent to the limestone outcropping along Shoal Creek in Bond County. [3, 4]

The Shoal Creek (New Haven) limestone also outcrops in the northeastern end of the Shawneetown Hills (Sec. 9, T. 10 E., R. 9 S. (No. 89). In addition to a small undetermined portion of the Shawneetown Hills, this limestone underlies a wedge-shaped area between the township line running north from the town of Ridgeway and an imaginary line extending northeast from Ridgeway to New Haven. Drill holes in this area usually encountered the limestone.

The Shoal Creek limestone in outcrop has lithologic characteristics common to several Pennsylvanian limestones, particularly to those of the upper part of the McLeansboro group, and is bluish gray to gray on fresh surfaces and brownish where weathered. The rock itself is mostly close textured and dense, relatively pure, and if crystalline, only very finely so. The usual nodular structure of McLeansboro limestones is evident in certain parts of the member, and thin argillaceous partings give a semblance of irregular bedding in the lower part. The rock exposed at New Haven possesses no physical characteristic that distinguishes it from the West Franklin limestone except possibly its fairly characteristic thickness of only 3 to 7 feet and its occurrence in a single bench. Like many other limestones it is often underlain by black more or less sheety shale or "slate." It is not conspicuously fossiliferous, but brachiopods and crinoid stems are present. The range of the interval between the Shoal Creek limestone and No. 6 coal bed is 500 to 566 feet.

The Shoal Creek limestone (fig. 12) is recorded in electric logs by a pronounced

[3] Udden, Jon A., Notes on the Shoal Creek limestone: Illinois Geol. Survey Bull. 8, pp. 117-126, 1907.

[4] Cady, G. H., Significant uncertainties in Pennsylvanian correlation in the Illinois basin: Bull. Amer. Assoc. Pet. Geol., vol. 20, no. 10, pp. 1507-1524, 1929.

Succession in road cut on Indiana Highway No. 66 in northwest edge of Evansville, *Sec. 14, T. 6 S., R. 11 W.*

	Ft.	in.
1. Drift	20	
2. Shale, carbonaceous, gray-black	1	2
3. Coal (Ditney)		11
4. Underclay light gray	3	
5. Shale, gray, silty	12	
6. UPPER WEST FRANKLIN LIMESTONE Limestone gray, finely crystalline to dense, ferruginous, massive, weathers with fairly smooth surface	1	11
7. Clay and clay shale, dark gray-brown	2	1
8. MIDDLE WEST FRANKLIN LIMESTONE Limestone light gray, finely crystalline, nodular, argillaceous, weathers to small nodules, very fossiliferous	6	
9. Clay shale, variegated	6	
10. LOWER WEST FRANKLIN LIMESTONE Limestone gray, very finely crystalline to dense, waxy, brown-buff with smooth surface weathers slabby, slightly fossiliferous	1	10
11. Shale and siltstone, greenish gray	41	

Succession in Standard Brick Manufacturing Company Shale Quarry, *Sec. 22, T. 6 S., R. 11 W.*

	Ft.	in.
Siltstone and sandstone, interbedded, light gray-buff	4	6
UPPER WEST FRANKLIN LIMESTONE Limestone light gray, finely crystalline, ferruginous, sparsely fossiliferous	1	6
Shale, light green-gray	2	
MIDDLE WEST FRANKLIN LIMESTONE Limestone mottled, light gray, nodular, very fossiliferous	4	
Clay shale, variegated	3	
LOWER WEST FRANKLIN LIMESTONE Limestone light gray, massive, dense, slightly fossilferous	4	
Shale and siltstone, light greenish gray	54	

"kick" typical of thin limestone. At the position of the Shoal Creek limestone the normal curve is usually off scale (has more than 100 ohm-meters),[5] and the third curve often behaves much like the normal resistivity curve with only slightly less relief. The potential curve is usually a straight line, but occasionally there is a slight positive potential opposite the resistivity peak at the limestone (fig. 13).

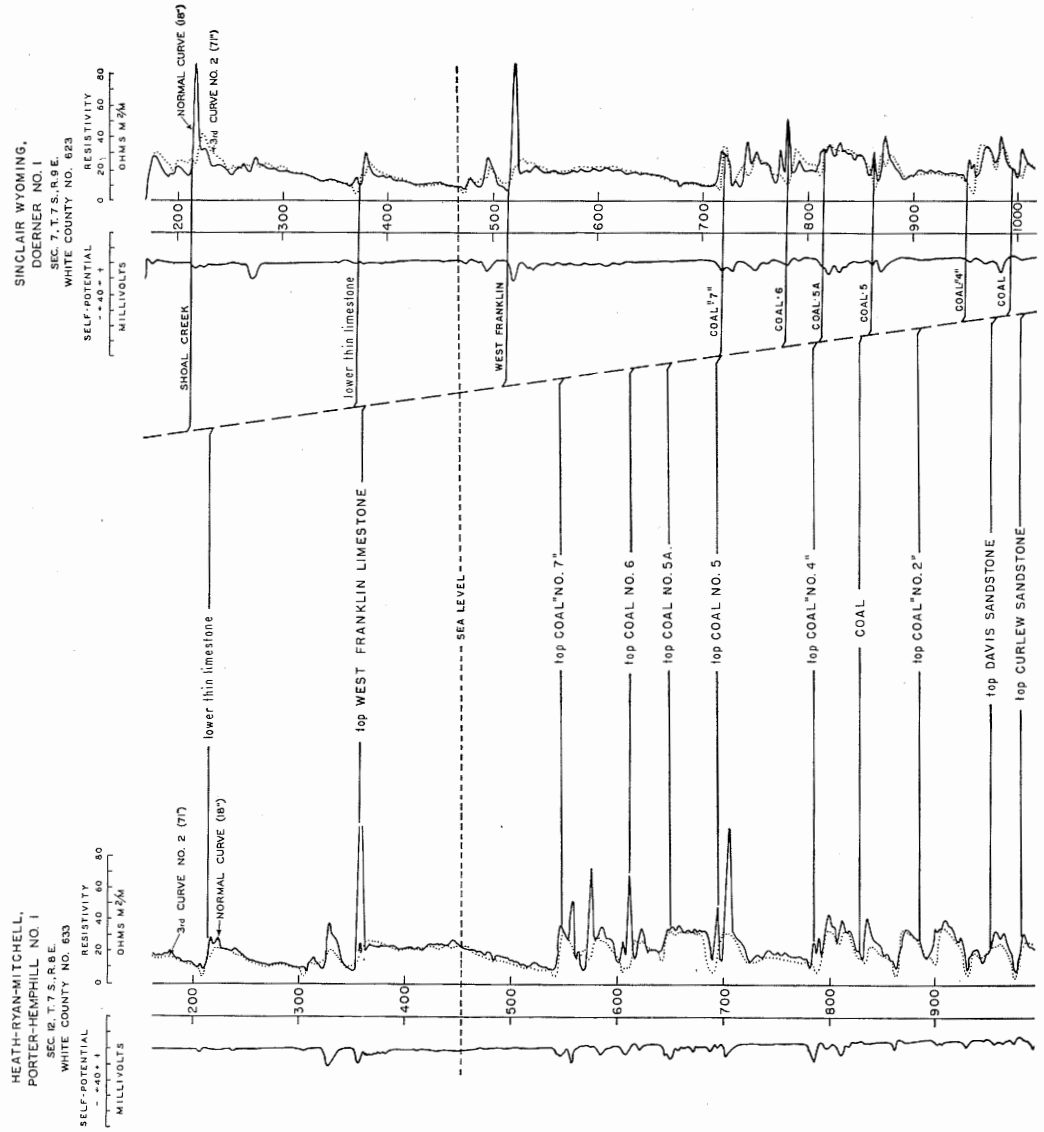
West Franklin limestone.—The West Franklin limestone in Gallatin County lies about 275 feet below the Shoal Creek limestone. The type occurrence of these beds is at West Franklin, Posey County, Indiana,[6, 7] but more complete successions of the beds are to be seen at two localities near Evansville, Indiana, as observed by J. N. Payne and the writer in 1943.

The sequence of beds observed in these two exposures is similar to that occasionally found in drill holes in Gallatin, White, Edwards, Wabash, Richland, and Clay counties. However, none of the units is continuous, and one or all the limestone beds may be absent locally. If so, the only basis for identification of the West Franklin zone may be the presence of a variegated shale (usually red in wet drill cuttings) at the appropriate position or the Ditney coal bed. There is no known way of identifying the individual limestone benches which make up the three benches of the West Franklin, and it is impossible to tell with certainty which is present when only one or two are penetrated. In these studies the thickest of two benches, or the intermediate of three benches, is regarded as representing the thick middle West Franklin member as developed in the Evansville region, and measurements are made from this bench. This procedure is more or less arbitrary and may not be correct in every case. There is insufficient evidence to justify the assumption that the variegated shale always lies between the two lower benches, al-

[5] Ohm-meters described and defined:
Mercanton, P. L., Regarding resistivity in electrical prospecting; a practice to be rejected: from a paper presented and distributed at the Int. Assoc. Terrestrial Magnetism and Elec. Wash. Assembly. September 4-15, 1939.

[6] Collett, J., 13th annual report: Indiana Dept. Geol. and Nat. Hist., pp. 61-62, 1884.

[7] Schrock, R. R., and Malott, C. A., Amer. Assoc. Pet. Geol. Bull., vol. 13, pp. 1301-1314, 1929.


HEATH-RYAN-MITCHELL,
PORTER-HEMPHILL NO. 1
SEC. 12, T. 7 S., R. 8 E.
WHITE COUNTY NO. 633
SELF-POTENTIAL
RESISTIVITY
MILLIVOLTS
OHMS M²/M
3rd CURVE NO. 2 (71')
NORMAL CURVE (18')
lower thin limestone
top WEST FRANKLIN LIMESTONE
SEA LEVEL
top COAL "NO. 7"
top COAL NO. 6
top COAL NO. 5A
top COAL NO. 5
top COAL "NO. 4"
COAL
top COAL "NO. 2"
top DAVIS SANDSTONE
top CURLEW SANDSTONE
SINCLAIR WYOMING,
DOERNER NO. 1
SEC. 7, T. 7 S., R. 9 E.
WHITE COUNTY NO. 623
SHOAL CREEK
lower thin limestone
WEST FRANKLIN
COAL "7"
COAL 6
COAL 5A
COAL 5
COAL "4"
COAL
NORMAL CURVE (18')
3rd CURVE NO. 2 (71')

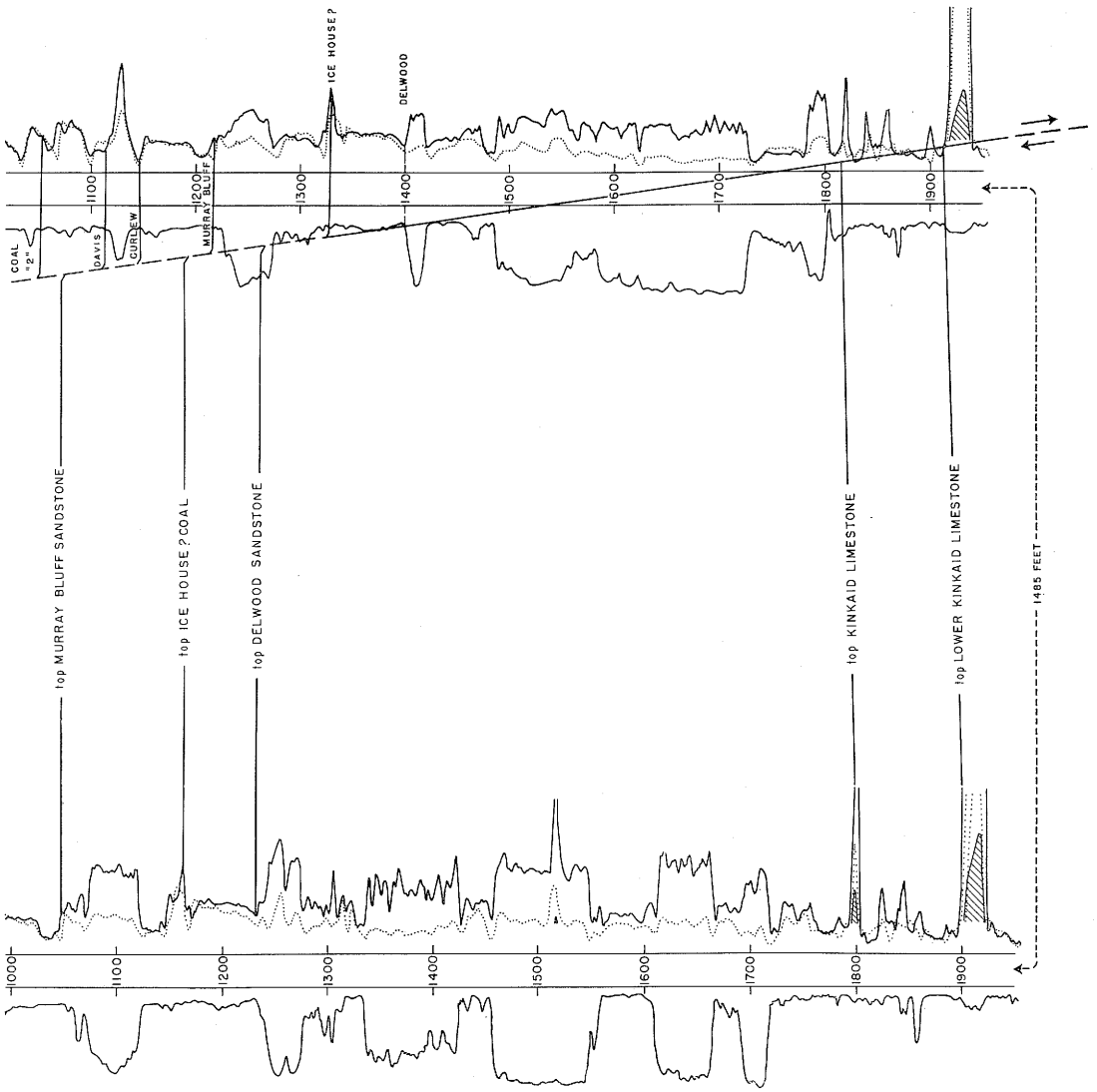


FIG. 12.—Comparison of graphic logs of two drill holes on either side of the northern part of the Ridgeway fault, showing extent and nature of displacement in southern White County.

though such a shale is common at this position. A limestone outcropping along Saline River about 2 miles northwest of Ridgeway in the NW¼ SW¼, sec. 23, T. 8 S., R. 8 E., is tentatively assigned to the West Franklin rather than to the Shoal Creek, as previously thought.[8]

The West Franklin limestone is recorded by one, two, or three characteristic limestone peaks in the normal resistivity curve. When the presence of three limestone beds is indicated, the middle peak is most prominent, having the greatest relief in both the normal and third resistivity curves, and is the peak most likely to go off scale (greater than 100 ohm-meters) in both resistivity curves. The peaks representing the other two benches rarely extend beyond the 70-ohm-meter value in the case of the normal resistivity curve, and the third resistivity curve usually shows a valley. Small negative potential usually occurs at the positions of the thinner upper and lower beds; whereas the position of the thicker intermediate bed is marked by a negative potential of as much as 50 millivolts. The position of the variegated clay shale between the two lower beds is marked by a prominent valley or re-entrant of the normal curve, which generally characterizes underclay-like shales, and by a positive peak of the potential curve.

"No. 7" coal bed.—The "No. 7" coal bed, usually only 2 to 3 feet thick, is commonly present 150 to 249 feet below the West Franklin limestone and 40 to 50 feet above Herrin (No. 6) coal bed. Its position is generally indicated on the normal resistivity curve by a peak extending about 10 ohm meters and by a re-entrant in the third resistivity curve, and the potential curve shows a slight negative value. The position of the coal bed is fairly definitely indicated because the pattern noted above terminates a rather long and monotonous pattern of low relief below the position of the West Franklin limestone. The coal bed is the first fairly distinct irregularity in the group of irregularities that mark the position of the beds near the No. 6 coal bed.

[8] Cady, G. H., Structure of Herrin (No. 6) coal bed in Hamilton, Saline, and Gallatin Counties, Illinois, north of Shawneetown fault: Illinois Geol. Survey Cir. 42 (Tabulated Coal Data, Gallatin County, Item No. 102), 1939.

Herrin limestone.—This is the caprock of the No. 6 coal bed from which it is usually separated in Gallatin County by a black shale a few feet thick. The limestone, 2 to 6 feet thick, often 3 feet, is almost as widespread in this county as the coal bed lying from 1 to 10 feet below. Except for the Jamestown limestone, a few feet higher, which it resembles, Herrin limestone is distinctive in its lithology among Pennsylvanian limestones in this part of the State. It varies in color from gray to brownish-gray to almost black and in texture from earthy to finely granular and dense. The black varieties are particularly fine grained. Bedding is usually poorly developed. The Herrin limestone is usually fossiliferous; *Fusulina girtyi* is generally present in any outcrop and is common in drill cuttings.[9] In a strip pit in sec. 16, T. 9 S., R. 8 E., the rock contains dark gray chert in large irregular masses.

The pattern produced by Herrin limestone in the electric log will be considered in the section on the Herrin (No. 6) coal bed.

Carbondale Group

Herrin (No. 6) coal bed.—The uppermost member of the Carbondale group is the Herrin (No. 6) coal bed. This bed, 4 to 5 feet thick in Gallatin County, carries here, as elsewhere in the Illinois coal field, a clay band called the blue band about 1½ inches thick, 12 to 15 inches above the base of the bed. This band, however, is not usually picked up in logging rotary-drill holes. Black "slate," 2 to 3 feet thick, commonly separates the coal bed from the Herrin limestone or caprock, and in places an additional few feet of gray shale may intervene between the black "slate" and the caprock. Beneath the coal bed are a few feet of underclay, the lower part of which in places is nodular and calcareous or sandy.

A characteristic pattern in electric logs occurs opposite the No. 6 coal bed, particularly when grouped with the overlying shales and limestones and the underclay.

[9] Dunbar, Carl O., and Henbest, Lloyd G., Pennsylvania *Fusulinidae* of Illinois: Illinois State Geol. Survey Bull. 67, p. 24, plate II, 1942.

Generally the caprock is recorded by a peak with 10 to more than 100 ohm-meters relief on the normal curve. The underlying gray shales are recorded as normal shale curves on both resistance and potential sides. The black "slate" and coal beds are recorded as one unit by a definite peak or peaks in one or both of the resistivity curves. Whether the resistivity peaks are positive or reverse depends on the thickness of the beds. If the thickness of the bed exceeds the electrode spacing, a positive peak results; if thinner, a valley or re-entrant results. This spacing is 18 inches for the normal resistivity curve, 53 inches for the third resistivity curve No. 1, and 71 inches for the third resistivity curve No. 2. The underclay generally produces prominent valleys or re-entrants in the normal and third resistivity curves. The resistivity curves commonly are lower in value for underclay than the shale base line, and the potential curve has a small positive value.

The limestone, shale, black "slate," coal, and underclay sequence produces a distinctive and readily recognizable pattern.[10] However, in some logs the pattern thought to represent these beds consists of a single positive deflection of the two resistivity curves with a slight break near the middle of the normal resistivity curve (fig. 13). This break probably represents the gray and black shales lying between the limestone and coal beds. The characteristic underclay resistivity curve occurs below this pattern.

Harrisburg (No. 5) coal bed.—This bed lies 90 to 122 feet below No. 6 bed and is 4 to 5 feet thick. The usual interval between the two beds is about 110 feet. Several feet of dark gray shale or black "slate" commonly overlie the coal bed. Usually there is no limestone above the black shale, but if one is present, it is thin and impure. Below the coal bed there is usually 2 to 4 feet of structureless gray underclay containing gray calcareous nodules in the lower part.

[10] Taylor, Earle F., Pullen, M. William, Sims, Paul K., and Payne, J. Norman, Methods of subsurface study of the Pennsylvanian strata encountered in rotary-drill holes: Illinois Geol. Survey Rept. Inv. 93, pp. 16-19, 1944.

No. 5 coal bed generally produces a prominent peak on the normal curve with a relief of 10 to 50 ohm-meters (pl. 6). The third resistivity curve produces a similar peak if the bed thickness exceeds the width of the electrode spacing and a sharp reversal when the bed thickness is less than the electrode spacing. The potential curve commonly has some negative value. This may amount to 50 millivolts or more opposite No. 5 coal bed.

OTHER BEDS OF STRATIGRAPHIC INTEREST

McLeansboro Group

Limestones between Shoal Creek and West Franklin.—Two thin beds of limestone are usually penetrated in drill holes in the interval between the Shoal Creek (New Haven) and West Franklin limestones. They are not known to outcrop and their character is known only from drill cuttings. The pattern of some electric logs suggests the presence of limestone at the appropriate positions (fig. 12). These beds underlie the wedge-shaped area in which the Shoal Creek limestone is found and are also present in other parts of the county wherever the West Franklin limestone is overlain by 175 feet or more of Pennsylvanian strata. The upper limestone is about 1 foot thick and fossiliferous, lying 400 to 460 feet above No. 6 coal bed and 150 to 210 feet above the West Franklin limestone. The second bed, 2 feet thick, lies 15 to 65 feet below the first. These two beds were penetrated in the diamond drill hole, White County (No. 4), near New Haven in sec. 31, T. 7 S., R. 9 E., where the upper bed is 434 feet above No. 6 coal bed and is separated from the lower bed by 50 feet of shale.

The electric log of the control well located in the NE¼, NE¼, NW¼, sec. 22, T. 7 S., R. 9 E. (No. 133) displays a characteristic pattern at the positions of these two limestones. This consists of a small peak in the third resistivity curve, accompanied by a small negative potential. The presence of a similar pattern with similar spacing in electric logs of other drill holes indicates the presence of these limestones.

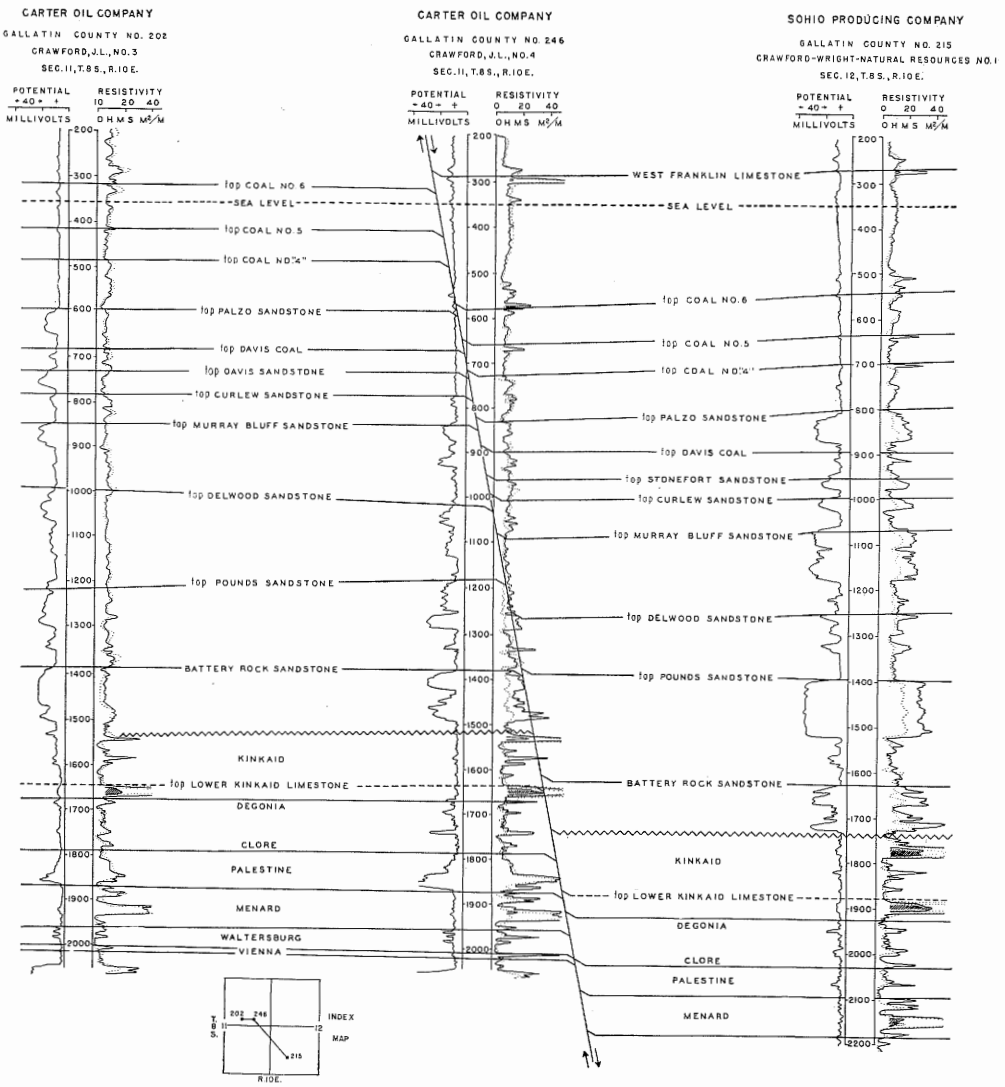


FIG. 13.—Graphic logs of three drill holes adjacent to the Inman East fault in Gallatin County, showing extent and nature of displacement.

Bankston Fork and Jamestown limestones and Anvil Rock sandstone.—The Bankston Fork and Jamestown limestones lie between the "No. 7" coal bed and the Herrin limestone over wide areas in southern Illinois. The Jamestown limestone, not over 4 feet thick and usually less, resembles and lies a few feet above the Herrin limestone. The two limestones are separated by the thin Jamestown coal bed which is usually only a few inches thick and accompanied by not more than a few inches of overlying dark gray shale and underlying clay.

The two limestones are so nearly alike and so closely associated that their differentiation in electric logs is impossible. The Bankston Fork limestone is more definitely

accentuated electrically by its position above predominately silty or sandy beds up to 25 feet or more thick separating this limestone from the Jamestown and Herrin limestones.

In wide areas in southern Illinois, including parts of Gallatin County, these sandy beds are represented by the Anvil Rock sandstone member, which may occupy the entire interval of 15 to 25 feet between the two limestones, and in some places may even extend to, into, or through the No. 6 coal bed as it does in certain areas in Saline County.[11]

The Bankston Fork limestone, about 5 feet and rarely more than 8 feet thick, is a dense light gray limestone that weathers to an ochre color. It is sparingly fossiliferous and is the uppermost bed in which *Fusulina girtyi* has been found. Its occurrence, however, is infrequent in contrast with the common occurrence of this fossil form in the Herrin limestone. The Bankston Fork limestone is somewhat unique among limestones in the McLeansboro and Carbondale groups because it is usually underlain by siltstone or sandstone rather than by black shale and a coal bed. There is, however, often a thin coal bed a short distance above the Bankston Fork limestone. The limestone therefore has the position usually occupied by the so-called "freshwater" or underclay limestone of the typical Pennsylvanian cyclical formation.[12] The Bankston Fork limestone is definitely a marine limestone carrying brachiopods and fusulinids.

In electric logs, at the position of the Bankston Fork limestone, the normal resistivity curve shows 10 to 50 ohm-meters relief with the third resistivity curve showing a re-entrant unless the bed is unusually thick (pl. 6). The potential curve usually shows a slight negative potential. A similar pattern a few feet above the position assigned to the Herrin limestone, on the basis of the prominent peak characteristic of that bed, may be ascribed to the effect of the Jamestown limestone and coal bed. However, this bed cannot be differentiated in most electric logs from the Herrin limestone. A fairly prominent deflection to the right of the normal and third resistivity curves and a corresponding relatively high negative potential generally indicate the presence of the Anvil Rock sandstone.

[11] Cady, G. H., Coal resources of District V (Saline and Gallatin counties): Illinois Geol. Survey Min. Inv. Bull. 19, pp. 21-25.

[12] Cady, G. H., Areal geology of Saline County: Trans. Illinois Acad. Sci., vol. 19, p. 261, 1926.

Carbondale Group

Briar Hill (No. 5A) coal bed and the Absher sandstone.—The thin No. 5A coal bed, 1 to 2 feet thick in this area, lies 40 to 60 feet below the No. 6 bed. It is usually accompanied by an overlying bed of black shale 1 to 2 feet thick, but rarely by a limestone above the shale. Between No. 5A and No. 6 coal beds there is often a more or less massive sandstone (pl. 6). Like other Pennsylvanian sandstones this one is not continuous in a massive form. Sandstone at this position is well exposed at the Absher Post Office in southeastern Williamson County. When beds other than the sandstone are present, it cannot be assumed that these beds are necessarily contemporaneous. They may be considerably older.

No. 5A coal bed produces a small peak on the normal curve usually with less than 10 ohm-meters of relief, whereas the third resistivity curve shows a re-entrant. Occasionally a small negative potential is indicated, but more often this curve is smooth (pl. 7).

When the sandstone between No. 6 and No. 5A coal beds is present, a sandstone pattern is present in both normal resistivity and potential curves. This and the Palzo sandstone described below are the two most conspicuous sandstones of the Carbondale.

"No. 4" coal bed.—This thin coal bed ranges from a few inches to 3 feet, but is commonly 1 to 2 feet thick and lies 161 to 202 feet below No. 6 in this area. The average interval is 185 feet. The interval to No. 5 coal bed is from 70 to 90 feet. The bed is usually overlain by black shale or "slate"; a thin bed of limestone is commonly present below the coal bed.

These beds produce a fairly distinctive pattern on the electric log. The normal curve usually has 10 to 20 ohm-meters of relief with twin points on the highest resistivity part of the curve. The third

TABLE 8.—INTERVALS BETWEEN TOP OF NO. 6 COAL BED AND TOP OF CERTAIN PENNSYLVANIAN LIMESTONES AND COAL BEDS AND THE BASE OF THE LOWER KINKAID AND TOP OF VIENNA LIMESTONE OF THE CHESTER SERIES IN GALLATIN COUNTY

Bed	Number of datum points	Range of interval, bed to top of No. 6 coal, ft.	Average interval, bed to top of No. 6 coal, ft.	Number of datum points	Range of interval, bed to top of No. 6 coal, ft.	Average interval, bed to top of No. 6 coal, ft.	Number of datum points	Range of interval, bed to top of No. 6 coal, ft.	Average interval, bed to top of No. 6 coal, ft.
	T. 7 S., R. 8 E.			T. 7 S., R. 9 E.			T. 7 S., R. 10 E.		
Top:									
New Haven (Shoal Creek?) limestone							1	500	500
West Franklin limestone	2	268–270 above	269	5	241–288 above	257	4	277–289 above	284
No. 6 coal bed									
		below			below			below	
No. 5 coal bed	23	90–117	102	6	95–111	102	6	96–98	97
No. "4" coal bed	16	175–187	179	5	187–202	192	6	170–185	177
Davis coal bed	16	290–352	338	5	346–372	359	6	314–380	344
Base:									
Lower Kinkaid limestone	16	1374–1442	1415	2	1236–1308	1272	6	1364–1397	1372
Top:									
Vienna limestone	11	1706–1807	1768	4	1584–1675	1613	6	1682–1729	1697
	T. 8 S., R. 8 E.			T. 8 S., R. 9 E.			T. 8 S., R. 10 E.		
Top:									
New Haven (Shoal Creek?) limestone				2	514–566	540			
West Franklin limestone	1	255 above	255	34	200–267 above	249	[a]11	250–280 above	266
No. 6 coal bed									
		below			below			below	
No. 5 coal bed	8	98–126	112	41	98–120	107	[b]111	91–122	102
No. "4" coal bed	3	178–192	183	21	172–192	180	[c]92	161–192	171
Davis coal bed	4	338–370	356	40	344–393	363	[d]97	352–395	370
Base:									
Lower Kincaid limestone	4	1415–1506	1455	22	1302–1378	1334	[e]92	1315–1468	1396
Top:									
Vienna limestone	2	1747–1790	1768	40	1606–1718	1673	[f]78	1680–1785	1746

[a] Not including holes with intervals 169′ and 134′ which are shortened through faulting.
[b] Not including holes with intervals 86′, 76′, and 70′ which are shortened through faulting.
[c] Not including holes with intervals 146′, 148′, and 156′ which are shortened through faulting.
[d] Not including holes with intervals 338′, 330′, 292′, 308′, 340′, 242′, and 298′ which are shortened through faulting.
[e] Not including holes with intervals 1152′, 1158′, 1150′, 1414′, 1219′, 1086′, 1220′, 1249′, 1234′, 1208′ which are shortened through faulting.
[f] Not including holes with intervals 1444′, 1442′, 1426′, 1486′, 1488′, 1456′, 1562′, 1435′, 1566′, 1500′, 1538′, 1546′ which are shortened through faulting.

TABLE 8.—Concluded

Bed	Number of datum points	Range of interval, bed to top of No. 6 coal, ft.	Average interval, bed to top of No. 6 coal, ft.	Number of datum points	Range of interval, bed to top of No. 6 coal, ft.	Average interval, bed to top of No. 6 coal, ft.	Number of datum points	Range of interval, bed to top of No. 6 coal, ft.	Average interval, bed to top of No. 6 coal, ft.
	T. 9 S., R. 8 E.			**T. 9 S., R. 9 E.**			**T. 9 S., R. 10 E.**		
Top:									
New Haven (Shoal Creek?) limestone.....									
West Franklin limestone..									
No. 6 coal bed.....		above			above			above	
		below			below			below	
No. 5 coal bed.....	11	102–125	115	[g]5	105–118	111	5	112–128	122
No. "4" coal bed.....	2	180–188	184	[g]5	180–197	186	5	184–199	191
Davis coal.....	2	373–378	375	[g]5	363–396	378	5	320–390	373
Base:									
Lower Kinkaid limestone..	2	1458–1507	1482	[g]5	1398–1433	1416	5	1362–1461	1408
Top:									
Vienna limestone.....	2	1808–1861	1834	[h]4	1758–1777	1766	5	1692–1790	1722

[g] Intervals estimated from No. 5 coal on three wells in Junction oil pool.
[h] Intervals estimated from No. 5 coal on two wells in Junction oil pool.

resistivity curve often shows a re-entrant opposite the normal curve, and the potential curve may have up to 20 millivolts of negative potential.

The coal bed designated "No. 2," thought to represent the LaSalle (No. 2) bed, commonly overlies the Palzo sandstone. It is usually thin, less than 3 feet, and is accompanied by several feet of black "slate" without a limestone. In electric logs the position of this coal bed is indicated by an abrupt increase of 10 to 20 ohm-meters on the normal and third resistivity curves, and 5 to 20 millivolts of negative potential. Sandstones immediately above and below "No. 2" coal bed occasionally have shows of oil in this area (pl. 6).

The Palzo sandstone, basal member of the Carbondale group as recently defined,[13] is a conspicuous but lenticular sandstone. In southeastern Williamson and southern Saline counties it outcrops and forms a line of prominent, although discontinuous, hills extending from Palzo eastward to the vicinity of Mitchellsville, a small hamlet about 8 miles south of Harrisburg on State Route No. 34. Although usually present the sandstone is actually lenticular and may be absent locally. Usually the underclay of "No. 2" coal rests upon this sandstone. Sometimes it rests on shale or siltstone, probably the local equivalent of the sandstone. The Palzo member is generally 40 to 50 feet thick, but greater thicknesses have been observed (County Nos. 200 and 229). The upper part of the Palzo sandstone locally contains small shows of oil (County No. 200).

Tradewater and Caseyville Groups

The designation of the base of the Palzo sandstone as the base of the Carbondale group does not establish the position of the top of the Tradewater group, and this position has not been defined. However, in many places the beds within 25 to 30 feet below the Palzo sandstone include one or two beds of coal. When both are present, the upper one is regarded as the Dekoven bed and is rarely more than 3 feet thick and usually less. The lower one is the Davis bed, with a maximum thickness of about 4 feet. In western Kentucky the beds have been called respectively the "three-foot" and "four-foot" beds as well as Dekoven and Davis.[14] The thicknesses of the beds are characteristic along the outcrops of the beds in Williamson and Saline counties, but are variable a few miles northward. The interval between the beds varies from about 10 to about 30 feet or more.[15] The lower surface of the Palzo sandstone is very uneven. In several localities it directly overlies the Dekoven coal bed, which is considered the top of the Tradewater group at such places. At some other places it apparently rests on strata below the Dekoven bed and may extend down to the top of the Davis coal bed. Wherever this is the case, the Davis coal bed is locally the uppermost bed of the Tradewater group. However, the base of the sandstone may be some distance above even the top of the Dekoven coal bed, and where this is the case, little is known of the character of the intervening beds. It cannot be definitely stated that one or more thin coal beds may or may not be included in these strata. In most places the Dekoven coal bed lies near the top of the Tradewater.

In subsurface the Davis and Dekoven coal beds often split, making a total of three coal beds. In some places diamond-drill cores reveal the presence of only two underclays, one beneath the middle of three beds and one below the lower bed. The middle bench therefore appears to be a split from the upper bench. There is inadequate evidence to prove whether this is the case in rotary-drill holes showing three coal beds.

The Davis bed is the most persistent and the thickest of the two beds; the Dekoven bed is locally cut out by the Palzo sandstones. Identification is difficult in electric logs, however, and this may account for the wide range of interval between No. 6 and the bed identified as Davis (table 8).

The Dekoven and Davis coal beds produce an electrical log pattern similar to that

[13] Weller, J. Marvin, Geology and oil possibilities of extreme southern Illinois: Illinois Geol. Survey Rept. Inv. 71, p. 36 (footnote 13), 1940.

[14] Lee, Wallace, Geology of Shawneetown quadrangle in Kentucky: Kentucky Geol. Survey, pp. 28 and 30, 1916.

[15] Cady, G. H., Coal resources of District V (Saline and Gallatin counties): Illinois Geol. Survey Min. Inv. Bull. 19, p. 40 and plate VI, 1919.

of the Harrisburg (No. 5) coal bed but with less relief on all curves. The third resistivity curve is usually a re-entrant since the coal bed is rarely thick enough to cause a peak pointing to the right. Generally only one curve stands out as representative of a coal bed (pls. 6 and 7; and control wells Nos. 133, 123, and 342). If either of the beds is split or one is absent, it is difficult to arrive at the correct interpretation (pl. 7).

Most of the Tradewater and Caseyville strata below the Davis coal bed follow Weller's designations.[16] The chart (pl. 6) shows the general nature of the succession encountered in drill holes in Gallatin County as now known. The use of definite names, such as Davis, Curlew, Murray Bluff, Delwood, Grindstaff, Pounds, and Battery Rock, for seven fairly thick and persistent sandstone members of the Tradewater and Caseyville groups, and the designation of intervening coal, shale, and limestone beds as Stonefort, Bald Knob, Ice House, Willis, and Battery Rock members, probably oversimplifies conditions as they actually exist. This implies more simplicity in the identification and correlation of individual members than is actually encountered even employing accurate and detailed well logs. The beds are lenticular and the sandstones overlap. Often two or more sandstones coalesce to form a single massive unit, and recognition of the original beds, as such, is impossible.

No diagnostic petrographic, lithologic, or paleontologic characteristics have been found which differentiate the beds, except possibly the occasional quartz pebbles in the sandstones of the Caseyville group. Such pebbles have not been found in beds of Tradewater age. However, the presence of such pebble conglomerate in the lower Pennsylvanian sandstones penetrated in drill holes in the Illinois basin is rarely reported. This may be because broken fragments in the cuttings are seldom recognizable as pebbles. Pebbles have been reported from drill holes as far north as Clay County.[17]

[16] Weller, J. Marvin, Geology and oil possibilities of extreme southern Illinois: Illinois Geol. Survey Rept. Inv. 71, pp. 36-42, 1940.

[17] Found by the writer in cuttings from drill holes in the Bible Grove pool in Clay County.

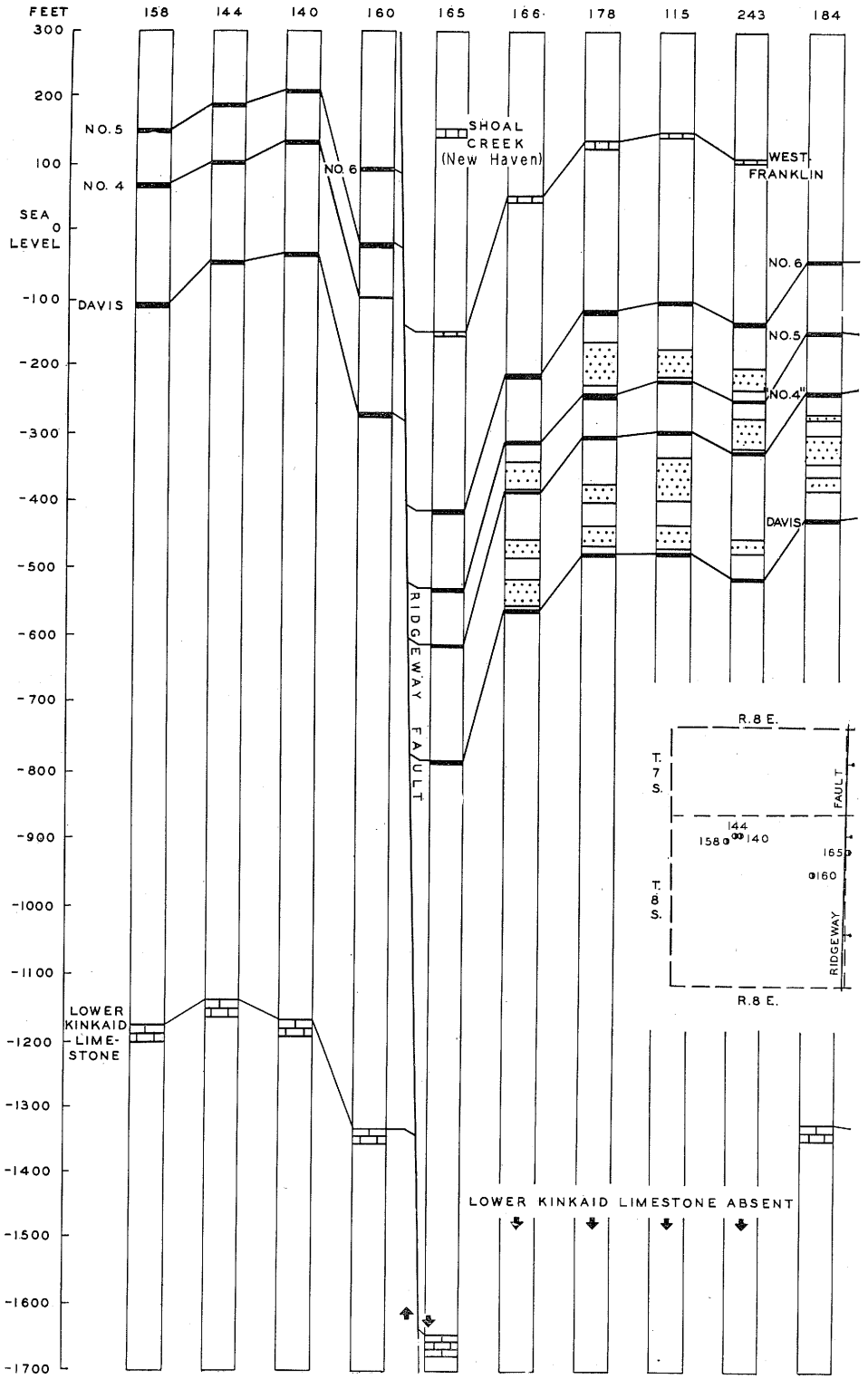
The thickness of the Tradewater and Caseyville groups in Gallatin County ranges from 830 to 920 feet in the control drill holes logged to the base of the Pennsylvanian system (Nos. 119, 200, 342).

STRUCTURE

Structure of the Pennsylvanian strata in Gallatin County is based on the variations in altitude of No. 6 coal bed. This bed is present in outcrop in the southern part of the county and has been explored with rod drills where it lies at shallow depths and with diamond drills at various places farther north. Within recent years many rotary-drill holes have penetrated the bed; of these, 11 are classified as control drill holes, having been logged through part or all of the Pennsylvanian succession by Survey field parties. Control wells were so located as to extend stratigraphic information into parts of the county where such data were not previously known, where electric logs constituted the only information available, or where interpretation of structural conditions required additional information. The various datum points upon which the structure map is based are fairly well distributed. Diamond-drill and control wells, with reliable lithologic records, provide adequate control of coal beds in drill holes at intervening locations for which only electric logs are available (fig. 17).

The present map (pl. 8) is a revision of an earlier one which included also part or all of Hamilton, White, and Saline counties.[18] No. 6 coal bed was selected as a structure datum because of its widespread economic importance in southern and southwestern Illinois, although it is somewhat less important than No. 5 bed in Saline and Gallatin counties. No. 6 coal is identifiable with relative ease where encountered in drill holes because of its exceptional thickness compared to other Illinois coal beds and its association with a fairly thick characteristic limestone caprock.

[18] Cady, G. H., Structure of Herrin (No. 6) coal bed in Hamilton, Saline, and Gallatin counties, Illinois, north of Shawneetown Fault: Illinois Geol. Survey Cir. 42 (structure map), 1939.


FEET
158
144
140
160
165
166
178
115
243
184
300
200
100
SEA LEVEL
0
-100
-200
-300
-400
-500
-600
-700
-800
-900
-1000
-1100
-1200
-1300
-1400
-1500
-1600
-1700
NO. 5
NO. 4
DAVIS
NO. 6
SHOAL CREEK (New Haven)
RIDGEWAY FAULT
WEST FRANKLIN
NO. 6
NO. 5
NO. 4
DAVIS
LOWER KINKAID LIME-STONE
LOWER KINKAID LIMESTONE ABSENT
R. 8 E.
T. 7 S.
T. 8 S.
FAULT
RIDGEWAY
158
144
140
165
160
R. 8 E.

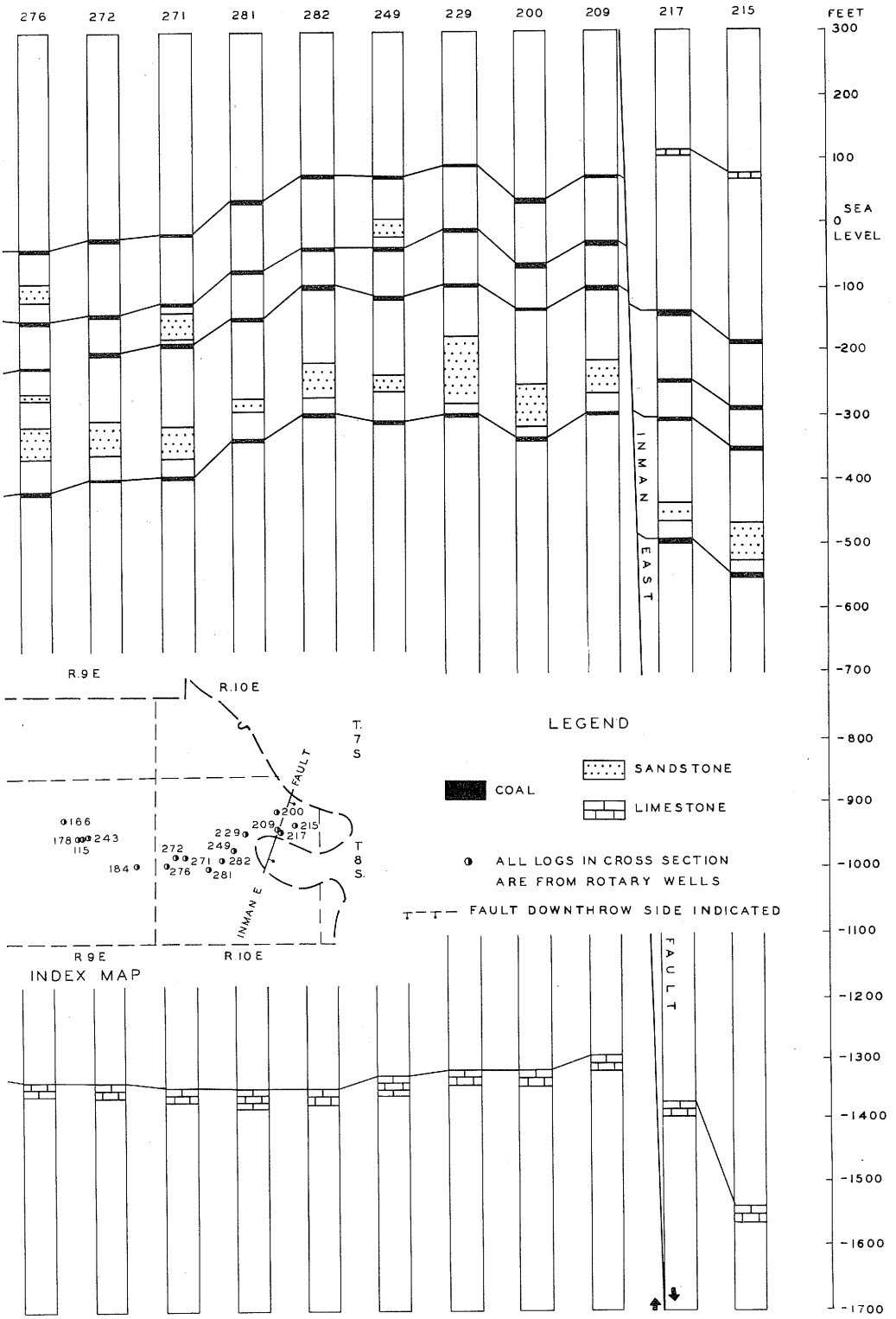


FIG. 14.—Graphic logs of drill holes arranged from west to east, from Omaha to Inman East pools in Gallatin County.

Structure of the No. 6 coal bed.—From its outcrop along the southern margin of the area the bed declines from an altitude of about 400 above to an altitude of 412 feet below sea level, on the downthrow side of the fault block in sec. 7, T. 8 S., R. 9 E. (No. 165). The structure map (pl. 8) shows a regional northward dip of 50 to 100 feet per mile. Interrupting the regional northward dip are important irregularities, including a conspicuous anticlinal dome southwest of the town of Omaha, anticlinal structures at the sites of Inman, Inman West, Junction, and New Haven oil pools, and several normal faults.

General parallelism of Pennsylvanian beds and of Pennsylvanian and Chester beds.—The structure of No. 6 coal bed (pl. 8) is closely parallel to other widespread beds of the Pennsylvanian system and to the Chester series as is shown by the interval between No. 6 coal bed and the New Haven and West Franklin limestones, the No. 5, "No. 4," and Davis coal beds, and the lower Kinkaid and Vienna limestones (table 8).

The isopach map (fig. 15) shows the distribution of variations in interval between No. 6 and No. 5 coal beds. It reveals a slightly smaller interval between the coal beds in the central part of the area as compared with the interval between the beds to the east and west. A thickening of the Absher sandstone, between No. 6 and No. 5A coal beds, generally accompanies an unusual increase in interval between these two coal beds.

A comparison of the structure map of No. 6 coal bed with study structure maps, made on Chester limestones, indicates that in general the interval increases toward the west (fig. 16) (T. 7 and 8 S., R. 8 E.). In local areas the coal and the lower Kinkaid limestone are nearly parallel, as for example, across the Omaha dome.

Table 8 gives the variation of the average interval between No. 6 coal bed and two Chester limestones, by township: 210 feet (1272 to 1482 feet) for the lower Kinkaid and 221 feet (1613 to 1834 feet) for the Vienna limestone. Variations in interval between beds, in both the Pennsylvanian system and between the Pennsylvanian system and Chester series, are on the order of 1 foot in 7 to 1 foot in 10.

Study structure maps of the Kinkaid and Vienna limestones show anticlinal structures close to the same positions as those shown on the structure map of the No. 6 coal bed. The pattern of the contours delineating the Omaha dome is essentially the same for both Pennsylvanian and Chester strata.

The isopach map (fig. 16) shows the distribution of variations in interval between No. 6 coal bed and the base of the lower Kinkaid limestone. The shorter interval occurs near the center of the map with longer intervals shown to the east and west. The area where the shorter interval occurs corresponds to the area of the Wabash Valley (New Harmony) anticlinal graben. It appears necessary, therefore, to postulate either some folding and erosion of the Kinkaid along this anticline before deposition of the Pennsylvanian beds or nondeposition during late Chester seas over high places or islands along the anticline. After deposition of Pennsylvanian beds, subsequent faulting and further folding produced a graben along the axis of the pre-Pennsylvanian anticline. Some drill holes failed to penetrate any Kinkaid, although they reached beds at lower stratigraphic levels (Nos. 132, 369, 115, and 243 in T. 7 and 8 S., R. 9 E.).

In the Kinkaid–No. 6 coal bed isopach map (fig. 16), intervals for the drill holes adjacent to, and east of, the Inman East fault zone in the Inman East pool were disregarded because the holes cross the fault plane. Thus, intervals between No. 6 coal bed and lower Kinkaid do not represent true stratigraphic intervals because of the omission of beds through faulting. Well No. 165, sec. 7, T. 8 S., R. 9 E., is cut by the Ridgeway fault in at least two places. One fault plane crosses the drill hole between the Kinkaid limestone and No. 6 coal bed,

thereby making the distance between the two beds about 100 feet less than the normal stratigraphic interval. This shortened interval was taken into account in preparation of the map.

Because the Pennsylvanian beds are all equally involved in the folding which produced the Omaha dome, and because there was little apparent thinning of these strata across the structure, it appears that most of the deformation took place after the deposition of these beds.

Faults

No evidence of displacement has been found in outcrop in this area except along the Shawneetown fault which marks its southern boundary. This fault has been observed when exposed at times of low water in the bed of the Ohio river. The evidence of faulting along other fault lines mapped consists entirely of drilling and mine data.

Besides the Shawneetown fault, which is a zone of major faulting not considered in this report, the faults or fault zones are the Ridgeway, Herald, Maunie, and Inman East, of which only the Ridgeway fault has been described.[19] These are all inclined normal faults or fault zones. Along each, drill holes show a shortened section due to omission of beds.

Along the Ridgeway fault, crossing the area from north to south and passing a short distance west of Ridgeway, the strata are downthrown to the east about 440 feet (fig. 12 and pl. 7). Its existence as a fault zone rather than as a sharp monocline[20] is established by omission of strata in a drill hole in sec. 7, T. 8 S., R. 9 E. (No. 165), which definitely cuts one fault at about 1560 feet and a second at 2600 feet (pl. 7). The hole starts in Pennsylvanian strata on the downthrown block and at 1560 feet passes into the first upthrow block with 55 feet of throw; between 1910-1950 feet it possibly passes into a second with a throw of 110 feet, and at 2600 feet into the third with a throw of 230 feet. Just above 2600 feet the drill hole is in strata of the Hardinsburg formation, and at 2600 feet it passes into strata of the Paint Creek formation, which is stratigraphically 230 feet lower than the Hardinsburg. The upper and lower faults are definitely determined. The middle fault is inferred because of the short interval between the top of the lower Kinkaid limestone and the base of the Pennsylvanian system.

Because the hole was dry and no others have been drilled nearby to the west, there is no means of direct comparison of the position of Pennsylvanian beds on the two sides of the fault. Scattered drill holes to the west (Nos. 340 and 160) indicate that corresponding key beds are much higher on the west than on the east side of the fault. Thus the altitude of No. 6 coal bed is 412 feet below sea level in drill hole No. 165, whereas in the drill hole in sec. 1, T. 8 S., R. 8 E. (No. 340) the coal lies 35 feet above sea level. What is believed to be the same fault is cut by several drill holes about 1½ miles north of Gallatin County along the east edge of the Roland pool in southern White County.

Proof of the southward extension of the fault across T. 9 S. is lacking. Earlier maps have indicated a fault zone[21] in one case, a sharp fold in another,[22] and essentially no irregularity in a third,[23] depending largely on the interpretation of four inadequate drill hole records in sec. 1 (No. 95) and sec. 24 (Nos. 34–36, and 98). The interpretation adopted here, as shown by the tabulated data, provides the basis for mapping the fault as indicated. The workings of the small mine in sec. 13 (No. 67) extend only a short distance east of the shaft, and terminate about one-quarter mile west of the indicated position of the fault.

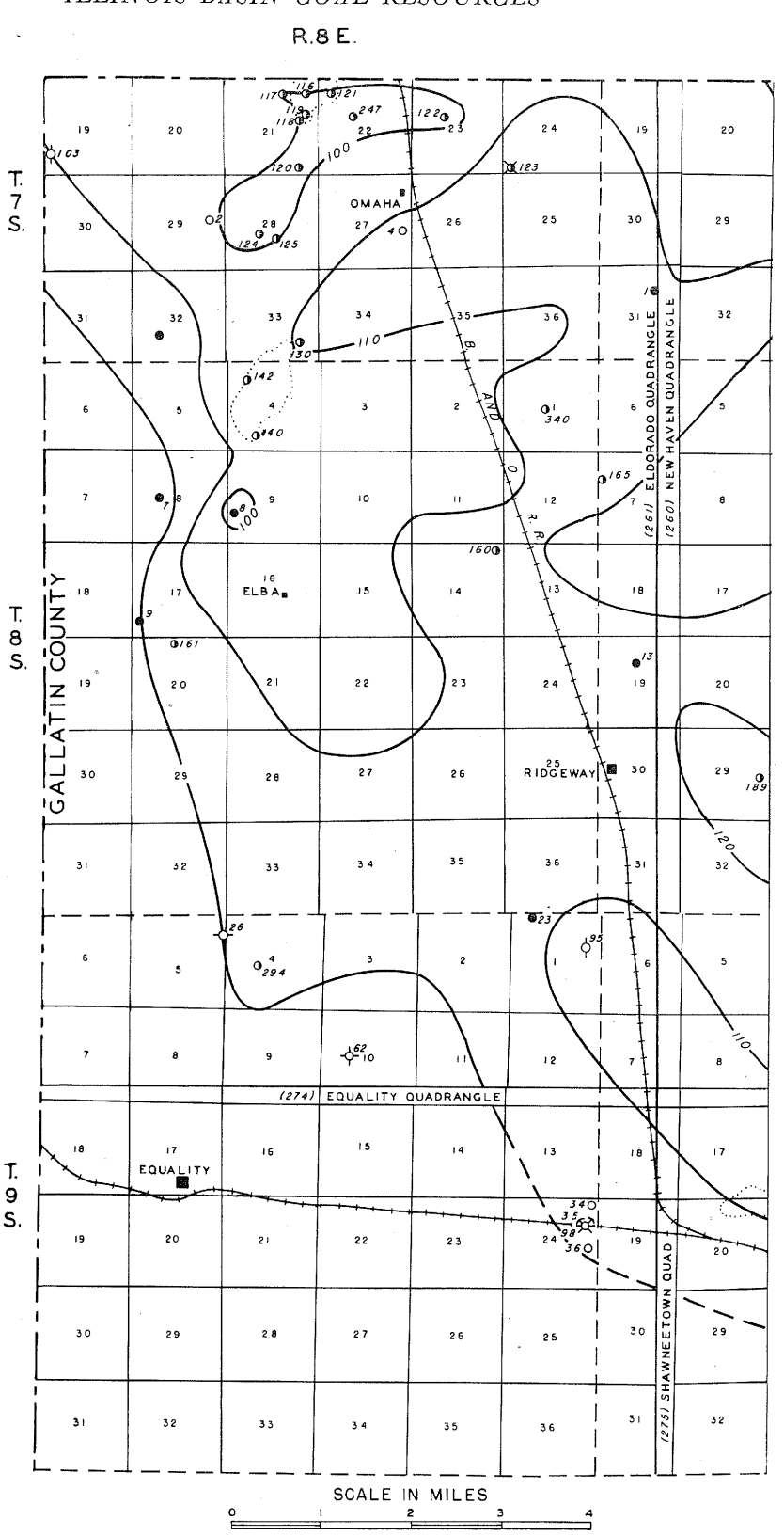
[19] Cady, G. H., Coal resources of District V (Saline and Gallatin counties): Illinois Geol. Survey Min. Inv. Bull. 19, plate I, 1919.

[20] Cady, G. H., Structure of Herrin (No. 6) coal bed in Hamilton, White, Saline, and Gallatin counties, Illinois, north of the Shawneetown fault: Illinois Geol. Survey Cir. 42, pp. 6-7, map, 1939.

[21] Cady, G. H., Coal resources of District V (Saline and Gallatin counties): Illinois Geol. Survey Min. Inv. Bull. 19, plate I, 1919.

[22] Cady, G. H., Structure of Herrin (No. 6) coal bed in Hamilton, White, Saline, and Gallatin counties, Illinois, north of Shawneetown fault: Illinois Geol. Survey Cir. 42, structure map, 1939.

[23] Butts, Charles, Geology and mineral resources of the Equality and Shawneetown area: Illinois Geol. Survey Bull. 47, plate I, 1925.


R.8 E.
T. 7 S.
T. 8 S.
T. 9 S.
GALLATIN COUNTY
OMAHA
ELBA
RIDGEWAY
EQUALITY
B. AND O. R. R.
(261) ELDORADO QUADRANGLE
(260) NEW HAVEN QUADRANGLE
(274) EQUALITY QUADRANGLE
(275) SHAWNEETOWN QUAD
SCALE IN MILES
0 1 2 3 4

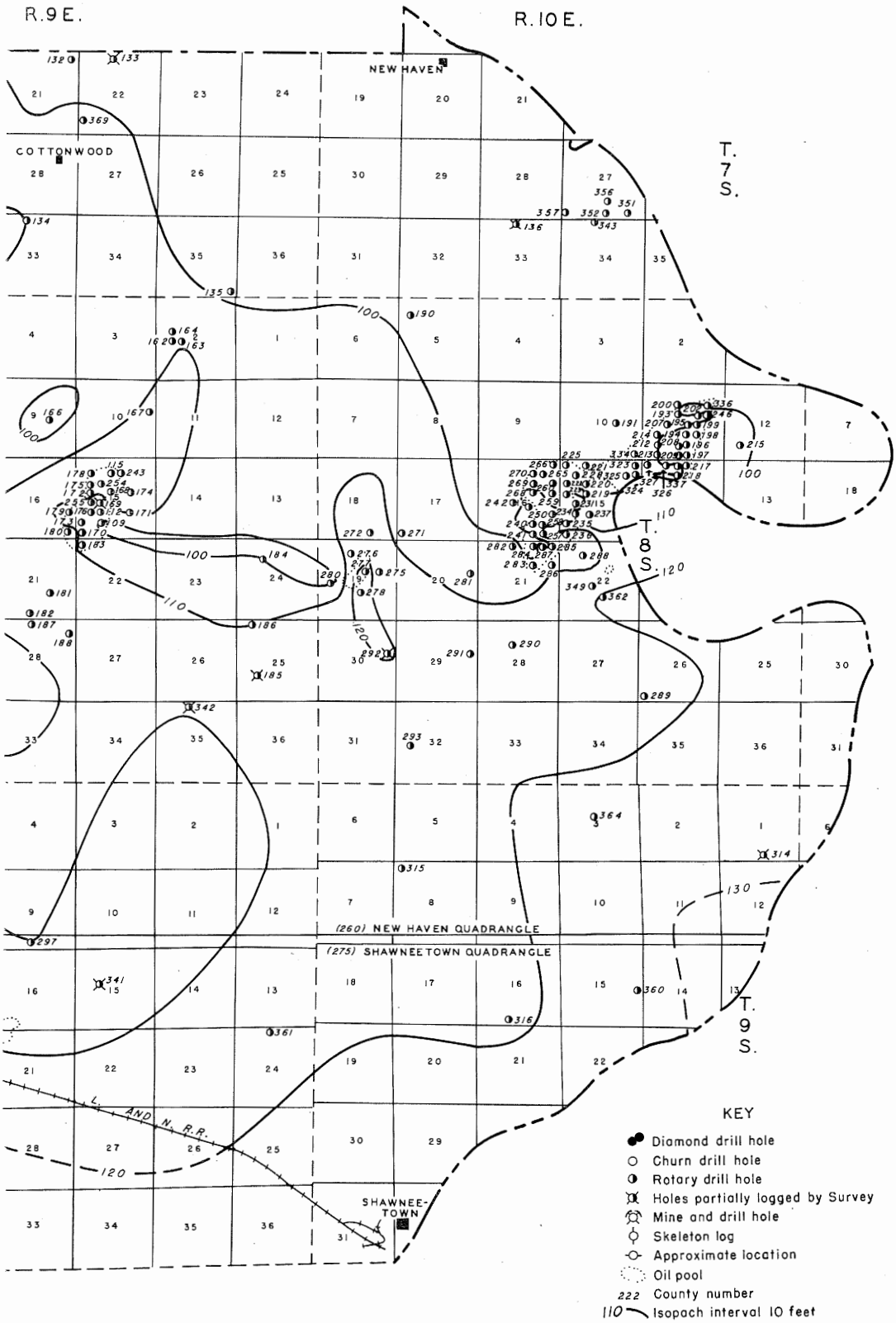
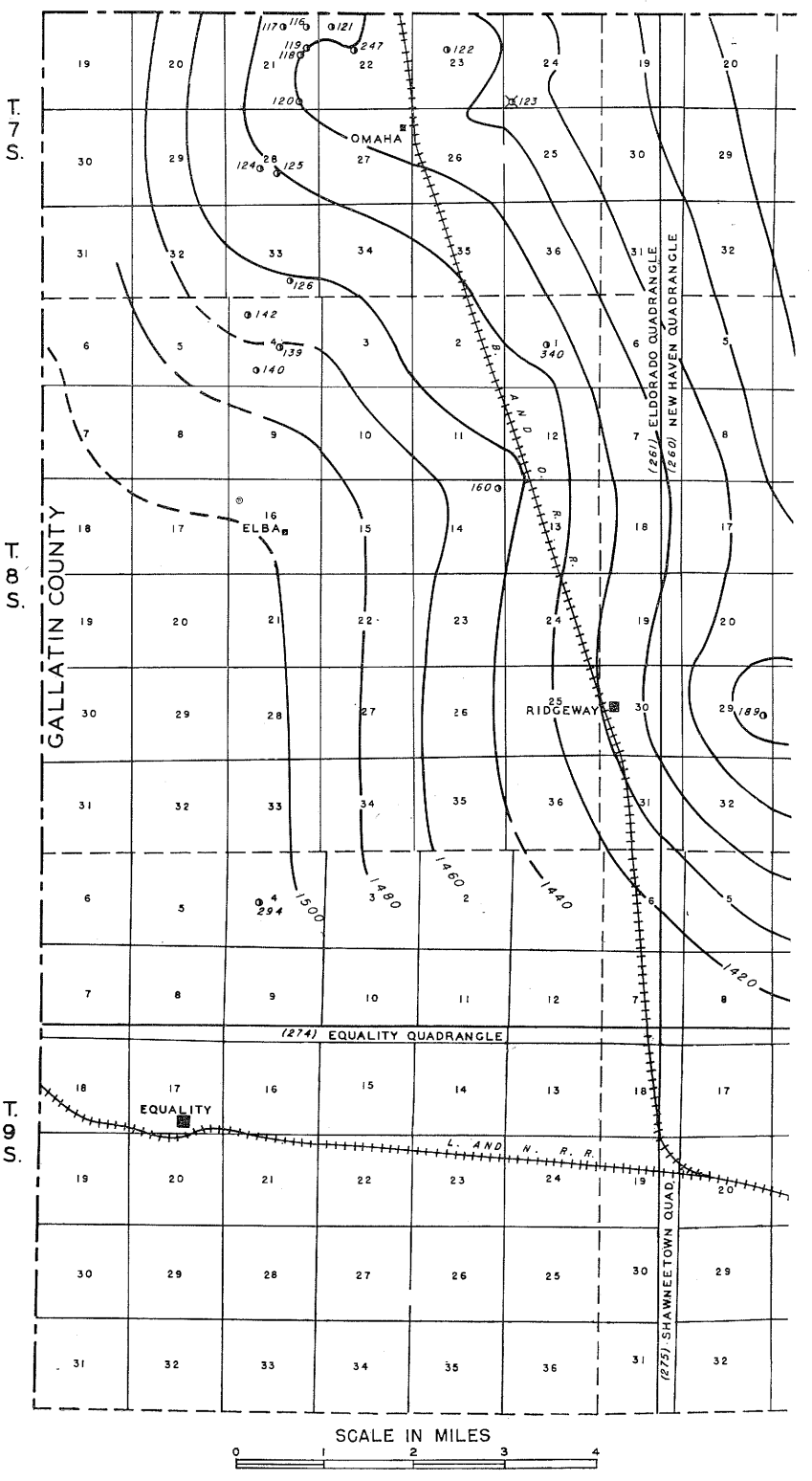


FIG. 15.—Isopach map showing the variation in interval between No. 6 and No. 5 coal beds in Gallatin County.


R.8 E.
T. 7 S.
T. 8 S.
T. 9 S.
GALLATIN COUNTY
OMAHA
ELBA
RIDGEWAY
EQUALITY
(261) ELDORADO QUADRANGLE
(260) NEW HAVEN QUADRANGLE
(274) EQUALITY QUADRANGLE
(275) SHAWNEETOWN QUAD.
L. AND N. R. R.
SCALE IN MILES
0 1 2 3 4

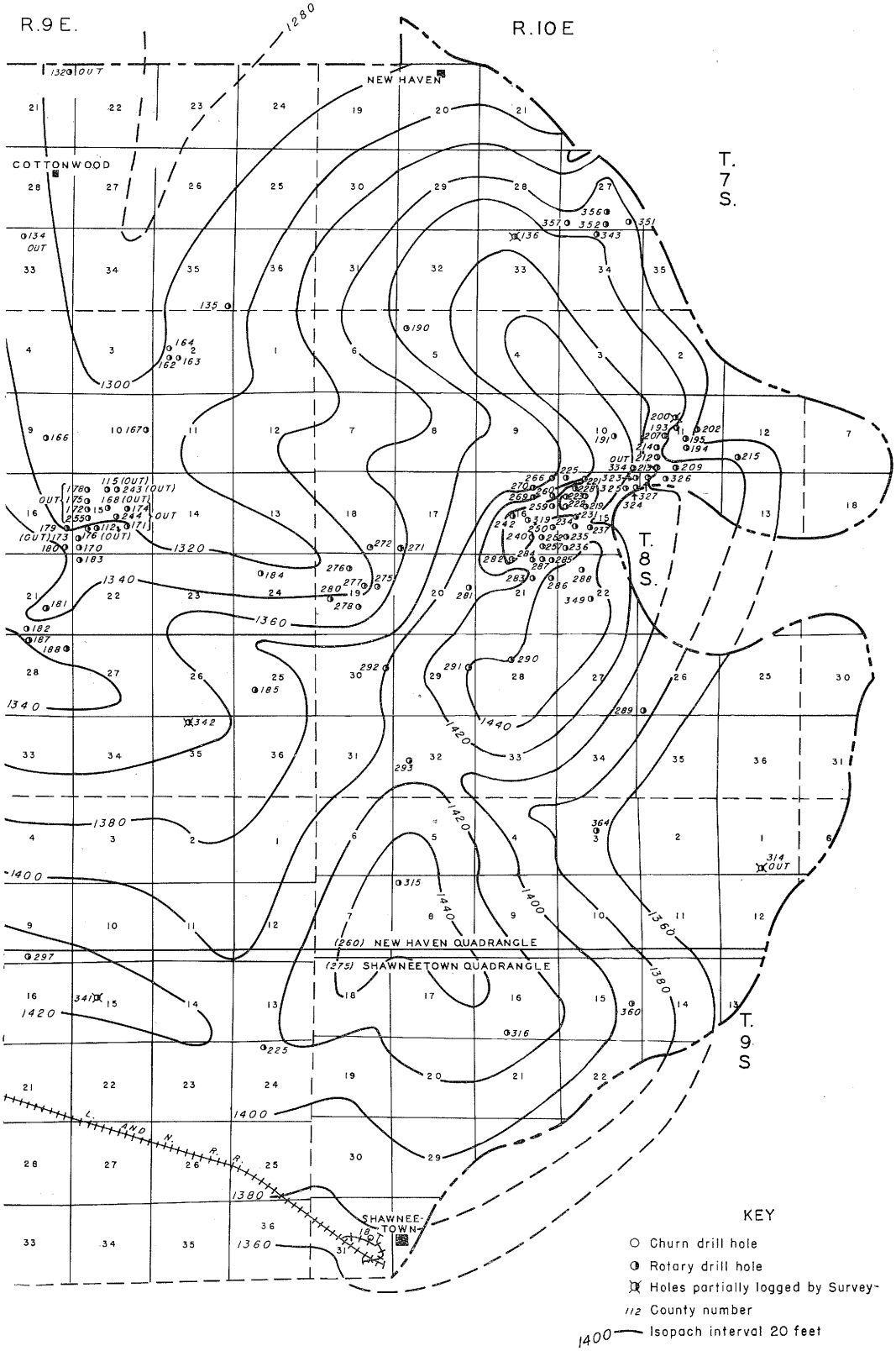


FIG. 16.—Isopach map showing variation in interval between No. 6 coal bed and the base of the Lower Kinkaid limestone in Gallatin County.

In sec. 1 of the same township the altitude of No. 6 coal bed in the two diamond-drill holes (Nos. 24 and 23) is 191 and 208 feet above sea level, respectively, whereas in a third hole (No. 95) to the east, it is 15 feet below sea level, representing a displacement of 206 to 223 feet.

The omission of beds in the drill hole, sec. 7, T. 8 S., R. 9 E. (No. 165), and differences in altitude of strata in secs. 1, 13, and 24, T. 9 S., and R. 8 E., can better be explained by faulting than by folding.

Between the Herald fault on the west and the Maunie fault on the east is a down-dropped block or graben to which the names Wabash Valley and the New Harmony graben are applied here.[24] The graben has a maximum width of 3 miles in Gallatin County and the boundary faults converge toward a point about 3 miles south of the north line of the county in sec. 15, T. 8 S., R. 9 E. Neither fault has been observed at the surface.

The existence of the Herald fault is indicated by a drill hole (McGraw-Dagley No. 1) in sec. 2, T. 7 S., R. 9 E., White County, where the altitude of No. 6 coal bed is 466 feet below sea level as compared with 240 feet below sea level in sec. 11 (Carter-Dagley No. 1). The Carter-Dagley No. 1 starts in the downthrow block and passes into the upthrow block at a depth of 450 feet. The exact position of the fault has not been determined because drill holes to the east are entirely in the downthrow block, drill holes to the west are in the upthrow block, and drill holes adjacent to the fault plane do not penetrate deep enough to yield critical data (Carter-Dagley No. 1, total depth, 1516; McGraw-Dagley No. 1, total depth, 1876).

The southernmost point to which the Herald fault has been traced is in secs. 22, 23, 26, 27, T. 7 S., R. 9 E., Gallatin County, where drilling is indicative of faulting but does not determine the exact position of the fault plane.

The farthest southern extension of the Maunie fault on the basis of present data is in secs. 3 and 10, T. 7 S., R. 10 E., White County. In adjacent drill holes, 660 feet apart, the altitude of No. 6 coal bed is —185 feet (Sohio No. B3—Union Central Life Ins. Co., sec. 3) and —361 feet (Sohio No. 2A—Union Central Life Ins. Co., sec. 3). In Sohio No. 1A (Union Central Life Ins. Co., sec. 10), 1320 feet south of Sohio No. 2A, the altitude of No. 6 coal bed is —367. The three drill holes, Sohio 1A, 2A, and B3, cut the fault plane at depths of 1130, 1700, and 420 feet respectively. Here the fault plane strikes N. 13 E. and dips 64 degrees N. 77 W. and the displacement of No. 6 coal bed is 176 feet.

The Inman East fault zone runs in a general northeast-southwest direction and cuts the eastern edge of the Inman East pool (figs. 13 and 14). Transections of the major fault plane by drill holes indicate that it dips southeast. In hole No. 199, sec. 11, T. 8 S., R. 10 E., the major fault is cut at an altitude of —210 feet; in hole No. 198 in the same section 660 feet south, it is cut at an altitude of —751 feet; and in hole No. 196 in the same section 940 feet southwest of hole No. 198, it is cut at an altitude of —341 feet. On the basis of these data it is determined that the strike of the major fault is N. 30 degrees E., and the dip required to obtain these differences in altitude is 60 degrees southeast.

A drill hole in the northwest corner of sec. 8, T. 9 S., R. 10 E. (No. 315), cuts the major fault of the Inman East fault zone at approximately 2500 feet and a vertical displacement of No. 6 coal bed of 420 feet is indicated. Here the Tar Springs formation lies in contact with what is probably the Paint Creek formation, and the Glen Dean, Hardinsburg, Golconda, and probably Cypress formations are absent because of faulting.

IGNEOUS INTRUSIONS

Igneous rocks occur fairly frequently in Saline County,[25] where they have been encountered in a number of coal mines. Igneous rock occurs closest to Gallatin County in an abandoned mine between Eldorado and Equality on the Louisville and Nashville Railroad (sec. 34, T. 8 S., R. 7 E.). In Saline County the rocks occur in the form of dikes, with a width in one mine of about 300 feet. The dikes are dark

[24] Adopting terminology in common use by oil company geologists.

[25] Cady, G. H., Coal resources of District V (Saline and Gallatin counties): Illinois Geol. Survey Min. Inv. Bull. 19, pp. 56-61, 1919.

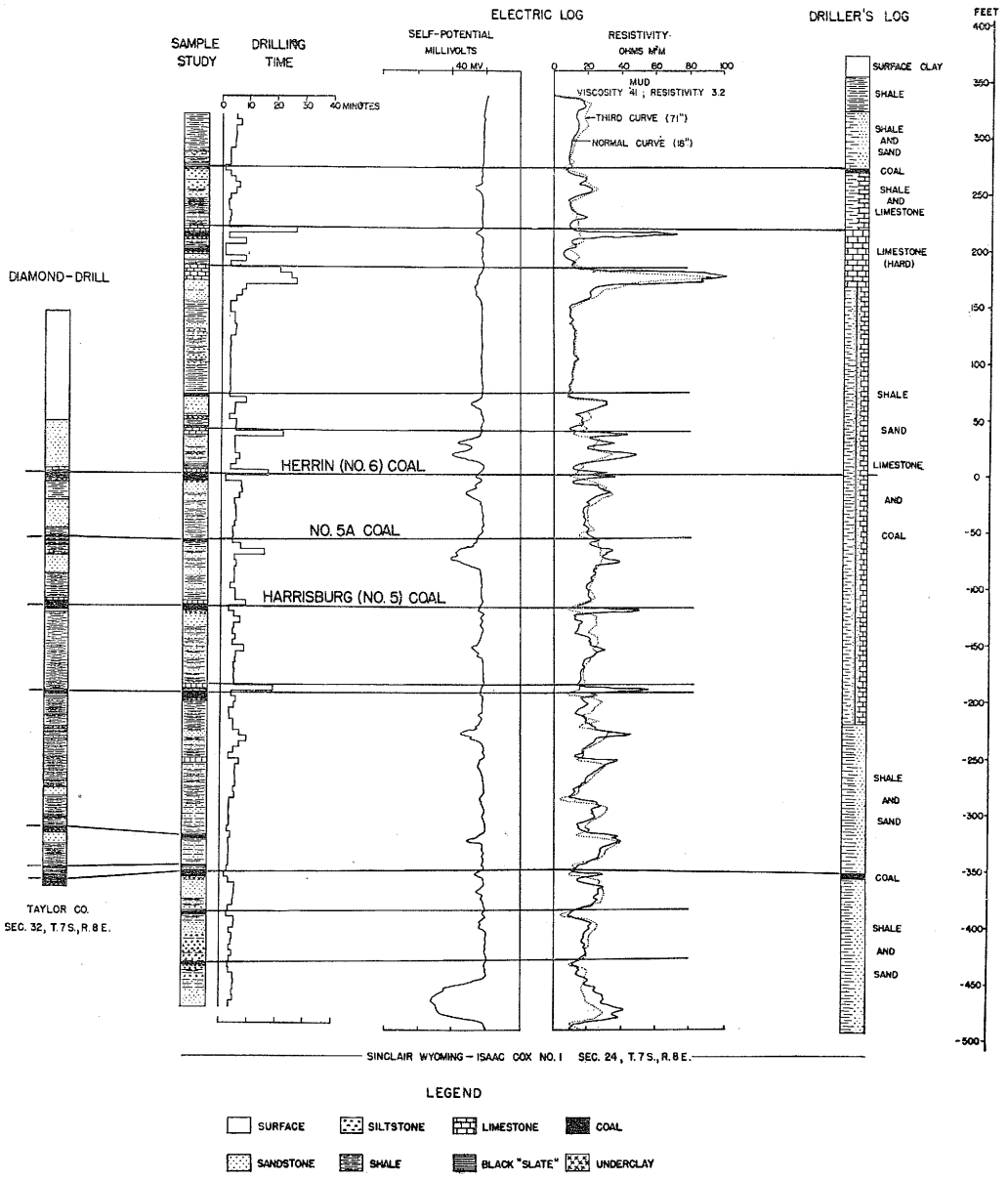


FIG. 17.—Comparison of diamond-drill log and drilling time, cuttings study, electric, and driller's log in Gallatin County. (Fig. 7, Illinois Geol. Survey Rept. Inv. 93, p. 20.)

green to nearly black, fine to fairly coarsely crystalline rocks of the type known as mica peridotite[26] or some similar variety of basic igneous rock.

[26] Grogan, R. M., Illinois Geol. Survey. Personal communication.

In Gallatin County igneous rocks have been encountered in holes drilled on the Omaha dome. They consist of the same type of rock found in Saline County. They do not extend widely at the same strati-

graphic level. In some drill holes many feet of igneous rock have been penetrated (fig. 18). It has not been demonstrated that the Omaha uplift was caused by the arching effect of igneous intrusion in the form of a thick sill or laccolith, although deeper drilling may prove this to be the case. The relatively shallow occurrences appear to be dikes rather than sills. It seems probable that such dikes are not restricted to the area of the uplift, but have been reported there mainly because of the more closely spaced drilling, and because of the alertness of company geologists in correctly interpreting the character of drill cuttings early in the exploration of the Omaha structure. Although dikes are relatively common in Saline County, examination of many drillers' records, both cable-tool and diamond-drill, reveals few that record igneous rock. It is doubtful that Illinois drillers, who are usually unfamiliar with this type of lithology, would recognize and report igneous rocks.

In the Omaha dome area igneous rocks occur at various stratigraphic levels. They are found as deep as 1800 feet where they occur in Chester beds, and as close to the surface as 250 feet in Pennsylvanian beds. The thickness penetrated ranges from a few to 50 or 60 feet (fig. 18). Contact metamorphism of a mild character, sufficient to coke an adjacent coal bed for several feet on either side, but with only very mild alteration on adjacent sedimentary rock, has been observed in mines in Saline County.[27] Similar mild contact metamorphism probably attended intrusion in the Omaha dome.

The igneous bodies are represented in electric logs by as much as 400 ohm-meters on the resistivity curves, whereas the potential curve is usually either a straight line or shows a slight positive potential. A more complete description of the igneous rock of the Omaha dome is given by English and Grogan.[28]

[27] Ref. 23.

[28] English, R. M., and Grogan, R. M., The Omaha pool and mica-peridotite intrusives, Gallatin County, Illinois: Structure of typical American oil fields, vol. III, A.A.P.G., pp. 189-212, April 1948; Illinois Geol. Survey Rept. Inv. 130, August 1948.

COAL RESOURCES

Coal resources in the No. 5 and No. 6 coal beds in Gallatin County north of the Shawneetown fault have been estimated at 1971 million tons (1919). This estimate was based on an average thickness of 4 feet for each coal bed, 225 square miles underlain by No. 5 and 210 square miles underlain by No. 6.[29] The calculations were made on the basis of 1,132,800 tons per square-mile-foot (1770 tons per acre foot—sp. gr. 1.30). Present studies require some revision of the estimate. The accompanying map indicates about 221 square miles underlain by No. 6 coal bed and about 232 square miles by No. 5, giving a total of 1000 million tons of No. 6 and 1053 million tons of No. 5 or a total of 2053 million tons, assuming an average thickness of 4 feet for each bed.

More recently (1944) the amount of coal in No. 5 and No. 6 beds north of the Shawneetown fault was estimated as approximately 2000 million tons and the resources present in the Davis and Dekoven beds as about 1000 million tons.[30]

The present studies have thrown additional light on distribution and thickness of the Davis and Dekoven beds in Gallatin County. The Davis bed underlies approximately 250 square miles of the county and represents about 990 million tons of coal with an average thickness of 3.5 feet. The combined thickness of the two beds is in the order of 6½ feet (p. 78), but the Davis bed appears to be the only one that maintains a thickness averaging more than 3 feet. Thus the estimated total amount of coal in the No. 6, No. 5, and Davis beds is in the order of 3000 million tons. Of this quantity less than 1 percent has been mined or rendered unrecoverable by mining processes. However, structural irregularities are probably sufficiently important along the fault lines to prevent the recovery of

[29] Cady, G. H., Coal resources of District V (Saline and Gallatin counties): Illinois Geol. Survey Min. Inv. Bull. 19, table 15, p. 106, 1919.

[30] Cady, G. H., Coal resources based on information obtained from rotary drilling: Illinois Geol. Survey Rept. Inv. 93, pp. 37-38, 1944.

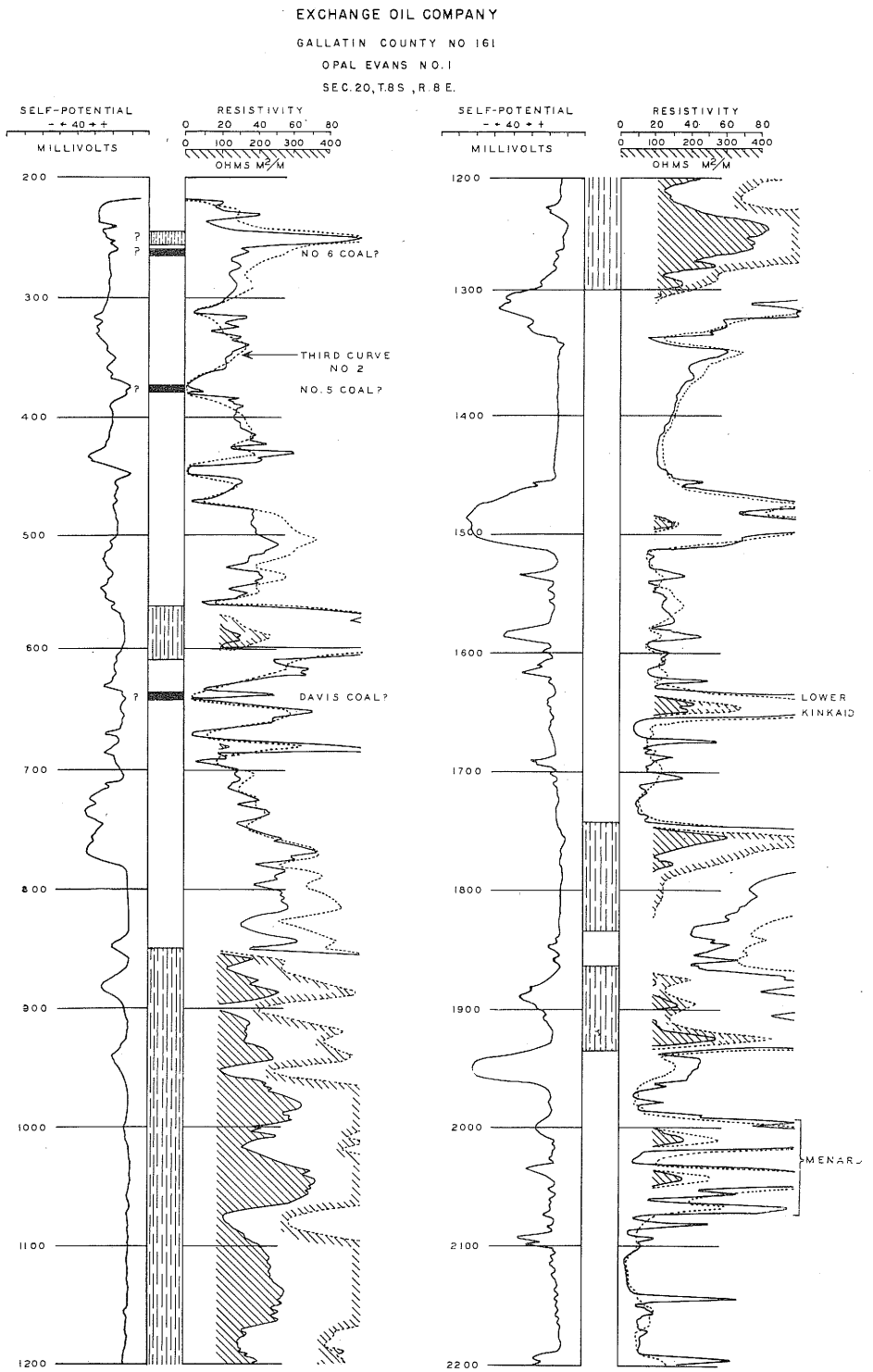


FIG. 18.—Graphic log of Exchange Oil Co., Opal Evans No. 1, Gallatin County, showing igneous bodies as broken vertical lines.

large quantities of coal. Probably damage to the coal beds will result from penetration of the beds by numerous drill holes, particularly where closely spaced in producing oil pools. Additional loss is inevitable from the mining processes. It seems probable that the actual amount of recoverable coal from these beds cannot be more than half the amount given above, or 1500 million tons.

Some of the other coal beds, including "No. 7," "No. 4," "No. 2," the Dekoven, Curlew, and possibly others higher or lower in the section, may be of workable thickness in areas large enough to support mining operations in Gallatin County. However, only additional exploration can provide the data necessary for evaluation of these possible reserves.

PROTECTION OF COAL BEDS

Workable beds of coal were originally defined in the Rules and Regulations of the Oil, Gas, and Coal Conservation Act (effective July 29, 1941) as beds 30 inches or more thick at a depth of 1000 feet or less, and 36 inches or more thick at a depth of more than 1000 feet. This order has been modified to limit workable beds to a thickness of 30 inches at or above 1000 feet.[31] Three beds need protection in this area: No. 6, No. 5, and the Davis. No drill hole should be abandoned in this county unless provision is made for the protection of these coal beds. With the aid of the structure contour map, showing the altitude of No. 6 coal bed above sea level, the depth to this bed can be calculated from the surface altitude. The average intervals between No. 6 bed and No. 5, and No. 6 bed and the Davis coal bed, for the various townships in the area mapped, appear in table 8. In general, No. 6 and No. 5 beds are separated by about 100 to 110 feet of strata. To protect these beds, a cement plug should extend from 50 feet above to 150 feet below No. 6 coal bed. To protect the Davis bed, a cement plug should extend for 100 feet from about 290 feet below No. 6 bed in T. 7 S., and about 315 feet below No. 6 bed in T. 8 S. Such a plug should give satisfactory protection for both the Dekoven and the Davis beds.

Placing of plugs at the positions indicated will provide protection for the three beds of special importance in the area. However, this procedure does not release the operator from the obligation of protecting other beds which adjacent diamond drilling or careful logging of any rotary-drill holes indicate are of workable thickness. The present report, particularly the cross-sections, graphic logs, and tabulations, shows the positions where coal beds are likely to be penetrated. Care should be exercised in drilling at these positions so that unusual thicknesses of coal beds that are generally thin may be reported.

OIL AND GAS RESOURCES

Structure of the No. 6 coal bed has a close similarity to the structure of the upper and middle Mississippian beds which contain the oil and gas produced in Gallatin County. Where these accumulations are related to structural features of the producing strata, the structure of No. 6 coal provides a fairly accurate picture of the structure of the reservoir formations. However, this constitutes a *post factum* relationship which is established after the pools have been discovered. The relationship nevertheless is important because it indicates the value of shallow structure testing to key beds such as No. 6 coal bed.

The structure map of the No. 6 coal bed presents the structural features in sufficient detail to meet the primary objectives of this study. However, a contour interval of 25 feet is probably too large to delineate the smaller structural irregularities that seem to determine positions of some of the oil pools in Gallatin County.

[31] Oil, Gas, and Coal Conservation Act—Rules and Regulations, Rule 11, p. 12: Illinois Dept. Mines and Minerals, Division of Oil and Gas Conservation, October 18, 1945 (mimeographed).

TABLE 9.—OIL OR GAS PRODUCING FORMATIONS IN GALLATIN COUNTY[32]

System or Series	Group or Formation	Producing Strata	Pool	Approx. Depth (feet)
Pennsylvanian	Tradewater	Murray Bluff sandstone	Inman East	780
Chester Series	Degonia	Degonia sandstone	Inman East	1,690
(Upper Missis-	Clore	Clore sandstone	Inman East	1,725
sippian)	Palestine	Palestine sandstone	Inman	1,830
			Omaha	1,670
	Waltersburg	Waltersburg sandstone	Inman	1,990
			Roland	2,170
	Tar Springs	Tar Springs sandstone	Inman East	2,080
			Inman West	2,175
			New Haven West	2,100
			Omaha	1,880
			Roland	2,240
	Hardinsburg	Hardinsburg sandstone	Inman East	2,135
	Cypress	Cypress sandstone	Inman East	2,430
			Inman West	2,480
			Roland	2,570
	Paint Creek	Paint Creek sandstone	Roland	2,750
	Bethel	Bethel sandstone	Roland	2,750
	Aux Vases	Aux Vases sandstone	Inman	2,740
			Inman North	2,815
			Roland	2,880
Iowa Series	Ste. Genevieve (Rosiclare member)	Rosiclare sandstone	Inman	3,005
(Lower Missis-				
sippian)	Ste. Genevieve (Fredonia member)	"McClosky" lime	Inman	2,730
			Inman East	2,740
			Inman West	2,875
			Inman North	2,870
			Roland	3,155

[32] Oil and Gas Drilling Report, Illinois Geol. Survey, 103, pp. b-h, May 1945.

SUBSURFACE GEOLOGY OF HAMILTON COUNTY

BY

MARY BARNES ROLLEY

THE STRUCTURAL FEATURES of the Herrin (No. 6) coal bed in Hamilton County, as delineated in an accompanying structure contour map, and the more important features of the Pennsylvanian stratigraphy of the county are described in this report.

Hamilton County, an area of about 435 square miles,[1] is in the southern part of the Illinois basin (fig. 1) and at the northern margin of the main southern Illinois coal field of Franklin, Williamson, and Saline counties. No coal mines are present in the county, but in the southern part a large volume of workable coal is present in Herrin (No. 6) and Harrisburg (No. 5) coal beds according to the records of diamond-drill holes.

TABULATED DATA

The data used in compiling the structure map appear in tabulated form in the Appendix. Coal thickness is most reliably recorded in records of diamond-drill holes, and next in the logs of control wells, the drilling of which was observed by a Survey field party. In general thicknesses cannot be accurately determined from electric logs.

Table 10, which follows, gives the interval between the top of No. 6 and the top of No. 5 coal beds, and the top of No. 6 coal bed and the top of the Little Menard limestone, the lowermost limestone member of the Menard formation of the Chester Series, for a number of drill holes fairly evenly spaced over the area of the county.

KEY BEDS

Certain Pennsylvanian beds are traceable from drill hole to drill hole over considerable areas of Hamilton County and are therefore regarded as key beds in the identification of stratigraphic positions in the Pennsylvanian.

The key beds for Hamilton County are mainly within the McLeansboro group[2] but also include three beds within the Carbondale group.[3] The records of the control wells (figs. 19, 20) are insufficiently definite in regard to the stratigraphic units of the underlying Tradewater and Caseyville groups to identify definitely individual beds in these predominately sandy and shaly strata.

Within the McLeansboro group the following limestone and coal beds are fairly conspicuous and widespread: Shoal Creek limestone, Cutler coal bed, Bankston Fork limestone, and Herrin limestone, the caprock of the Herrin (No. 6) coal bed. Within the Carbondale group three coal beds are commonly recognized in the records of drill holes of sufficient depth. These are Herrin (No. 6) and Harrisburg (No. 5) coal beds, recorded in most of the diamond-drill holes in the county, and the coal bed called "No. 4" lying about 75 to 95 feet below No. 5 coal bed. No diamond-drill hole in the county extended more than a few feet below the No. 5 coal bed, but the "No. 4" bed was picked up in logging seven of the control wells. The presence of "No. 4" in many other rotary wells is indicated by the characteristic pattern of the electric logs at the appropriate position.

Shoal Creek limestone.—This limestone is believed to be continuous into Wayne County[4] and to be represented by the New Haven limestone outcropping at New

[1] Estimated by D. H. Swann from measurements based on topographic maps.

[2] DeWolf, F. W., Studies of Illinois coal—Introduction: Illinois Geol. Survey Bull. 16, p. 181, 1910.

[3] Cady, G. H., Analysis of Illinois coals: U. S. Bur. Mines Tech. Paper 641, p. 9, 1942.

[4] Sims, P. K., et al., Pennsylvanian key beds in Wayne County and the structure of the Shoal Creek limestone and the Herrin (No. 6) coal bed: Illinois Geol. Survey Rept. Inv. 93, p. 28, 1944.

TABLE 10.—DATA ON INTERVALS BETWEEN NO. 6 AND NO. 5 COAL BEDS AND BETWEEN NO. 6 AND "LITTLE MENARD" LIMESTONE OF CHESTER SERIES

Location T. S.	Location R. E.	Interval No. 6 to No. 5 coal bed Range	Interval No. 6 to No. 5 coal bed Av.	Number of drill holes	Interval No. 6 coal bed to "Little Menard" Range	Interval No. 6 coal bed to "Little Menard" Av.	Number of drill holes
3	5	73–130	107	26	1441–1570	1508	26
3	6	72–100	84	3	1568–1585	1574	3
3	7	83–103	92	11	1500–1571	1539	10
4	5	81–136	99	8	1541–1625	1575	8
4	6	60–108	89	15	1545–1615	1571	13
4	7	65–110	87	47	1532–1623	1571	47
5	5	55– 97	80	9	1565–1612	1584	7
5	6	65–110	92	26	1534–1635	1603	26
5	7	95–129	102	15	1580–1706	1629	19
6	5	45– 91	67	57	1535–1674	1571	54
6	6	55–118	91	99	1560–1750	1650	91
6	7	85–143	114	53	1576–1750	1659	55
7	5	58–106	83	4		1680	1
7	6	70– 93	82	7	1608–1683	1645	4
7	7	107–122	114	3	1722–1730	1726	2

Haven, Gallatin County.[5] It is the first conspicuous limestone encountered in drilling and lies 480 to 580 feet above Herrin (No. 6) coal bed. The interval increases toward the east (fig. 21). The Shoal Creek limestone, about 5 to 12 feet thick, generally forms a single bench but appears locally in two benches. In drill cuttings the rock is white to light tan and finely granular to crystalline. It becomes somewhat sandy near the eastern boundary of the county, and a thick sandstone member lies across the position of the limestone in the southern part of the county. The limestone is generally underlain by shale, described sometimes as black for a few feet, overlying a thin coal bed. In those drill holes where coal was recorded, the interval between the coal bed and the Shoal Creek limestone is about 20 feet.

Cutler coal bed.—A coal bed, 1 to 2 feet thick and about 65 to 75 feet above the Herrin (No. 6) coal bed, underlies most of the county. Locally the interval increases to 85 to 95 feet where a large part of the intervening strata consists of sandstone. The correlation of this coal bed with the Cutler coal bed of Perry County[6] is tentative, but it occupies the approximate position of a coal bed underlying the Cutler limestone. The Cutler limestone is usually not encountered in drill holes in Hamilton County, but members of the Survey have observed it in drill cores from holes as far east as the vicinity of Eldorado and in outcrops along the Illinois Central Railroad in Saline County.[7]

Bankston Fork limestone.[8]—This limestone, 2 to 6 feet thick, occupies an intermediate position between the Cutler coal bed and the Herrin limestone and lies 40 to 50 feet above the No. 6 coal bed. Well cuttings are light gray to tan with a slightly granular texture, locally becoming somewhat shaly and nodular. It is only sparingly fossiliferous. It is not immediately underlain by black shale or a coal bed

[5] DeWolf, F. W., Coal investigations in the Saline and Gallatin field: Illinois Geol. Survey Bull. 8, p. 218, 1908.

[6] Bell, A. H., Ball, C. G., and McCabe, L. C., Geology of the Pinckneyville and Jamestown areas, Perry County, Illinois: Illinois Geol. Survey, Illinois Petroleum 19, p. 3, 1931.

[7] Personal communication from G. H. Cady.

[8] Cady, G. H., The areal geology of Saline County: Trans. Illinois Acad. Sci., vol. 19, p. 262, 1926.

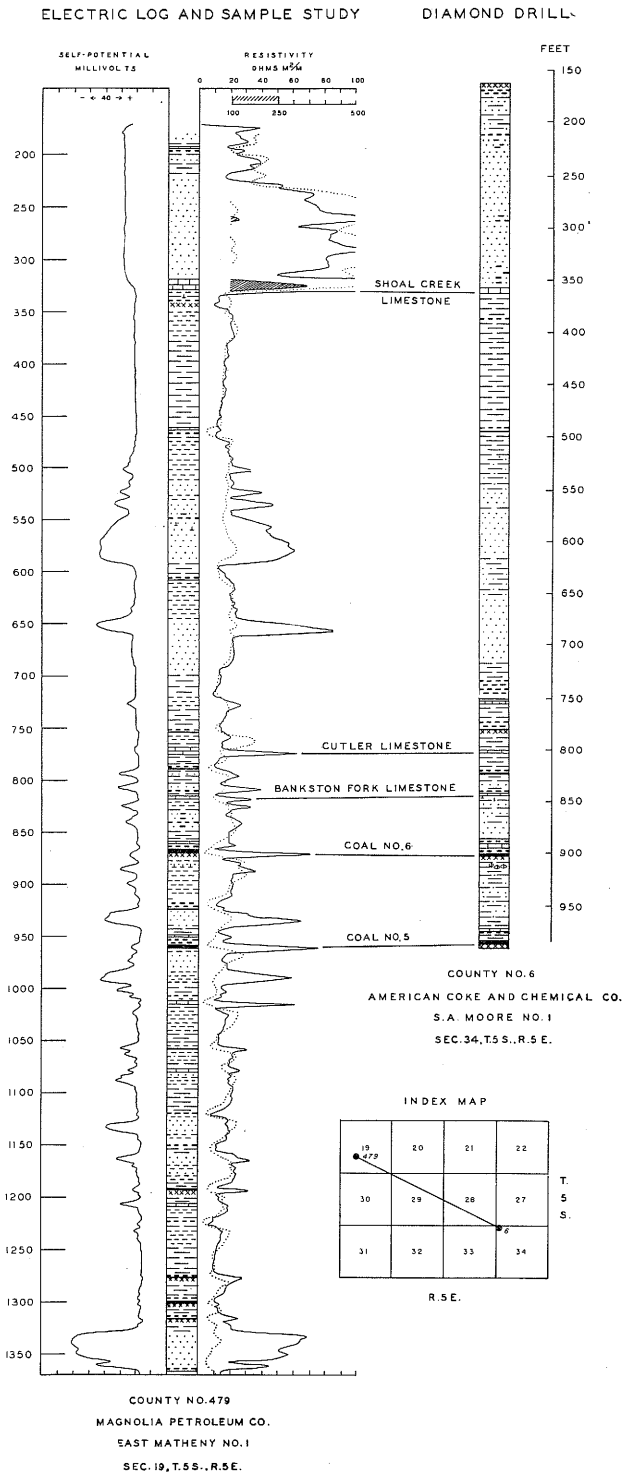


FIG. 19.—Comparison of electric log and diamond-drill log of adjacent drill holes in Hamilton County.

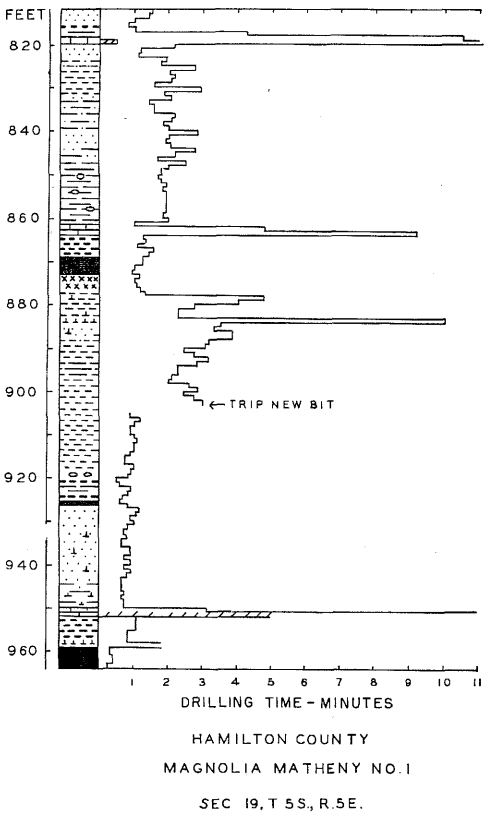


FIG. 20.—One-foot drilling time log of Magnolia-Matheny No. 1 drill hole in Hamilton County, 19-5S-5E.

and thus differs from most Pennsylvanian limestones. Commonly the underlying stratum is a siltstone or silty shale or even a sandstone.

Herrin limestone.—The caprock of No. 6 coal bed is one of the most conspicuous members of the McLeansboro group and is encountered in most drill holes. It is called the Herrin,[9] the Brereton[10] (western Illinois) or the Providence[11] limestone (southeastern Illinois, Indiana and western Kentucky). It is 2 to 6 feet thick, and drill cuttings consist of fragments of dark gray, brown or black, finely granular and sparingly fossiliferous limestone. A characteristic small fossil, fragments of which are occasionally encountered in drill cuttings, is *Fusulina girtyi.*[12] This limestone is separated from the No. 6 coal bed by black "slate" and gray shale from 1 to 10 feet thick.

Herrin (No. 6) coal bed.—The No. 6 coal bed, 5 to 9 feet thick, is the upper member of the Carbondale group and the most commonly recognized key bed of the Pennsylvanian system in southern Illinois. Because it is easily identified and commercially important, the bed has been selected as the datum for mapping Pennsylvanian structure in the southern half of the State. In electric logs the position of the bed is usually indicated by a characteristic pattern[13] closely associated with the pattern of the caprock limestone.

Harrisburg (No. 5) coal bed.—Harrisburg (No. 5) coal bed lies 50 to 120 feet below the bottom of No. 6 bed. Diamond-drill records generally show 3 to 7 feet of coal in the No. 5 bed, but a few holes near the eastern county line encountered no coal at this position. A caprock is reported only rarely in the logs; when present it is thin. The position of No. 5 coal bed appears in electric logs of rotary-drill holes as a characteristic fairly prominent peak in the normal resistivity curve.

"No. 4" coal bed.—In the control wells black "slate" and coal were usually present at a depth 140 to 200 feet below No. 6 coal bed. In some wells only black "slate" was found at this position. The thickness of the bed is usually recorded in inches, but 3 feet of coal were reported 185 feet below No. 6 coal bed in a drill hole in sec. 19, T. 5 S., R. 5 E. (County No. 479). Diamond-drill holes in the county have not reached this coal bed. Its thickness and position are determined primarily from data supplied by records of control wells and electric logs of other rotary-drill holes. In general the pattern of "No. 4" coal bed has a fairly prominent peak to the right in the normal curve, less prominent, however, than that produced by the Harrisburg (No. 5) coal

[9] Idem.
[10] Savage, T. E., Significant breaks and overlaps in the Pennsylvanian rocks of Illinois: Amer. Jour. Sci., 5th Ser., vol. 14, pp. 307-316, 1921.
[11] Glenn, L. C., The geology and coals of Webster County: Kentucky Geol. Survey, Ser. 6, vol. 5, p. 98, 1922.
[12] Dunbar, Carl O., and Henbest, Lloyd G., Pennsylvanian Fusulinidea of Illinois: Illinois Geol. Survey Bull. 67, p. 117, 1942.
[13] Taylor, E. F., et al., Methods of subsurface study of Pennsylvanian strata encountered in rotary-drill holes: Illinois Geol. Survey Rept. Inv. 93, pp. 15-19, 1944.

bed. Because actual proof of the presence of this coal bed is not established by diamond drilling, it is a less satisfactory key bed than those described above. Although tentatively designated as "No. 4" coal bed, correlation with either the Summum[14] (No. 4) bed of western Illinois or Indiana No. IV coal bed has not been definitely established. These three coal beds all lie at about the same stratigraphic position.

Interpreting Electric Logs

A knowledge of the general character and spacing of the key beds in the upper part of the Pennsylvanian succession is necessary to interpret correctly the electric logs. The relatively strong resistivity of the Shoal Creek, Bankston Fork, and Herrin limestones in the McLeansboro group and of the No. 6, No. 5 and "No. 4" coal beds in the Carbondale group makes it possible to identify the position of this series of strata with reasonable accuracy in any electric log.[15] The resistivity and potential curves may change somewhat with variation in the thickness of the individual members, but the general pattern remains essentially the same.

Beds in the Lower Part of the Pennsylvanian

Because there has been no diamond drilling below No. 5 coal bed, no individual member of the lower Carbondale, the Tradewater or the Caseyville groups, except "No. 4" coal bed, can be regarded as a key bed. Drilling of seven rotary-drill control wells was observed by Survey field parties and the cuttings were studied in the laboratory. Even these drill holes have not provided information of much value in interpreting electric logs through these lower Pennsylvanian strata.

[14] Wanless, H. R., Pennsylvanian cycles in western Illinois: Illinois Geol. Survey Bull. 60, pp. 179-193, 1931.
[15] Taylor, op. cit.

OTHER PENNSYLVANIAN STRATA OF STRATIGRAPHIC INTEREST

McLeansboro Group

Approximately 125 feet above the Shoal Creek limestone in the upper part of the McLeansboro group a thin bed of black shale and an underlying thin coal bed are reported. An overlying limestone bed, 1 to 2 feet thick, is locally present. Drill cuttings indicate that this is a medium-gray shaly fossiliferous limestone. This and other Pennsylvanian beds described in the report are shown graphically in figures 21 and 22.

At varying positions 370 to 420 feet above the No. 6 coal bed a bed of black shale or "slate," accompanied by a coal bed or a thin bed of limestone, or both, is commonly reported in drill records or indicated in electric logs. A similar thin bed of black shale and a coal bed are also commonly reported 270 to 300 feet above the No. 6 bed.[16]

The West Franklin limestone[17] is an important member of the lower part of the McLeansboro group in certain counties in southeastern Illinois and in adjacent counties in southwestern Indiana. Limestone beds suggestive of the West Franklin limestone were penetrated in only two control drill holes. In a control drill hole logged by the Survey in sec. 15, T. 5 S., R. 7 E. (County No. 498) a 4-foot limestone was penetrated 270 feet above No. 6 coal bed. The presence of limestone at about the same position in drill holes to the north and south is indicated by electric logs. A control drill hole in sec. 26, T. 4 S., R. 7 E. (County No. 478) penetrated a white to light gray, fine to crystalline, fossiliferous limestone 310 feet above No. 6 coal bed. This limestone bed can be traced westward to a diamond drill hole in sec. 27, T. 4 S., R. 6 E. (County No. 3) in which a 4-foot

[16] Cady, G. H., Coal resources of District VI: Illinois Geol. Survey Min. Inv. Bull. 15, p. 34.
[17] Collett, J., Thirteenth annual report: Ind. Dept. Geol. and Nat. Hist., pp. 61-62, 1884.

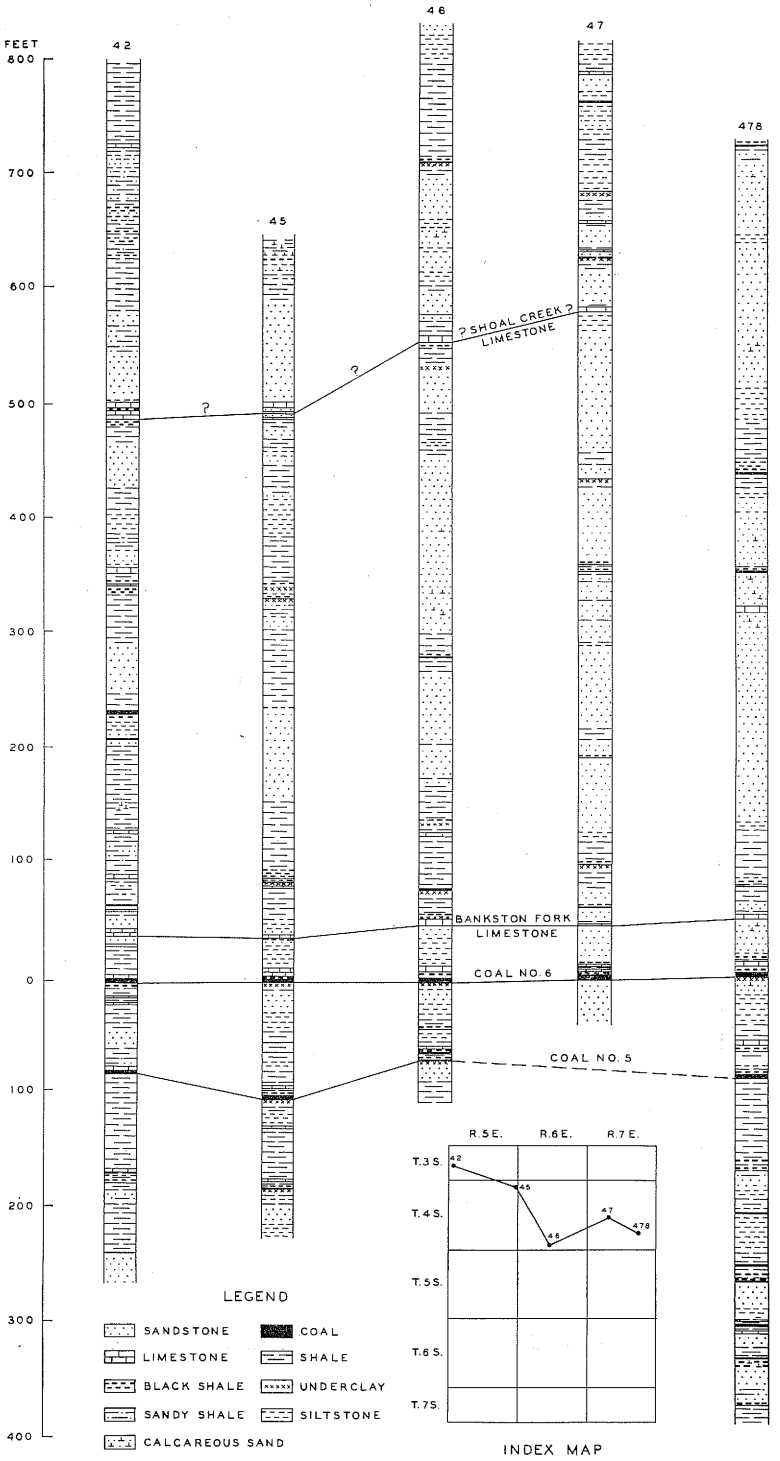


FIG. 21.—East-west cross section of Hamilton County.

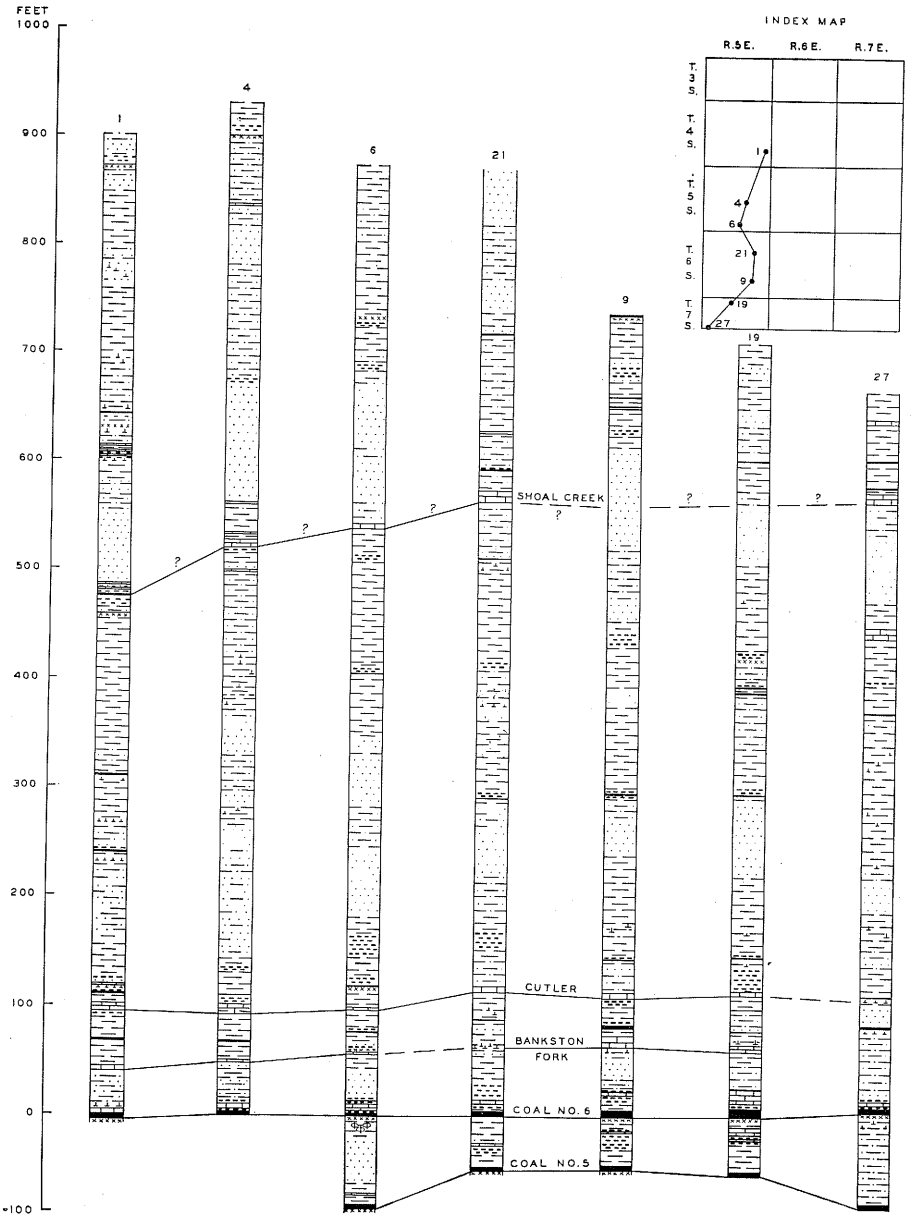


FIG. 22.—North-south cross section of Hamilton County.

bed of limestone was penetrated 290 feet above No. 6 coal bed. Apparently no single drill hole in Hamilton County is known to have penetrated two beds of limestone at the two positions. It is suspected that one or both of these limestones may represent the West Franklin limestone, but this has not been established. The position of these limestones relative to the thin coal beds noted in the preceding paragraph is not evident.

Like the West Franklin limestone to the east, the Cutler limestone is widespread west of Hamilton County. Usually in Franklin County and westward the Cutler limestone lies immediately above a black shale or "slate" which in turn overlies the Cutler coal bed. If the Cutler limestone is present in Hamilton County, it lies at a greater interval above the Cutler coal bed than is usual farther west. In the southwestern half of the county the first limestone lies 15 to 25 feet above the Cutler coal bed (fig. 22, Nos. 1, 4, 6, 9, 19, 21) or 95 to 130 feet above No. 6 coal bed. The variation in interval suggests that more than one lenticular bed of limestone may be present at different stratigraphic levels. As yet definite correlation is impossible. Therefore the Cutler limestone does not have the same value as a key bed in Hamilton County as it has farther west. Cuttings from the limestone or limestones at this general position are light gray to tan, white to light gray to tan, and slightly granular to fine. The recorded thicknesses are from 3 to 6 feet. Limestones at the position of the Cutler are missing from the succession in the northeastern half of Hamilton County.

A thin coal bed lying a short distance above the Bankston Fork limestone, and between this limestone and the Cutler coal bed, is reported in the logs of three drill holes: County No. 6 (sec. 34, T. 5 S., R. 5 E.); County No. 46 (sec. 33, T. 4 S., R. 6 E.); and County No. 478 (sec. 26, T. 4 S., R. 7 E.). The coal bed is overlain by a thin bed of black shale and may represent the Bankston Fork coal bed of Saline County.[18]

A thin bed of black shale and a thin bed of coal are reported in some records within a few feet above the Herrin limestone. This is the position of the Jamestown coal bed of Perry County.[19] The Jamestown coal bed is commonly overlain by a bed of limestone up to 2 feet thick closely resembling the Herrin limestone. Usually the Jamestown coal bed is either absent or is not recognized. It has been suggested that this coal bed is equivalent to the much thicker No. 12 coal bed of Kentucky.[20] Because it is difficult to recognize, it cannot be regarded as an important key bed.

Carbondale Group

Within the Carbondale group there are several thinner beds in addition to the key beds No. 6, No. 5, and "No. 4." Briar Hill[21] (No. 5A) coal bed, in places accompanied by a thin bed of limestone, is generally reported between No. 5 and No. 6 coal beds. On the basis of information obtained from two control drill holes on the Carbondale group, Nos. 42, 478 (fig. 21), it appears that a thin bed of coal lies 50 to 60 feet below "No. 4" and a second coal bed about 100 feet below, or 200 to 260 feet and 240 to 300 feet respectively below the top of No. 6 bed. The upper of these beds may represent the LaSalle "No. 2" coal bed of northern Illinois. The difficulty in recognizing the position of these thin coal beds in electric logs makes them unsatisfactory as key beds.

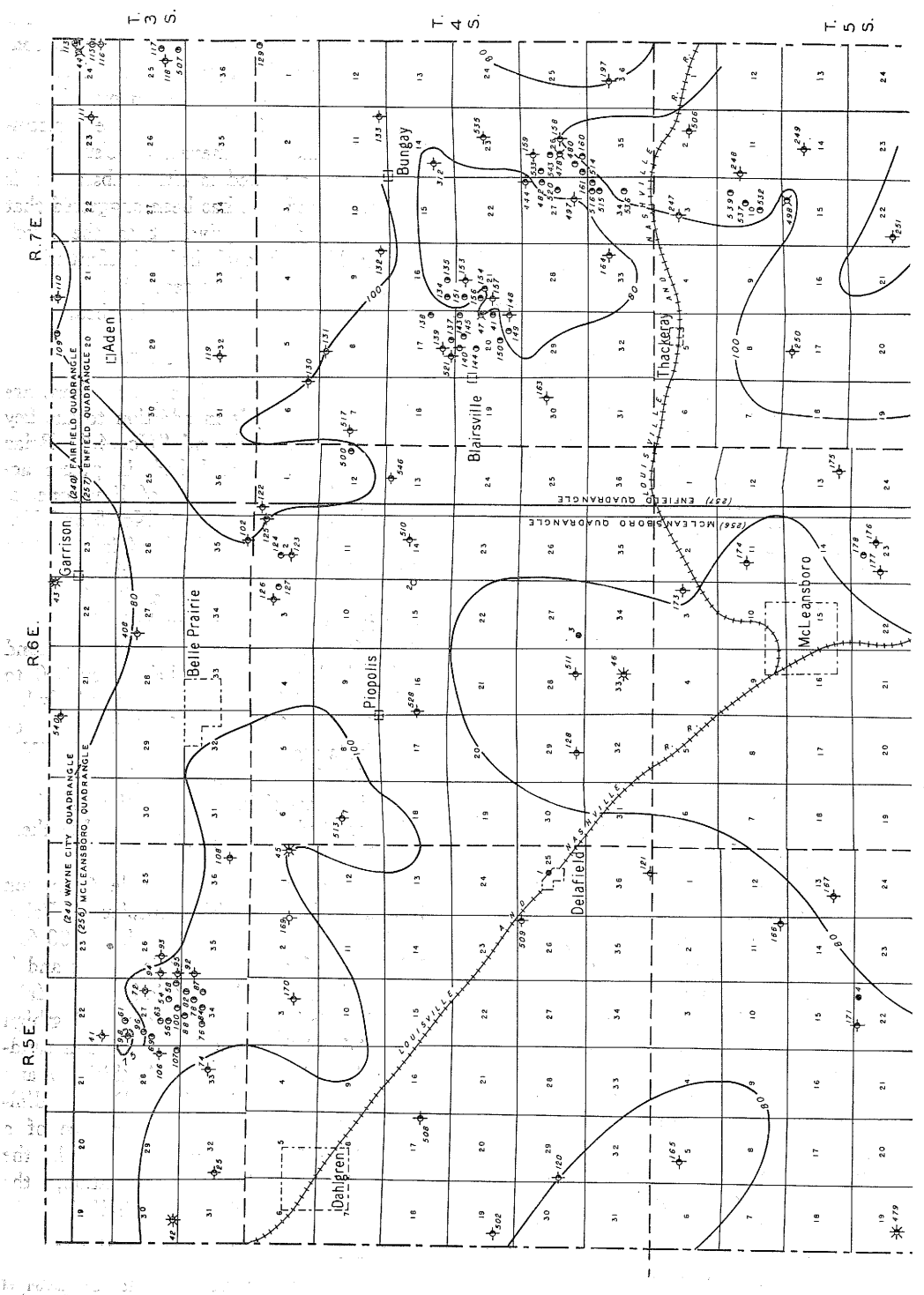
The base of the Carbondale formation is marked by the fairly conspicuous Palzo sandstone commonly present about 300 feet below No. 6 coal bed. It is porous and is commonly marked in electric logs by a fairly high resistivity and an accompanying high potential. Like most Pennsylvanian sandstones it varies considerably in thickness and cannot always be identified. Further difficulty arises because of the presence of a succession of lenticular sandstones in the underlying Tradewater formation, the upper ones of which may be indistinguishable from the Palzo sandstone.

[18] Cady, op. cit. (Areal geology).

[19] Bell, Ball, and McCabe, op. cit.

[20] Weller, J. M., and Wanless, H. R., Correlation of mineable coals of Illinois, Indiana and western Kentucky: Bull. A.A.P.G., vol. 23, No. 9, p. 1391, Sept. 1939.

[21] Wanless, H. R., Pennsylvania cycles in western Illinois: Ill. Geol. Survey Bull. 60, pp. 79-83, 1931.


T. 3 S.
T. 4 S.
T. 5 S.
R. 5 E.
R. 6 E.
R. 7 E.
(240) WAYNE CITY QUADRANGLE
(256) MCLEANSBORO QUADRANGLE
(240) FAIRFIELD QUADRANGLE
(257) ENFIELD QUADRANGLE
(257) ENFIELD QUADRANGLE
(256) MCLEANSBORO QUADRANGLE
Garrison
Aden
Bungay
Belle Prairie
Pioppolis
Blairsville
Thackeray
McLeansboro
Dahlgren
Delafield
LOUISVILLE AND NASHVILLE
LOUISVILLE AND NASHVILLE

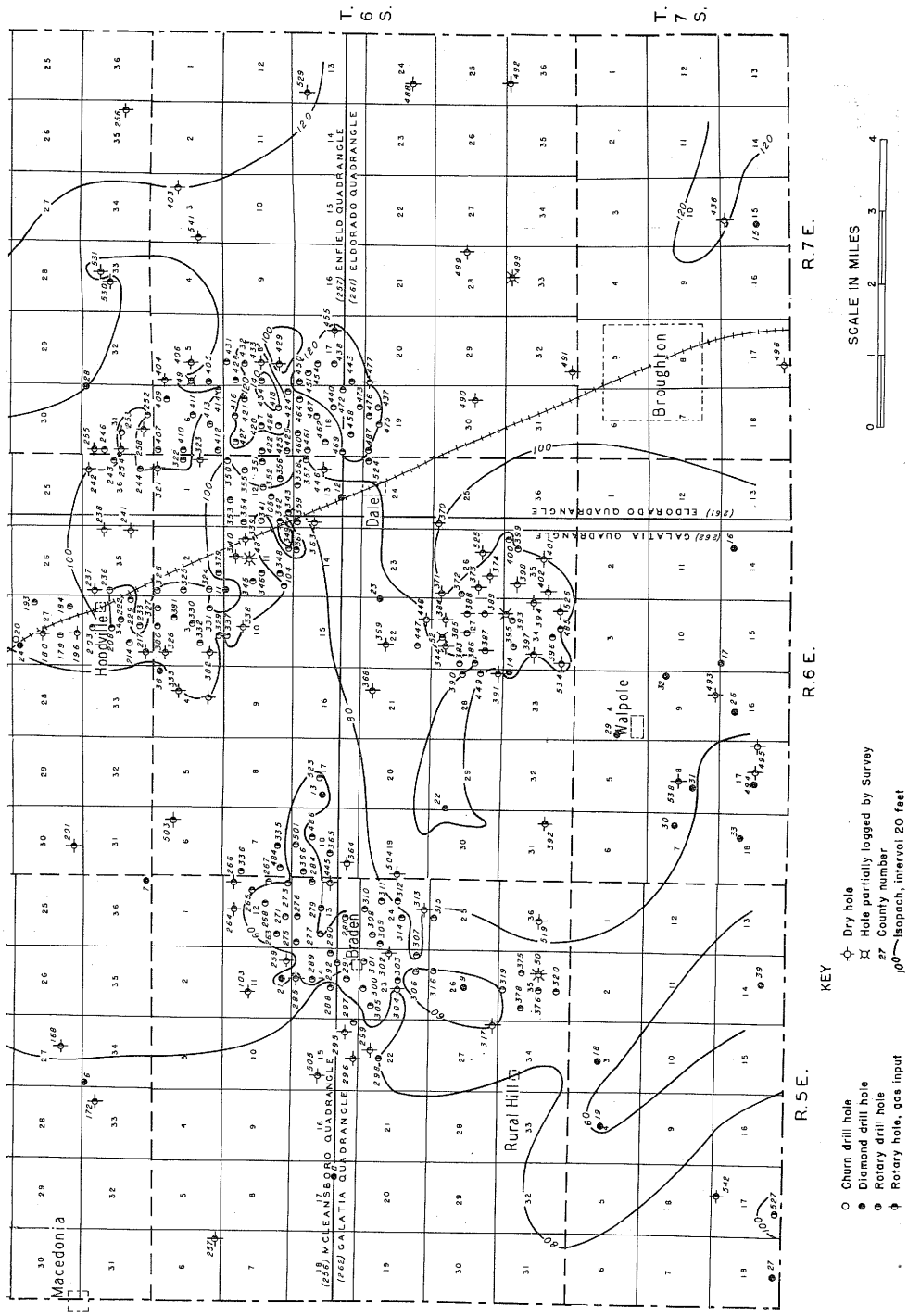
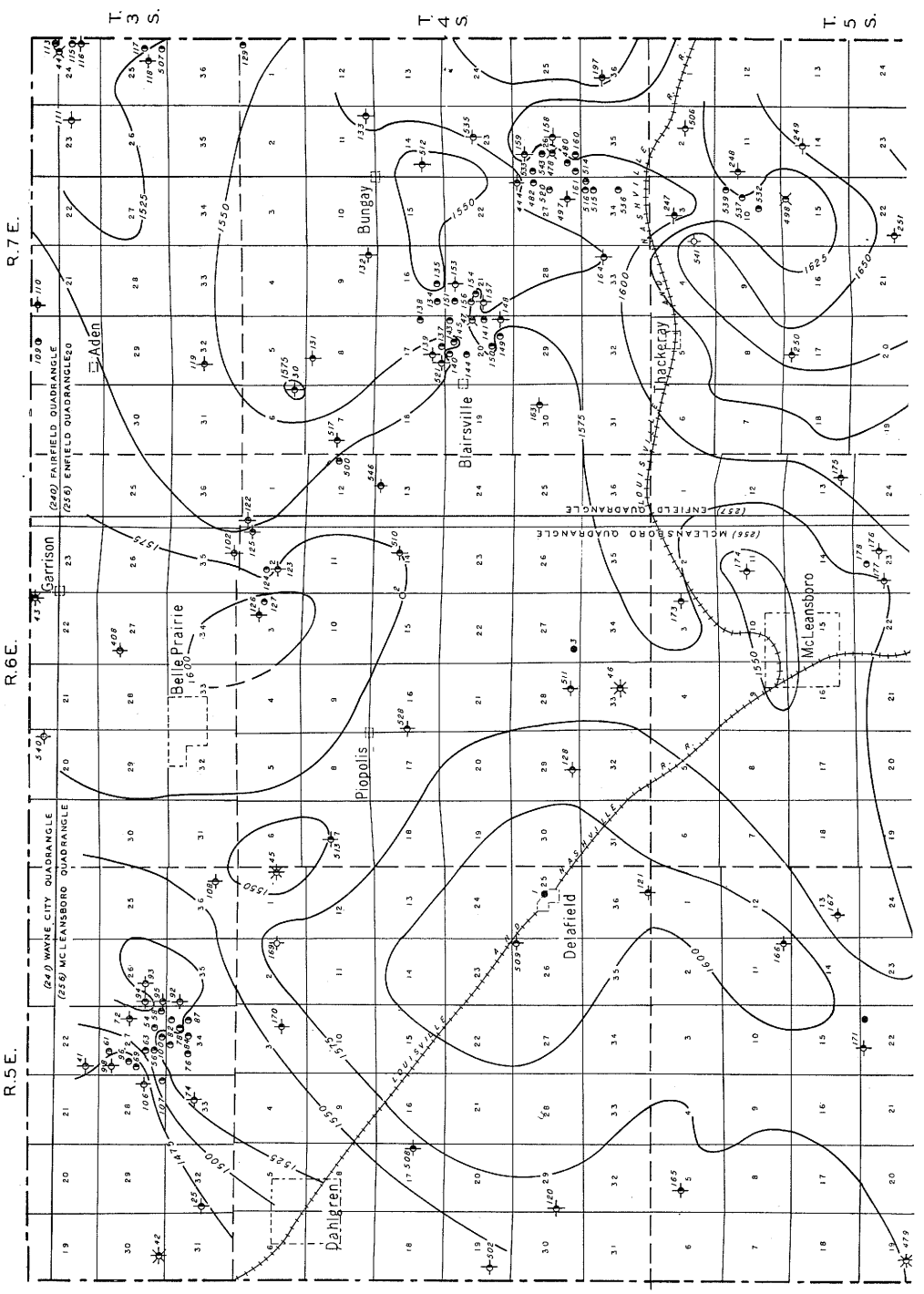


FIG. 23.—Isopach map showing distribution of variations in interval between No. 6 and No. 5 coal beds in Hamilton County.


T. 3 S.
T. 4 S.
T. 5 S.
R. 5 E.
R. 6 E.
R. 7 E.
(240) WAYNE CITY QUADRANGLE
(256) MCLEANSBORO QUADRANGLE
(240) FAIRFIELD QUADRANGLE
(256) ENFIELD QUADRANGLE
(257) ENFIELD QUADRANGLE
(256) MCLEANSBORO QUADRANGLE
Aden
Garrison
Belle Prairie
Bungay
Blairsville
Hackeray
Piopolis
Dahlgren
Delafield
McLeansboro
LOUISVILLE & NASHVILLE R.R.

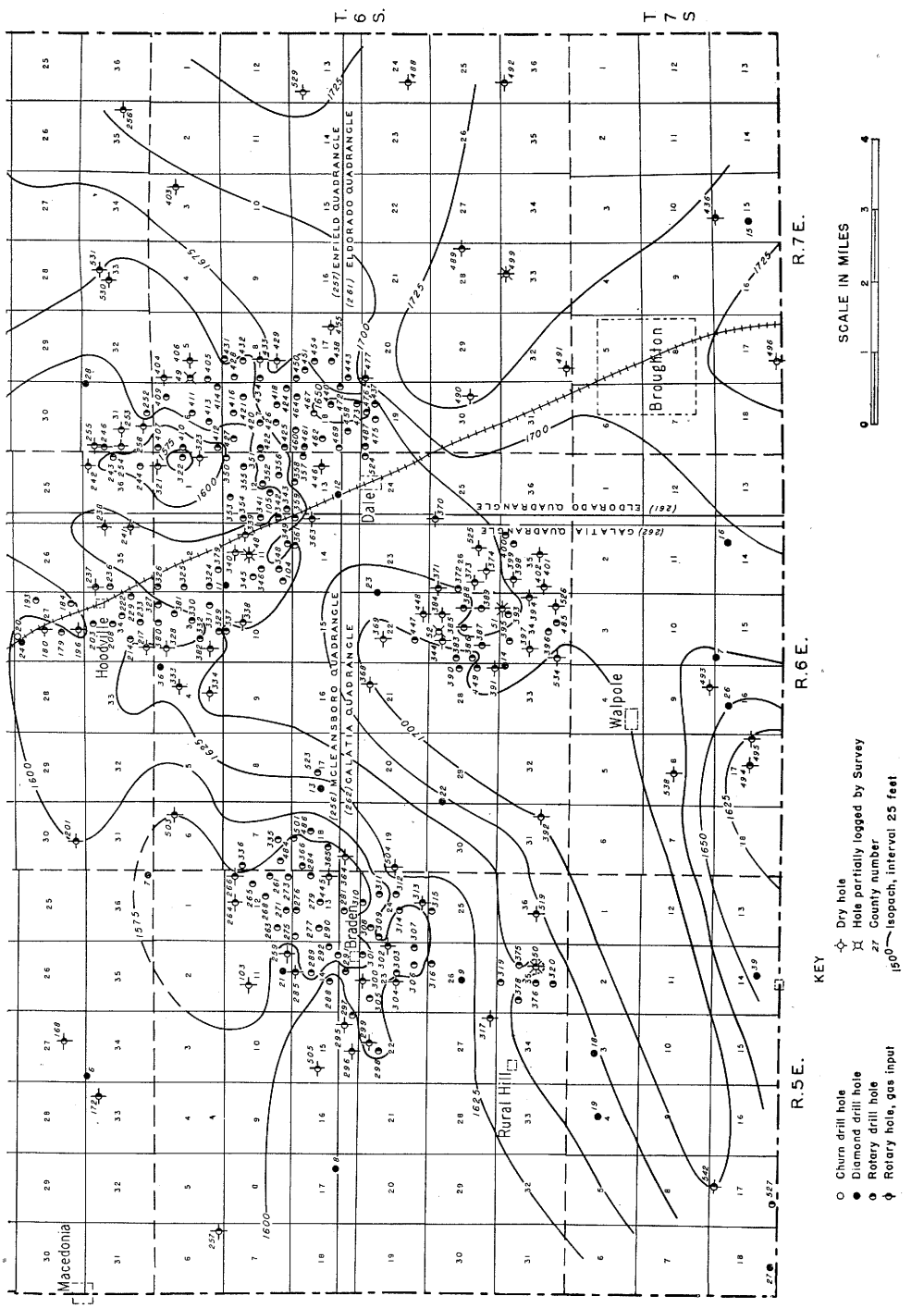


FIG. 24.—Isopach map showing the distribution of variations in interval between No. 6 coal bed and the "Little Menard" limestone in Hamilton County.

Tradewater and Caseyville Groups

In southern Saline and Gallatin counties the base of the Palzo sandstone lies upon, or a short distance above, the Dekoven coal bed, which is a short distance above the Davis coal. Formerly these beds were incorrectly thought to represent the Murphysboro coal bed of Jackson County. In places the Palzo sandstone apparently extends below the level of the Dekoven coal bed so that the Davis coal bed is the first underlying coal bed. In other places thick shale may separate the Palzo sandstone from the Dekoven coal bed.

A coal bed commonly underlies or is a short distance below the Palzo sandstone in drill holes in Hamilton County. It may represent the Davis or the Dekoven coal bed. In one of the seven control drill holes a thin bed of limestone is present a short distance below the coal bed.

Two Hamilton County control drill holes were studied to positions below the top of the Tradewater group; one continued to the base of the Pennsylvanian system. In one drill hole three coal beds were penetrated below the zone of the Dekoven and Davis coal beds, and in the other four coal beds. No correlation of these coal beds is attempted, but one may represent the Murphysboro coal bed.

STRUCTURE OF HERRIN (NO. 6) COAL BED

The structure of the Herrin (No. 6) coal bed in Hamilton County is indicated graphically by the accompanying structure contour map, which shows distribution of variations in the altitude of the top of the coal by contour lines spaced at 25-foot intervals (pl. 9).

The general regional dip of the No. 6 coal bed is at an average rate of 25 feet per mile from the highest recorded altitude, 166 feet below sea level, in sec. 17, T. 7 S., R. 7. E. (County No. 496) to the lowest recorded altitude, 638 feet below sea level, in sec. 16, T. 4 S., R. 6 E., (County No. 528) a distance of about 18¾ miles.

The structure map was constructed from unevenly distributed datum points, so that different parts of the map vary in detail and accuracy depending upon the spacing of the control points. The contours are drawn mechanically assuming a constant slope between adjacent datum points.

Irregularities in the direction and amount of dip of the coal bed produce some reversals of the regional dip. The following structural features are noteworthy: the Dale-Hoodville domes in the south-central part of the county, the Rural Hill anticlinal nose in the southwestern part, the Dahlgren anticline in the northwestern part, the Blairsville and Bungay domes in the northeastern part, and a structural low in the north-central part of the county. Some oil has been produced from each of the structural highs.

Where drilling is closely spaced the regional dip is modified locally to such an extent that local rather than regional conditions dominate the structure. Where datum points are widely spaced, additional drilling would probably change the generalized structure mapping. Unfortunately it has not been possible to discover these structural irregularities from surface outcrops.

The present structure map is a revision of the Hamilton County portion of the blueline print map of No. 6 coal bed in Hamilton and White and parts of Saline and Gallatin counties dated October 1, 1938.[22]

COAL BEDS OF MINEABLE THICKNESS

Herrin (No. 6) and Harrisburg (No. 5) coal beds are the only coal beds believed to be of mineable thickness over any great extent of Hamilton County. No. 6 coal bed ranges from 5 to between 9 and 10 feet thick in the 30 diamond-drill holes in the county. In seven holes the thickness is between 5 and 6 feet; in eight holes between 6 and 7 feet; in ten holes between 7 and 8 feet; in two holes 8 feet; and in three holes between 9 and 10 feet. In one of the control rotary-drill holes, the No. 6 coal bed was found to be 6 feet thick in an area

[22] Cady, G. H., et al., Structure of No. 6 coal bed in Hamilton and White and parts of Saline and Gallatin counties: Illinois Geol. Survey Cir. 42, 1939.

where a nearby diamond-drill hole penetrated 8 feet of this coal. In other control drill holes the coal varied in thickness from 3 to 6 feet. Attempts to estimate the thickness where only electric logs are available proved unprofitable. The No. 6 coal bed appears to be thickest in the southwest quarter of the county.

The thickness of No. 5 coal bed, as determined by diamond drilling, varies between 3 to 7 feet with an average of about 4 feet. The interval between No. 6 and No. 5 coal beds varies between 50 to 120 feet. The distributions of variations in interval are shown by the accompanying isopach map (fig. 23).

On the basis of approximately 1 million tons per square mile-foot the amount of coal in No. 6 bed, assuming an average thickness of 5 feet over 435 square miles, is 2175 million tons, and in No. 5 bed, assuming an average thickness of 3 feet, 1305 million tons, or a total of 3480 million tons. Previously, a recent estimate for these two beds was 3½ billion tons.[23] Other coal beds are present below No. 5 coal, but none appears to be more than 3 feet thick. The facts about these lower coal beds will not be known until the Carbondale and lower Pennsylvanian groups are explored with a diamond drill or more accurate methods of logging other types of drilling operations are devised.

PROTECTION OF COAL BEDS

Both No. 6 and No. 5 coal beds require protection when drill holes are abandoned and plugged. The structure map (pl. 9) gives the approximate altitude above sea level of the No. 6 bed in all parts of the county. The altitude of the surface or the drilling floor is available to the person responsible for the plugging of the well. If the altitude of the coal bed is added to the surface altitude, which gives in this county a negative or below-sea-level value, the depth to the coal bed is obtained. Plugging should extend from 50 feet above to 50 feet below the position of the coal bed. However, because the No. 5 coal bed is usually about 100 feet below No. 6, the plug should actually extend for about 200 feet, which would carry it from 50 feet above No. 6 to 50 feet below No. 5 coal bed.

If plugging is not required for coal beds more than 1000 feet in depth, regardless of their thickness, the No. 6 coal bed and lower beds will not require plugging in most of the northern part of the county. This is likely to be true where the No. 6 coal bed lies 600 feet or more below sea level or where the surface altitude exceeds 500 feet. Under this rule plugging will be applied very unevenly because of local irregularities of the surface, and its value, when applied, will be correspondingly diminished.

OIL AND GAS RESOURCES

The extent to which the structure of No. 6 coal bed may reflect the presence of pre-Pennsylvanian structures favorable to oil and gas accumulation is of interest. An isopach map (fig. 24) showing the distribution of variations in interval between No. 6 coal bed and the top of "Little Menard" limestone indicates that these variations are relatively regular. Fairly close agreement between the structure of the coal bed and that of the limestone is to be expected. Almost every oil pool in the county is located on a structural irregularity in the No. 6 coal bed.

The name and location of the oil pools in Hamilton County along with the producing formations for each pool are given on page 110.

The delineation of the detailed structural features in areas occupied by the various oil pools was made possible only by the drilling of the pools. Elsewhere drilling has been widely spaced and delineation of the structure is correspondingly generalized. The presence of what might be regarded as structures favorable for oil accumulation in such sparsley explored areas must be discounted to some extent because the map is generalized. More closely spaced drilling would considerably modify the present interpretation.

[23]Cady, G. H., Coal resources based on information obtained from rotary drilling February 1, 1942 to May 31, 1943: Illinois Geol. Survey Rept. Inv. 93, p. 38, 1944.

Pool	Location		Producting Strata
	Township South	Range East	
Aden Consolidated (Wayne and Hamilton counties)	2–3	7	Aux Vases "Lower O'Hara" lime Rosiclare lime "McClosky" lime
Belle Prairie	4	6	"McClosky" lime
Blairsville	4	7	Aux Vases "Lower O'Hara" lime Rosiclare lime "McClosky" lime
Bungay	4	7	Aux Vases "McClosky" lime
Dahlgren	3	5	"McClosky" lime
Dale-Hoodville Consolidated	5–6	6–7	Tar Springs Cypress Paint Creek Bethel Aux Vases "Lower O'Hara" lime Rosiclare lime "McClosky" lime
Hoodville East (abandoned)			"McClosky" lime
Mill Shoals (Wayne, White and Hamilton counties)	3–4	7–8	Aux Vases "Lower O'Hara" lime Rosiclare lime "McClosky" lime
Rural Hill	6	5–6	Paint Creek Aux Vases "Lower O'Hara" lime Rosiclare lime "McClosky" lime
Thackeray	5	7	Aux Vases
Walpole	6	6	Tar Springs Aux Vases
West End (Hamilton and Saline counties)	7	5	Aux Vases

Ordinarily, in regions where geological conditions permit, generalized interpretations could be tested by thorough investigations and mapping of outcrops, but the paucity of outcrops and the absence of key beds in the outcropping zone makes such procedure impracticable in Hamilton County. Short of drilling to the oil-bearing formations, the testing of the validity of the structures mapped would be possible only by drilling to one of the key beds, as the Shoal Creek limestone or the No. 6 coal bed, or by some geophysical method.

Except for the dry hole (Texas-Davis) in sec. 7, T. 6 S., R. 7 E., which was drilled to the Devonian at 5358 feet, strata below the Mississippian formations have not been tested in this county.

SUBSURFACE GEOLOGY OF RICHLAND COUNTY

BY

RAYMOND SIEVER AND GILBERT H. CADY

INTRODUCTION

THIS REPORT presents the results of a preliminary study of the Pennsylvanian formations encountered in drilling for oil in Richland County (figs. 1 and 25). The study was undertaken in order to obtain information concerning the depth, thickness, and distribution in the county of mineable coal beds, and concerning the occurrence of key beds that might be useful as stratigraphic markers and as structural datum planes.

The sources of information were drilling-time and sample-study logs of nine control drill holes compiled by the Coal Division of the Geological Survey, about 350 electric logs of rotary-drill holes, and drillers' logs of two cable-tool holes. Only a few drillers' logs and company sample-study logs were used, as they were generally found to be unsatisfactory for identifying Pennsylvanian formations.

The coal beds generally of mineable thickness (30 inches at 1000 feet or less, 3 feet at more than 1000 feet)[1] are Herrin (No. 6) and Harrisburg (No. 5), which lie at depths between 950 and 1200 feet below the surface (fig. 26). A lower bed which in places at least seems to be 3 feet or more in thickness was penetrated in three control drill holes from 1300 to 1400 feet below the surface. The depth and thickness of all these coal beds make very slight the probability of their being mined in the near future.

KEY BEDS

Shoal Creek limestone.—The youngest Pennsylvanian sedimentary unit identifiable over a considerable part of Richland County is the one designated here as the Shoal Creek limestone. It appears to be the same limestone as that similarly named in northeastern Wayne County[2] by Sims and co-authors, who suggested its probable correlation with the type Shoal Creek limestone exposed in Bond County.[3] The interval between the Shoal Creek limestone and Herrin (No. 6) coal bed in Richland County is between 338 and 456 feet in the tabulated drill holes.

In six control drill holes, the cuttings consisted of white to buff, very finely crystalline, dense, and fairly pure limestone. Certain zones in which the limestone has a grayish mottled appearance were indicated by the cuttings. Fragments of marine fossils, including crinoid fragments, were sparsely distributed through these mottled cuttings. Directly beneath the limestone is usually 1 to 3 feet of black "slate" underlying which is commonly a thin bed of coal underlain by 1 to 2 feet of light gray underclay.

Because this limestone cannot be definitely recognized in more than forty percent of the logs, it was not satisfactory here as a datum plane for structural delineation as it was in Wayne County.

West Franklin limestone.—More persistent than the Shoal Creek limestone is a second limestone which lies about 180 to 190 feet lower. The position and lithology of this limestone is similar to that of the West Franklin limestone of Indiana,[4] which outcrops near Evansville, Vanderburg County, and with which it is correlated.

[1] Oil, Gas and Coal Conservation Act, Rules and Regulations: p. 15 (Rule 15), Illinois Dept. Mines and Minerals, Division of Oil and Gas Conservation, 1941. (New rules adopted October 18, 1945, set 30 inches down to 1000 feet as the limit of mineability.)

[2] Sims, Paul K., Payne, J. Norman, and Cady, Gilbert H., Pennsylvanian key beds of Wayne County and the structure of the "Shoal Creek" limestone and Herrin (No. 6) coal bed: Illinois Geol. Survey Rept. Inv. 93, p. 28, 1944.

[3] Udden, Jon A., Notes on Shoal Creek limestone: Illinois Geol. Survey Bull. 8, p. 117, 1908.

[4] Shrock, Robert R., and Malott, Clyde A., Structural features of the West Franklin formation of southwestern Indiana: Bull. Amer. Assoc. Pet. Geol. vol. 13, No. 10, pp. 1301-1315, 1929. See also the report on Gallatin County in present volume, p. 69.

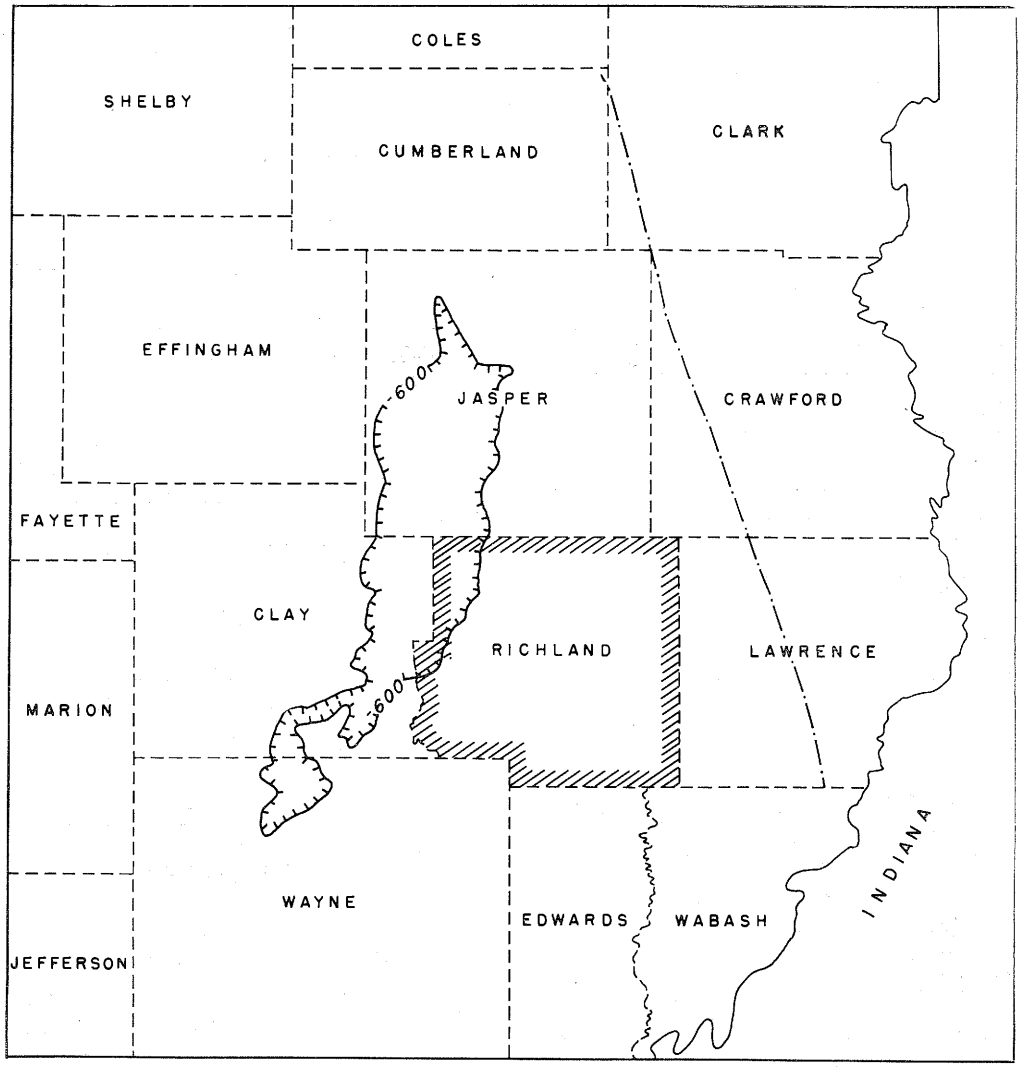


FIG. 25.—Richland County index map.

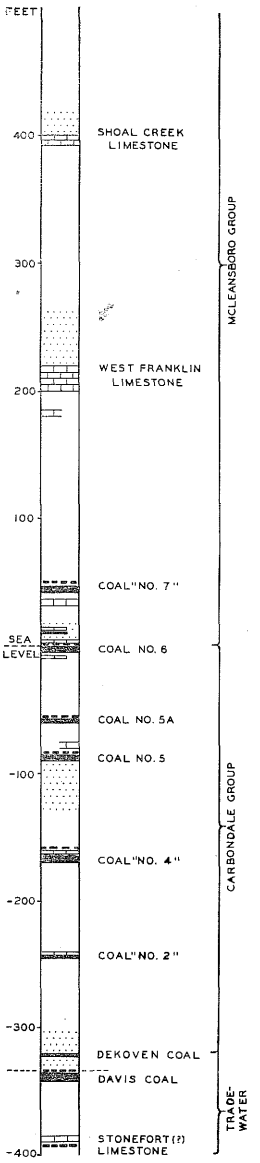


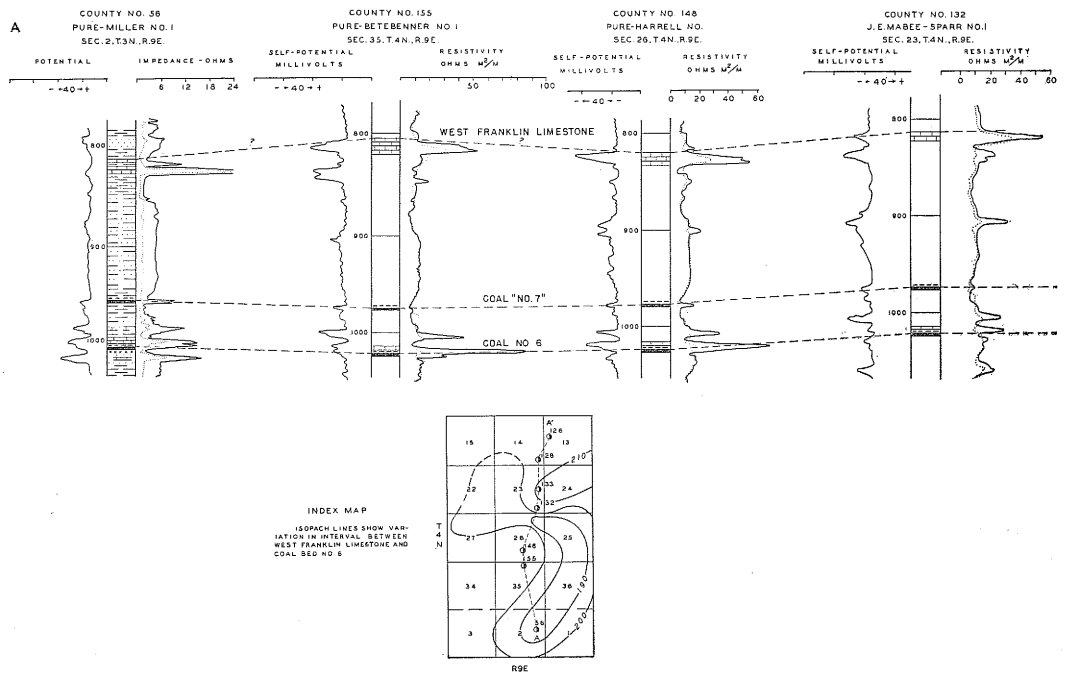
FIG. 26. — Generalized partial section of the Pennsylvanian system showing certain key beds of the lower part of the McLeansboro, of the Carbondale, and of the upper part of the Tradewater groups in Richland County.

It is also generally given this name by drillers and oil geologists working in this county. The interval between West Franklin limestone and Herrin (No. 6) coal bed in the county varies from 180 to about 250 feet. In most parts of the county the interval is about 225 feet. At one locality at least (drill hole No. 56, sec. 2, T. 3 N., R. 9 E.) only 180 feet of interval is recorded (fig. 27). The limestone and underlying shale cuttings collected by the company from this drill hole were found to correspond closely with the West Franklin limestone and underlying shale as described below.

Drill cuttings and various types of drilling records indicate that the West Franklin limestone in Richland County usually consists of two benches of light gray, finely crystalline, dense, moderately fossiliferous limestone, commonly separated by 1 to 4 feet of light gray micaceous clay shale (fig. 28). Locally 6 inches to 1 foot of black shale is found at the top of the gray shale. The upper bench of limestone averages 5 feet in thickness, but locally this bench is as much as 10 feet thick. The lower bench is fairly uniformly 8 to 10 feet thick. In places only one bench is present, but whether this represents the upper or lower bench or both is not known.

The upper bench shows moderately high resistivity (80-100 ohm-meters) in the normal curve in most logs (fig. 29), the third curve generally having a reverse (negative) peak. The potential of this bench in some holes was high for a limestone (No. 1, fig. 29; Nos. 126 and 128, fig. 27), indicating high permeability, but in many holes the potential was not high. The lower, more massive bed of limestone is distinguished by a very pronounced peak in both the normal resistivity and the third curve, and a potential varying to about the same degree as the upper limestone bench.

As elsewhere when only one bench of limestone is present or only one high resistivity peak is shown, identification of the limestone as the upper or lower bench is highly conjectural. This is the condition in several localities in the county, notably



in the Parkersburg Pool in secs. 29 and 30, T. 2 N., R. 14 W.

A thin coal bed, capped by 1 to 4 feet of black "slate," commonly lies 10 to 15 feet above the upper bed of the West Franklin limestone (fig. 28), with shale and silty shale intervening. This coal bed has the position of the Ditney coal bed of southwestern Indiana and Wabash County, Illinois.[5] It is absent in the west tier of townships in Richland County; there a higher sandstone cuts across the position of the coal bed and extends down to the West Franklin limestone. The coal bed was found in all drill holes logged by the Survey in the eastern part of the county. The Ditney coal bed has not been definitely recognized in electric logs in areas where only a single bench of limestone is present.

Underlying the West Franklin limestone there is commonly 5 to 10 feet of variegated shale, dark red, green, yellow, and gray. In three of the nine control drill holes (Nos. 1, 5, 6, fig. 28) this variegated shale was absent. Generally it is one of the most diagnostic beds in the Pennsylvanian succession. The cuttings resemble underclay, being very soft with poorly defined or no bedding planes and with slip-fracture surfaces.

The West Franklin limestone is one of the best stratigraphic markers or key beds in the Pennsylvanian system in Richland County, because it was absent in only ten drill holes, all in the southwestern part of the county (Ts. 2 and 3 N., Rs. 8 and 9 E.), and was therefore selected as a structural datum plane (pl. 11). Because it is thought to be more persistent, the lower bench is regarded as most suitable to use for this purpose when two benches are reported or are indicated by the electric log pattern. Reference is to the top of this bed.

"No. 7" coal bed.—A coal bed probably rarely as much as 3 feet thick is widespread in the county 40 to 70 feet above No. 6 coal bed. It is overlain by 2 or 3 feet of black "slate" which, together with the coal bed, produces a distinctive pattern, ordinarily consisting of a small normal re-

[5] Fuller, R. L., Ditney folio, Indiana: U. S. Geol. Survey, Geol. Atlas, Folio 84, p. 2, 1902.

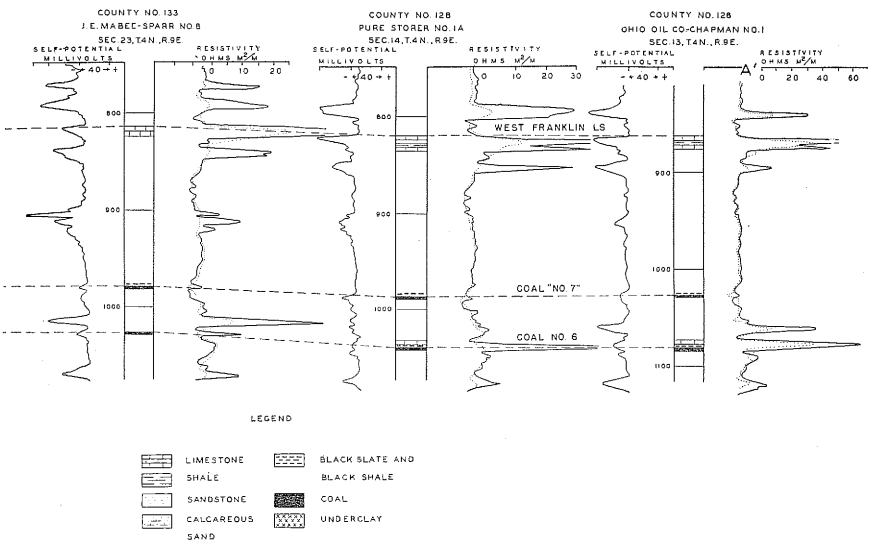


FIG. 27.—Graphic representation of the partial succession and of corresponding electric logs for seven drill holes in Ts. 3 and 4 N., R. 9 E., from a few feet above West Franklin limestone to a few feet below No. 6 coal bed in Richland County.

sistivity peak opposed by a small negative peak in the third curve and usually by a small peak in the potential curve (fig. 29). This bed is tentatively correlated with the Danville (No. 7) coal bed.

From 4 to 10 feet below "No. 7" coal bed there is in most places a bed of limestone 3 to 4 feet thick. Cuttings consist of fragments of buff to brown, dense, slightly argillaceous limestone. No fossils have been observed in the cuttings. There are insufficient data to permit correlation of this limestone with any one of the limestones found elsewhere between "No. 7" coal bed and the Herrin limestone.

Herrin limestone and No. 6 coal bed.—The No. 6 coal bed and its associated caprock, the Herrin limestone, have their usual importance as key beds in Richland County. No. 6 and No. 5 are usually the thickest coal beds found in the county, No. 6 averaging about 3 feet and reaching what is believed to be a maximum of 5 feet. No. 6 coal bed has been traced into the Illinois basin from the mining districts in southern and southwestern Illinois by means of logs of diamond-drill holes on the margins of the mining districts, by carefully logged rotary holes, and by electric logs. The coal bed is recognized in logs by its unusual thickness and by its association with the Herrin limestone, which has a distinctive lithology.[6] It is described as "an impure, earthy, dark-gray to bluish-black limestone, finely granular or sugary, and somewhat fossiliferous. Among the characteristic fossils sometimes seen in the cuttings are fragments of certain fairly large robust fusulinids (*Fusulina girtyi* Dunbar and Condra)." The electric-log pattern for the limestone and coal beds is quite variable. Some logs show two separate peaks in the normal resistivity curve, others one peak with a reverse indentation, thereby supposedly differentiating the limestone and the coal bed, and in still others there is a combined peak with no separation of limestone and coal bed.

Almost immediately above the Herrin limestone, with 1 or 2 feet of intervening underclay, in the northwest quarter of the county, is a thin bed of coal overlain by 1 to 2 feet of black sheety shale. Locally a

[6] Sims, Paul K., et al., op. cit., p. 29.

thin limestone, brown to buff, fine to medium grained, and fairly pure, overlies the coal bed. The Jamestown coal bed of southwestern Illinois occupies the same relative position with respect to the Herrin limestone, but the lithological characteristics of this limestone differ somewhat from those of the Jamestown limestone in the type locality in Perry County;[7] there it closely resembles the Herrin limestone.

No. 6 coal bed invariably has a moderately thick underclay, averaging 2 feet, but in many places as much as 5 feet thick. Like many other Pennsylvanian underclays it is very light gray, slip-fractured and massive, and contains carbonaceous particles and pyritized root remains. In most electric logs the position of the underclay is marked by a negative normal resistivity pattern.

Some drill holes penetrate a limestone 1 to 3 feet thick beneath the underclay, the cuttings from which reveal a light brown, argillaceous, silty, non-fossiliferous, possibly nodular rock. The general appearance of the cuttings indicates that this is possibly an underclay or "freshwater"[8] type of limestone.

Since No. 6 and No. 5 coal beds are those most likely to be mineable, the determination of their thicknesses is of particular importance. Unfortunately the determinations cannot be made with desirable precision. Most reliance is placed upon drilling time, particularly when this is taken at short intervals. In some drill holes the difference in rate of drilling of the coal bed and of the black shale that usually overlies it makes it possible to differentiate the coal from the shale (fig. 30). Commonly, however, this is not possible. Nor can the position of the base of the coal bed always be definitely determined, although in general it is believed that the underclay is somewhat harder than the coal, so that the contact of the two is indicated by a slight increase in the drilling time.

The amount of coal delivered to the sample box from each coal bed penetrated is also an important means of estimating bed thickness. Continuous sieving at the sample box is essential to recover the coal cuttings, which, because of their low specific gravity, tend to float off and get out of the sample box.

Estimates of the thickness of No. 6 and No. 5 coal beds made on the basis of the pattern of electric logs are also unsatisfactory. In some of the control drill holes for which excellent stratigraphic logs are available, the high resistivity peak of the normal curve opposes both the roof shale and the coal bed and, in some logs, even the Herrin limestone; thus an estimate of the thickness of the coal bed based entirely upon the width of the high resistivity pattern would be excessive (Nos. 3 and 9; figs. 29 and 30). Yet in some electric logs irregularities in the pattern appear to coincide with breaks in the sequence and to provide a fairly definite idea of the thicknesses of the various beds (Nos. 8, 9, 59, and 91; fig 29). In this report estimates of the thickness of No. 6 and No. 5 coal beds are based upon data provided by the control drill holes (table 11).

No. 5A coal bed.—With respect to the No. 6 and No. 5 coal beds, the coal bed called No. 5A has a position similar to that of the No. 5A (Briar Hill) bed in southern Illinois.[9] It is 1 to 2 feet thick, is capped by 1 to 2 feet of black "slate," and lies about 20 to 30 feet above the Harrisburg (No. 5) coal bed.

Harrisburg (No. 5) coal bed.—The position of the No. 5 coal bed varies from 45 feet below No. 6 bed in the northern part of the county to 90 feet in the southern part (fig. 29). In the control holes the No. 5 coal bed was usually as thick as No. 6 bed, averaging 3 feet but attaining a thickness of 5 feet. The bed is not continuous, and where it is absent, 2 or 3 feet of black shale probably marks its approximate position, as 1 to 2 feet of underclay usually underlies the shale. Locally a thin caprock limestone overlies the black shale. Cuttings from the limestone consist in general of brown to grayish, slightly argillaceous, very finely

[7] G. H. Cady, personal communication.

[8] Weller, J. Marvin, Cyclical sedimentation of the Pennsylvanian period and its significance: Jour. Geol., vol. 38, No. 2, p. 102, 1940.

[9] Butts, Charles, Geology and mineral resources of the Equality-Shawneetown area: Illinois Geol. Survey Bull. 47, 1925.

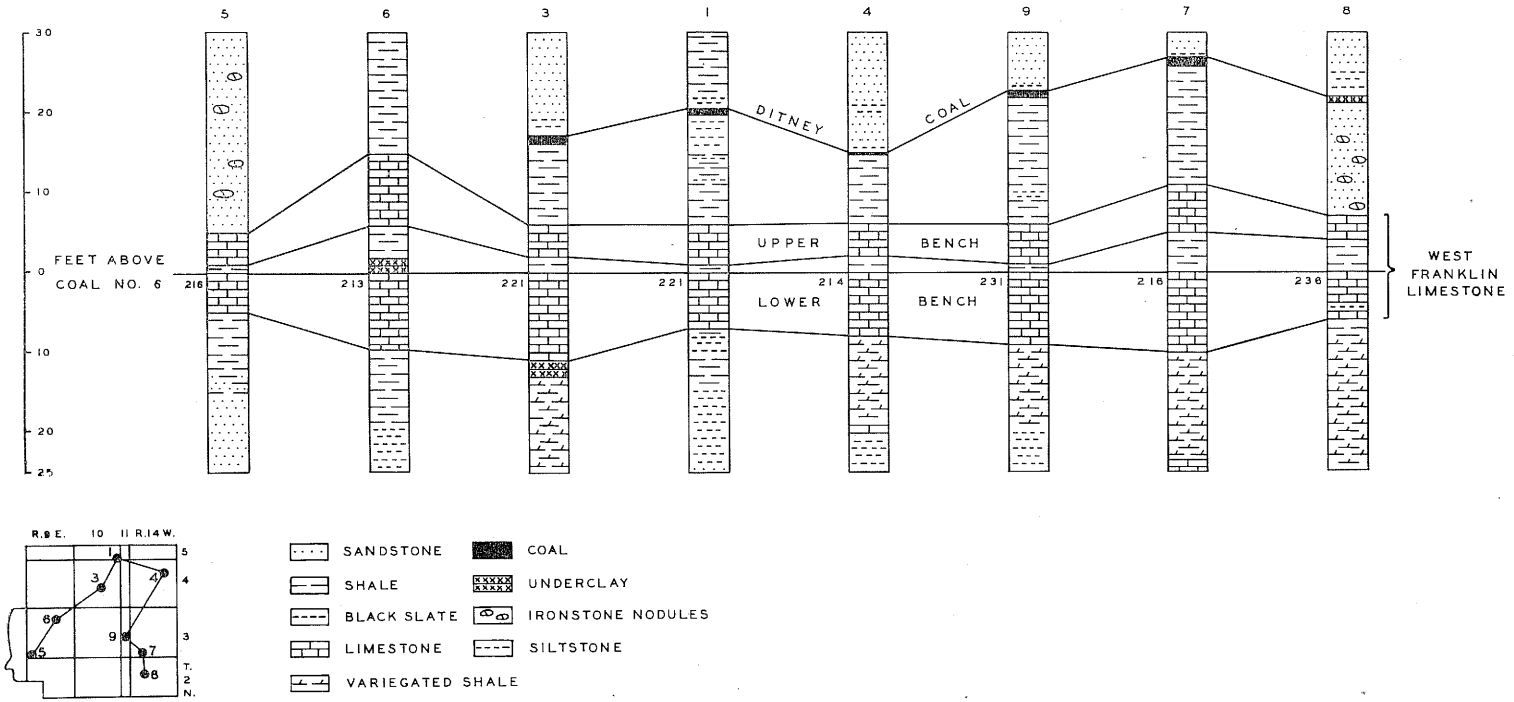
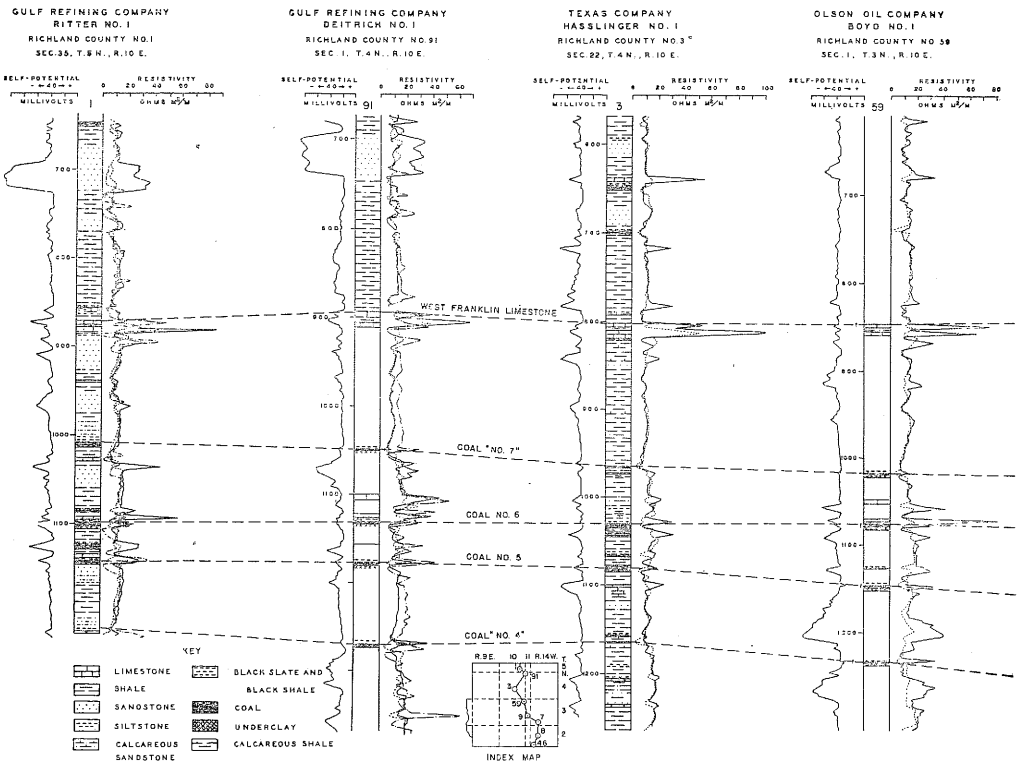


FIG. 28.—Graphic representation of the succession from 30 feet above to about 20 feet below the top of the lower bench of West Franklin limestone in eight control drill holes in Richland County.



textured, pyritic rock. Some fossils have been observed.

About a 1-foot thickness of light gray, plastic, structureless underclay usually underlies No. 5 coal bed. There is no evidence of the presence of an underclay limestone at the base of the underclay in the control drill holes in Richland County.

In electric logs the position of No. 5 coal bed is marked by a relatively prominent single peak of high resistivity in the normal curve, by a reverse peak in the third curve, and by an opposing moderately high potential.

OTHER BEDS

Coal bed 80 to 100 feet below No. 5 ("No. 4").—A thin bed of coal appears in several of the control well logs between 80 and 100 feet below No. 5 coal bed, having a thickness which appears to be not more than 2 feet. This bed is designated "No. 4" in this report. Five control drill holes in Richland County were logged through this bed (Nos. 1, 3, 7, 8, and 9; fig. 29).

A characteristic pattern of curves is usually found in the electric logs at the position of this coal bed. The normal resistivity curve (fig. 29) usually displays two small peaks, which in some logs are very distinctly separated. On the basis of information supplied by the control drill holes, the lower of these peaks represents the position of the coal bed. The third curve pattern indicates a negative reaction for the whole succession. The potential is moderately high, usually with an indentation in the curve just above the coal bed. That this coal bed is generally present is indicated by the prevalence of this pattern in many of the electric logs that have been examined.

Coal bed 150 feet below No. 5 ("No. 2").—About 150 feet below No. 5 coal bed and approximately 80 feet below the

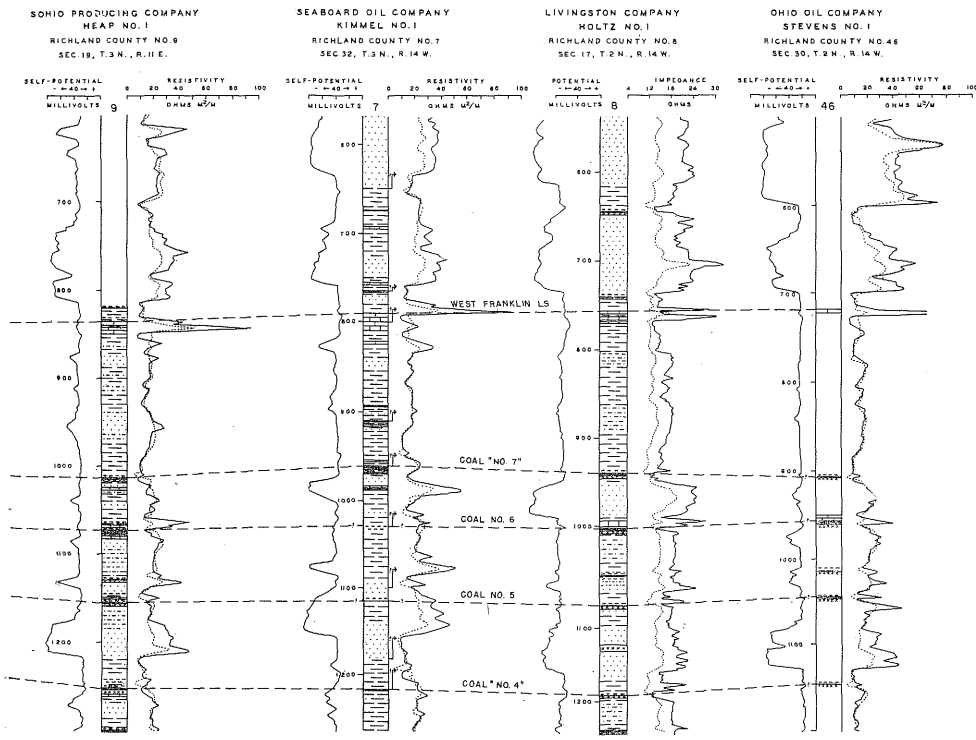


FIG. 29.—Graphic representation of the complete or partial stratigraphic succession and of electric logs of eight drill holes distributed from north to south across Richland County in Ts. 10 and 11 E., and 14 W., from a short distance above West Franklin limestone to a short distance below "No. 4" coal bed.

"No. 4" coal bed (fig. 30), the few control holes logged to this depth penetrated a thin bed of coal underlying a thin limestone. The cuttings indicate that the limestone is white to light gray, dense, and fairly pure. The coal bed can usually be recognized in electric logs by a pattern which is very similar to that characteristic of the "No. 7" coal bed. This coal bed has a stratigraphic position approximately that of the LaSalle ("No. 2") coal bed of northern Illinois, but existing evidence does not justify more than a tentative correlation with this bed.

Coal beds 235 and 270 feet below No. 5 ("Dekoven" and "Davis" beds).—A coal bed having an average thickness of 3 feet, and locally possibly reaching 6 feet, was encountered 250 to 270 feet below No. 5 coal bed in four control drill holes (Nos. 2, 3, 9, and 11). In two of these holes (Nos. 3 and 9) a thinner coal bed lies 20 to 30 feet higher. The lower coal bed probably represents the Davis coal bed of southern Illinois and the upper one the Dekoven bed,[10] the correlations being tentative pending the possibility of definite verification.

Limestone 300 to 320 feet below No. 5 coal bed.—In three control drill holes (Nos. 3, 8, 106) a limestone 2 to 3 feet thick was penetrated 300 to 320 feet below No. 5 coal bed and about 50 feet below the "Davis" bed. The Stonefort limestone of southern Illinois occupies a similar position with respect to the Davis coal bed.[11] Electric logs of borings at various positions in the county show a characteristic pattern indicative of the presence of limestone at the

[10] Butts, Charles, op. cit.

[11] Henbest, Lloyd G., Fusulinellas from the Stonefort limestone member of the Tradewater formation: Jour. Paleontology, vol. 2, No. 1, pp. 70-71, 1928.

TABLE 11.—DATA ON POSSIBLY WORKABLE COAL BEDS IN RICHLAND COUNTY

County No.	Control well No.	Location T.	R.	Sec.	Company and farm name and No.	Total depth logged	Coal bed No.	Depth ft.	Thickness of coal ft.
7	7	3N	14W	32	Seaboard	1500	6?	962	4
				A5	Kimmel No. 1		5?	1030	4
2	20	4N	9E	27	Pure Oil Co.	1170		740	3
				E7	Murvin No. B-2		"7"	1020	8
							6	1065	3
								1109	3
							5	1134	4
3	39	4N	10E	22	Texas Co.	1511		385	3
				E6	Hasslinger No. 1		6	1031	4
							5	1082	4
								1435	4
								1459	3
1	40	5N	10E	35	Gulf Refining Co.	1230		566	4
				E1	Ritter No. 1			1009	3
							6	1098	5
6	88	3N	9E	10	Carter Oil Co.	1100	6	1015	5
				F7	Winters No. 2		5	1084	3
4	111	4N	14W	11	Lee R. Trustees	1100		1002	4
				F7	Miller No. 1		6	1013	5
							5	1076	5
5	135	3N	9E	31	Pure Oil Co.	1077		270	3
				E5	Myers No. 1		6	967	3
							5	1031	4
8	147	2N	14W	17	Livingston	1468		938	4
				E3	Holtz No. 1		6	1000	4
							5	1087	5
								1368	4
9	168	3N	11E	19	Sohio Oil Co.	2000	6	1073	4
				A8	Heap No. 1			1359	3

appropriate position. The cuttings consist of fragments of white, grayish-brown, and dark gray, argillaceous, and pyritic limestone. Below the limestone, and separated from it by 2 or 3 feet of dark gray shale, is a thin bed of coal.

Limestone 350 feet below No. 5 coal bed.—A thin bed of limestone about 400 feet below No. 6 coal bed (350 feet below No. 5) was penetrated in control drill holes Nos. 3, 34, and 91. What appears to be a limestone at the same position shows up here and there in electric logs of drill holes in various parts of the county. It may possibly represent the Curlew limestone of southern Illinois,[12] but such a correlation is of little more value than simply to indicate the general position of the bed. The cuttings are those of a very dense limestone, brown to buff and mottled white in part.

[12] Butts, Charles, op. cit.

STRUCTURE OF THE FORMATIONS

Richland County lies west of the LaSalle anticline, the axis of which crosses Lawrence County east of the deepest part of the Pennsylvanian basin (fig. 25). The regional rise to the east on the flank of the LaSalle anticline begins at about the position of the minus 550-foot structure contour showing the altitude of the No. 6 coal bed (pl. 10) in Ts. 5, 4, and 3 N., and at about the position of the minus 500-foot contour in T. 2 N.

In a narrow belt on the east side of the county there is a relatively sharp rise eastward at the rate of about 50 feet per mile for about 2 miles. Westward, on the other hand, the regional dip carries the coal bed downward only about 100 feet in the remaining width of the county. In this distance of 18 to 20 miles the structure is irregular but is dominated by a general

north-south strike. An indistinct, interrupted, and indefinitely bounded belt of structural depression extends in a line with a regional trend slightly east of north from between the Calhoun and Parkersburg oil pools to an area south and east of Olney in the southern half of the county. It is closed off on the north by convergence on the LaSalle anticlinal structure.

The beds rise unevenly westward from this rather indefinitely marked trough toward a fairly distinct but mild anticlinal structure, along which are situated the Noble, North Noble, and Dundas Consolidated oil pools, and which has become known as the Clay City anticlinal belt. The Dundas East, Stringtown, Olney, Olney South, and Calhoun pools lie on the east flank of, but somewhat removed from, the Clay City anticline on irregular east-west directed cross folds of minor importance. These minor irregularities fail to develop into definitely aligned and continuous north-south structures parallel to the Noble-Dundas anticline. Fairly evenly spaced and relatively numerous drill holes in the central north-south belt make possible delineation of the structure in this portion of the county with considerable detail and it seems improbable that there are any important undiscovered "highs" along the Calhoun-Dundas East belt. The general character of the structure in the county is well established.

The Clay City anticline is more abrupt on the west than on the east; the altitude of the coal bed falls off about 125 feet toward a trough-like depression along the boundary between Clay and Richland counties. (See Bogota—Rinard syncline in accompanying report on Clay County, p. 41).

In general throughout most of the county, the structural relief is in the order of about 100 feet in the No. 6 coal bed. Because the "lay" of the beds is relatively even, variations of only a few feet of relief seem to be adequate to determine the position of oil accumulations in the underlying strata.

In the southeast portion of the county, the Parkersburg Consolidated oil pool (pl. 10) lies at the north end of an anticlinal structure which can be traced southward into Edwards County and which converges northward on the LaSalle anticline just as does the Clay City anticline on the west side of the county.

The structure of the West Franklin limestone (pl. 11) is nearly parallel to that of the No. 6 coal bed about 225 feet lower. A comparison of the two structure maps (pls. 10 and 11) reveals no indication of important thickening or thinning of intervening beds. Since the position of the West Franklin limestone is somewhat easier to identify in electric logs than that of No. 6 coal bed, the limestone is useful in picking the probable position of the coal bed in such logs.

EXPLORATION FOR OIL AND GAS

The main structural characteristics of the No. 6 coal bed in Richland County have been fairly completely outlined and the definite relationship between the distribution of oil pools in the Mississippian beds and irregularities in the structure of the coal bed indicated. However, drill holes are too widely spaced in some parts of the county to eliminate the possibility of the existence of small pools.

The easternmost tier of townships (R. 14 W.) has been least thoroughly explored, particularly north of the Bonpas pool, but the generalized structure does not delineate any structures that appear very favorable. A good many of the scattered small producing areas seem as yet to be underdeveloped and additional drilling is to be expected. The present map may provide some suggestions as to most suitable directions of exploration, but in general it is probable that a map using smaller contour intervals should be constructed in order to make the most of the data available.

Attention should be called again to the fact that the full record of exploration for oil is not provided by the present map. Only drill holes for which electric logs are available or those logged by Survey field parties are shown on the map, with the exception of two cable-tool drill holes, the records of which contained some usable information on the coal resources. The

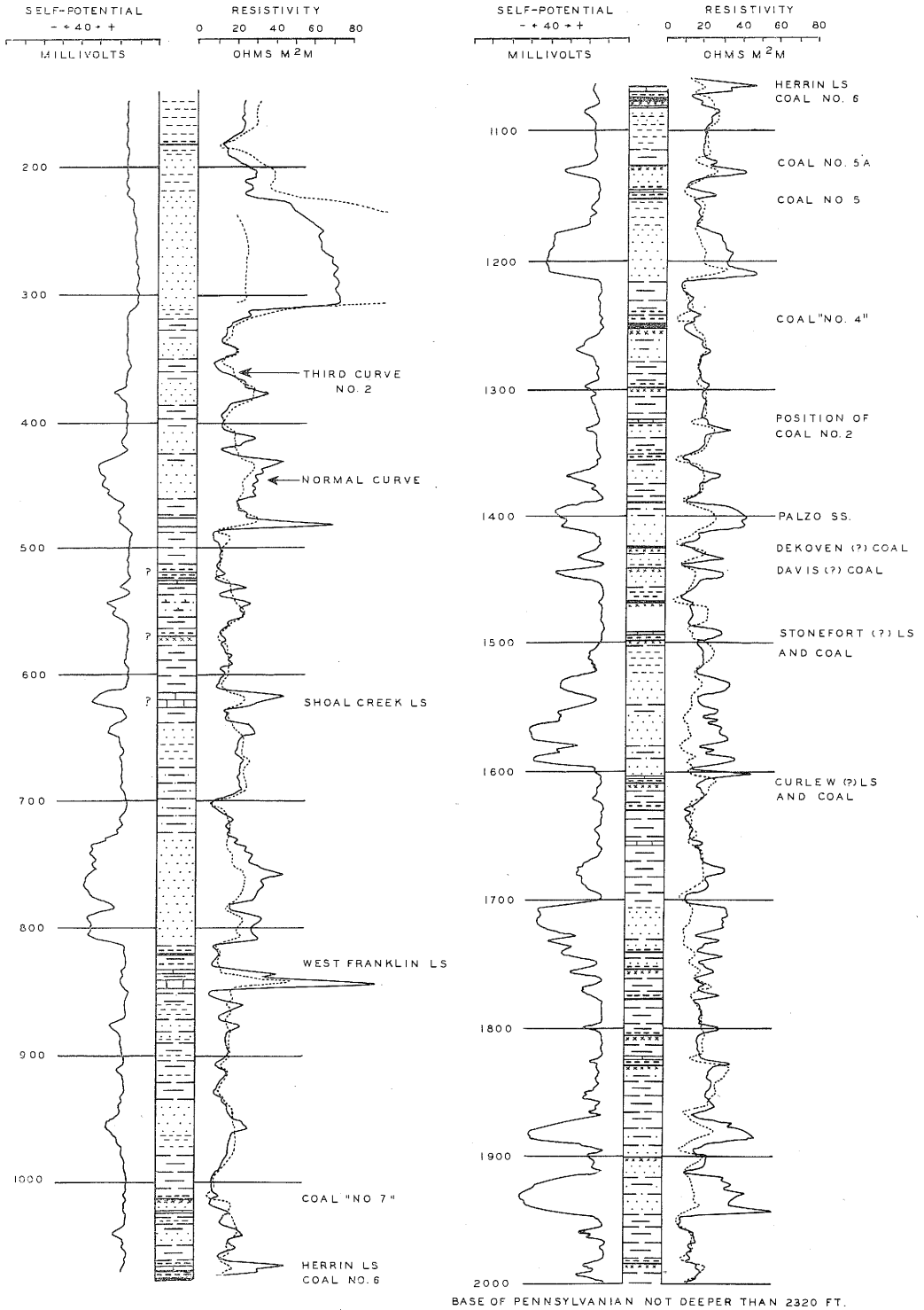


FIG. 30.—Stratigraphic succession and electric logs of rotary-drill hole Sohio-Heap No. 1 (Richland County No. 9) from 150 to 2000 feet. Above 810 feet stratigraphy is interpreted from electric logs; from 810 to 2000 feet, stratigraphy is based on drill cuttings and drilling time.

greater part of the drill holes not shown were drilled in the Noble pool.

COAL RESOURCES

The most reliable information in regard to the occurrence of coal beds of workable thickness in Richland County, other than thin beds that outcrop and occupy positions in the upper part of the McLeansboro group, is that supplied by the records of the nine control drill holes. In 1944[13] a tabulation similar to that presented in table 11 was published, in which data were given for seven control drill holes logged before June 1, 1943. Two other holes in the county have been logged since. In 1944[14] it was stated that No. 6 and No. 5 beds were believed to be essentially widespread in the county at depths between about 1000 and 1100 feet for No. 6 bed with No. 5 bed lying 50 to 75 feet lower. Assuming the average total thickness of these two beds to be about 6 feet, the county (357 square miles) is underlain by approximately 2000 million tons of coal in these two beds (1 million tons per square mile-foot).

Hole No. 39 penetrated two beds of coal, the upper reported as 5 feet thick and the lower as 3 feet at 1435 and 1459 feet respectively, 404 and 428 feet below the top of No. 6 bed and 964 and 988 feet below sea level. Hole No. 147 penetrated a 3-foot coal bed 368 feet below the top of No. 6 (1368 feet deep; 878 feet below sea level), and hole No. 193 penetrated two 3-foot coal beds at 1359 and 1426 feet respectively, 866 and 933 feet below sea level, and 186 and 253 feet below No. 6 coal bed. It seems probable that "No. 4," "No. 2," "Davis," and "Dekoven" coal beds are all represented in one or another of these records, but there is inadequate evidence to establish a condition of widespread distribution for any of these coal beds. For this reason an estimate of the amount of coal present in these beds is not attempted. No. 6 coal bed in Richland County generally lies more than 1000 feet in depth.

The character of the coal, so far as it can be determined from cuttings from drill holes in Richland County, is shown in table 1, page 16, analyses Nos. C-2698, C-2699, and C-2866. The moisture values shown are probably several percent units too low as compared with the actual moisture content of the coal, but even so the heat values are relatively high for Illinois coals, whereas sulfur values are about average. The coal may be slightly better than average Illinois coal, but not as high quality as the highest grade coal mined in the State.

[13] Illinois Geol. Survey Rept. Inv. 93, p. 57, 1944.
[14] Idem., p. 41.

ILLINOIS STATE GEOLOGICAL SURVEY
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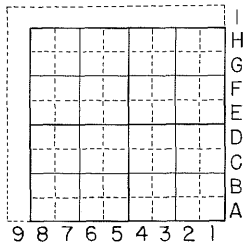
1951

APPENDIX OF TABULATED DATA

Abbreviations
Used in Tabulated Drill Record Data

Location: The location of the drill holes and mines is shown by township, range, section, and location within section. The wells are located in the section as accurately as records permit.

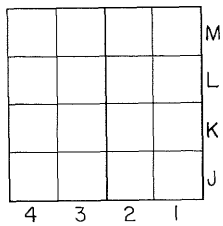
When the location is known to the nearest 10 acres (quarter-quarter-quarter section), the position of the drill hole is indicated by the letters A through H and the numbers 1 through 8, starting from the southeast corner of the section. The letter I and the number 9 are used to indicate an oversized section.



Example:

SE - SE - SE = A1
NW - NE - SE = D2

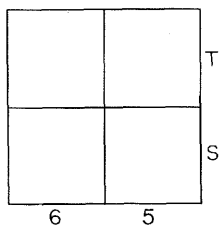
Where the location is known only to the nearest 40 acres (quarter-quarter section) it is indicated by the letters J through M and the numbers 1 through 4, as shown on the section plat below.



Example:

SE - SE = J1
NW - SW = K4

Where the location is known only to the nearest 160 acres (quarter section), it is indicated by the letters S and T and the numbers 5 and 6, as shown on the section plat below.



Example:

SE = S5
NW = T6

County number: The county number is an identification number assigned to each drill hole or mine within the county. It is also recorded on the structure contour map next to the symbol of the hole or mine.

Type hole: The following symbols have been used to indicate the type of drill hole or mine:

Drill holes (logs are available for examination at the offices of the Survey):

CH = Churn drill
PT = Oil test by churn drill
DD = Diamond drill
RD = Rod drill
TD = Rotary drill
LD = Rotary drill logged by the Coal Division as a control well
GW = Gas well
WW = Water well or other drill hole

Combination symbols, replacing the second letter of the abbreviations above, have the following meaning:

-S = Skeleton log
-C = Thickness of coal confidential
-K = Entire log confidential
-N = No log in Survey files

Mines:

SH = Shaft mine
SL = Slope mine
SD = Drift mine
ST = Strip mine
SA = Abandoned mine
OA = Abandoned strip mine
OU = Outcrop information

Operator's name and number: Operator and farm names are abbreviated to ten spaces. The operator's name is on the first line, the farm name on the second, each followed by their respective numbers. CC signifies Coal Company; MC, Mining Company; OC, Oil Company; etc.

Surface elevation: Surface elevation is given in feet and tenths of feet, the last digit representing tenths of a foot, as "4326" means "top of hole is 432.6 feet above sea-level." The Level Method for determining elevation of top of hole, shaft, etc., is indicated as follows:

B = Barometer
C = Company information
D = Company derrick floor
F = Field estimate using topographic map
T = Topographic map estimate not in field
G = Ground (estimated from instrumentally determined data, recorded depths modified accordingly)
H = Hand level
P = Plane table
Y = Wye level or transit

Total depth: The total depth of the hole is given to the nearest foot.

Quadrangle number: This refers to the number of the quadrangle as given on the Index Map (page 52) in the "List of Publications on the Geology, Mineral Resources and Mineral Industries of Illinois," January, 1950.

An asterisk (*) after the quadrangle number indicates that the datum point is not shown on the structural contour map drawn on the No. 6 coal.

Year drilled: Only the last two figures of the year drilled are shown; as "25" means "1925."

Doubtful information: A notation here indicates that, although information is available, the accuracy of some part of the data is in doubt. The nature of the doubt is shown by number, as follows:

2. Correlation of key coal bed
3. Exact location
4. Surface altitude
5. Correlation and location
6. Correlation and elevation
7. Location and elevation
8. Depth to key coal bed

Datum beds: The names of the beds shown in columns for datum beds are indicated by line at the top of each column.

SC = Shoal Creek limestone
WF = West Franklin limestone
No. 7 = "No. 7" coal bed
No. 6 = Herrin "No. 6" coal bed
No. 5 = No. 5 coal bed
No. 4 = "No. 4" coal bed
Palzo = Palzo sandstone
Base Penn = Base of the Pennsylvanian system
Little Menard = Little Menard limestone
GD = Glen Dean limestone

Depths to datum beds are given to the nearest foot to either the top or bottom of the bed, as indicated in the text. Elevation of the datum bed is in feet above sea-level. An asterisk (*) following this figure indicates the elevation is below sea-level. Thickness is given in feet and inches. *O indicates that the coal bed is eroded or is absent at its horizon for some other reason. Where no coal data are given the information is unreliable or the hole did not reach the coal bed. Where elevation is shown but not depth, the former is estimated from other data.

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
					CLAY JAN 1 1946														
2N	5E	4 B8	340	TD	CARTER OC KELLER A M BASE PENN	1	5410 C	3003		41		983 572	442* 31*	1	06	1042 860 1813	501* 319* 1272*	2	00
2N	5E	4 G1	25	LD	CARTER OC WALKER IDA BASE PENN	1	5430 D	3097		42		1053 635	510* 92*	2	06	1115 1878	572* 1335*	2	00
2N	5E	5 A3	97	TD	NRTHRN ORD SAPP J E BASE PENN	1	5420 C	4697		43		987 576	445* 34*	2	06	1052 865 1815	510* 323* 1273*	2	00
2N	5E	7 F1	2	TD	ROBINSON C BRYANT BASE PENN	1	5450 G	3015		39		999 606	454* 61*	2	06	1060 885 1839	515* 340* 1294*		
2N	5E	8 C4	37	TD	DELK CORP NEWMAN A L BASE PENN	1	5330 D	3071		42		1006 603	473* 70*	1	06	1074 1846	541* 1313*	2	00
2N	5E	9 H6	27	TD	CARTER OC CAMPBELL H BASE PENN	1	5200 C	2991		42		983 578	463* 58*	2	06	1046 1795	526* 1275*	3	00
2N	5E	11 C7	534	TD	LYNN J J CAMPBELL BASE PENN	1	5260 C	3004		45		985	459*			1045 1840	519* 1314*		
2N	5E	12 G2	26	TD	SNCLR WYOM ROSE E BASE PENN	1	5320 D	3110		42		1006 604	474* 72*	1	00	1075 1936	543* 1404*	1	06
2N	5E	18 A8	341	TD	GULF REF YOUNG P BASE PENN	1	5300 D	3052		43		958 573	428* 43*	2	00	1017 1834	487* 1304*	1	00
2N	6E	1 D4	338	LD	GIBSON A H VALBERT BASE PENN	1	4740 C	3192		42		1088 655	614* 181*	1	00	1145 2038	671* 1564*	2	06

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
												Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
Twp.	Range	Sec.																	
2N	6E	5 E6	403	LD	SNCLR WYOM HAUPT L C BASE PENN	1	5180 D	3210		44		998 592	480* 74*	2	06	1072 1978	554* 1460*	2	06
2N	6E	12 B6	339	TD	SNDM&TREES VALBERT A BASE PENN	1	4650 C	3162		37	8	1085 630	620* 165*			1150 885 2010	685* 420* 1545*		
2N	7E	2 G5	324	TD	SANDERS J BISSEY J BASE PENN	1	4470 D	3112		42		1026 640	579* 193*	2	00	1086 814 2163	639* 367* 1716*	1	06
2N	7E	3 E7	401	TD	AMER MIN S MCALLISTER BASE PENN	1	4430 D	3150		44		1042 648	599* 205*	1	00	1096 834 1980	653* 391* 1537*	2	00
2N	7E	3 F7	489	TD	AMER MIN S MCALLISTER BASE PENN	2	4250 D	3125		44		1025 632	600* 207*	1	06	1074 820 1970	649* 395* 1545*	4	00
2N	7E	5 A4	325	PT	SMITH ETAL GRAHAM C	1	4376 P	1560		36		1020 608	583* 170*	3	00	1080	642*	2	00
2N	7E	10 D1	420	TD	PURE OC KITLEY C M BASE PENN	A1	4360 C	3151		42		1035 640	599* 204*	3	00	1100 818 2095	664* 382* 1659*	2	06
2N	7E	10 D6	116	TD	PURE OC STANFORD R BASE PENN	1	4330 C	3077		41		1029 630	596* 197*	2	06	1089 813 2100	656* 380* 1667*	2	00
2N	7E	10 E5	326	TD	WILLIAMS B NOLAN M E BASE PENN	1	4520 C	3083		41		1051 647	599* 195*	2	06	1110 833 2145	658* 381* 1693*		
2N	7E	10 F1	327	TD	PURE OC PEARCE L A BASE PENN	A3	4380 C	3090		42		1029 639	591* 201*	1	00	1090 812 2100	652* 374* 1662*	2	00
2N	7E	10 H3	109	LD	PURE OC BAYLER P BASE PENN	A1	4300 C	3095		42		1008 622	578* 192*	3	00	1072 2102	642* 1672*	2	00
2N	7E	12 B7	328	TD	WASHBURN J BAYLOR J BASE PENN	1	4550 C	3073		42		1071 664	616* 209*	3	00	1136 2100	681* 1645*	2	00

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	7E	12 D7	329	TD	WASHBURN J BONNER C BASE PENN	1	4530 G	3085		41		1066 663	613* 210*	2	06	1128 854 2052	675* 401* 1599*	2	00
2N	7E	12 E5	330	TD	OLSON DRC IRWIN C BASE PENN	2	4570 G	3174		39		1076 667	619* 210*	2	00	1137 856 2067	680* 399* 1610*		
2N	7E	13 A3	332	TD	SANDRS ETL STANFORD L BASE PENN	1	4400 C	3068		41		1003 599	563* 159*	3	00	1063 2022	623* 1582*		
2N	7E	13 A4	333	TD	SANDRS ETL STANFRD LE BASE PENN	2	4340 C	3069		41		1001 586	567* 152*			1062 2028	628* 1594*		
2N	7E	13 B4	331	TD	DUNBAR ETL GILL H C BASE PENN	1	4480 D	3036		41		1017 606	569* 158*	1	06	1078 2048	630* 1600*		
2N	7E	14 D2	520	TD	PURE OC BROYLS CON BASE PENN	B1	4480 D	3077		45		1053	605*	2	06	1118 837 2090	670* 389* 1642*	3	00
2N	7E	14 E7	334	TD	KINGWOODOC NEFF F BASE PENN	1	4550 C	3207		40		1040 636	585* 181*	2	00	1102 826 2075	647* 371* 1620*	1	00
2N	7E	15 H1	336	TD	ILL PROD NEFF F O BASE PENN	1	4460 C	3132		42		1035 630	589* 184*	2	06	1101 817 2055	655* 371* 1609*	2	06
2N	7E	15 H5	335	TD	WSHBRN&PWR BAYLOR CON BASE PENN	1	4400 C	3119		42		1029 620	589* 180*	1	00	1096 820 2076	656* 380* 1636*	2	00
2N	7E	17 D8	337	TD	GULF REF SKELTON L BASE PENN	1	4350 D	3247		43		1038 606	603* 171*	2	06	1102 818 2132	667* 383* 1697*	1	06
2N	8E	3 B6	107	TD	PURE OC MOSELY CON	1	4370 C	3068		41		1004	567*	3	00	1065	628*	2	06
2N	8E	3 E5	105	LD	PURE OC MOSELY B W BASE PENN	B5	4340 C	2615		42		978 596	544* 162*	2	00	1040 1965	606* 1531*	2	06

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	8E	3 H4	104	TD	PURE OC TAYLOR CON BASE PENN	1	4160 C	3040		42		960 570	544* 154*	3	00	1016 1950	600* 1534*	3	00
2N	8E	4 D8	115	TD	PURE OC MOSELEY J	3B	4490 C	4840		41		1038 626	589* 177*	3	00	1097 855	648* 406*	2	06
2N	8E	6 A6	108	TD	WISER OC DALY J	5	4700 C	3121		39		1088 681	618* 211*	2	06	1151	681*	2	06
2N	8E	6 A7	112	TD	WISER OC DALY J	4	4740 C	3131	*	39	3	1093 619	619* 145*	2	00	1155	681*	2	06
2N	8E	6 C6	110	TD	WISER OC DALY J BASE PENN	8	4690 C	3124		39		1095 691	626* 222*	2	06	1157 2015	688* 1546*	2	00
2N	8E	6 D7	111	TD	WISER OC DALY J	3	4740 C	3150	*	39	3	1096 685	622* 211*	2	00	1160	686*	2	06
2N	8E	7 A5	320	TD	ORCHARD OC NORTN MARC BASE PENN	2A	4580 C	3095		39		1052 652	594* 194*	3	00	1122 2000	664* 1542*	2	06
2N	8E	7 F3	319	TD	PURE OC SMITH S	5B	4530 G	3100		39		1061 649	608* 196*			1128	675*	2	00
2N	8E	8 D7	490	TD	PURE OC CLARK L BASE PENN	16	4660 D	2683		44		1036 624	570* 158*	2	06	1098 1930	632* 1464*	3	00
2N	8E	8 F4	535	TD	DUNCAN W CARROLL BASE PENN	7	4670 C	2760		45		1042	575*			 2032	 1565*		
2N	8E	10 H1	509	TD	PURE OC TETRICK T BASE PENN	B1	4380 D	3113		44		996	558*	2	06	1060 2010	522* 1572*	2	06
2N	8E	11 A6	504	TD	PURE OC MOSELY C B BASE PENN	B1	4310 D	3144		45		999 594	568* 163*	3	00	1063 782 2008	632* 351* 1577*	3	06
2N	8E	13 G7	106	TD	PURE OC HOUGH W BASE PENN	1	4090 D	3115		43		973 566	564* 157*	2	00	1040 742 2037	631* 333* 1628*	2	00

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	8E	15 A6	118	TD	PURE OC PIERCE R H BASE PENN	6	4720 C	3058		42		1053 645	581* 173*	3	00	1120 2050	648* 1578*	3	00
2N	8E	15 D4	321	TD	PURE OC EVANS W BASE PENN	B1	4560 G	3080		44		1012 602	556* 146*	2	06	1079 782 2027	623* 326* 1571*	2	06
2N	8E	17 E5	322	TD	PURE OC HENDERSN E BASE PENN	1	4530 G	3110		38		1027 627	574* 174*	2	06	1087 2057	634* 1604*	2	00
2N	8E	17 F8	323	TD	REGENT OC HENDERSN E BASE PENN	1	4510 C	2670		41		1036 632	585* 181*	2	00	1100 2084	649* 1633*	2	00
2N	8E	18 B5	117	TD	PURE OC SCRUGHAM L BASE PENN	1	4480 C	3120		40		994 598	546* 150*	3	00	1058 2005	610* 1557*	2	00
2N	8E	18 F5	114	TD	SANDERS J GILL L BASE PENN	1	4410 G	3101		39		1017 621	576* 180*			1081 2012	640* 1571*		
2N	8E	18 F6	113	TD	SANDERS J GILL BASE PENN	3	4500 C	3104		39	3	1032 632	582* 182*	3	00	1094 829 2053	644* 379* 1603*	2	06
3N	5E	15 E5	3	PT	BNDM&TREES ANDERSON	1	5406 P	2076		15	3	1025	484*	2	00	1075	534*	3	00
3N	5E	18 B3	4	TD	MYERS&NLSN NEWTON BASE PENN	1	5190 C	2896		41		986 620	467* 101*			1046 1782	527* 1263*	3	00
3N	5E	24 E4	96	TD	MYERS J W HENDY CHAS BASE PENN	1	5060 D	3003		43		996 627	490* 121*	2	00	1050 1873	544* 1367*	1	06
3N	5E	25 A1	33	TD	BAYER K M ALLISON M BASE PENN	1	5210 C	2967	*	42		944 557	423* 36*	2	00	1006 1851	485* 1330*	2	00
3N	5E	25 B3	479	TD	LYNN J J ALLEN BASE PENN	1	5190 D	2705	*	44		940 550	421* 31*	2	06	998 1830	479* 1311*	1	06

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	5E	25 D2	481	TD	LYNN J J HAYNES 3 BASE PENN		5100 D	2725	*	44		960 579	450* 69*	1	06	1118 1856	608* 1346*	2	00
3N	5E	25 E3	480	TD	LYNN J J CLCLRE HRS 1 BASE PENN		4910 G	2718	*	44		943 557	452* 66*	2	00	997 1831	506* 1340*	3	06
3N	5E	25 G2	303	LD	LAIN OG HYNS&MC CN 1 BASE PENN		5150 D	2976		42		967 593	452* 78*	4	00	1023 1859	508* 1344*	3	00
3N	5E	27 A8	5	TD	STEWART A WALKER HRS 1 BASE PENN		5610 C	3082		41		1105 708	544* 147*	2	06	1170 1926	609* 1365*	1	06
3N	5E	32 B2	6	TD	GORDON&RBN CANNON 1 BASE PENN		5680 C	3030		38		1058 656	490* 88*	2	00	1124 1920	556* 1352*	2	06
3N	5E	35 A2	511	TD	NAT ASSOC MODLIN EST 1 BASE PENN		5270 D	3010		45		984 608	457* 81*	1	06	1042 1848	515* 1321*	1	06
3N	5E	36 H5	512	TD	LYNN J J ANDRN&BRYN 1 BASE PENN		5190 D	2735	*	45		949 564	430* 45*	2	00	1004 1847	485* 1328*	2	00
3N	6E	9 A1	304	TD	CUPPS L B FROST D 1 BASE PENN		4810 G	3141		42		1003 614	522* 133*			1060 1927	579* 1446*		
3N	6E	12 C3	305	TD	MARTN&GDSN NASH 5 BASE PENN		4640 D	3007		42		1030 624	566* 160*	2	06	1080 1970	616* 1506*		
3N	6E	13 A6	310	TD	GULF REF PEARCE R 2 BASE PENN		4680 D	3001	*	43		1017 603	549* 135*	2	06	1072 1974	604* 1506*	3	00
3N	6E	13 A7	312	TD	TIDE WATER WINKA T 1		4690 D	2990	*	43		1017 604	548* 135*	2	06	1074	605*	2	00
3N	6E	13 C7	313	TD	TIDE WATER WINKA T 2 BASE PENN		4670 D	2986	*	43		1022 602	555* 135*			1082 1922	615* 1455*		

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	6E	13 B3	307	TD	CARTER OC NEELY E	1	4680 D	2992	*	38		1010 602	542* 134*	2	00	1067	599*	1	00
3N	6E	13 E3	421	TD	KINGWOODOC GRAHAM BASE PENN	1	4730 G	2984	*	38		1017 607	544* 134*	2	00	1074 1937	601* 1464*	2	00
3N	6E	13 E7	306	TD	TIDE WATER HILL G	1	4670 D	2977	*	43		1034 621	567* 154*	3	00	1094	627*	2	00
3N	6E	14 B1	314	TD	NAT REF GOODENGH A	1	4660 D	2984	*	43		1024 601	558* 135*	2	00	1086	620*	2	00
3N	6E	14 E1	396	TD	GULF REF WORTHAM E	2	4670 D	3085	*	44		1034 613	567* 146*	2	00	1096	629*	1	00
3N	6E	14 F2	366	TD	GULF REF WORTHAM E	1	4700 D	3004	*	44		1044 621	574* 151*	2	00	1102	632*	2	00
3N	6E	14 G8	365	TD	MILLER DRC DUNNIGAN C BASE PENN	1	4750 D	3081		44		1015 609	541* 134*	1	06	1070 1900	595* 1425*	1	06
3N	6E	16 E4	367	TD	TALBOT C W SMITH A BASE PENN	1	5210 D	3130		44		1030 632	509* 111*	1	00	1087 1966	566* 1445*	1	00
3N	6E	23 E2	308	TD	DEEP ROCK THOMPSON A	1	4750 D	2996		43		1048 627	573* 152*	2	00	1110	635*	1	06
3N	6E	23 G2	309	TD	KINGWOODOC GATEWOOD A	1	4740 D	3076		42		1036 624	562* 150*	2	00	1098	624*	2	00
3N	6E	24 C8	316	TD	STANLND OG RIGGLE C BASE PENN	1	4890 D	3021		43		1072 642	583* 153*	2	00	1134 1976	645* 1487*	3	00
3N	6E	24 H8	315	TD	NAT REF THING A C	1	4710 D	2994		43		1022 615	551* 144*	2	06	1082	611*	2	06
3N	6E	30 D3	317	TD	WILLIAMS B THOMPSON BASE PENN	1	4720 C	2957	*	41		925 530	453* 58*	2	00	982 1845	510* 1373*	2	00

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	6E	30 D8	398	TD	LYNN J J JOPLIN BASE PENN	2	5220 D	2724	*	44		949 572	427* 50*	2	00	1004 1802	482* 1380*	1	06
3N	6E	30 E8	495	LD	LYNN J J DEAIN BASE PENN	3	5130 G	2726		44		946 567	433* 54*	3	00	1001 1858	488* 1345*	3	00
3N	6E	30 F2	369	TD	LYNN J J WEILDT	1	5040 D	3018	*	43		956 563	452* 59*	2	06	1008	504*	2	00
3N	6E	30 F4	318	TD	LYNN J J GREENE BASE PENN	2	5050 C	2700	*	43		956 573	456* 63*	2	06	1018 1855	508* 1350*	2	00
3N	6E	30 G3	397	TD	LYNN J J GREENE BASE PENN	3	4970 C	2706	*	43		955 564	458* 67*	2	06	1012 1787	515* 1290*	1	00
3N	6E	30 G5	370	TD	LYNN J J CHASTEEN	1	5120 D	2712	*	43		980 590	468* 78*	2	06	1039	527*	2	00
3N	6E	30 G7	368	TD	LYNN J J COMMUNITY BASE PENN		5120 C	2822	*	44		964 576	452* 64*	1	00	1020 1820	508* 1308*	2	00
3N	6E	31 H4	510	TD	LYNN J J COLLEGE	1	5160 C	2976		43		982 594	466* 78*	2	06	1038	522*	2	06
3N	6E	31 H7	516	TD	LYNN J J ALLISON BASE PENN	C3	5200 G	2720		45		968 582	448* 62*	2	00	1024 1889	504* 1369*	2	00
3N	6E	34 C4	513	TD	GULF REF MCVEIGH W BASE PENN	1	4920 D	3190		45		1042 635	550* 143*	2	00	1102 1990	610* 1498*	3	00
3N	7E	2 A1	251	TD	DUNCAN N&W PATRIDG J BASE PENN	1	4310 D	2955		42		1027	596*	1	00	1071 876 2010	640* 445* 1579*	3	00
3N	7E	2 A3	254	TD	WISER OC SULLENS J BASE PENN	1	4310 D	3030		42		1031	600*	2	06	1076 2025	645* 1594*	3	06

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	7E	2 A7	255	TD	MCBRIDE INC THOMPSON BASE PENN	1	4340 D	2655	*43			1026	592*	2	00 *0	1075 1995	641* 1561*	3	06
3N	7E	2 B6	284	TD	BRIT AM OP DANNELLS B BASE PENN	1	4350 C	2999	*43			1021	586*	1	06	1067 880 2005	732* 445* 1570*	3	06
3N	7E	2 B7	494	TD	MCBRIDE INC DANNELLS C BASE PENN	1	4340 D	2622	*44			1026	592*	2	06 *0	1069 1996	635* 1562*	3	00
3N	7E	2 C7	252	TD	MCBRIDE INC PHILLIPS BASE PENN	1	4330 D	2600	*43			1018	585*	2	00 *0	1062 2000	629* 1567*	3	06
3N	7E	2 D8	344	TD	MCBRIDE INC PHILLIPS F BASE PENN	3	4340 D	2615	*43			1014	580*	3	00 *0	1060 1993	626* 1559*	3	06
3N	7E	2 E7	253	TD	MCBRIDE INC PHILLIPS BASE PENN	2	4340 D	2615	*43			1016	582*	1	00 *0	1058 2006	624* 1572*	3	00
3N	7E	2 F3	256	TD	NAT REF TOLLIVER M BASE PENN	1	4320 C	3010	*42			1027	595*	1	06	1072 2016	640* 1584*	3	06
3N	7E	2 G5	482	TD	RBNSN PUCK TOLLIVER J BASE PENN	B1	4430 D	2627	*44			1016	573*	2	06	1062 854 2003	619* 411* 1560*	3	00
3N	7E	2 G7	250	TD	MCBRIDE INC FRANKLIN B BASE PENN	1	4310 D	2610	*43			1004	573*	2	00	1048 1994	617* 1563*	3	00
3N	7E	3 A1	262	TD	MCBRIDE INC NEELY A H BASE PENN	1	4370 D	2607	*43			1021 624	584* 187*	3	00	1074 838 1997	637* 401* 1560*	2	00
3N	7E	3 A3	302	TD	MCBRIDE INC CAILTEUX F BASE PENN	1	4360 C	3020	*43			1019 623	583* 187*	1	00	1064 2010	628* 1574*	3	00
3N	7E	3 A4	483	TD	MCBRIDE INC CAILTEUX F BASE PENN	2	4350 D	2622	*44			1022 622	587* 187*	1	06	1066 2006	631* 1571*	3	00
3N	7E	3 C1	263	TD	MCBRIDE INC NEELY A H BASE PENN	2	4340 D	2603	*43			1017	583*	2	00	1062 2006	628* 1572*	2	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	7E	3 C3	259	TD	MCBRIDE INC HAGEN L BASE PENN	1	4340 D	3015	*42			1010	576*	2	00	1059 1980	625* 1546*	2	06
3N	7E	3 E1	345	TD	MCBRIDE INC CLARK A BASE PENN	2	4350 D	2613	*43			1021	586*	1	06	1066 2011	631* 1576*	2	00
3N	7E	3 E7	261	LD	MCBRIDE INC MCNEELY C BASE PENN	1	4350 D	3084	42			1006	571*	3	00 *0	1058 820 1990	623* 385* 1555*	3	06
3N	7E	3 G1	257	TD	MCBRIDE INC CLARK A BASE PENN	1	4330 D	2997	*43			1007	574*	1	06 *0	1050 2007	617* 1574*	2	06
3N	7E	3 G3	258	TD	MCBRIDE INC DICKEY H BASE PENN	1	4330 D	2607	*42			997	564*	2	06	1043 2013	610* 1580*	2	06
3N	7E	6 F5	264	TD	KINGWOOD OC COGGIN O D BASE PENN	1	4740 D	3113	41			1088 695	614* 221*	2	06	1143 2062	669* 1588*	2	06
3N	7E	7 A4	484	TD	COOP REF NASH E R BASE PENN	1	4730 D	3065	44			1034 624	561* 151*	2	06	1089 2025	616* 1552*	3	00
3N	7E	8 E7	260	TD	KINGWOOD OC BRISSENDEN BASE PENN	1	4620 C	3101	38			1046 640	584* 178*			1099 2019	637* 1557*		
3N	7E	9 B3	267	TD	OHIO OIL STANFORD S BASE PENN	1	4600 G	3460	38			1047 642	587* 182*			1102 907 2027	642* 447* 1567*		
3N	7E	9 C1	265	TD	MCBRIDE INC DEHART W BASE PENN	2	4560 D	3060	*43			1030	574*	3	00	1087 2022	631* 1566*	2	00
3N	7E	9 E1	266	TD	MCBRIDE INC GERMAN K BASE PENN	1	4530 D	3040	*43			1026 628	573* 175*	2	00	1076 2032	623* 1579*	3	00
3N	7E	10 A6	280	TD	SHULMN BRO GILL S BASE PENN	1	4490 C	2641	*41			1034	585*	2	00	1087 2000	638* 1551*	2	00
3N	7E	10 A7	273	TD	SHULMN BRO COLCLASURE BASE PENN	3	4340 G	2596	*41			1013 611	579* 180*	2	00	1063 873 1997	632* 442* 1566*	1	00

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Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	7E	10 B6	285	TD	SHULMN BRO GILL S BASE PENN	2	4320 D	2607	*43			1006 606	574* 174*	2	00	1058 1986	626* 1554*	2	00
3N	7E	10 B8	272	TD	SHULMN BRO COLCLSRE C BASE PENN	1	4560 C	2955	*40			1036 635	580* 179*	3	00	1088 2020	632* 1564*	3	00
3N	7E	10 D7	346	TD	MCBRIDEINC DEHART W BASE PENN	3	4380 D	2625	*43			1010 604	572* 166*	2	00	1060 2000	622* 1562*	2	00
3N	7E	10 D8	279	TD	MCBRIDEINC DEHART W BASE PENN	1	4370 D	2612	*43			1004	567*	1	00	1054 2010	617* 1573*	1	00
3N	7E	10 E7	268	TD	MCBRIDEINC ARMSTG ETL BASE PENN	1	4320 D	2610	*42			1002	570*	2	00	1050 1996	618* 1564*	3	00
3N	7E	10 F2	274	TD	SHULMN BRO COLCLSRE C BASE PENN	B2	4420 C	2340	*43			1020	578*	2	00	1073 1995	631* 1553*	2	06
3N	7E	10 F4	271	TD	MCBRIDEINC BERLIN C BASE PENN	2	4430 D	2610	*43			1032	589*	2	06	1082 831 2007	639* 388* 1564*	2	00
3N	7E	10 F6	270	TD	MCBRIDEINC BERLIN C BASE PENN	1	4500 D	2626	*42			1034	584*	2	00	1084 2010	634* 1560*	3	00
3N	7E	10 G7	269	TD	MCBRIDEINC ARMSTRONG BASE PENN	2	4490 D	2620	*43			1035	586*	3	00	1086 2016	637* 1567*	2	00
3N	7E	10 H2	281	TD	MCBRIDEINC HANCOCK E BASE PENN	1	4430 D	2615	*43			1020	577*	3	00 *0	1070 1976	627* 1533*	1	00
3N	7E	10 H4	282	TD	MCBRIDEINC MOENCH W F BASE PENN	2	4350 D	2605	*43			1022	587*	3	00	1067 1970	632* 1535*	3	00
3N	7E	11 D7	399	TD	MCBRIDEINC MORGAN S BASE PENN	1	4320 D	2615	*44			1027 614	595* 182*			1074 1940	642* 1508*	3	00
3N	7E	11 D8	485	TD	MCBRIDEINC MORGAN BASE PENN	2	4340 D	2614	*44			1024 620	590* 186*	2	00	1073 1965	639* 1531*	3	06

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	7E	11 E7	486	TD	MCBRIDE INC PATTON BASE PENN	3	4330 D	2612	*	44		1035 615	602* 182*	2	00	1084 1956	651* 1470*	3	00
3N	7E	11 E8	487	TD	MCBRIDE INC PATTON H BASE PENN	4	4330 D	2612	*	44		1020 618	587* 185*	2	00	1072 1952	639* 1519*	2	00
3N	7E	11 F5	287	TD	PRUETT T M CAILTEUX BASE PENN	1	4330 D	2960	*	42		1034	601*	2	00	1086 2020	653* 1587*	2	00
3N	7E	11 G2	290	TD	SANDERS J STNFRD & L	1	4330 D	2978		42		1010	577*	3	00	1060	627*	2	06
3N	7E	11 G7	289	TD	MCBRIDE INC PATTON H BASE PENN	1	4340 D	2611	*	43		1027 618	593* 184*	3	00	1078 2000	644* 1566*	2	00
3N	7E	11 H3	288	TD	JONES J H NEELEY	1	4320 C	2958		42		1025 612	593* 180*	2	06	1070	638*	2	06
3N	7E	11 H6	347	TD	MCBRIDE INC SMITH F BASE PENN	1	4340 D	2616	*	43		1034	600*	3	00	1082 1997	648* 1563*	3	00
3N	7E	11 H8	291	TD	MCBRIDE INC PATTON H BASE PENN	2	4350 D	2611	*	43		1024 624	589* 189*			1076 1984	641* 1549*	2	00
3N	7E	13 C4	292	TD	LEONARD C RALEY BASE PENN	1	4320 C	3031		39	3	1019 624	587* 192*			1070 2025	638* 1593*		
3N	7E	14 H1	517	TD	MCBRIDE INC HOHLBAUCH BASE PENN	1	4380 D	3081		45		1042 633	604* 195*	1	00	1093 1982	655* 1544*	1	06
3N	7E	14 H5	293	TD	CHI SYND STASER BASE PENN	1	4580 C	3067		39		1060 647	602* 189*	2	00	1113 2035	655* 1577*	2	06
3N	7E	15 B4	505	TD	BELL BROS CRICKMAN BASE PENN	1	4660 D	3081		45		1056 648	590* 182*	1	00	1111 2004	645* 1538*		
3N	7E	15 B7	295	TD	MILLER DRC SMITH C T BASE PENN	1	4620 D	3032		40		1040 618	578* 156*			1092 2022	630* 1560*		

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	7E	15 E6	515	TD	BELL BROS PEARCE H BASE PENN	1	4550 D	3044		45		1027 621	572* 166*	2	00	1086 883 2020	631* 428* 1565*	2	00
3N	7E	15 H7	294	TD	SHULMN BRO ROSS W E BASE PENN	1	4370 C	2330	*	41		1021 623	584* 186*	1	06	1076 2000	639* 1563*	3	00
3N	7E	16 A5	498	TD	DORAN PAUL BRISSENDEN BASE PENN	1	4606 D	2706		45		1023 609	562* 148*	3	00	1070 1970	609* 1509*	4	00
3N	7E	18 A1	296	TD	RUMLY HEIS CHANEY	1	4650 D	3061		42		1024 612	559* 147*	2	00	1081	616*	3	00
3N	7E	24 E5	526	TD	PURE & LYN GOINGS J A BASE PENN	A2	4580 C	3068		45		1064	606*			2080	1622*		
3N	7E	24 H3	527	TD	PHILLIPS MINNIE	2	4426 C	3026		46		1046	603*						
3N	7E	25 D7	297	TD	PURE OC WELSH M S BASE PENN	1	4590 C	3185		42		1064 660	605* 201*	3	06	1124 2155	665* 1696*	3	00
3N	7E	27 D5	298	TD	TEXAS CO WEILER F BASE PENN	1	4530 D	3132		43		1053 653	600* 200*	1	00	1102 2025	649* 1572*	3	06
3N	7E	33 G6	299	TD	KUTLICH L KUTLCH HRS BASE PENN	1	4660 D	3088		42		1065 656	599* 190*	2	06	1121 832 2060	655* 366* 1594*	2	00
3N	8E	8 A7	400	TD	NAT ASSOC HUNLEY J BASE PENN	1A	4270 D	3100		44		1040 642	613* 215*	1	06	1094 1956	667* 1529*	2	00
3N	8E	10 H3	522	TD	BLACK OP DAUBS J BASE PENN	1	4330 D	3090		45		1086	653*	2	00 *0	1145 881 2126	712* 448* 1693*		
3N	8E	14 F7	523	TD	SOHIO PET BEMIS THOS BASE PENN	2	4180 D	3055		45		1044	626*	2	00	1103 834 2024	685* 416* 1606*	2	06

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	8E	20 B8	300	TD	ROCK HILL DUFF J W BASE PENN	1	4610 D	2896		41		1062 	601* 	2	00	1116 924 2142	655* 463* 1681*	2	00
3N	8E	22 H7	528	TD	LYNN J J BRISSENDN BASE PENN	1	4200 D	3090		45		1024 	604* 			 2094	 1674*		
3N	8E	26 G3	529	TD	WALLACE D WILLAMS JS BASE PENN	1	4180 D	2967		45		993 	575* 			 2015	 1597*		
3N	8E	28 E7	488	TD	PURE OC MAYO J W BASE PENN	1	4430 D	3022		44		1052 662 	609* 219* 	1	00	1110 2026	667* 1583*	1	00
3N	8E	29 A5	417	TD	REGENT OC TOTTER L BASE PENN	1	4770 D	3084		41		1100 706 	623* 229* 	2	00	1158 2122	681* 1645*	2	00
3N	8E	29 E1	416	TD	PURE OC TAYLOR W H BASE PENN	A1	4610 D	3155		43		1087 690 	626* 229* 	1	00	1148 2086	687* 1625*	3	00
3N	8E	29 F8	415	TD	ROCK HILL STANFORD C BASE PENN	A1	4990 C	3155		41		1126 734 	627* 235* 	3	00	1183 2183	684* 1684*		
3N	8E	33 F5	418	TD	PURE OC BECHTEL S 	1	4323 P	2967		37	8	1011 626 	579* 194* 			 828 	 396* 		
3N	8E	35 F4	419	TD	EUREKA OC SIEHENS BASE PENN	1	4150 C	3074		38		963 568 	548* 153* 	2	06	1023 815 1965	608* 400* 1550*		
4N	5E	6 B5	7	TD	MADDEN A R SLOAN BASE PENN	1	5670 C	4296		40		923 621 	356* 54* 	2	06	971 776 1673	404* 209* 1106*	2	06
4N	5E	9 H5	8	TD	WRRN & BRD CRUSE BASE PENN	1	5360 D	2750		41		915 593 	379* 57* 	2	00	965 1655	429* 1119*	2	06
4N	5E	10 A1	377	LD	KROHN WM H SMTH CLAUD BASE PENN	1	5290 D	2706		44		930 609 	401* 80* 	1	00	982 1866	453* 1337*	3	00

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												Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
Twp.	Range	Sec.																	
4N	5E	12 E7	521	TD	GULF REF		5110 D	2748		45		933	422*	2	00	980	469*		
					COLGLAZIER	1						591	80*						
					BASE PENN											1800	1289*		
4N	5E	14 A5	9	TD	CARTER OC		5390 D	4325		38		950	411*			1004	465*		
					COX W T	1						613	74*			830	291*		
					BASE PENN											1890	1351*		
4N	5E	15 E8	376	TD	CRSN & COR		5140 D	2673		43		938	424*	2	00	988	474*	4	00
					BILLINGS M	1						590	76*			810	296*		
					BASE PENN											1653	1139*		
4N	5E	18 F8	499	TD	WILLIAMS A		6040 D	2704		44		1004	400*	1	00	1063	459*		
					BOSTIC P	1						681	77*						
					BASE PENN											1737	1133*		
4N	5E	20 D2	378	LD	KROHN WM H		5270 D	2793		44		974	447*	1	00	1026	499*	2	00
					KING W	1						634	107*			868	341*		
					BASE PENN											1713	1186*		
4N	5E	26 D1	10	TD	LAIN OG		5234 C	2838		41		951	428*			1004	481*		
					ALDRICH	1						604	81*			810	287*		
					BASE PENN											1911	1388*		
4N	5E	27 H1	11	CH	BNDM TRS&G		5347 P	2302		16	8	960	425*						
					HARRELL JH	1													
					BASE PENN											1700	1165*		
4N	6E	2 E4	391	TD	EASON OC		4910 D	2976		43		1023	532*	1	06	1066	575*	2	06
					TUCKER C	1						647	156*			847	356*		
					BASE PENN											1953	1491*		
4N	6E	8 H5	203	TD	MIDSUN OC		5200 C	2851		42		976	456*	1	00	1022	502*	3	00
					DAVIES G	1						645	125*						
					BASE PENN											1794	1274*		
4N	6E	20 E8	204	TD	LAGALL OC		5160 D	2925		40		934	418*	3	00	972	456*	2	00
					HUFFMAN N	1						584	68*						
					BASE PENN											2020	1504*		
4N	6E	26 B4	205	LD	GULF REF		4780 D	3110		42		1050	572*	2	00	1098	620*	2	00
					MCCOLLUM H	1						673	195*			893	415*		
					BASE PENN											1954	1476*		
4N	6E	34 D2	361	TD	TEXAS CO		4840 D	3082		44		1028	544*	2	00	1075	591*	2	00
					KEMMERER R	1						642	158*						
					BASE PENN											1930	1446*		

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	7E	3 C1	283	TD	RBNSN PUCK GIBSON CON BASE PENN	1	4810 D	3028		43		1049 662	568* 181*	4	00	1093 1984	612* 1503*		
4N	7E	11 C8	500	TD	LUTTRELL H PHILLIPS A BASE PENN	1	4630 D	3045		45		1035 644	572* 181*			1078 1974	615* 1511*		
4N	7E	12 A6	206	TD	GULF REF HASTINGS R BASE PENN	1	4720 C	3066		41		1059 683	587* 211*	2	00	1103 1997	631* 1525*		
4N	7E	16 F1	525	TD	MAGNOLIA CAMMON M BASE PENN	1	4730 D	3058		45		1050 650	577* 177*	2	06	1089 2022	616* 1549*		
4N	7E	23 A7	470	TD	RBNSN PUCK LEWIS BASE PENN	1	4510 C	3010		44		1026 650	575* 199*	2	06	1074 1980	623* 1529*	1	06
4N	7E	23 C1	207	TD	GULF REF HASTINGS E BASE PENN	1	4410 D	2648		42		1027 629	586* 188*	3	00	1074 2000	633* 1559*		
4N	7E	25 A7	208	TD	GULF REF ANDERSON A BASE PENN	1	4500 D	2356	*	42		1019 624	569* 174*			1069 2013	619* 1563*		
4N	7E	25 A8	468	TD	GULF REF FRANKLIN J BASE PENN	6	4430 D	2324	*	44		1000 610	557* 167*	2	06	1048 1940	605* 1497*	2	00
4N	7E	25 B8	469	TD	GULF REF FRANKLIN BASE PENN	5	4480 D	2327	*	44		1008 614	560* 166*	2	06	1056 1947	608* 1499*	2	00
4N	7E	25 C7	210	TD	GULF REF DILLMAN W	1	4530 D	2343	*	42		1026 631	573* 178*			1074	621*		
4N	7E	26 A1	217	TD	GULF REF KECK R BASE PENN	5	4470 D	2327	*	43		1002 610	555* 163*	3	00	1044 1992	597* 1545*		
4N	7E	26 A7	211	TD	MCBRIDE INC KECK A H BASE PENN	2	4540 D	2339	*	43		1034 642	580* 188*	3	00	1084 2020	630* 1566*	1	06

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	7E	26 A8	506	TD	RBNSN PUCK TOOLEY W S BASE PENN	3	4540 D	2615	*44			1020 629	566* 175*	3	00	1068 910 1950	614* 456* 1496*	3	00
4N	7E	26 B1	214	TD	GULF REF KECK R	2	4430 D	2317	*41			997 612	554* 169*			1042	599*		
4N	7E	26 B2	215	TD	GULF REF KECK R	3	4480 D	2338	*41			1000 616	552* 168*			1045	597*		
4N	7E	26 B3	216	TD	GULF REF KECK R	4	4500 D	2338	*43			1005 613	555* 163*	2	06	1051	601*		
4N	7E	26 B4	213	TD	GULF REF KECK R	1	4560 C	2356	*41			1016 630	560* 174*	3	00	1064	608*		
4N	7E	26 B6	212	TD	MCBRIDE INC KECK A H	3	4550 D	2618	*43			1027 640	572* 185*	3	00	1074	619*		
4N	7E	26 C1	219	TD	GULF REF REED E	3	4510 D	2996	*42			1008 618	557* 167*	1	00	1050	599*		
4N	7E	26 C6	475	TD	RBNSN PUCK TOLLIVER J	6	4560 D	2620	*44			1030 640	574* 184*	3	00	1075 910	619* 454*	3	06
4N	7E	26 D2	218	TD	GULF REF REED E	1	4520 D	2326	*41			1001 622	549* 170*	3	00	1052	600*		
4N	7E	26 D6	492	TD	RBNSN PUCK TOLLIVER J BASE PENN	7	4540 C	2621	*44			1033 641	579* 187*	2	06	1088 1940	634* 1486*	2	00
4N	7E	26 D7	491	TD	RBNSN PUCK TOLLVR CON BASE PENN	3	4540 C	2620	*44			1036 638	582* 184*	3	06	1086 850 1950	632* 396* 1496*	2	00
4N	7E	26 E2	348	TD	GULF REF TOLLIVER M	2	4550 D	2338	*41			1015 628	560* 173*	2	00	1062	607*		
4N	7E	26 E6	473	TD	RBNSN PUCK EASTIN	A1	4570 D	2623	*44			1034 644	577* 187*	2	06	1080	623*	2	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	7E	26 E7	471	TD	RBNSN PUCK TOOLEY W S BASE PENN	A2	4560 D	2634		*44		1041 644	585* 188*	3	00	1084 1942	628* 1486*	3	00
4N	7E	26 F2	220	TD	GULF REF TOLLIVER M	1	4570 D	2338		*41		1024 636	567* 179*			1070	613*		
4N	7E	26 F6	472	TD	RBNSN PUCK EASTIN BASE PENN	A2	4560 D	2622		*44		1034 642	578* 186*	2	06	1080 1954	608* 1498*	2	00
4N	7E	26 F7	395	TD	RBNSN PUCK TOOLEY W S BASE PENN	A1	4570 D	2619		*44		1034 646	577* 189*	3	06	1078 1955	621* 1498*	2	00
4N	7E	26 G3	349	TD	GULF REF BETTINGR F	2	4580 D	3030		*41		1024 638	566* 180*	3	00	1074	616*		
4N	7E	26 G4	209	TD	GULF REF BETTINGR F	1	4600 C	3047		*41		1028 640	568* 180*			1074	614*		
4N	7E	26 G6	350	TD	GULF REF TOLLIVER I	1	4580 D	2660		*44		1039 648	581* 190*			1083	625*		
4N	7E	26 G7	393	TD	GULF REF REED E BASE PENN	B1	4560 D	2624		*44		1039 653	583* 197*	3	00	1086 1965	630* 1509*	1	06
4N	7E	27 A1	371	TD	RBNSN PUCK TOOLEY W S BASE PENN	1	4560 D	3027		*43		1022 626	566* 170*	2	06	1063 2022	607* 1566*	3	00
4N	7E	27 A3	221	TD	SANDRS ETL HAGEN J	1	4530 D	2630		41		1028 628	575* 175*	2	00	1073	620*		
4N	7E	29 E4	476	TD	SKELLY O.C JOHNSN R W BASE PENN	1	4680 D	3104		44		1052	584*	2	06	1100 2022	632* 1554*	1	06
4N	7E	34 A3	226	TD	MCBRIDEINC GOLDBY COM BASE PENN	1	4340 D	2599		*42		996 604	562* 170*			1044 1993	610* 1559*		
4N	7E	34 C4	223	TD	MCBRIDEINC ERWIN P	1	4500 D	3111		*42		1015 616	565* 166*			1059	609*		

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
												Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
Twp.	Range	Sec.																	
4N	7E	34 C5	224	TD	MCBRIDEINC ERWIN STAN	1	4520 D	2622	*42			1024 1070	572* 618*						
4N	7E	34 E1	120	LD	MCBRIDEINC BUSBY G M	2	4450 D	2620	43			1015 612 1063 887	570* 167* 618* 442*	4	00			2	00
4N	7E	34 E3	222	TD	MCBRIDEINC DRAKE COMM BASE PENN	1	4460 D	2610	*41			1012 610 1052 2002	566* 164* 606* 1556*	2	00				
4N	7E	34 G1	225	TD	MCBRIDEINC FRANKLIN H BASE PENN	1	4590 D	2685	*43			1026 630 1070 2020	567* 171* 611* 1561*	2	06			2	00
4N	7E	35 C5	233	TD	WILLIAMS B KECK E W	2	4330 C	3125	41			992 595 1040	559* 162* 607*						
4N	7E	35 C6	414	TD	MCBRIDEINC COOPER G BASE PENN	2	4440 D	2633	*44			1003 602 1050 1960	559* 158* 606* 1516*	3	06				
4N	7E	35 E7	228	TD	MCBRIDEINC DUFF J W	1	4410 D	2600	*43			1009 606 1058	568* 165* 617*						
4N	7E	35 F4	351	TD	HEIDRH ETL KECK E W	5	4480 D	2342	*43			1009 616 1056	561* 168* 608*						
4N	7E	35 F5	392	TD	ASHLND ORC KECK E W	6	4510 D	2863	*44			1013 610 1059	562* 159* 608*	3	00			1	06
4N	7E	35 F6	355	TD	MCBRIDEINC COOPER G BASE PENN	1	4430 D	2606	*43			1014 610 1058 1990	571* 167* 615* 1547*						
4N	7E	35 F7	493	TD	MCBRIDEINC DUFF J W	3	4530 D	2615	*44			1022 624 1070	569* 171* 617*	3	00			2	00
4N	7E	35 F8	354	TD	MCBRIDEINC DUFF J W BASE PENN	2	4520 D	2660	*43			1026 622 1067 1996	574* 170* 615* 1544*						
4N	7E	35 G1	229	TD	GULF REF FRANKLIN J	1	4490 D	2328	*42			1005 620 1051	556* 171* 602*						

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness * Ft.	Thickness * In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	7E	35 G2	230	TD	GULF REF FRANKLIN J	2	4470 D	2335	*	43		1000 620	553* 173*	2	00	1048	601*		
4N	7E	35 G7	232	TD	MCBRIDEINC KECK A H BASE PENN	1	4480 D	2606	*	43		1024 630	576* 182*	3	00	1070 1990	622* 1542*		
4N	7E	35 H1	231	TD	GULF REF FRANKLIN J BASE PENN	3	4470 D	2335	*	43		1000 615	553* 168*	3	00	1049 1958	602* 1511*		
4N	7E	35 H3	422	TD	GULF REF KECK COMM BASE PENN	1	4470 D	2330	*	44		1005 612	558* 165*	1	06	1050 1954	603* 1507*	2	00
4N	7E	35 H5	394	TD	GULF REF KECK R BASE PENN	7	4530 D	2626	*	44		1018 620	565* 167*	3	00	1061 1946	608* 1493*	1	06
4N	7E	35 H6	353	TD	MCBRIDEINC KECK A H	4	4520 D	2618	*	43		1027 638	575* 186*			1069	617*		
4N	7E	35 H8	227	TD	MCBRIDEINC BUSBY G M BASE PENN	1	4520 D	2611	*	43		1020 631	568* 179*	3	00	1065	613*		
4N	7E	36 E7	234	TD	GULF REF DRAKE M A BASE PENN	1	4450 D	2656		42		1016	571*	3	00	1068 1968	623* 1523*		
4N	7E	36 H8	235	TD	GULF REF FRANKLIN J BASE PENN	4	4460 D	2327	*	43		1002 614	556* 168*	2	00	1048 2060	602* 1614*		
4N	8E	1 D1	236	TD	KIDD B RUDOLPHI J BASE PENN	1	4740 C	3136		41		1116 728	642* 254*			1172 925 2076	698* 451* 1602*		
4N	8E	3 B4	237	TD	NAT PET IFFERT V	1	4640 C	3129		42		1090 702	626* 238*	3	00	1136	672*	3	06
4N	8E	4 C1	119	TD	SNCLR WYOM HNTRSCHR A BASE PENN	1	4690 C	3052		43		1093 702	624* 233*	2	00	1137 2007	668* 1538*	2	06

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	8E	8 G4	238	TD	SNCLR WYOM STANLEY F 1 BASE PENN		4690 C	3150		42		1107 710	638* 241*			1156 2060	687* 1591*		
4N	8E	9 B5	239	TD	NAT REF LA RUE G 1 BASE PENN		4610 D	3115		42		1073 682	612* 221*			1120 2060	659* 1599*		
4N	8E	10 B2	240	TD	NAT PET HNTRSCHR G 1 BASE PENN		4630 D	3136		42		1088 694	625* 231*	2	00	1134 1996	671* 1533*		
4N	8E	11 F5	241	TD	SUPRIOR OC HNTRSCHR H 1 BASE PENN		4600 D	3148		43		1078 676	618* 216*	4	00	1124 1982	664* 1522*		
4N	8E	12 E4	503	TD	MAGNOLIA STANLEY F 1 BASE PENN		4700 D	3004		45		1102 690	632* 220*			1154 2091	684* 1621*		
4N	8E	15 D2	242	TD	DELTA OPC MUHS 1 BASE PENN		4520 C	3150		42		1087 690	635* 238*	3	00	1140 2140	688* 1688*		
4N	8E	21 B5	243	TD	GULF REF LEVITT J 1		4540 D	3170		42		1060 667	606* 213*						
4N	8E	22 E8	244	TD	BALDWN ETL LEVITT G 1 BASE PENN		4370 D	3108		41		1038 640	601* 203*	3	00	1092 2030	655* 1593*	3	00
4N	8E	23 A3	245	TD	DELTA OPC CRACKEL 1 BASE PENN		4450 C	3150		41		1085 676	640* 231*	3	00	1136 880 2080	691* 435* 1635*		
4N	8E	24 C5	246	TD	OHIO OIL NEGLEY D 1 BASE PENN		4360 G	3150		38		1040 637	604* 201*			1092 822 2147	656* 386* 1711*		
4N	8E	28 A1	478	TD	MAGNOLIA BROWN WM 1 BASE PENN		4470 D	3168	*	44		1078 676	631* 229*	1	00	1129 864 2020	682* 417* 1573*	2	00
4N	8E	30 E4	248	TD	MCBRIDEINC STANLEY L 1 BASE PENN		4470 D	3130		43		1048	601*			1094 854 1986	647* 407* 1539*		
4N	8E	33 E4	524	TD	MAGNOLIA BROWN S A1		4460 D	3152		44		1064 660	618* 214*			1114 854	668* 408*		

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	8E	33 G1	477	TD	MAGNOLIA RINNERT M	2	4440 D	2697	*44			1062 652	618* 208*	3	00	1114 852	670* 408*		
5N	5E	2 A8	440	TD	TEXAS CO SPURLIN G BASE PENN	1	5350 D	2161	*44			900 582	365* 47*			934 760 1594	399* 225* 1059*	3	00
5N	5E	3 D2	29	TD	TEXAS CO WRIGHT V BASE PENN	1	5400 C	2544	42			890 578	350* 38*			930 740 1612	390* 200* 1072*	2	00
5N	5E	3 H4	130	TD	LUTTRELL H NORBUT J BASE PENN	1	5480 D	2553	43			886 574	338* 26*			924 746 1615	376* 198* 1067*		
5N	5E	5 F2	12	TD	KINGWOODOC DANKS M B BASE PENN	1	5660 C	2723	40			927 610	361* 44*			965 793 1820	399* 227* 1254*	2	06
5N	5E	10 A2	379	TD	COOP REF ROSEBRUGH BASE PENN	1	5320 D	2473	*44			900 688	368* 156*			941. 1610	409* 1078*		
5N	5E	10 A4	79	TD	GULF REF EDG ST STE BASE PENN	1	5360 D	2511	*43			897 582	361* 46*			938 1606	402* 1070*		
5N	5E	10 A6	80	TD	TEXAS CO HIN&ELK CM BASE PENN	2	5330 D	2375	*43			877 570	344* 37*			915 1604	382* 1071*		
5N	5E	10 E5	43	TD	TEXAS CO RUSH I J BASE PENN	1	5400 D	2586	42			904 592	364* 52*			942 760 1624	402* 220* 1084*		
5N	5E	10 F2	442	TD	TEXAS CO ROSE J BASE PENN	1	5330 D	2559	*44			897 586	364* 53*			935 765 1594	402* 232* 1061*	3	00
5N	5E	10 G2	441	TD	TEXAS CO CRUSE J BASE PENN	1	5380 D	2163	*44			903 583	365* 45*	1	00	942 764 1580	404* 226* 1042*	2	00
5N	5E	11 A8	423	TD	JABLNSKI F BURGE ALMA BASE PENN	1	5240 D	2379	*43			888 575	364* 51*			924 1610	400* 1086*	3	00

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Twp.	Range	Sec.											Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	13 C7	101	TD	GULF REF PILCHER J BASE PENN	1	4780	D	2421	*	43		860 532	382* 54*			899 1700	421* 1222*		
5N	5E	13 E3	100	TD	WAGGONER L GEN AM INS BASE PENN	1	5200	D	2534		43		888 570	368* 50*			928 1820	408* 1300*	1	06
5N	5E	13 E7	129	TD	WAGGONER L PILCHER JR BASE PENN		5290	D	2457	*	43		905 576	376* 47*			943 776 1680	414* 247* 1151*	2	00
5N	5E	13 G5	275	TD	CENTRLPIPE FENDER E BASE PENN	1	5260	D	2475		43		900 584	374* 58*	1	06	937 1632	411* 1106*		
5N	5E	13 G8	127	TD	CENTRLPIPE PILCHER JR BASE PENN	1	5170	D	2457	*	43		892 574	375* 57*			933 1620	416* 1103*		
5N	5E	14 B6	364	TD	TEXAS CO WOOLRGE F BASE PENN	1	5300	D	2363	*	44		906 576	376* 46*			945 775 1606	415* 245* 1076*		
5N	5E	14 B7	124	TD	SHELL OC MOSS LEE BASE PENN	6	5160	D	2341	*	44		876 548	360* 32*			916 1590	400* 1074*		
5N	5E	14 B8	121	LD	SHELL OC MOSS LEE BASE PENN	5	5240	D	2349		44		878 556	354* 32*			914 770 1594	390* 246* 1070*	2	00
5N	5E	14 C2	496	TD	TEXAS CO WADE C T BASE PENN	1	5270	C	2466	*	43		920 582	393* 55*			960 1726	433* 1199*		
5N	5E	14 C3	425	TD	TEXAS CO WADE C T BASE PENN	2	5260	D	2585	*	43		912 576	386* 50*			950 1654	424* 1128*		
5N	5E	14 C6	426	TD	TEXAS CO BASE PENN RODGERS A	3	5290	D	2360	*	43		899 570	370* 41*			940 1604	411* 1075*		
5N	5E	14 C7	276	TD	SHELL OC MOSS LEE BASE PENN	3	5210	D	2346	*	43		882 554	361* 33*			924 1590	403* 1069*	2	00
5N	5E	14 C8	424	TD	SHELL OC MOSS ETAL BASE PENN	4	5310	D	2356	*	43		886 562	355* 31*			922 780 1590	391* 249* 1059*		

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Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	14 D5	375	TD	TEXAS CO RODGERS A BASE PENN	2	5280 D	2358	*43			899 568	371* 40*			938 780 1610	410* 252* 1082*		
5N	5E	14 D7	128	TD	SHELL OC MOSS LEE BASE PENN	2	5310 D	2356	*43			891 565	360* 34*			926 772 1592	395* 241* 1061*		
5N	5E	14 D8	125	TD	SHELL OC MOSS LEE BASE PENN	1	5330 D	2356	*43			883 562	350* 29*			920 764 1592	387* 231* 1059*		
5N	5E	14 E5	58	TD	CENTRLPIPE REED HEIRS BASE PENN	3	5320 C	2148	*43			902 574	370* 42*			940 1600	408* 1068*		
5N	5E	14 E7	82	TD	LUTTRELL H REED HEIRS BASE PENN	13	5320 D	2472	*43			890 572	358* 40*			930 774 1592	398* 242* 1060*		
5N	5E	14 E7	95	TD	LUTTRELL H REED HEIRS BASE PENN	12	5300 D	2381	*43			888 572	358* 42*			930 781 1590	400* 251* 1060*		
5N	5E	14 E8	81	TD	LUTTRELL H REED HEIRS BASE PENN	10	5320 C	2302	*43			894 565	362* 33*			930 1588	398* 1056*		
5N	5E	14 F1	126	TD	CARTER OC HARPER L BASE PENN	1	4800 D	2553	*43			876 546	396* 66*			910 1571	430* 1091*		
5N	5E	14 F5	497	TD	TEXAS CO BYERS H E BASE PENN	4	5290 D	2360	*43			906 572	377* 43*			942 772 1595	413* 243* 1066*		
5N	5E	14 F7	94	TD	LUTTRELL H REED HEIRS BASE PENN	11	5240 D	2387	*43			892 570	368* 46*			928 778 1590	404* 254* 1066*		
5N	5E	14 F8	77	TD	LUTTRELL H REED HEIRS BASE PENN	9	5350 D	2366	*43			890 566	355* 31*			928 770 1592	393* 235* 1057*		
5N	5E	14 G1	98	TD	KINGWOODOC DANKS MAUD BASE PENN	1	5190 D	2508	*43			906 583	387* 64*	2	06	946 1614	427* 1095*		
5N	5E	14 G8	57	TD	CENTRLPIPE REED HEIRS BASE PENN	2	5340 C	2146	*43			893 572	359* 38*			932 1600	398* 1066*		

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude		Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.											Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	14 H8	68	TD	CENTRLPIPE REED HEIRS BASE PENN	1	5360	C	2370	*43			902 586	366* 50*			940 1610	404* 1074*		
5N	5E	15 C2	75	TD	CARTER OC VANGESON R BASE PENN	3	4970	D	2420	*43			856 530	359* 33*			894 740 1550	397* 243* 1053*	4	00
5N	5E	15 C4	89	TD	TEXAS CO RISSER F BASE PENN	3	4830	D	2314	*43			841 522	358* 39*			881 1502	398* 1019*	3	00
5N	5E	15 D1	74	TD	CARTER OC VANGESON R BASE PENN	2	5290	D	2355	*43			878 553	349* 24*			915 756 1590	386* 227* 1061*	2	00
5N	5E	15 D2	73	TD	CARTER OC VANGESON R BASE PENN	1	5250	D	2352	*43			879 550	354* 25*			919 1560	394* 1035*	2	00
5N	5E	15 D3	88	TD	TEXAS CO RISSER F BASE PENN	2	5170	D	2346	*43			864 534	347* 17*			902 1550	385* 1033*	2	00
5N	5E	15 D4	55	TD	TEXAS CO RISSER F BASE PENN	1	5060	C	2336	*43			854 538	348* 32*			892 1512	386* 1006*	3	00
5N	5E	15 D5	54	TD	SHELL & TXAS LEONRD COM BASE PENN		4940	C	2372	*43			846 536	352* 42*			886 1520	392* 1026*	2	00
5N	5E	15 D7	363	TD	SHELL OC BUHRMAN R BASE PENN	1	5300	D	2451	*43			879 563	349* 33*			919 740 1566	389* 210* 1036*	2	00
5N	5E	15 E1	84	TD	TIDE WATER DAVIS CORA	8	5180	D	2320	*43			869 540	351* 22*			906	388*		
5N	5E	15 E2	53	TD	TIDE WATER DAVIS CORA BASE PENN	7	5270	D	2338	*43			877 548	350* 21*			916 1552	389* 1025*	2	00
5N	5E	15 E3	93	TD	TIDE WATER DAVIS CORA BASE PENN	6	5300	C	2337	*43			878 560	348* 30*			916 1572	386* 1042*	2	00
5N	5E	15 E4	50	TD	TIDE WATER DAVIS CORA BASE PENN	3	5310	C	2351	*43			869 564	338* 33*			911 1594	380* 1063*	2	00

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	15 E6	45	TD	TEXAS CO KIDWELL A BASE PENN	6	5310 D	2361	*43			883 564	352* 33*			918 1558	387* 1027*	3	00
5N	5E	15 E7	91	TD	TEXAS CO B & K COMM BASE PENN	2	5320 D	2366	*43			887 570	355* 38*			926 750 1566	394* 218* 1034*	2	00
5N	5E	15 F1	52	TD	TIDE WATER DAVIS CORA BASE PENN	5	5280 C	2335	*43			880 553	352* 25*			916 762 1560	388* 234* 1032*	2	00
5N	5E	15 F1	86	TD	TIDE WATER DAVIS CORA BASE PENN	10	5290 D	2482	*43			872 548	343* 19*			910 1556	381* 1027*	2	00
5N	5E	15 F2	51	TD	TIDE WATER DAVIS CORA BASE PENN	4	5270 C	2337	*43			872 563	345* 36*			908 1570	381* 1043*	2	00
5N	5E	15 F3	49	TD	TIDE WATER DAVIS CORA BASE PENN	2	5350 D	2361	*43			878 570	343* 35*			916 1590	381* 1055*		
5N	5E	15 F4	48	TD	TIDE WATER DAVIS CORA BASE PENN	1	5290 D	2354	*42			866 559	337* 30*			904 1510	375* 981*	3	00
5N	5E	15 F4	85	TD	TIDE WATER DAVIS CORA BASE PENN	9	5310 D	2472	*43			871 562	340* 31*			910 1570	379* 1039*	3	00
5N	5E	15 F5	70	TD	TEXAS CO KIDWELL A BASE PENN	5	5280 C	2437	*43			862 549	334* 21*			907 1545	379* 1017*	3	00
5N	5E	15 F6	71	TD	TEXAS CO KIDWELL A BASE PENN	7	5120 D	2342	*43			860 540	348* 28*			900 750 1538	388* 238* 1026*	2	00
5N	5E	15 G1	47	TD	LUTTRELL H REED HEIRS BASE PENN	8	5330 D	2148	*43			881 570	348* 37*			919 773 1566	386* 240* 1033*	2	00
5N	5E	15 G1	87	TD	LUTTRELL H REED HEIRS BASE PENN	14	5310 D	2496	*43			876 569	345* 38*			914 1570	383* 1039*	2	00
5N	5E	15 G3	36	TD	LUTTRELL H REED HEIRS BASE PENN	1	5310 D	2311	*42			879 569	348* 38*			922 1565	391* 1034*	2	00

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	15 G4	34	TD	LUTTRELL H REED HEIRS BASE PENN	2	5240 D	2287	*42			863 554	339* 30*			904 1552	380* 1028*	1	06
5N	5E	15 G5	40	TD	TEXAS CO KIDWELL A BASE PENN	1	5320 D	2488	*42			873 555	341* 23*			913 1560	381* 1028*		
5N	5E	15 G6	69	TD	TEXAS CO KIDWELL A BASE PENN	2	5010 C	2327	*43			852 532	351* 31*			887 1530	386* 1029*	4	00
5N	5E	15 G7	46	TD	TEXAS CO KIDWELL A BASE PENN	9	5210 C	2351	*43			876 560	355* 39*			914 1552	393* 1031*	4	00
5N	5E	15 H1	99	TD	LUTTRELL H REED HEIRS BASE PENN	7	5280 D	2360	*43			883 576	355* 48*			921 780 1555	393* 252* 1027*	2	00
5N	5E	15 H2	39	TD	LUTTRELL H REED HEIRS BASE PENN	5	5310 D	2155	*43			890 575	359* 44*			929 776 1570	398* 245* 1039*	2	00
5N	5E	15 H4	38	TD	LUTTRELL H REED HEIRS BASE PENN	4	5300 D	2305	*43			886 571	356* 41*			924 1562	394* 1032*	2	00
5N	5E	15 H5	41	TD	TEXAS CO KIDWELL A BASE PENN	3	5320 D	2314	*43			882 564	350* 32*			916 1550	384* 1018*	4	00
5N	5E	15 H6	72	TD	TEXAS CO KIDWELL A BASE PENN	8	5320 D	2369	*43			882 567	350* 35*			920 1554	388* 1022*	3	00
5N	5E	16 D1	90	TD	TEXAS CO JOLIFF J W BASE PENN	1	5320 D	2374	*43			876 566	344* 34*			914 730 1553	382* 198* 1021*	2	00
5N	5E	16 D8	67	TD	BRIDGE F A LANDRETH C BASE PENN	1	5420 C	2380	*42			882 580	340* 38*			920 747 1550	378* 205* 1008*		
5N	5E	16 E1	56	TD	TEXAS CO BIRCH N BASE PENN	1	5330 C	2366	*43			888 574	355* 41*			926 1584	393* 1051*	3	00
5N	5E	17 C6	17	TD	STEWART OC FIELDS J BASE PENN	1	5530 C	2562		39		865 581	312* 28*			905 733 1610	352* 180* 1057*		

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	17 D2	373	TD	DUNBAR J W LIGGETT J BASE PENN	2	4980 D	2346	*	44		822 535	324* 37*			858 698 1576	360* 200* 1078*		
5N	5E	17 D3	31	TD	DUNBAR ETL LIGGETT BASE PENN	1	4990 D	2342	*	42		819 530	320* 31*			855 686 1575	356* 187* 1076*	2	00
5N	5E	17 E1	18	TD	MADDEN A R GING BASE PENN	1	5480 D	2399	*	41		886 590	338* 42*			920 770 1600	372* 222* 1052*	2	06
5N	5E	17 E3	374	TD	BRIDGE F A LANDRETH BASE PENN	2	4960 G	2342	*	43		813 535	317* 39*			848 689 1557	352* 193* 1061*		
5N	5E	17 E6	20	TD	DUNCAN D HUBER BASE PENN	1	5580 C	2400		39		875 592	317* 34*			914 744 1645	356* 186* 1087*	3	00
5N	5E	17 G5	102	TD	DUNBAR ETL HUBER M BASE PENN	2	5370 D	2516		43		864 574	327* 37*			902 730 1620	365* 193* 1083*		
5N	5E	18 E5	501	TD	TEXAS CO JONES W BASE PENN	1	5650 C	2505		45		877 583	312* 18*	1	00	917 742 1750	352* 177* 1185*		
5N	5E	20 F5	92	TD	KILPTRCK K WILLIAMS J BASE PENN	1	5480 D	2568		43		868 569	320* 21*	1	00	910 743 1642	362* 195* 1094*	2	00
5N	5E	21 D3	32	TD	BURNET ETL SMITH BASE PENN	1	5360 C	2522		39		865 560	329* 24*			899 743 1580	363* 207* 1044*	2	06
5N	5E	21 H6	76	TD	LCY&RLY DC SMITH R E BASE PENN	1	4900 G	2339		39		818 511	328* 21*			857 680 1572	367* 190* 1082*	2	00
5N	5E	22 A7	502	TD	REDWINE N CZYZEWSKI BASE PENN	1	5300 D	2538		43		868 558	338* 28*			910 745 1570	380* 215* 1040*		
5N	5E	22 B1	444	TD	TEXAS CO SPENCER F BASE PENN	2	5280 D	2514	*	44		878 555	350* 27*	1	06	922 760 1707	394* 232* 1179*	2	00
5N	5E	22 B2	443	TD	TEXAS CO SPENCER F BASE PENN	1	5320 D	2360	*	44		886 574	354* 42*	1	06	934 768 1682	402* 236* 1150*	1	00

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	22 B3	277	TD	SHELL OC MOSS LEE BASE PENN	1B	5330 D	2360	*44			886 580	353* 47*			930 780 1610	397* 247* 1077*	3	00
5N	5E	22 C1	357	TD	TEXAS CO SPENCR COM BASE PENN	2	5290 D	2362	*44			871 549	342* 20*	2	00	915 754 1694	386* 225* 1165*		
5N	5E	22 C2	358	TD	TEXAS CO SPENCR COM BASE PENN	1	5300 D	2359	*44			890 568	360* 38*			932 766 1660	402* 236* 1130*		
5N	5E	22 C5	123	TD	MCBRIDEINC WOOLRGE L BASE PENN	1	5320 D	2531	*43			880 570	348* 38*	1	06	926 750 1570	394* 218* 1038*		
5N	5E	22 D1	430	TD	TEXAS CO BYERS HIRA BASE PENN	4	5280 D	2355	*43			871 560	343* 32*			912 754 1650	384* 226* 1122*		
5N	5E	22 D2	427	TD	TEXAS CO BYERS HIRA BASE PENN	2	5300 D	2355	*43			881 552	351* 22*			926 756 1594	396* 226* 1064*	3	00
5N	5E	22 D3	356	TD	WILLIAMS H MCGEE ESTY BASE PENN	2	5300 D	2355	*43			876 557	346* 27*			928 750 1552	398* 220* 1022*	2	00
5N	5E	22 D4	122	TD	WILLIAMS H MCGEE ESTY BASE PENN	1	5320 D	2356	*43			877 562	345* 30*	2	00	924 742 1564	392* 210* 1032*	3	00
5N	5E	22 D5	508	TD	MCBRIDEINC WOOLRGE L BASE PENN	2	5290 D	2156	*44			883 565	354* 36*			922 740 1574	393* 211* 1045*	2	06
5N	5E	22 E1	436	TD	TEXAS CO LOUDEN J F BASE PENN	3	5140 D	2342	*43			860 546	346* 32*			900 740 1700	386* 226* 1186*	3	00
5N	5E	22 E2	435	TD	TEXAS CO LOUDEN J F BASE PENN	1	5290 D	2358	*43			881 558	352* 29*			920 750 1502	391* 221* 973*	2	00
5N	5E	22 E3	431	TD	TEXAS CO BYERS H BASE PENN	3	5300 D	2357	*43			884 550	354* 20*			925 746 1552	395* 216* 1022*	2	00
5N	5E	22 E4	428	TD	TEXAS CO BYERS HIRA BASE PENN	1	5220 D	2353	*43			872 550	350* 28*	1	00	912 734 1556	390* 212* 1034*	3	00

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	22 E5	438	TD	TEXAS CO BYERS HIRA BASE PENN	7	4950 D	2333	*44			846 530	351* 35*	2	00	886 708 1550	391* 213* 1055*	3	00
5N	5E	22 F1	434	TD	TEXAS CO LOUDEN J F BASE PENN	4	5190 D	2351	*44			873 554	354* 35*			908 756 1542	389* 237* 1083*	3	00
5N	5E	22 F2	429	TD	TEXAS CO LOUDEN J F BASE PENN	2	5270 D	2357	*43			882 554	355* 27*			916 754 1530	389* 227* 1003*	4	00
5N	5E	22 F3	432	TD	TEXAS CO BYERS HIRA BASE PENN	5	5290 D	2358	*43			887 553	358* 24*			927 756 1540	398* 227* 1011*	2	00
5N	5E	22 F4	352	TD	TEXAS CO BYERS HIRA BASE PENN	6	4890 D	2318	*44			847 518	358* 29*			887 708 1510	398* 219* 1021*		
5N	5E	22 G1	507	TD	TEXAS CO RUSH I J BASE PENN	2B	4920 D	2323	*44			831 511	339* 19*			872 728 1532	380* 236* 1040*	2	06
5N	5E	22 G2	433	TD	TEXAS CO RUSH I J BASE PENN	1B	5100 D	2339	*44			865 545	355* 35*			904 752 1540	394* 242* 1030*	2	00
5N	5E	22 G3	437	TD	TEXAS CO WILLIAMS J BASE PENN	1	4890 D	2319	*44			848 550	359* 61*	1	06	886 722 1525	397* 233* 1036*	4	00
5N	5E	22 G4	380	TD	TEXAS CO WILLIAMS J BASE PENN	3	5290 D	2358	*44			895 560	364* 31*			936 760 1585	407* 231* 1056*	1	06
5N	5E	22 G5	21	TD	MCBRIDE INC SMITH W E BASE PENN	1	5320 D	2570	*40			882 560	350* 28*			922 754 1560	390* 222* 1028*	4	00
5N	5E	22 H3	359	TD	TEXAS CO WILLIAMS J BASE PENN	2	5290 D	2359	*44			896 556	367* 27*			938 1574	409* 1045*		
5N	5E	23 D8	360	TD	WILLIAMS H SMITH JOHN BASE PENN	1	5310 D	2358	*43			866 558	335* 27*	2	00	912 748 1690	381* 217* 1159*	3	00
5N	5E	23 E8	22	TD	MINERVA OC SMITH JOHN BASE PENN	1	5270 C	2469	*39			867 553	340* 26*	1	00	915 744 1590	388* 217* 1063*	1	00

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	5E	23 F5	30	LD	NAT PET SMITH JOHN BASE PENN	1	4790 D	2341		42		838 518	359* 39*			880 712 1678	401* 233* 1199*		
5N	5E	26 B2	23	TD	KNGWD&GULF DAVIS BASE PENN	1	5190 C	2685		39		912 590	393* 71*			960 780 1770	441* 261* 1251*	2	06
5N	5E	27 H2	439	TD	LUTTRELL H LANDRETH O BASE PENN	1	5270 D	2362		44		868 566	341* 39*	2	06	916 750 1696	389* 223* 1169*		
5N	5E	27 H4	24	TD	MCBRIDEINC LANDRETH O BASE PENN	1	5310 C	2475		40		868 562	337* 31*	1	06	915 750 1620	384* 219* 1089*	3	00
5N	5E	28 D7	78	TD	CORLEY E PEMBERTN H BASE PENN	1	5370 D	2608		43		876 570	339* 33*			920 742 1600	383* 205* 1063*	3	00
5N	5E	33 C2	530	TD	NAT ASSOC WILLIAMS H BASE PENN	1	5320 C	2651		45		900	368*			1626	1094*		
5N	6E	5 A1	149	TD	LYNN&WLLMS WITTE BASE PENN	1	5210 D	2751		42		961 630	440* 109*	2	00	1000 1910	479* 1389*	1	06
5N	6E	11 H6	133	TD	RBNSN PUCK BARNICK F BASE PENN	1	5290 D	2900		43		1040 653	511* 124*	2	00	1084 930 1955	555* 401* 1426*	2	00
5N	6E	17 D2	134	TD	NAT ASSOC KINCAID O BASE PENN	1	5220 D	2772		43		964 624	442* 102*	1	00	1010 806 1976	488* 284* 1454*	3	00
5N	6E	24 B4	372	TD	WALL T E MCGEE R BASE PENN	1	5100 D	2961		44		1054 681	544* 171*	3	00	1103 1930	593* 1420*	2	00
5N	6E	25 B1	445	TD	OBERING E BEASLEY A BASE PENN	1	5000 D	2915		44		1055 688	555* 188*	3	00	1100 1938	600* 1438*	2	00
5N	6E	25 H1	135	TD	SOHIO PROD BEHREN R C BASE PENN	1	5100 D	2908		43		1054 701	544* 157*	3	00	1100 1925	590* 1415*	3	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	6E	35 A2	137	TD	MAGNOLIA GRAHN E H BASE PENN	1	5000 C	2864		42		1017 660	517* 160*	2	06	1060 1916	560* 1416*	3	00
5N	6E	35 A4	138	TD	EASON OC BARBEE R BASE PENN	1	4650 D	2887		42		992 638	527* 173*	3	00	1038 1898	573* 1433*		
5N	6E	35 E3	136	TD	EASON ETAL MILLER A BASE PENN	1	4920 D	2924		42		1028 668	536* 176*	2	00	1070 1918	578* 1426*	3	00
5N	7E	1 H1	139	TD	STOUT C E PULLIAM L BASE PENN	1	5350 D	3039		43		1098 706	563* 171*	3	00	1134 894 2148	599* 359* 1613*		
5N	7E	3 A3	402	LD	OHIO OIL WEBSTER B BASE PENN	3	5210 D	2532		44		1026 637	505* 116*	4	06	1066 830 2088	545* 309* 1567*	3	00
5N	7E	3 A4	446	TD	OHIO OIL WEBSTER BASE PENN	2	5270 D	2533	*	44		1020 636	493* 109*	2	00	1056 830 2084	529* 303* 1557*	2	00
5N	7E	3 A5	409	TD	TEXAS CO CHLDRS COM BASE PENN	3	5180 D	2518	*	44		1009 623	491* 105*	4	00	1046 818 2060	528* 300* 1542*	3	00
5N	7E	3 A6	447	TD	TEXAS CO CHLDRS COM BASE PENN	4	5300 D	2526	*	44		1032 649	502* 119*	3	00	1068 840 2068	538* 310* 1538*	3	06
5N	7E	3 A7	410	TD	TEXAS CO CHLDRS COM BASE PENN	2	5330 D	2521	*	44		1039 659	506* 126*	1	06	1080 850 2054	547* 317* 1521*	2	00
5N	7E	3 B4	381	TD	OHIO OIL WEBSTER BN BASE PENN	1	5300 D	2543	*	44		1032 650	502* 120*	3	06	1070 840 2086	540* 310* 1556*	3	06
5N	7E	3 B5	448	TD	TEXAS CO CHLDRS COM BASE PENN	5	5200 D	2526	*	45		1023 642	503* 122*	3	06	1062 832 2060	542* 312* 1540*	3	00
5N	7E	3 B6	406	TD	TEXAS CO CHLDRS COM BASE PENN	1	5320 D	2525	*	44		1034 658	502* 126*	3	00	1070 842 2066	538* 310* 1534*	4	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	3 B8	362	TK	TEXAS CO WEBSTER L BASE PENN	1	5350 D	2533		*44									
5N	7E	3 C5	343	TD	TEXAS CO BLMKR COMM BASE PENN	4	5280 D	2528		*44		1040 652	512* 124*	3	00	1076 846 2062	548* 318* 1534*	4	00
5N	7E	3 C7	143	TD	TEXAS CO BLMKR COMM BASE PENN	2	5370 D	2535		*43		1062 684	525* 147*	3	00	1102 870 2060	565* 333* 1523*	3	00
5N	7E	3 D8	144	TD	TEXAS CO BLMKR COM BASE PENN	1	5390 D	2534		*43		1076 682	537* 143*	3	00	1117 898 1958	578* 359* 1419*	4	00
5N	7E	3 E5	342	TD	TEXAS CO BLOEMKER M BASE PENN	8	5340 D	2536		*44		1091 704	557* 170*	3	00	1134 894 1970	600* 360* 1436*	2	00
5N	7E	3 E7	146	TD	TEXAS CO BLOEMKER M BASE PENN	6	5390 D	2538		*43		1090 696	551* 157*	3	00	1132 1970	593* 1431*	3	00
5N	7E	3 F4	147	TD	PURE OC GREENLAW G BASE PENN	1	5330 C	2928		42		1092 700	559* 167*	3	00	1132 894 1976	599* 361* 1443*	2	00
5N	7E	3 F6	145	TD	TEXAS CO BLOEMKER M BASE PENN	7	5420 D	2542		*43		1105 710	563* 168*	3	00	1148 930 2000	606* 388* 1458*	2	00
5N	7E	3 F8	140	TD	TEXAS CO BLOEMKER M BASE PENN	5	5390 C	2538		*43		1084 690	545* 151*	3	00	1125 1953	586* 1414*	3	00
5N	7E	3 G5	411	TD	TEXAS CO NADLER C BASE PENN	8	5360 D	2544		*44		1095 706	559* 170*	3	00	1132 924 1974	596* 388* 1438*	3	00
5N	7E	3 G7	141	TD	DUNCAN W BRINK R BASE PENN	2	5400 D	2540		*43		1094 702	554* 162*	4	00	1138 1974	598* 1434*	3	00
5N	7E	3 H6	148	TD	TEXAS CO NADLER C BASE PENN	7	5390 D	2548		*43		1104 714	565* 175*	3	00	1148 1970	609* 1431*	2	00
5N	7E	3 H8	142	TD	DUNCAN W BRINK R BASE PENN	1	5400 D	2541		*43		1086 696	546* 156*	3	00	1127 920 1965	587* 380* 1425*	3	00

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	4 A5	159	TD	PURE OC NADLER J BASE PENN	4	5340 D	2524	*42			1026 638	492* 104*	3	00	1065 2040	531* 1506*		
5N	7E	4 A7	157	TD	PURE OC NADLER CH BASE PENN	4	5340 D	2548	*42			1031 639	497* 105*	3	06	1076 2030	542* 1496*	2	06
5N	7E	4 B4	163	TD	DUNCAN W VEITH L BASE PENN	1	5350 D	2950	*42			1051 655	516* 120*	3	00	1093 865 2040	558* 330* 1505*	3	00
5N	7E	4 B8	155	TD	TEXAS CO NADLER CH BASE PENN	1	5330 D	2843	*42			1060 664	527* 131*	1	06	1104 2032	571* 1499*	2	00
5N	7E	4 C1	154	TD	PURE OC KLUTHE A H BASE PENN	4	5380 D	2838	*43			1063 676	525* 138*	4	00	1108 904 2060	570* 366* 1522*	2	06
5N	7E	4 C7	158	TD	TEXAS CO NADLER CH	6	5390 D	2509	*43			1082 676	543* 137*	2	06	1123 914	584* 375*	4	00
5N	7E	4 D8	156	TD	TEXAS CO NADLER CH BASE PENN	3	5350 D	2868	*42			1080 682	545* 147*	3	00	1122 1927	587* 1392*	4	00
5N	7E	4 E1	150	TD	TEXAS CO BLOEMKER E BASE PENN	1	5390 D	2534	*42			1073 682	534* 143*	4	00	1112 1963	573* 1424*	4	00
5N	7E	4 E3	152	TD	TEXAS CO BLOEMKER M BASE PENN	1	5390 C	2515	*42			1058 665	519* 126*	3	00	1099 1925	560* 1386*	3	00
5N	7E	4 E5	161	TD	OHIO OIL POEHLER H BASE PENN	2	5370 C	2505	*42			1078 680	541* 143*	2	06	1116 894 1920	579* 357* 1383*	4	00
5N	7E	4 F4	153	TD	TEXAS CO BLOEMKER M BASE PENN	2	5380 D	2528	*42			1072 678	534* 140*	2	06	1112 882 1934	574* 344* 1396*	3	00
5N	7E	4 F6	160	TD	OHIO OIL POEHLER H BASE PENN	1	5410 D	2971	*42			1084 691	543* 150*	3	00	1122 906 1940	581* 365* 1399*	4	00
5N	7E	4 G1	151	TD	TEXAS CO BLOEMKER E BASE PENN	3	5410 C	2540	*43			1078 690	537* 149*	3	00	1120 895 1952	579* 354* 1411*	3	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude		Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.											Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	4 G5	162	TD	OHIO OIL POEHLER H BASE PENN	3	5400	D	2521	*42			1084 690	544* 150*	3	00	1126 904 1934	586* 364* 1394*	2	06
5N	7E	5 A5	166	TD	DUNCAN N&W SCHNEIPP BASE PENN	1	5320	D	2846	*42			1044 660	512* 128*	3	00	1087 1925	555* 1393*	2	06
5N	7E	5 B2	199	LD	GULF REF STORCK M BASE PENN	1	5270	D	2819		42		1046 658	519* 131*			1092 2025	565* 1498*	2	00
5N	7E	5 B3	167	TD	PURE OC STORCK M	2	5340	D	2835	*42			1062 655	528* 121*	2	06	1104	570*	3	00
5N	7E	5 C3	165	TD	TEXAS CO NADLER CH BASE PENN	5	5360	C	2884	*42			1078 686	542* 150*	3	00	1124 925 1934	588* 389* 1398*	3	00
5N	7E	5 D2	164	TD	TEXAS CO NADLER CH BASE PENN	2	5340	D	2845	*42			1077 684	543* 150*	3	00	1121 912 1920	587* 378* 1386*	3	00
5N	7E	5 E3	168	TD	ILL PROD VEITH L BASE PENN	1	5360	C	2835	*42			1078 697	542* 161*	2	00	1117 1933	581* 1397*	2	00
5N	7E	8 A3	449	TD	PURE OC ZANDER L BASE PENN	6	5240	D	2900		44		1036 640	512* 116*	3	00	1080 865 2085	556* 341* 1561*	3	00
5N	7E	8 D4	249	TD	PURE OC ZANDER L BASE PENN	1	5260	C	2907		42		1010 625	484* 99*	3	00	1055 2094	529* 1568*	4	00
5N	7E	8 F2	172	TD	TEXAS CO LANDWHR WM BASE PENN	1	5310	D	2830	*42			1016 616	485* 85*	2	00	1056 2046	525* 1515*	4	00
5N	7E	8 F4	171	TD	TEXAS CO LANDWEHR W BASE PENN	1	5230	D	2924	*42			1028 622	505* 99*	3	00	1077 2040	554* 1517*	1	06
5N	7E	8 H2	170	TD	CAMERON OC LANDWEHR E BASE PENN	2	5230	C	2824	*42			1019 622	496* 99*	3	00	1060 2020	537* 1497*	3	00
5N	7E	8 H4	169	TD	CAMERON OC LANDWEHR E BASE PENN	1	5320	D	2825	*42			1046 642	514* 110*	2	06	1092 2030	560* 1498*	2	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	9 B4	383	TD	LEWIS S WEBSTR CON BASE PENN	1	5240 D	2543	*44			1026 632	502* 108*	3	00	1068 836 2090	544* 312* 1566*	2	00
5N	7E	9 B6	184	TD	DUNCAN W LEWIS H D BASE PENN	2	5290 D	2542	*42			1026 634	497* 105*	2	00	1070 2083	541* 1554*	4	00
5N	7E	9 B7	458	TD	KINGWOODOC LEWIS A BASE PENN	6	5270 C	2531	*44			1023 628	496* 101*	3	00	1068 2076	541* 1549*	1	06
5N	7E	9 B8	181	TD	KINGWOODOC LEWIS A BASE PENN	2	5260 D	2527	*42			1031 630	505* 104*	3	00	1070 2082	544* 1556*	4	00
5N	7E	9 C2	451	TD	GULF REF HALL B BASE PENN	2	5260 D	2539	*44			1028 650	502* 124*	2	06	1072 2096	546* 1570*	3	00
5N	7E	9 C4	412	TD	LEWIS ETAL HALL B BASE PENN	1	5270 D	2524	*44			1022 638	495* 111*	3	00	1062 840 2082	535* 313* 1555*	3	06
5N	7E	9 C7	182	TD	KINGWOODOC LEWIS A BASE PENN	3	5270 D	2521	*43			1028 628	501* 101*	2	06	1070 2090	543* 1563*		
5N	7E	9 D2	467	TD	GULF REF HALL B BASE PENN	1	5260 D	2556	*44			1023 639	497* 113*	4	00	1063 2088	537* 1562*	3	06
5N	7E	9 D3	382	TD	LEWIS S HALL B BASE PENN	2	5280 D	2530	*44			1024 634	496* 106*	4	00	1063 831 2078	535* 303* 1550*	3	06
5N	7E	9 D6	183	TD	DUNCAN W LEWIS H D BASE PENN	1	5270 D	2521	*43			1015 636	488* 109*	3	00	1056 2062	529* 1535*	2	00
5N	7E	9 D7	457	TD	KINGWOODOC LEWIS A BASE PENN	5	5290 D	2529	*44			1012 639	483* 110*	3	00	1057 834 2074	528* 305* 1545*	1	00
5N	7E	9 D8	180	TD	KINGWOODOC LEWIS A BASE PENN	1	5310 D	2542	*42			1020 639	489* 108*	3	00	1060 835 2086	529* 304* 1555*	3	00
5N	7E	9 E2	456	TD	TEXAS CO MASHER H BASE PENN	3	5200 D	2534	*44			1017 631	497* 111*	3	06	1057 2086	537* 1566*	3	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	9 E 3	452	TD	TEXAS CO MASHER H BASE PENN	2	5270 D	2550	*44			1028 631	501* 104*	3	00	1071 2098	544* 1571*	2	06
5N	7E	9 E 4	454	TD	TEXAS CO MASHER. H BASE PENN	4	5280 D	2532	*44			1026 630	498* 102*	3	00	1068 2085	540* 1557*	3	00
5N	7E	9 E 5	407	TD	TEXAS CO LANDWHR WM BASE PENN	6	5300 D	2533	*44			1018 643	488* 113*	3	06	1058 822 2082	528* 292* 1552*	4	00
5N	7E	9 E 6	453	TD	TEXAS CO LANDWHR WM BASE PENN	7	5270 C	2529	*44			1011 630	484* 103*	3	06	1056 820 2060	529* 293* 1533*	2	00
5N	7E	9 E 7	179	TD	TEXAS CO LANDWHR WM BASE PENN	5	5240 C	2540	*42			1005 623	481* 99*	3	00	1045 2071	521* 1547*	4	00
5N	7E	9 E 8	455	TD	TEXAS CO LANDWHR WM BASE PENN	8	5260 D	2539	*44			1011 629	485* 103*	3	06	1054 832 2065	528* 306* 1539*	2	00
5N	7E	9 F 4	185	TD	TEXAS CO MASHER H BASE PENN	1	5300 C	2885	*43			1026 645	496* 115*	3	00	1068 2080	538* 1550*	4	00
5N	7E	9 F 6	178	TD	TEXAS CO LANDWHR WM BASE PENN	3	5300 C	2927	*42			1011 630	481* 100*	3	06	1050 2066	520* 1536*	4	00
5N	7E	9 F 8	177	TD	TEXAS CO LANDWHR WM BASE PENN	2	5270 C	2540	*42			1010 615	483* 88*	2	06	1049 828 2048	522* 301* 1521*	2	06
5N	7E	9 G 5	450	TD	TEXAS CO LANDWEHR W BASE PENN	5	5310 D	2541	*44			1016 632	485* 101*	4	00	1058 830 2040	527* 299* 1509*	3	00
5N	7E	9 G 7	176	TD	TEXAS CO LANDWEHR W BASE PENN	4	5310 D	2500	*42			1014 622	483* 91*	3	00	1054 822 2034	523* 291* 1503*	3	00
5N	7E	9 H 4	173	TD	DUNCAN W BEHREN R C BASE PENN	1	5360 D	2551	*42			1028 633	492* 97*	3	00	1070 835 2042	534* 304* 1511*	3	00
5N	7E	9 H 6	175	TD	TEXAS CO LANDWEHR W BASE PENN	3	5330 C	2498	*42			1016 630	483* 97*	3	00	1058 2032	525* 1499*	3	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	9 H8	174	TD	TEXAS CO LANDWEHR W BASE PENN	2	5310 D	2840	*	42		1021 630	490* 99*	2	06	1062 2020	531* 1489*	3	06
5N	7E	10 F8	460	TD	TEXAS CO STRUVE D BASE PENN	1	5300 D	2893	*	44		1031 648	501* 118*	3	00	1070 836 2095	540* 306* 1565*	3	00
5N	7E	10 G4	462	TD	TEXAS CO MCKNELLY G BASE PENN	2	5180 D	2534	*	44		1018 628	500* 110*	2	06	1054 824 2090	536* 306* 1572*	3	06
5N	7E	10 G5	386	TD	OHIO OIL GHARST L BASE PENN	4	5180 D	2514	*	44		1010 624	492* 106*	3	00	1050 820 2090	532* 302* 1572*	2	00
5N	7E	10 G6	459	TD	OHIO OIL GHARST BASE PENN	6	5260 D	2517	*	44		1017 628	491* 102*	2	06	1056 824 2084	530* 298* 1558*	3	00
5N	7E	10 G7	385	TD	OHIO OIL GHARST L BASE PENN	3	5260 D	2530	*	44		1024 636	498* 110*	3	00	1064 831 2083	538* 305* 1557*	3	00
5N	7E	10 H4	388	TD	TEXAS CO MCKNELLY G BASE PENN	1	5190 D	2519	*	44		1016 629	497* 110*	3	00	1052 826 2090	533* 307* 1571*	3	00
5N	7E	10 H5	461	TD	OHIO OIL GHARST L BASE PENN	5	5280 D	2530	*	44		1016 631	488* 103*	3	00	1052 823 2000	524* 295* 1472*	3	00
5N	7E	10 H6	387	TD	OHIO OIL GHARST L BASE PENN	1	5280 D	2525	*	44		1026 633	498* 105*	2	00	1064 832 2095	536* 304* 1567*	1	00
5N	7E	10 H8	384	TD	OHIO OIL GHARST L BASE PENN	2	5340 D	2542	*	44		1048 660	514* 126*	3	00	1087 854 2066	553* 320* 1532*	4	00
5N	7E	11 H4	186	TD	OHIO OIL MASHER C H BASE PENN	1	5300 D	3005		42		1076 701	546* 171*	4	00	1113 880 2116	583* 350* 1586*	3	00
5N	7E	12 G4	531	TK	TEXAS CO YOUNT E BASE PENN	1	5340 C	3015		45									
5N	7E	13 A6	514	TD	KINGWOODOC FULK BASE PENN	1	5120 D	2575		45		1094 724	582* 212*	3	00	1143 1958	631* 1446*	3	00

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CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin . 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	13 B6	532	TD	KINGWOODOC FULK BASE PENN	4	5160 C	2922		46		1087 716	571* 200*			1136 2052	620* 1536*		
5N	7E	14 A1	188	TD	KINGWOODOC WOLFE BASE PENN	1	5130 C	2955		40		1075 699	562* 186*	3	00	1119 2010	606* 1497*	2	00
5N	7E	15 E7	187	TD	PEARSON C MURVIN BASE PENN	1	5130 C	2925		42		1044 660	531* 147*	3	00	1085 2020	572* 1507*	2	06
5N	7E	16 F8	408	TD	TEXAS CO WNTRWD COM	1	5220 D	2972	*	44		1035 640	513* 118*	2	06	1073	551*	3	06
5N	7E	16 H8	189	TD	KINGWOODOC LEWIS H D BASE PENN	1	5280 D	2539	*	42		1032 636	504* 108*	3	00	1076 860 2096	548* 332* 1568*	2	00
5N	7E	17 E1	191	TD	KINGWOODOC HALL E	2	5210 D	2800	*	43		1040 646	519* 125*	3	00	1083	562*	3	00
5N	7E	17 E3	311	TD	KINGWOODOC HALL E BASE PENN	B1	5190 C	2537	*	43		1028 625	509* 106*	3	00	1072 2080	553* 1561*	2	00
5N	7E	17 F2	190	TD	KINGWOODOC HALL E BASE PENN	1	5220 D	2945	*	43		1044 629	522* 107*	3	00	1096 2083	574* 1561*		
5N	7E	17 G2	463	TD	PURE OC ZANDER L BASE PENN	5	5220 D	2530	*	44		1040 634	518* 112*	3	00	1083 2076	561* 1554*	3	00
5N	7E	17 G4	278	TD	KINGWOODOC ZANDER L BASE PENN	1	5230 D	2531	*	43		1052 640	529* 117*	2	06	1094 2082	571* 1559*	4	00
5N	7E	17 G5	413	TD	TEXAS CO RICHARS C BASE PENN	1	5220 D	2972	*	44		1048 640	526* 118*	2	06	1092 2080	570* 1558*	4	00
5N	7E	20 D2	195	LD	TEXAS CO HARDIN A BASE PENN	1	5010 D	2882		42		1023 634	522* 133*	3	00	1068 1932	567* 1431*	2	00
5N	7E	20 D4	192	TD	KINGWOODOC ESSON BASE PENN	1	5180 D	2928		42		1039 654	521* 136*	2	06	1080 1926	562* 1408*	3	00

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	20 E5	194	TD	SNCLR WYOM HARDIN S S BASE PENN	1	5140 D	2765		43		1032 636	518* 122*	3	00	1074 1920	560* 1406*	2	06
5N	7E	22 D4	519	TD	LUTTRELL H MURVIN J R BASE PENN	3	5130 D	2524		45		1071 699	558* 186*	3	00	1113 904 2080	600* 391* 1567*	2	06
5N	7E	22 E4	196	TD	PHILLIPS MURVIN J R BASE PENN	1	5150 D	2983		39		1065 690	550* 175*	3	06	1109 2075	594* 1560*	2	06
5N	7E	22 F2	533	TD	DORAN PAUL MURVIN BASE PENN	2	5110 D	2498		45		1047	536*			1996	1485*		
5N	7E	22 F3	464	TD	DORAN&WIS MURVIN BASE PENN	1	5110 D	2514		44		1059 684	548* 173*	2	06	1100 2080	589* 1569*	4	00
5N	7E	27 E1	197	TD	BLACKETT H HARMON A A BASE PENN	1	5010 D	2980		42		1074 694	573* 193*	2	00	1116 886 1978	615* 385* 1477*	3	00
5N	7E	29 H2	404	TD	EASON OC LEWIS W BASE PENN	1	5040 D	2946		44		1022 643	518* 139*	3	00	1066 1954	562* 1450*		
5N	7E	30 C4	466	TD	TEXAS CO BROOKS E BASE PENN	A4	5040 D	2855		44		1041 688	537* 184*	2	00	1086 1934	582* 1430*	2	00
5N	7E	30 D3	405	TD	TEXAS CO BROOKS E BASE PENN	A1	5040 D	2945		43		1036 670	532* 166*	2	00	1080 1930	576* 1426*	3	00
5N	7E	30 D5	198	TD	OBERING E MCGEE J H BASE PENN	1	5040 D	2846		43		1038 687	534* 183*	3	00	1081 890 1930	577* 386* 1426*	3	00
5N	7E	30 E5	390	TD	TEXAS CO BROOKS E BASE PENN	A2	5100 D	2853		44		1048 694	538* 184*	2	00	1094 1934	584* 1424*	1	06
5N	7E	30 F5	465	TD	TEXAS CO BROOKS E BASE PENN	A3	5070 D	2945	*	44		1036 672	529* 165*	2	00	1078 1925	571* 1418*	3	00
5N	7E	32 C5	200	TD	THARPE&LNE MONICL COM BASE PENN	1	4980 D	2996		42		1010 674	512* 176*	3	00	1050 2050	552* 1552*		

TABULATED DATA ON KEY BEDS

CLAY COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — Shoal Creek				Line 1 — Coal No. 5 2 — West Franklin 3 — Base Penn.			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	7E	36 C8	201	TD	LONGHRN&MA HARMON J F BASE PENN	1	488 0 D	3037		41		1065 690	577* 202*	3	00	1110 2000	622* 1512*	3	00
5N	8E	25 H1	103	TD	FRAZR&SPED WEBER A BASE PENN	1	492 0 D	3157		41		1143 748	651* 256*	3	00	1184 2150	692* 1658*	3	00
5N	8E	27 D1	389	TD	MAGNOLIA IFFERT A BASE PENN	1	480 0 D	3162		44		1104 729	624* 249*	4	00	1140 2086	660* 1606*	4	00
5N	8E	36 E8	202	TD	CANTRBRY J KLINGER R BASE PENN	1	461 0 D	3152		43		1106 729	645* 268*	3	00	1152 2130	691* 1669*	2	06

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TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
					EDWARDS NOV 15 1945														
1N	10E	1 A2	232	TD	TEXAS CO LAMBRGHT C	1	4870 D	3242		44		1003 745	516* 258*			1084 962	597* 475*		
1N	10E	1 B3	279	TD	TEXAS CO BRANT H A	1	4760 D	3316		44		1000 740	524* 264*			1084 962	608* 486*		
1N	10E	3 A8	218	TD	TEXAS CO HAYS A	1	4280 D	3320		43		932 682	504* 254*			1014 896	586* 468*		
1N	10E	4 A1	155	TD	OHIO OIL HAYES ALV	2	4360 D	3370		43		949 694	513* 258*			1030 912	594* 476*		
1N	10E	4 A5	282	TD	ILL PROD BARBER H C	2	4260 D	3274		43		955 705	529* 279*			1034 921	608* 495*		
1N	10E	4 B3	150	TD	OHIO OIL HAYES ALV	1	4330 D	3312		43		960 709	527* 276*			1038 922	605* 489*		
1N	10E	4 C3	281	TD	ILL PROD IBBTSN JSN	1	4420 D	3271		43		958 710	516* 268*			1037 923	595* 481*		
1N	10E	4 C5	12	TD	ILL PROD BARBER H C	1	4420 C	3301		43		955 710	513* 268*			1030 918	588* 476*		
1N	10E	4 E5	283	TD	ILL PROD AHLFIELD S	1	4080 D	3257		43		916 675	508* 267*			992 882	584* 474*		
1N	10E	6 F5	258	TD	YNGLNG S C SMITHWICK	1	3970 D	3377		44		967 712	570* 315*			1042 916	645* 519*		
1N	10E	7 B2	308	TD	LAMBERT B VAN SCHK N	5	4370 D	3285		45		968 720	531* 283*			930	493*		
1N	10E	7 B8	314	TD	MABEE OG VAN SCHK N	2	3930 C	3240		45		940 691	547* 298*			1040 902	647* 509*		
1N	10E	7 C7	315	TD	MABEE OG VAN SCHK N	4	3940 D	3243		45		950 700	556* 306*			1050 914	656* 520*		
1N	10E	7 D6	316	TD	AETNA OC VAN SCHK N	5	3950 D	3245		45		940 696	545* 301*			1040 904	645* 509*		
1N	10E	7 E5	317	TD	AETNA OC WEBER E	1	3970 D	3226		45		924 684	527* 287*			1030 890	633* 493*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
1N	10E	7 G3	318	TD	OHIO OIL WEBER P M	1	4140 D	3278		45		956 704	542* 290*			1040 1914	626* 500*		
1N	10E	9 A1	190	TD	RYAN OC GINTHR RLS	1	4870 C	3348		43		1012 754	525* 267*			1095 973	608* 486*		
1N	10E	9 A3	13	TD	RYAN&FRTNR RALSTON	1	4450 C	3336		43		984 721	539* 276*			1063 943	618* 498*		
1N	10E	9 C1	174	TD	ILL PROD GILLESPIE	1	4730 D	3322		43		994 744	521* 271*			1074 960	601* 487*		
1N	10E	9 C3	173	TD	ILL PROD GAEDE E	A1	4670 D	3301		43		1000 744	533* 277*			1080 964	613* 497*		
1N	10E	9 C4	280	TD	ILL PROD GAEDE A	A2	4740 D	3310		44		1007 746	533* 272*			1084 968	610* 494*		
1N	10E	9 C5	14	TD	BANDR&OLDS IBBOTSON G	1	4550 D	3294		43		1003 737	548* 282*			1082 961	627* 506*		
1N	10E	9 E2	211	TD	TEXAS CO GILLSP SHB	2	4460 D	3290		44		966 714	520* 268*			1044 930	598* 484*		
1N	10E	9 E5	151	TD	MAGNOLIA KHMHS FRTR	1	4590 D	3298		43		990 736	531* 277*			1070 954	611* 495*		
1N	10E	9 F1	159	TD	TEXAS CO GILLSP SHB	1	4490 D	3281		43		961 713	512* 264*			1044 926	595* 477*		
1N	10E	9 F3	219	TD	TEXAS CO GILLSP COM	1	4340 D	3281		43		954 708	520* 274*			1032 920	598* 486*		
1N	10E	9 G3	153	TD	RYAN OC MOATS E	1	4170 D	3259		43		938 684	521* 267*			1014 898	597* 481*		
1N	10E	9 G5	152	TD	MAGNOLIA KHMHS FRTR	2	4410 D	3338		43		972 720	531* 279*			1050 934	609* 493*		
1N	10E	10 C3	157	TD	TEXAS CO SHELBY HYS	1	4810 D	3366		43		1016 756	535* 275*			1096 978	615* 497*		
1N	10E	10 C7	158	TD	TEXAS CO GILLSP SHB	1	4470 D	3320		43		969 714	522* 267*			1051 934	604* 487*		
1N	10E	10 E1	291	TD	TEXAS CO HAYES C	1	4690 D	3355		43		998	529*		*0	1092 958	623* 489*		
1N	10E	10 E7	275	TD	RYAN&FRTNR GAEDE A	1	4270 D	3296		43		940 688	513* 261*			1020 904	593* 477*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude		Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.											Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
1N	10E	10 G8	169	TD	TEXAS CO MOATES L	1	4360	D	3264		43		940 688	504* 252*			1024 906	588* 470*		
1N	10E	12 H1	251	TD	TEXAS CO IBBTSN COM	1	4880	C	3227		44		988 734	500* 246*			1072 949	584* 461*		
1N	10E	12 H3	212	TD	TEXAS CO DUSH A	1	4860	D	3229		44		1006 744	520* 258*			1098 960	612* 474*		
1N	10E	13 A1	15	TD	WALSH&DYE TULL W S	1	4830	C	3302		42		934	451*		*0	1013 895	530* 412*		
1N	10E	16 G3	16	TD	ARMOUR ETL RALSTON	2	4710	D	3319		43		1000 737	529* 266*			1076 957	605* 486*		
1N	10E	16 G5	154	TD	DUNCAN W KOENECK W	1	4550	D	3325		43		970 712	515* 257*			1046 932	591* 477*		
1N	10E	16 H1	292	TD	TEXAS CO SHELBY C	1	4650	D	3312		43		1000 732	535* 267*			1081 959	616* 494*		
1N	10E	18 D2	9	LD	MIDSTAT OC MCKINLEY	1	3940	D	3350		43		946 686	552* 292*			1041 904	647* 510*		
1N	10E	18 F6	17	TD	LAMBERT B VAN SCHOCK	1	3940	C	3217		44		947 685	553* 291*			1035 897	641* 503*		
1N	10E	18 H6	162	TD	TIDE WATER VAN SCHK N	1	3910	D	3235		44		954 694	563* 303*			1040 903	649* 512*		
1N	10E	18 H8	313	TD	LAMBERT B VAN SCHK N	4	3940	D	3245		45		958 700	564* 306*			1046 910	652* 516*		
1N	10E	23 H5	309	TD	AETNA OC GREATHSE C	1	5140	D	3358		45		984	470*			1100 950	586* 436*		
1N	10E	27 C7	18	TD	ZEPHYR DRC SHELBY H	1	4650	D	3371	239	42		954 688	489* 223*			1042 914	577* 449*		
1N	10E	31 D4	225	TD	ROSS C R RODGERS	1	3900	D	3335	239	44		977 696	587* 306*			1054 942	664* 552*		
1N	10E	31 F2	224	TD	GULF REF GUYOT	1	3900	D	3373	239	44		952 681	562* 291*			1034 910	644* 520*		
1N	10E	35 H4	149	TD	DEEP ROCK MADDEN M	1	4750	C	3365	239	42		968 690	493* 215*			1057 930	582* 455*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
1N	11E	18 H2	294	CH	EVERSON OC PIXLEY A	1	4983 P	1254		6		930	432*						
1N	11E	30 E6	25	TD	OWEN&DRMN BRISTOW W	1	5030 C	3310	239	42		955 698	452* 195*			1040 920	537* 417*		
1N	11E	31 E2	19	TD	MENEFEE K MCDOWELL C	1	5080 D	3299	239	41		950 682	442* 174*			1034 914	526* 406*		
1N	14W	3 A5	20	TD	MARTIN R B BRADHAM E	1	4730 D	3125	234	44		842 605	369* 132*			944 780	471* 307*		
1N	14W	4 G5	22	TD	WALSH&DYE LEMKE C	1	4790 C	3184	234	39		910 655	431* 176*			855	376*		
1N	14W	5 H7	23	TD	MAGNOLIA KOERTGE	2	4720 C	3333		42		943 690	471* 218*			1023 883	551* 411*		
1N	14W	6 D3	1	LD	SNCLR WYOM BIERHAUS A	1	4970 C	3215		42		966 709	469* 212*			1046 912	549* 415*		
1N	14W	6 D5	29	TD	NELSON DEV ROTHROCK G	1	4990 D	3144		42		976 722	477* 223*			1058 928	559* 429*		
1N	14W	6 F2	26	TD	BROKHVN OC ROTHROCK C	1	4840 C	3150		42		962 705	478* 221*			1055 902	571* 418*		
1N	14W	6 F3	28	TD	SEABOARD ROTHROCK C	1	4960 C	3141		42		974 719	478* 223*			1058 920	562* 424*		
1N	14W	6 G5	24	TD	MARTIN R B BLACKFRD E	1	5180 C	3172		42		986 741	468* 223*			1068 934	550* 416*		
1N	14W	6 H1	27	TD	MAGNOLIA KOERTGE K	1	4770 C	3200		42		960 706	483* 229*			1046 900	569* 423*		
1N	14W	6 H3	30	TD	CENTRLPIPE GADAU	1	4960 D	3141		42		974 722	478* 226*			1056 917	560* 421*		
1N	14W	10 F1	11	LD	MAGNOLIA MATTHES	1	4130 D	2918	234	43		790 548	377* 135*			905 738	492* 325*		
1N	14W	11 E5	217	TD	BENNET BRO HNDLTR MCV	2	4060 D	2868	234	43		774 534	368* 128*			892 714	486* 308*		
1N	14W	11 H7	21	TD	1 NAT PET MYERS E	1	4080 D	2873	234	43		768 534	360* 126*			886 712	478* 304*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
1N	14W	18 A8	31	TD	DYE A F SCHERNEKAU	1	4830 C	3262		43		898 652	415* 169*			984 860	501* 377*		
1N	14W	18 H1	175	TD	ASHLND ORC BETEBENNER	1	4910 D	3180		44		876 630	385* 139*			960 828	469* 337*		
1N	14W	22 B8	163	TD	BIG CHIEF THOMPSON S	1	4100 D	3084	238	44		812 562	402* 152*			924 770	514* 360*		
1N	14W	31 H3	32	TD	CENTRLPIPE STANINGR D	1	4990 D	3218	239	42		910 652	411* 153*			1010 874	511* 375*		
1N	14W	31 H5	33	TD	CENTRLPIPE TARPLEY C	1	4730 D	3220	239	42		908 644	435* 171*			1004 870	531* 397*		
1N	14W	32 A5	51	TD	SEABOARD NELSON L W	1	4290 D	3239	238	41		865 602	436* 173*			962 828	533* 399*		
2N	10E	34 C6	220	TD	TEXAS CO PAMPE COM	1	4410 D	3350		43		980 728	539* 287*			1060 940	619* 499*		
2N	10E	35 G6	34	LD	TEXAS CO DENSMORE	1	4600 D	3250		43		1000 749	540* 289*			1081 960	621* 500*		
2N	14W	31 B1	35	TD	CENTRLPIPE BIERHAUS	1	4780 D	3120		42		944 700	466* 222*			1026 886	548* 408*		
2N	14W	31 B3	36	TD	CENTRLPIPE BLACKFORD	1	5010 C	3190		42		962 716	461* 215*			1050 908	549* 407*		
2N	14W	31 B5	45	TD	CENTRLPIPE SUMMRFLT D	1	5160 D	2891		42		988 739	472* 223*			1068 931	552* 415*		
2N	14W	31 C5	37	TD	MAGNOLIA BRAKE C C	1	5140 C	3240		42		984 738	470* 224*			1068 934	554* 420*		
2N	14W	31 D1	41	TD	CENTRLPIPE KENT	4	4560 D	3100		41		920 672	464* 216*			1002 862	546* 406*		
2N	14W	31 D2	40	TD	CENTRLPIPE KENT	3	4890 D	3130		41		948 705	459* 216*			1030 894	541* 405*		
2N	14W	31 D3	42	TD	CENTRLPIPE RIDGLEY	1	4740 C	3116		42		940 692	466* 218*			1024 884	550* 410*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	14W	31 E1	38	TD	CENTRLP IPE KENT	1	4880 D	3121		41		954 710	466* 222*			1038 900	550* 412*		
2N	14W	31 E2	39	TD	CENTRLP IPE KENT	2	4890 D	3124		41		955 710	466* 221*			1036 902	547* 413*		
2N	14W	31 E3	46	TD	BANDR&MRTN WELLS L C	1	4970 C	3150		41		966 723	469* 226*			1053 914	556* 417*		
2N	14W	31 G2	44	TD	OHIO OIL STREMME	2	4920 C	3140		41		965 722	473* 230*			1050 912	558* 420*		
2N	14W	31 G3	222	TD	BLACK J L MARKMAN E	1	4890 D	3156		43		970 724	481* 235*			1052 918	563* 429*		
2N	14W	31 H1	43	TD	OHIO OIL STREMME O	1	4960 C	3160		41		960 720	464* 224*			1050 906	554* 410*		
2N	14W	32 C8	47	TD	DYE A F KENT E C	3	4580 C	3117		41		924 676	466* 218*			1005 866	547* 408*		
2N	14W	32 F6	48	TD	WSHBRN&PWR MARKMAN H	1	4660 C	3148	234	41		936 687	470* 221*			1026 876	560* 410*		
2N	14W	32 F7	50	TD	OHIO OIL MARKMAN H	2	4630 C	3103	234	41		926 682	463* 219*			870	407*		
2N	14W	32 F8	49	TD	OHIO OIL MARKMAN H	1	4830 C	3169		41		950 707	467* 224*			1036 894	553* 411*		
2N	14W	32 H8	52	TD	BROWN W C STREMME O	1	4700 C	3117		41		933 695	463* 225*			1020 880	550* 410*		
1S	10E	3 A5	53	TD	SKELLY OC GUMBRELL C	1	4200 D	3367	239	43		947 661	527* 241*			1038 897	618* 477*		
1S	10E	9 D5	276	TD	PHILLIPS COLYER	1	4380 D	3396	239	44		996 700	558* 262*			1066 946	628* 508*		
1S	10E	11 C2	304	CH	LEACH BROS LEA A	1	5100 G	4088	239	38		995 713	485* 203*			1093	583*		
1S	10E	12 A8	161	TD	WALL&MTCHL STEWART W	1	4800 C	3408	239	41		930 665	450* 185*			1040 885	560* 405*		
1S	10E	13 C1	55	TD	TIDE WATER PRVDNT INS	1	4450 D	3205	239	41		888 613	443* 168*			1000 838	555* 393*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
1S	10E	13 H1	54	TD	TIDE WATER GAWTHORP I	1	5260 C	3325	239	41		940 670	414* 144*			1042 898	516* 372*		
1S	10E	16 E7	2	LD	NELSON DEV REID A	1	4270 D	3388	239	43		940 666	513* 239*			1034 893	607* 466*		
1S	10E	21 E5	56	TD	TIDE WATER BUNTING E	1	4280 C	3410	239	40		927 661	499* 233*			1013 884	585* 456*		
1S	10E	29 A2	160	TD	SOHIO&BCHF BUNTING C	1A	4820 D	3526	239	44		1014 742	532* 260*			1107 964	625* 482*		
1S	10E	31 D8	57	TD	OLSON OC FELIX J	1	3990 D	3455	239	43		940	541*		*0	1028 894	629* 495*		
1S	11E	6 A4	58	TD	STEELE C F COUCH C	1	5120 D	3255	239	42		930 667	418* 155*			1018 895	506* 383*		
1S	11E	7 A6	64	TD	CITIESSERV DRURY E	1	4920 C	3263	239	42		914 644	422* 152*			1010 866	518* 374*		
1S	11E	7 A8	63	TD	TIDE WATER GAWTHORP I	2	5180 D	3277	239	41		934 661	416* 143*			1026 888	508* 370*		
1S	11E	7 C6	60	TD	CONGDON R HOCKING	1	4970 C	3230	239	42		900 665	403* 168*			994 858	497* 361*		
1S	11E	7 E6	59	TD	TIDE WATER HOCKING B	1	4700 D	3208	239	42		876 650	406* 180*			970 840	500* 370*		
1S	11E	7 E7	61	TD	CITIESSERV BLDNG COMM	1	5080 D	3252	239	42		920 684	412* 176*			1005 884	497* 376*		
1S	11E	7 G6	3	LD	MAGNOLIA GOULD E	1	5070 C	3350	239	42		926 698	419* 191*			1012 888	505* 381*		
1S	11E	7 G7	62	TD	MAGNOLIA BROKAW C	1	5230 C	3290	239	42		934	411*			1018 898	495* 375*		
1S	11E	18 A7	70	TD	TIDE WATER ST LEDGER	1	4340 D	3265	239	42		867 592	433* 158*			983 815	549* 381*		
1S	11E	18 C8	69	TD	TIDE WATER GAWTHORP I	4	4420 D	3211	239	42		866 604	424* 162*			984 818	542* 376*		
1S	11E	18 E6	68	TD	TIDE WATER GAWTHORP I	3	4710 D	3208	239	42		611	140*		*0	973 828	502* 357*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
1S	11E	18 E8	67	TD	CITIESSERV THREADS A	2B	4730 C	3265	239	42		884 612	411* 139*			980 835	507* 362*		
1S	11E	18 G7	66	TD	CITIESSERV THREAD L	2A	4760 C	3228	239	42		882 604	406* 128*			968 838	492* 362*		
1S	11E	18 H8	65	TD	CITIESSERV THREAD L	1	5220 C	3316	239	41		940 666	418* 144*			1038 898	516* 376*		
1S	11E	30 A5	71	TD	TAYLOR DRC ODLE	1	4490 C	3261	239	42		918 622	469* 173*			1020 870	571* 421*		
1S	11E	30 A8	259	TD	ROTHLEI SMITH	1	4670 D	3278	239	44		898 618	431* 151*			994 852	527* 385*		
1S	11E	30 G5	305	TD	SUPRIOR OC SMITH G E	1	4270 D	3190	239	44		870 594	443* 167*			957 817	530* 390*		
1S	11E	31 B3	181	TD	BRIT AM OP PETERS	2	4470 C	3182	239	44		907 622	460* 175*			994	547*		*0
1S	11E	31 B5	176	TD	MAGNOLIA FEWKES EST	1	4930 D	3276	239	44		936 654	443* 161*			1038 888	545* 395*		
1S	11E	31 C4	170	TD	SUPRIOR OC LAMBERT J	1	4490 D	3206	239	44		914 621	465* 172*			1006 862	557* 413*		
1S	11E	31 D3	180	TD	SUPRIOR OC LAMBERT J	5	4460 D	3175	239	44		902 614	456* 168*			1000 855	554* 409*		
1S	11E	31 D5	178	TD	SUPRIOR OC LAMBERT J	3	4810 D	3186	239	44		934 644	453* 163*			1034 884	553* 403*		
1S	11E	31 E4	284	TD	SUPRIOR OC LAMBERT J	4	4680 D	3157	239	44		927 638	459* 170*			1018 886	550* 418*		
1S	11E	31 E5	177	TD	SUPRIOR OC LAMBERT E	1	4870 D	3216	239	44		945 650	458* 163*			1050 890	563* 403*		
1S	14W	4 A5	73	TD	POWERS ETL STRAUSS F	1	4730 D	3156	238	41		854 599	381* 126*			946 820	473* 347*		
1S	14W	4 G5	74	TD	KINGWOODOC SHURTLFF M	1	4070 D	3128	238	40		835 578	428* 171*			935 804	528* 397*		
1S	14W	7 G5	72	TD	PERSHA&ADG HESSLER	1	5110 C	3330	239	42		957 686	446* 175*			1036 913	525* 402*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
1S	14W	16 F1	75	TD	SNCLR WYOM GAWTHORP I	1	3990 C	3061	238	41		810 549	411* 150*			896 779	497* 380*		
1S	14W	21 E3	253	TD	SUPRIOR OC COWLING HE	1	4010 D	3079	238	44		798 536	397* 135*			892 767	491* 366*		
1S	14W	28 A3	254	TD	SUPRIOR OC LIPPER L	8	4000 C	3048	238	44		803 540	403* 140*			912 770	512* 370*		
1S	14W	28 B6	183	TD	SUPRIOR OC LIPPER L	5	4010 D	2799	238	44		814 550	413* 149*			902 780	501* 379*		
1S	14W	28 C5	167	TD	SUPRIOR OC LIPPER L	2	3980 D	2947	238	44		800 538	402* 140*			910 766	512* 368*		
1S	14W	28 C7	182	TD	SUPRIOR OC LIPPER L	3	4010 D	2810	238	44		812 549	411* 148*			916 777	515* 376*		
1S	14W	28 D6	166	TD	SUPRIOR OC LIPPER L	1	3980 D	3091	238	43		802 542	404* 144*			918 770	520* 372*		
1S	14W	28 D8	91	LD	SUPRIOR OC LIPPER L	4	3980 D	3112	238	43		828 558	430* 160*			930 791	532* 393*		
1S	14W	28 E3	171	TD	SUPRIOR OC DANIELSON	2	3880 D	3081	238	44		771 514	383* 126*			872 743	484* 355*		
1S	14W	28 E5	168	TD	SUPRIOR OC DANIELSON	1	3990 D	2824	238	44		782 527	383* 128*			897 752	498* 353*		
1S	14W	30 A8	184	TD	MAGNOLIA CURTIS J L	1	4790 D	3228	239	44		938 652	459* 173*			1014 888	535* 409*		
1S	14W	31 E8	285	TD	SUPRIOR OC LAMBERT J	2	4400 D	3180	239	44		896 603	456* 163*			994 846	554* 406*		
1S	14W	31 G8	257	TD	KINGWOODOC FREEMN ETL	1	4540 D	3252	239	44		906 632	452* 178*			1000 876	546* 422*		
1S	14W	32 F4	172	TD	SUPRIOR OC CURTIS V A	1	4280 D	3146	238	44		888 602	460* 174*			974 834	546* 406*		
1S	14W	33 G5	255	TD	SUPRIOR OC LANKFORD	1	4150 D	3071	238	44		812 558	397* 143*			914 778	499* 363*		
1S	14W	33 H4	273	TD	SUPRIOR OC LIPPER L	C2	4020 D	3042	238	44		800 544	398* 142*			920 768	518* 366*		
1S	14W	33 H6	256	TD	SUPRIOR OC LANKFORD	2	4150 D	3086	238	44		814 554	399* 139*			926 780	511* 365*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2S	10E	1 H1	260	TD	NOAH F HODGSON E	1	4630 D	3208	239	44		914 636	451* 173*			1000 866	537* 403*		
2S	10E	3 G8	306	CH	LEACH BROS ELLEN J	1	5150 T	4932	239	37		1016 750	501* 235*			965	450*		
2S	10E	7 E1	76	TD	STANLND OG BROSTER M	1	5040 D	3495	239	42		1010 736	504* 232*			1082 940	578* 436*		
2S	10E	8 E7	4	LD	NELSON DEV BUNTING C	1	4690 C	3447	239	43		975 709	506* 240*			919	450*		
2S	10E	12 B3	79	TD	MORSN&NOAH SMITH ARCH	1	4720 C	3212	239	41		856 584	384* 112*			808	336*		
2S	10E	12 C1	77	TD	MAGNOLIA FEWKES M	1	4590 D	3069	239	42		826 563	367* 104*			780	321*		*0
2S	10E	13 A1	88	TD	MORSN&NOAH WORKS G	2A	5040 C	3144	239	40		908 634	404* 130*			1004 856	500* 352*		
2S	10E	13 A4	80	TD	MORSN&NOAH BARNES W	3	4700 C	3213	239	40		876 597	406* 127*			974 828	504* 358*		
2S	10E	13 B1	87	TD	MORSN&NOAH WORKS G	1B	4740 C	3118	239	40		879 602	405* 128*			972 830	498* 356*		
2S	10E	13 B2	89	TD	MORSN&NOAH WORKS G	2B	4860 C	3218	239	40		892 620	406* 134*			986 852	500* 366*		
2S	10E	13 B4	83	TD	MORSN&NOAH HORTON L J	2	4810 C	3226	239	40		883 607	402* 126*			980 829	499* 348*		
2S	10E	13 B5	81	TD	WATKNS DRC CONOVER O	1	4970 C	3260	239	40		902 626	405* 129*			994 862	497* 365*		
2S	10E	13 D2	90	TD	TUESDAY OC WORKS G	4	4700 C	3210	239	40		882 599	412* 129*			975 830	505* 360*		
2S	10E	13 D8	84	TD	MORSN&NOAH STAFFORD	1	4900 C	3350	239	39		925 640	435* 150*			1015 889	525* 399*		
2S	10E	13 F1	86	TD	CONTNTL OC STAFFORD L	2	5050 C	3225	239	40		908 642	403* 137*			999 882	494* 377*		
2S	10E	13 G2	85	TD	ARROW DRC STAFFORD L	2	5160 D	3265	239	40		916 646	400* 130*			1006 875	490* 359*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2S	10E	13 H1	82	TD	CONTNTL OC COWLING JJ	1	5120 C	3251	239	40		908 636	396* 124*			992 866	480* 354*		
2S	10E	18 E1	92	TD	OHIO OIL HARRIS C P	1	4220 C	3475	239	42		614	192*			844	422*		
2S	10E	19 A1	5	LD	SUN OC MCKIBBEN R	1	4370 D	3394	239	42		938 646	501* 209*			1015 862	578* 425*		
2S	10E	19 A8	94	TD	MARTIN R B LESTER R P	1	4360 C	3351	239	41		924 643	488* 207*			1036 858	600* 422*		
2S	10E	19 G6	93	TD	SMOKEY OC CHALCRFT L	1	4780 C	3418	239	41		978 704	500* 226*			1100 906	622* 428*		
2S	10E	24 D1	97	TD	JARVISMARC GREEN CAM	1	4760 C	3137	239	40		885 604	409* 128*			985 828	509* 352*		
2S	10E	24 D3	98	TD	JARVISMARC WICK A	1	4580 C	3122	239	40		870 587	412* 129*			964 816	506* 358*		
2S	10E	24 D5	99	TD	MORSN&NOAH WICK G	1	4350 C	3188	239	40		844 562	409* 127*			938 791	503* 356*		
2S	10E	24 E1	100	TD	JARVISMARC WICK H	2A	4720 C	3125	239	40		874 597	402* 125*			956 821	484* 349*		
2S	10E	24 E4	101	TD	JARVISMARC WICK H	W2A	4490 C	3220	239	40		856 580	407* 131*			957 802	508* 353*		
2S	10E	24 F2	102	TD	JARVISMARC WICK H	3A	4750 C	3194	239	40		879 600	404* 125*			960 824	485* 349*		
2S	10E	24 F3	103	TD	JARVISMARC WICK H	W1A	4530 C	3109	239	40		862 583	409* 130*			962 808	509* 355*		
2S	10E	24 G2	95	TD	MORSN&NOAH BARNES H	2	4800 D	3127	239	40		888 610	408* 130*			984 828	504* 348*		
2S	10E	24 G3	96	TD	MORSN&NOAH BARNES W	1	4570 C	3189	239	40		866 585	409* 128*			966 812	509* 355*		
2S	10E	25 A1	208	TD	SUPRIOR OC EARHART H	2	4850 D	3065	239	43		889 614	404* 129*			970 830	485* 345*		
2S	10E	25 B1	226	TD	SUPRIOR OC EARHART	4	5050 D	2408	239	44		925 644	420* 139*			1024 868	519* 363*		
2S	10E	25 B2	179	TD	SUPRIOR OC EARHART H	1	5140 D	3233	239	43		930 654	416* 140*			1026 896	512* 382*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2S	10E	25 F2	186	TD	SUPRIOR OC WICK A C	1	5100 D	3208	239	43		925 650	415* 140*			1027 872	517* 362*		
2S	10E	32 C1	277	TD	DUNCAN INC CULISN COM	1	4700 D	3373	239	43		994	524*		*0	1092 922	622* 452*		
2S	10E	33 C7	105	TD	DEEP OPC SUTTON A E	1	4440 C	3351	239	43		952 662	508* 218*			1042 896	598* 452*		
2S	10E	33 E1	286	TD	COLSTR PET SHERDN COM	1	4200 D	3340	239	44		915 615	495* 195*			1014 836	594* 416*		
2S	10E	33 E7	209	TD	DEEP ROCK CRACKL CON	1	4140 D	3330	239	43		935 645	521* 231*						
2S	10E	36 B1	104	TD	WHSNT&TRD DUNK I	1	5130 C	3275	239*	39		1024 756	511* 243*			1105	592*		
2S	10E	36 B1	106	LD	LEWIS PROD DUNK I	1A	5140 D	2453	239	43		1029 757	515* 243*			1110	596*		*0
2S	10E	36 B2	164	TD	TEXAS CO DUNK I	2	5180 D	2435	239	43		910 684	392* 166*			994	476*		*0
2S	10E	36 B3	230	TD	TEXAS CO DUNK I	3	5160 D	3272	239	44		 642	 126*		*0	1000	484*		*0
2S	10E	36 B4	107	TD	WHSNT&TRD DUNK I	1A	5180 C	2552	239	40		 641	 123*		*0	1023 838	505* 320*		
2S	10E	36 C1	210	TD	SUPRIOR OC JUDGE J W	1	4940 D	2376	239	44		 742	 248*		*0	978	484*		
2S	10E	36 D2	231	TD	TEXAS CO JUDGE R	2	5150 D	2445	239	44		910 640	395* 125*			1000	485*		*0
2S	10E	36 E1	250	TD	SUPRIOR OC SCOTT	1	4710 C	5196	239	40		870 590	399* 119*			955 790	484* 319*		
2S	10E	36 E3	278	TD	FISHER OC WICK G C	1	5020 D	2441	239	43		905 633	403* 131*			996	494*		*0
2S	10E	36 F2	261	TD	WHITE W R SCOTT HEIR	5	5010 D	2403	239	44		898 622	397* 121*			990 822	489* 321*		
2S	10E	36 G1	165	TD	TEXAS CO TAIT COMM	2	4750 D	2386	239	44		868 592	393* 117*			958 800	483* 325*		
2S	10E	36 H2	262	TD	SACKETT H TAIT R	1	4960 D	2396	239	44		890 618	394* 122*			982 830	486* 334*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2S	11E	6 A6	189	TD	TRNSWESTRN CRACKEL D	1	4320 D	3159	239	44		854 578	422* 146*			934 804	502* 372*		
2S	11E	6 A7	156	TD	1 NAT PET BROWN	1	4240 D	3030	239	43		846 568	422* 144*			941 796	517* 372*		
2S	11E	6 F7	289	TD	NOAH F A EDWA CO FM	1	4440 D	3166	239	43		884 609	440* 165*			962 838	518* 394*		
2S	11E	7 A3	113	TD	SUPRIOR OC KILEY C L	2	4250 D	3164	239	41		804 540	379* 115*			750	325*		
2S	11E	7 A6	111	TD	SUPRIOR OC FEWKES J	3	4550 D	3190	239	41		848 575	393* 120*			800	345*		
2S	11E	7 A6	112	TD	SUPRIOR OC FEWKES J	4	4530 D	3113	239	41		853 580	400* 127*			807	354*		
2S	11E	7 B6	108	TD	MAGNOLIA FEWKES F J	2	4410 C	3205	239	41		820 559	379* 118*			772	331*		*0
2S	11E	7 B7	109	TD	MAGNOLIA FEWKES F J	3	4440 C	3220	239	41		840 565	396* 121*			790	346*		
2S	11E	7 D6	110	TD	SUPRIOR OC FEWKES H W	2	4290 D	3155	239	41		806 545	377* 116*			764	335*		
2S	11E	18 A6	119	TD	SUPRIOR OC WORKS G J	4	4420 D	3087	239	40		860 583	418* 141*			950 822	508* 380*		
2S	11E	18 A7	122	TD	SUPRIOR OC WORKS G J	7	4600 D	3098	239	40		870 595	410* 135*			965 822	505* 362*		
2S	11E	18 B8	117	TD	SUPRIOR OC WORKS G J	2	4640 D	3114	239	40		871 598	407* 134*			962 830	498* 366*		
2S	11E	18 C5	120	TD	SUPRIOR OC WORKS G J	5	4320 C	3133	239	40		850 573	418* 141*			948 802	516* 370*		
2S	11E	18 C7	118	TD	SUPRIOR OC WORKS G J	3	4400 D	3084	239	40		858 579	418* 139*			942 803	502* 363*		
2S	11E	18 C8	121	TD	SUPRIOR OC WORKS G J	6	4440 D	3173	239	40		854 576	410* 132*			949 808	505* 364*		
2S	11E	18 D6	124	TD	SUPRIOR OC WORKS M	2	4420 D	3087	239	40		851 575	409* 133*			947 802	505* 360*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2S	11E	18 D8	123	TD	SUPRIOR OC WORKS M	1	4580 C	3090	239	40		876 589	418* 131*			965 822	507* 364*		
2S	11E	18 E5	115	TD	SUPRIOR OC HEDGE E	1	4510 D	3110	239	40		872 599	421* 148*			968 828	517* 377*		
2S	11E	18 E7	125	TD	SUPRIOR OC WORKS M	4	4560 D	3111	239	40		873 599	417* 143*			969 840	513* 384*		
2S	11E	18 F5	116	TD	SUPRIOR OC HEDGE E	2	4700 D	3184	239	40		891 612	421* 142*			981 862	511* 392*		
2S	11E	18 F6	127	TD	SUPRIOR OC WORKS M	6	5020 C	3164	239	40		913 644	411* 142*			1000 887	498* 385*		
2S	11E	18 F8	126	TD	SUPRIOR OC WORKS M	5	4990 C	3233	239	40		908 630	409* 131*			994 860	495* 361*		
2S	11E	18 H7	114	TD	SUPRIOR OC FEWKES J	2	4770 D	3190	239	40		884 605	407* 128*			840	363*		
2S	11E	19 A7	133	TD	SUPRIOR OC WOOD ETAL	6	4490 D	3147	239	40		860 582	411* 133*			960 809	511* 360*		
2S	11E	19 D6	128	TD	SUPRIOR OC GREEN C	1	4380 C	5185	239	40		861 582	423* 144*			963 810	525* 372*		
2S	11E	19 F8	129	TD	SUPRIOR OC WOOD F	1	4850 C	3131	239	40		892 618	407* 133*			993 850	508* 365*		
2S	11E	19 G8	130	TD	SUPRIOR OC WOOD ETAL	3	4910 D	2374	239	40		902 620	411* 129*			998 855	507* 364*		
2S	11E	19 G8	134	TD	SUPRIOR OC WOOD F	7	4900 D	3136	239	40		900 620	410* 130*			1000 850	510* 360*		
2S	11E	19 H7	132	TD	SUPRIOR OC WOOD ETAL	5	4650 D	3114	239	40		881 592	416* 127*			978 830	513* 365*		
2S	11E	19 H8	131	TD	SUPRIOR OC WOOD ETAL	4	4790 D	2361	239	40		885 607	406* 128*			982 830	503* 351*		
2S	11E	30 A7	216	TD	SUPRIOR OC WILLETT J	2	4530 D	3123	239	44		848 578	395* 125*			944 794	491* 341*		
2S	11E	30 B7	228	TD	SUPRIOR OC WILLETT J	3	4640 D	2366	239	44		872 594	408* 130*			974 818	510* 354*		
2S	11E	30 B8	214	TD	SUPRIOR OC WILLETT J	1	4870 D	3170	239	44		904 625	417* 138*			992 849	505* 362*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2S	11E	30 C8	227	TD	SUPRIOR OC		4950 D	2397	239	44		922	427*			1025	530*		
					WICK T J	2						640	145*			872	377*		
2S	11E	30 F6	199	TD	SUPRIOR OC		4670 D	3154	239	44		916	449*			1008	541*		
					SCOTT M J	1						629	162*			860	393*		
2S	11E	31 B8	188	TD	SOHIO OC		5070 D	3319	239	43		1016	509*			1107	600*		
					UNION INS	1						742	235*			954	447*		
2S	11E	31 F8	78	TD	CARDR TRST		4510 G	2510	239	44		831	380*			921	470*		
					SCOTT HRS	3						641	190*			797	346*		
2S	11E	31 H7	213	TD	TEXAS CO		4530 C	2365	239	44		942	489*						*0
					TAIT	2B						670	217*			887	434*		
2S	11E	31 H8	187	TD	LEWIS PROD		4950 D	2412	239	44		885	390*			970	475*		
					TAIT	1B						612	117*			824	329*		
2S	14W	5 A3	191	TD	SUPRIOR OC		4020 D	3142	238	43		838	436*			921	519*		
					JACK A	1						561	159*			802	400*		
2S	14W	5 A5	288	TD	TRNSWESTRN		4020 D	2871	239	44		835	433*			925	523*		
					WAHLER	1						556	154*			802	400*		
2S	14W	5 D8	135	TD	NAT PET		4020 D	3150	239	41		820	418*			913	511*		
					CRACKEL G	1						542	140*			770	368*		
2S	14W	5 E8	265	TD	MITCHELL Q		4010 D	2869	239	44		818	417*			906	505*		
					HENDERSN H	1						540	139*			772	371*		
2S	14W	7 A3	136	TD	SUPRIOR OC		4030 D	3177	239	42		828	425*						*0
					HUBER P W	1						568	165*			794	391*		
2S	14W	7 F7	137	TD	SUPRIOR OC		4170 D	3150	239	41		808	391*						
					KILEY C L	3						541	124*			763	346*		
2S	14W	16 A4	194	TD	SCHONMKR G		4120 D	3151	238	44		854	442*						*0
					COWLING JT	1						601	189*			818	406*		
2S	14W	17 F1	307	TD	SKELLY OC		4010 D	3153	238	44		850	449*			940	539*		
					BASS H L	1						586	185*			810	409*		
2S	14W	18 D7	138	TD	WSTLND ETL		4140 D	3175	239	42		878	464*			972	558*		
					ROOSEVLT J	1						601	187*			829	415*		
2S	14W	20 A2	264	TD	MABEE OG		4570 D	2775	238	44		896	439*			996	539*		
					FRANKLND A	2						625	168*			846	389*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2S	14W	20 A6	8	LD	KINGWOODOC COWLING W	1	4670 D	3247	239	43		928 651	461* 184*			1023 879	556* 412*		
2S	14W	20 A8	221	TD	GULF REF FIEBER J W	1	4810 D	3196	239	43		952 673	471* 192*			1050 902	569* 421*		
2S	14W	20 C4	263	TD	MABEE OG FRANKLND A	1	4680 D	3160	239	43		903 636	435* 168*			992 854	524* 386*		
2S	14W	20 C6	287	TD	ASHLAND OC COWLING R	1	4410 D	3047	239	43		906 623	465* 182*			1004 856	563* 415*		
2S	14W	20 D5	229	TD	SCHNMKRETL COWLING	2	4790 D	3052	239	43		918 650	439* 171*			1012 870	533* 391*		
2S	14W	20 E6	144	TD	SKELLY OC FEBER L	1	4400 D	3029	239	43		890 620	450* 180*			988 842	548* 402*		
2S	14W	22 A6	200	TD	RIDDLE H K SCHROEDER	1	4050 C	3083	238	39		800 550	395* 145*			925 755	520* 350*		
2S	14W	27 C1	310	TD	WICKHM G H SCHROEDR M	2	4110 D	2958	238	45		766 522	355* 111*			910 725	499* 314*		
2S	14W	27 E1	311	TD	WICKHM G H SCHROEDR J	2	4360 D	3004	238	45		786 540	350* 104*			738	302*		
2S	14W	27 E3	266	TD	WICKHM G H SCHRDR J	1	4400 D	2987	238	44		802 554	362* 114*			766	326*		*0
2S	14W	27 E5	267	TD	WICKHM G H SCHRDR COM	1	4790 C	3060	238	44		872 618	393* 139*			1014 835	535* 356*		
2S	14W	28 H5	252	TD	KEITH RAIL GARNER	1	4440 C	2990	238	44		898 630	454* 186*			1008 858	564* 414*		
2S	14W	29 G2	193	TD	SUPRIOR OC REID M	1	4850 D	3230	238	43		935 666	450* 181*			1029 888	544* 403*		
2S	14W	29 G5	268	TD	LAMBERT B BENDER G A	1	5120 D	2819	239	44		972 698	460* 186*			1070 924	558* 412*		
2S	14W	29 G6	192	TD	SUPRIOR OC BENDER G A	1	4940 D	3178	239	43		948 674	454* 180*			1044 902	550* 408*		
2S	14W	34 A4	139	TD	OMEAR&ANDR BROSTER	2	4500 C	2653	238	39		827 569	377* 119*			965 782	515* 332*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3S	10E	1 A4	295	TD	SUPRIOR OC BLOOD J C	A7	5000 D	3076	239	45		700	200*		*0	1090	590*		
3S	10E	1 A5	247	TD	SUPRIOR OC BLOOD J C	A6	5120 D	2048	239	44		716	204*		*0	1010 906	498* 394*		
3S	10E	1 A6	246	TD	SUPRIOR OC BLOOD J C	A5	5060 D	2396	239	44		578	72*		*0	972 782	466* 276*		
3S	10E	1 A8	206	TD	SUPRIOR OC MUSSETT W	3	5710 D	3177	239	44		662	91*		*0	1050 878	479* 307*		
3S	10E	1 B4	298	TD	SUPRIOR OC BLOOD J C	A8	5110 D	2402	239	45		710	199*		*0	1110 964	599* 453*		
3S	10E	1 B5	205	TD	SUPRIOR OC BLOOD J	A2	5010 D	3094	239	44		573	72*		*0	974 784	473* 283*		
3S	10E	1 B6	204	TD	SUPRIOR OC BLOOD J C	A1	5310 D	3263	239	44		604	73*		*0	996 798	465* 267*		
3S	10E	1 B7	203	TD	SUPRIOR OC MUSSETT	2	5450 D	3149	239	44		620	75*		*0	1014 831	469* 286*		
3S	10E	1 C4	245	TD	SUPRIOR OC BLOOD J C	A4	4840 D	3056	239	44		692	208*		*0	1092 880	608* 396*		
3S	10E	1 C5	301	TD	GULF REF WEBB S M	1	4890 D	3211	239	44		560	71*		*0	965 760	484* 271*		
3S	10E	1 C6	302	TD	GULF REF WEBB S M	2	5380 C	3143	239	44		610	72*		*0	1010 818	472* 280*		
3S	10E	1 D3	215	TD	SUPRIOR OC BLOOD J C	A9	4450 D	3026	239	45		656	211*		*0				
3S	10E	1 D4	274	TD	SUPRIOR OC BLOOD J C	A3	4700 D	3174	239	44		686	216*		*0	1016 870	546* 400*		
3S	10E	1 D5	300	TD	GULF REF WEBB S M	3	4990 D	3229	239	44		582	83*		*0	980 780	491* 281*		
3S	10E	1 E4	249	TD	SUPRIOR OC BLOOD J C	2	4490 D	3027	239	44		610	161*		*0	937 730	488* 281*		
3S	10E	1 F2	303	TD	SUPRIOR OC BLOOD J C	5	4810 D	3040	239	45		710	229*		*0	1110 890	629* 409*		
3S	10E	1 F3	297	TD	SUPRIOR CC BLOOD J C	4	4690 D	3047	239	45		680	211*			1024 916	555* 447*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3S	10E	1 G2	201	TD	SUPRIOR OC		4860 D	3053	239	45					*0	1100	614*		
					BLOOD J C	6						712	226*			896	410*		
3S	10E	1 G3	299	TD	SUPRIOR OC		4990 D	3175	239	45					*0	1096	597*		
					BLOOD J C	7						710	211*			898	399*		
3S	10E	1 H2	223	TD	SUPRIOR OC		4850 D	3200	239	44		954	469*			1064	579*		
					BLOOD J C	1						712	227*			898	413*		
3S	10E	2 B7	140	TD	HRSHBCH CO		4250 C	3271	239	40		846	421*			946	521*		
					PERKINS M	1						562	137*			770	345*		
3S	10E	2 C8	269	TD	HAYNES J C		4430 D	2024	239	44		870	427*			978	535*		
					PERKINS	1						584	141*			788	345*		
3S	10E	2 F5	312	TD	ILL MIDCON		4810 D	2064	239	44		894	413*			1005	524*		
					PERKINS	1						614	133*			846	365*		
3S	10E	6 C1	290	TD	PHILLIPS		3870 D	3434	239	43		870	483*						*0
					FIEBER F	1						600	213*			804	417*		
3S	10E	6 C4	198	TD	PHILLIPS		3810 D	3379	239	44		882	501*			986	605*		
					BROSTER	1						620	239*			816	435*		
3S	10E	7 D4	141	TD	MABEE OC		3770 G	3092	239	41		885	508*			985	608*		
					SMITH R W	1						599	222*			816	439*		
3S	10E	8 B2	6	LD	SNCLR WYOM		4140 C	3410	239	42		878	464*			1019	605*		
					PERKINS H	1						604	190*			837	423*		
3S	10E	11 A1	196	TD	ASHLAND OC		5400 C	2566	239	43		946	406*			1045	505*		
					MICHELS J	1						652	112*			883	343*		
3S	10E	11 E1	234	TD	SUPRIOR OC		5300 D	1885	239	45		937	407*			1052	522*		
					SCHMITLR F	3						645	115*			874	344*		
3S	10E	11 F2	233	TD	SUPRIOR OC		5490 D	2088	239	44		958	409*			1060	511*		
					SCHMITLR F	1						667	118*			896	347*		
3S	10E	12 A8	207	TD	SKELLY OC		4750 D	1969	239	43		876	401*			974	499*		
					GLOVER R S	1						582	107*			810	335*		
3S	10E	12 B8	195	TD	SKELLY OC		4650 D	2034	239	43		872	407*			962	497*		
					GLOVER R	2						573	108*			796	331*		
3S	10E	12 D7	248	TD	CARTER OC		4820 D	3213	239	45					*0	990	508*		
					SCHMITLR V	7						590	108*			814	332*		
3S	10E	12 E6	236	TD	ROCK ISLND		4670 C	1966	239	44					*0	1056	589*		
					CHLCRFT LG	2						682	215*			856	389*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3S	10E	12 E7	243	TD	CARTER OC		4920 C	2659	239	44					*0	1004	512*		
					SCHMITLR V	2						586	94*			810	318*		
3S	10E	12 E8	244	TD	CARTER OC		5370 D	2720	239	44					*0	1048	511*		
					SCHMITLR V	3						650	113*			872	335*		
3S	10E	12 F4	272	TD	REASOR G L		4730 D	2400	239	44					*0	1110	637*		
					JOHNSN HRS	1						686	213*			880	407*		
3S	10E	12 F6	235	TD	ROCK ISLND		4980 D	3180	239	44					*0	1006	508*		*0
					CHLCRFT LG	1						690	192*						
3S	10E	12 F7	242	TD	CARTER OC		4910 D	3188	239	44					*0	986	495*		
					SCHMITLR V	1						582	91*			801	310*		
3S	10E	12 G4	271	TD	LYNN J J		4870 D	3054	239	44					*0	1110	623*		
					COAD	1						700	213*			894	407*		
3S	10E	12 G6	237	TD	SUPRIOR OC		4960 D	3077	239	44					*0	966	470*		
					MUSSETT W	4						573	77*			784	288*		
3S	10E	12 G7	240	TD	SUPRIOR OC		5280 C	2699	239	44					*0	1012	484*		
					MUSSETT W	8						612	84*			830	302*		
3S	10E	12 G8	241	TD	SUPRIOR OC		5140 D	1870	239	44					*0	1006	492*		
					MUSSETT W	9						610	96*			828	314*		
3S	10E	12 H4	296	TD	SUPRIOR OC		5080 D	3208	239	45						1090	582*		
					BARNES J B	1						704	196*			950	442*		
3S	10E	12 H6	239	TD	SUPRIOR OC		4900 D	2106	239	44					*0	952	462*		
					MUSSETT W	7						562	72*			772	282*		
3S	10E	12 H7	238	TD	SUPRIOR OC		5240 D	3119	239	44					*0	984	460*		
					MUSSETT W	5						604	80*			812	288*		
3S	10E	13 D1	142	TD	WILSON DRC		4670 C	3260	239	40		952	485*						
					CURTISS R	1						684	217*			892	425*		
3S	10E	13 H8	10	LD	MIDSTAT OC		4830 C	3240	239	43		964	481*			1055	572*		
					COAD M	1						711	228*			934	451*		
3S	11E	7 A7	270	TD	LYNN J J		4170 D	3201	239	44		906	489*			1014	597*		
					COAD	2						624	207*			823	406*		
3S	11E	18 E3	143	TD	KINGWOODOC		4180 C	3267	239	39		880	462*			970	552*		
					JOHNSON	1						605	187*			825	407*		

TABULATED DATA ON KEY BEDS

EDWARDS COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin				Line 1 — Coal No. 5 2 — Coal No. 7			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3S	14W	8 G1	145	TD	KINGWOOD OC		4220 C	3161	238	40		868	446*			962	540*		
					FROST S	1						603	181*			825	403*		
3S	14W	9 A1	146	TD	LEGHORN OC		3760 D	3078	238	41		811	435*			922	546*		
					BROSTER L	1						543	167*			760	384*		
3S	14W	10 H7	197	TD	PUGH JOHN		3820 C	2668	238	39		790	408*			885	503*		
					SMITH L V	1						525	144*			750	368*		
3S	14W	17 C8	293	TD	RIDDLE&MAB		4430 D	3169	239	41		853	410*			930	487*		
					TOOPS M K	1						580	137*			798	355*		
3S	14W	17 H1	7	LD	HALBERT R		4060 D	3100	238	43		844	438*			918	512*		
					PROCTOR	1						572	166*			792	386*		
3S	14W	18 B7	148	TD	MAGNOLIA		4050 G	3147	239	39		858	453*			958	553*		
					ETHERDGE E	2						588	183*			805	400*		
3S	14W	18 C7	147	TD	MAGNOLIA		4060 C	3190	239	39		870	464*			960	554*		
					ETHERDGE E	1						592	186*			815	409*		
3S	14W	18 G7	202	TD	BARNES J B		4070 C	3160	239	39		876	469*			976	569*		
					BAKER	1						595	188*			830	423*		

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
					GALLATIN MAR 23 1945														
7S	8E	19 B8	103	DS	GRAVES I E		3750 B		261			433	58*	4	10	543	168*	4	05
7S	8E	21 A2	120	TD	CARTER OC WHIPPLE H	1	4040 C	3120	261	41		426	22*	4	00	525	121*	5	00
7S	8E	21 E2	118	TD	CARTER OC VINYARD R	1	4300 C	3165	261	40		480	50*	4	00	580	150*	5	00
7S	8E	21 E2	119	LD	CARTER OC VINYARD R	2	4080 C	2962	261	42		458	50*	4	00	558	150*	4	00
7S	8E	21 G1	116	TD	HEATH B M EDWARDS W	1	4080 C	2971	261	42		457	49*	4	00	557	149*	4	00
7S	8E	21 G4	117	TD	CARTER OC KIMSALL O	1	3980 C	2982	261	42		450	52*	4	00	550	152*	4	00
7S	8E	22 E5	247	TD	HLBRTHEATH BENER GREG	1	3880 C	2961	261	43		454	66*			553	165*		
7S	8E	22 G7	121	TD	HEATH B M EDWARDS W	2	4160 C	2972	261	42		469	53*	4	00	569	153*	5	00
7S	8E	23 E6	3	CH	OMAHA OG RANDOLPH J	1	4022 P	1556	261	10		480	78*	7	00	571	169*	5	06
7S	8E	23 E6	122	TD	CARTER OC BROCKETT G	1	4030 C	3085	261	42		470	67*	4	00	568	165*	4	00
7S	8E	24 A8	123	LD	SNCLR WYOM COX ISAAC	1	3950 C	3083	261	42		508	113*	4	00	625	230*	4	00
7S	8E	26 D8	100	DS	BLACKARD H		3615 P		261	12	8	400	38*	7	00	490	128*	5	00
7S	8E	27 D1	4	CH	OMAHA OG DAVIS M M		3624 P	1790	261	10		370	8*	6	06	482	120*	3	00
7S	8E	28 C4	125	TD	POWERS ETL WEST R G	1	3640 G	2955	261	40		241	123	3	00	341	23	4	00
7S	8E	28 C5	124	TD	POWERS R R WEST L F	1	3690 C	2873	261	42		245	124	2	00	343	26	4	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness		Depth (Feet)	Altitude (Feet)	Thickness	
														Ft.	In.			Ft.	In.
7S	8E	29 E2	2	CH	KLEVALLAOG DAVIS W E	1	3907 P	738	261	21		333	58	5	06	435	44*	5	00
7S	8E	32 B6	6	DD	TAYLOR CO	100	3578 P	508	261	12		144	214	4	04	259	99	4	04
7S	8E	32 H3	5	CH	OHIO OIL FORESTER W	1	4154 P	1807	261	17	8	230	185	10	00				
7S	8E	33 A4	127	TD	CARTER OC KUDER A W	1	3740 C	1754	261	40	8	120	254			225	149	5	00
7S	8E	33 A5	129	TD	CARTER OC YORK R M	1	3650 C	2840	261	40	8	115	250			220	145		
7S	8E	33 B2	130	TD	TOMBS&SMTH PATTON C W	1	3790 G	620	261	41	2	137	242	2	00	249	130	3	00
7S	8E	33 B3	126	TD	CARTER OC KUDER A W	4	3780 G	1739	261	41	8	129	249			231	147	4	00
7S	8E	33 C6	131	TD	CARTER OC MCGINLEY W	1	3780 C	2529	261	41	8	127	251			232	146	4	00
7S	8E	33 E5	128	TD	CARTER OC DUCKWORTH	1	3720 C	2007	261	42	8	145	227			250	122	4	00
7S	9E	21 H1	132	TD	SKELLY OC HALE HUGH	1	4010 G	3087	260	40		659	258*	3	00	755	354*	4	00
7S	9E	22 B8	369	TD	CARTER OC HALE R H	1	4130 D	3104	260	45		690	277*	3	00	792	379*	3	00
7S	9E	22 H5	133	LD	DUNCAN INC KNIGHT S S	1	4120 C	3082	260	42		684	272*	5	00	779	367*	5	00
7S	9E	31 F3	1	DD	TAYLOR F K	102	3685 P	751	261	12		634	265*	4	02	745	376*	4	11
7S	9E	33 H6	134	TD	MRPHY&MLSN SPENCE	1	3750 C	3150	260	42		680	305*	4	00	790	415*	4	00
7S	9E	35 A1	135	TD	DUNCAN INC GREER	1	3720 G	3042	260	41		541	169*	4	00	639	267*	4	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
7S	10E	17 A2	91	OU	NEW HAVEN		3700 H		260		8	500	130*						
7S	10E	27 A4	352	TD	CARTER OC WILLAMS JA	1	3520 D	2170	260	44		402	50*	3	00	499	147*	4	00
7S	10E	27 A6	351	TD	OIL MANGMT GOFORTH	3	3540 D	2139	260	44		402	48*	3	00	500	146*	4	00
7S	10E	27 A7	357	TD	OIL MANGMT GOFRTH YNG	1	3580 D	2880	260	44		416	58*	3	00	514	156*	4	00
7S	10E	27 B4	356	TD	CARTER OC WILLAMS JA	2	3540 D	2130	260	44		404	50*	3	00	500	146*	4	00
7S	10E	33 H5	136	LD	KINKAID R SCHMIDT A	1	3500 C	2946	260	42		405	55*	4	00	502	152*	4	00
7S	10E	34 H5	343	TD	HAGEMN&PND STOFLETH A	1	3500 D	2930	260	44		388	38*	4	00	485	135*	4	00
8S	8E	1 D5	340	TD	JARVISMARC DAVIS O	1	3800 D	2970	261	43		345	35	4	00	458	78*	5	00
8S	8E	4 B6	140	TD	CAMERON OC GREEN IVAN	1	3540 C	1720	261	41		38	316	3	00	144	210	4	00
8S	8E	4 B7	144	TD	CARTER OC JONES D M	1	3470 G	1932	261	41	8	53	294			159	188	4	00
8S	8E	4 C6	145	TD	CARTER OC KOVAL JOHN	1	3510 C	1707	261*	41	8	49	302			155	196		
8S	8E	4 C7	137	TD	CARTER OC CARNAHAN R	1	3500 C	1917	261	41	8	53	297			159	191	4	00
8S	8E	4 D4	139	TD	SEABOARD COLNAN J T	1	3630 C	1720	261	41	8	75	288			181	182	4	00
8S	8E	4 D5	146	TD	CARTER OC KOVAL JOHN	2	3630 C	1718	261*	41	8	69	294			175	188	4	00
8S	8E	4 D8	138	TD	CARTER OC CARNAHAN R	2	3510 G	1918	261	41	8	51	300			157	194	4	00
8S	8E	4 E8	151	TD	CARTER OC RISTER L	2	3610 C	1950	261*	41	8	56	305			162	199	5	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	8E	4 F3	156	TD	CARTER OC RISTER S	5	3580 C	1718	261	41	8	92	266			198	160	4	00
8S	8E	4 F6	154	TD	CARTER OC RISTER S	3	3690 C	1724	261	41	8	77	292			183	186		
8S	8E	4 F7	150	TD	CARTER OC RISTER L	1	3640 G	1957	261	41	8	61	303			167	197	3	00
8S	8E	4 G6	177	TD	CARTER OC RISTER S	1	3750 C	1720	261	41	8	98	277			204	171	4	00
8S	8E	4 G7	142	TD	CAMERON OC ROBINSON S	1	3760 C	1727	261	40		98	278	4	00	202	174	4	00
8S	8E	4 H2	141	TD	SUN OC PATTON C W	1	3810 C	2543	261	41	8	124	257			230	151	4	00
8S	8E	4 H3	148	TD	CARTER OC KUDER A W	3	3690 C	1724	261*	41	8	109	260			215	154	4	00
8S	8E	4 H4	147	TD	CARTER OC KUDER A W	2	3630 C	1700	261	41	8	98	265			204	159	4	00
8S	8E	4 H5	152	TD	CAMERON OC RISTER S	1	3610 G	1704	261	41	8	95	266			201	160	4	00
8S	8E	4 H7	157	TD	KINGWOODOC ROBINSON	1	3750 C	2915	261	40	8	121	254			227	148		
8S	8E	5 A1	158	TD	CARTER OC GREGG PAUL	1	3570 C	1999	261	43	8	107	250			212	145	5	00
8S	8E	5 E1	159	TD	TEXAS CO EDWARDS G	1	3590 C	2807	261	41	8	80	279			184	175	3	00
8S	8E	8 D6	7	DC	TRI COUNTY1007 OVERTON A		3950 C	445	261	20		313	82			439	44*		
8S	8E	9 C8	8	DC	TRI COUNTY1005 WATSON A P		3583 C	354	261	20		250	108			348	10		
8S	8E	14 H1	160	TD	DUNCAN N&L GREEN E	1	3820 C	3048	261	41		288	94	4	00	400	18*	3	00
8S	8E	17 B8	9	DD	TAYLOR F K	104	3619 P	349	261	12		222	140	4	06	342	20	5	10
8S	8E	18 G8	101	DS	PARKER C V MOSEBY		4120 P		261										

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	8E	20 M5	161	TD	EXCHNGE OC EVANS O	1	3850 C	3042	261	40	2	255	130	3	00	371	14	4	00
8S	8E	23 E7	102	OU	W FRANKLIN		3600 T		261		6	200	160						
8S	8E	28 H7	11	DD	BYRD PITTS	2	3729 C	266	261	12	3	239	134	5	08				
8S	8E	33 A8	12	DD	BYRD PITTS		3872 C	320	261	12	2				*0	241	146	2	00
8S	9E	2 D6	163	TD	SNCLR WYOM HENSON W	1	3710 C	3000	260	41		529	158*	3	00	639	268*	4	00
8S	9E	2 D7	162	TD	BLKSTK&DCK COX J	1	3720 G	3020	260	41		537	165*	2	00	642	270*		
8S	9E	2 E7	164	TD	SNCLR WYOM WILLIAMS C	1	3750 C	2995	260	41		546	174*	2	00	652	280*	3	06
8S	9E	7 F8	165	TD	EXCHNGE OC HUELSING T	1	3820 C	3060	261	40		794	412*	3	00	907	525*		
8S	9E	9 D3	166	TD	RYAN OC CRUNK	1	3830 G	2636	260	41		594	211*	2	06	692	309*	4	00
8S	9E	10 E1	167	TD	AETNA OC FOSTER L	1	3710 C	3060	260	42		516	145*	3	00	628	257*	4	00
8S	9E	15 A7	253	TD	GULF REF BAHL L	6	3730 C	2511	260*	43		456	83*	4	00	570	197*	4	00
8S	9E	15 A8	170	TD	GULF REF BAHL L	5	3740 C	2515	260	43		463	89*	2	00	571	197*	4	00
8S	9E	15 B6	109	TD	GLOBE ORC BAHL L	1	3730 C	2493	260	43		468	95*	4	00	566	193*	5	00
8S	9E	15 B7	111	TD	GULF REF BAHL L	3	3740 C	2495	260*	43		476	102*	3	00	578	204*	4	00
8S	9E	15 B8	173	TD	GULF REF BAHL L	2	3710 C	2500	260	43		479	108*	2	00	581	210*	4	00
8S	9E	15 C3	171	TD	SKELLY OC HOGE MYRL	1	3830 C	2985	260	42		495	112*	3	00	605	222*	4	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	9E	15 C6	112	TD	GULF REF BAHL L	4	3740 C	2497	260	43		476	102*	2	00	580	206*	4	00
8S	9E	15 C7	176	TD	MARTIN R B STRAUB COM	1	3700 C	2517	260	42		480	110*	4	00	585	215*	4	00
8S	9E	15 D4	244	TD	SKELLY OC HOGE MYRL	2	3740 C	2985	260	43		492	118*	5	00	604	230*	6	00
8S	9E	15 D6	169	LD	GULF REF BAHL L	1	3710 C	2511	260	42		480	109*	4	00	589	218*	4	00
8S	9E	15 D7	255	TD	MARTIN STRAUB COM	3	3710 C	2540	260	43		490	119*	4	00	598	227*	4	00
8S	9E	15 E3	174	TD	GULF REF MOYE C	1	3730 C	2547	260	42		489	116*	3	00	602	229*	4	00
8S	9E	15 E5	168	TD	MARTIN R B BAHL L	1	3710 C	2492	260	42		464	93*	4	00	579	208*	4	00
8S	9E	15 E6	339	TD	MARTIN ETL BAHL L	3	3710 C	2545	260*	43		478	107*	3	00	590	219*	4	00
8S	9E	15 E7	172	TD	SKELLY OC SCHMITT J	1	3720 C	2518	260	42	2	488	116*	5	00				
8S	9E	15 F4	110	TD	DCKRSN ETL MOYE C	1	3730 C	2517	260*	42		490	117*	3	00	605	232*	5	00
8S	9E	15 F6	254	TD	MARTIN ETL BAHL L	2	3740 C	2548	260	43		486	112*	3	00	601	227*	4	00
8S	9E	15 F7	175	TD	SKELLY OC SCHMITT J	3	3780 C	2526	260	43		495	117*	4	00	610	232*	4	00
8S	9E	15 G4	243	TD	ASHLND ORC RISTER A P	2	3720 C	2989	260	43		504	132*	3	00	616	244*	4	00
8S	9E	15 G5	115	TD	GREENE I B GRANT S E	1	3710 C	2509	260	43		472	101*	5	00	588	217*	4	00
8S	9E	15 G6	338	TD	ASHLND ORC GRANT S E	2	3830 C	2522	260*	43		495	112*	3	00	611	228*	5	00
8S	9E	15 G7	178	TD	SKELLY OC SCHMITT J	2	3810 C	2574	260	43		490	109*	4	00	610	229*	4	00
8S	9E	16 A1	180	TD	GLOBE ORC PILOT HISH	1	3730 C	2519	260	43		460	87*	4	00	574	201*	4	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	9E	16 C1	179	TD	GLOBE ORC HRNGTN HSH	1	3710 C	2521	260	43		484	113*	3	00	588	217*	5	00
8S	9E	19 F4	13	DD	TAYLOR F K HEMPHILL	105	3756 P	766	261	12		644	268*	3	11	760	384*	4	10
8S	9E	20 E8	14	CH	RIGGS E R HEMPHILL F		3706 P	1056	260	10	2	605	234*	7	00				
8S	9E	21 A5	182	TD	SNCLR WYOM SCHMITT W	1	3760 C	2964	260	41		462	86*	3	00	576	200*	4	00
8S	9E	21 C3	181	TD	MCBRIDEINC HISE SHAN	1	3780 C	2989	260	43		466	88*	3	00	584	206*	4	00
8S	9E	22 H8	183	TD	GLOBE ORC STRAUB A	1	3720 C	2901	260	43		450	78*	3	00	558	186*	5	00
8S	9E	24 F6	184	TD	DELTA DRC DOHERTY M	1	3640 G	2941	260	41		405	41*	3	00	505	141*	4	00
8S	9E	25 C7	185	TD	ANGLE&ANGL DAILY JOHN	1	3750 C	2864	260	41		380	5*	3	00	492	117*	4	00
8S	9E	25 H7	186	TD	EASN&ANGLE DUFFY M	1	3690 C	3007	260	40		402	33*	3	00	512	143*	5	00
8S	9E	28 G1	188	TD	MRTN&TDWTR MINER LEO	1	3750 C	2974	260	42		418	43*	3	00	530	155*	4	00
8S	9E	28 H5	187	TD	DELTA DRC MINER LEO	1	3750 C	2993	260	41		464	89*	3	00	580	205*	4	00
8S	9E	28 H7	15	CH	RIGGS E R MINER A		3622 P	1032	260	10	2	477	115*	4	00				
8S	9E	29 D1	189	TD	RBNSN PUCK SMITH P	1	3770 C	3050	260	43		494	117*	4	00	620	243*	4	00
8S	9E	29 G1	16	CH	RIGGS E R SMITH L	1	3634 P	1200	260	10	2	484	121*	4	00				
8S	9E	35 H5	342	LD	CONTNTL OC MALONEY A	1	3700 D	2972	260	44		372	2*	6	00	482	108*	4	00
8S	10E	5 G7	190	TD	BUELL J G SUTTON	1	3520 G	3010	260	39		395	43*	2	00	494	142*	3	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	10E	10 A1	334	TD	CHERRY&KD KERWIN M E	14	3410 C	1986	260	43		262	79	4	00	360	19*	4	00
8S	10E	10 A2	358	TD	CHERRY&KD KERWIN M G	25	3460 D	1990	260*	44		270	76	4	00	368	22*	4	00
8S	10E	10 A3	365	TD	CARTER O C BRWNNG J H	1	3420 D	1980	260*	44		264	78	3	00	359	17*	3	00
8S	10E	10 D3	191	TD	VANDNBRK A BROWNING J	1	3460 C	2840	260	41		270	76	4	00	365	19*	4	00
8S	10E	11 A4	197	TD	CARTER O C BUSIEK E H	4	3420 C	2054	260	43		508	166*	4	00	608	266*	3	00
8S	10E	11 A5	209	TD	CHERRY&KD KERWIN M E	6	3420 C	2053	260	42		266	76	5	00	370	28*	5	00
8S	10E	11 A6	210	TD	CHERRY&KD KERWIN M E	7	3520 C	2075	260*	42		270	82	3	00	370	18*	4	00
8S	10E	11 A7	213	TD	CHERRY&KD KERWIN M E	10	3440 C	2059	260	43		256	88	4	00	356	12*	5	00
8S	10E	11 A8	216	TD	CHERRY&KD KERWIN M E	12	3450 C	2805	260*	43		260	85	3	00	358	13*	4	00
8S	10E	11 B4	196	TD	CARTER O C BUSIEK E H	3	3490 C	2056	260	42		512	163*	4	00	582	233*	4	00
8S	10E	11 B5	208	TD	CHERRY&KD KERWIN M E	5	3500 C	2057	260	42		272	78	4	00	377	27*	4	00
8S	10E	11 B6	211	TD	CHERRY&KD KERWIN M E	8	3460 C	2053	260*	42		267	79	4	00	369	23*	5	00
8S	10E	11 B7	212	TD	CHERRY&KD KERWIN M E	9	3490 C	2070	260	42		270	79	4	00	368	19*	5	00
8S	10E	11 B8	335	TD	CHERRY&KD KERWIN M E	13	3470 C	2071	260*	43		266	81			364	17*		
8S	10E	11 C3	198	TD	CARTER O C BUSIEK E H	5	3490 C	2057	260	43		540	191*	4	00	642	293*	4	00
8S	10E	11 C4	194	TD	CARTER O C BUSIEK E H	1A	3480 C	2055	260	42		286	62	4	06	389	41*	4	00
8S	10E	11 C5	205	TD	CHERRY&KD KERWIN M E	2	3500 C	2061	260*	42		290	60	4	00	390	40*	5	00

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GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	10E	11 C6	206	TD	CHERRY&KD KERWIN M E	3	3500 C	2061	260*	42		289	61	4	00	383	33*	5	00
8S	10E	11 C7	214	TD	CHERRY&KD KERWIN M E	11	3520 C	2076	260	42		282	70	4	00	380	28*	4	00
8S	10E	11 D2	345	TD	CARTER OC BUSIEK CRW	13	3520 D	2659	260*	44		562	210*	4	00	662	310*	5	00
8S	10E	11 D3	199	TD	CARTER OC BUSIEK E H	6	3500 C	2062	260	43		440	90*	4	00	542	192*	3	00
8S	10E	11 D4	195	TD	CARTER OC BUSIEK C87	2	3490 C	2062	260	42		294	55	4	00	393	44*	4	00
8S	10E	11 D5	203	TD	CHERRY&KD KERWIN M E	1	3490 C	1863	260*	42		298	51	4	00	396	47*	5	00
8S	10E	11 D5	204	TD	CHERRY&KD KERWIN M E	1A	3500 C	2060	260*	43		299	51	4	00	398	48*	5	00
8S	10E	11 D6	207	TD	CHERRY&KD KERWIN M E	4	3500 C	2073	260	42		300	50	5	00	396	46*	4	00
8S	10E	11 E2	246	TD	CARTER OC CRWFRD C87	4	3500 C	2066	260	43		574	224*	5	00	665	315*	5	00
8S	10E	11 E3	202	TD	CARTER OC CRWFRD C87	3	3510 C	2067	260	43		312	39	3	00	412	61*	5	00
8S	10E	11 E4	201	TD	CARTER OC CRWFRD C87	2	3510 C	2065	260*	42		308	43	4	00	408	57*	4	00
8S	10E	11 E5	193	TD	VNDNBRKBRO BUSIEK	1	3480 G	2452	260	39		304	44	4	00	402	54*		
8S	10E	11 F1	344	TD	CARTER OC BUSIEK CRW	12A	3510 D	2815	260	44		562	211*	3	00	648	297*	4	00
8S	10E	11 F2	336	TD	CARTER OC CRWFRD C87	5	3500 C	2073	260	43		444	94*	2	00	543	193*	4	00
8S	10E	11 F5	200	LD	CARTER OC CRAWFORD J	1A	3530 C	2091	260	42		311	42	5	00	412	59*	4	00
8S	10E	12 B7	215	TD	SOHIO PROD CRWFD WRHT	1	3500 C	2751	260	42		531	181*	4	00	632	282*	5	00
8S	10E	14 G4	363	TD	CHERRY&KD KERWIN	19	3400 D	2423	260*	44		490	150*	3	00	588	348*	3	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	10E	14 G5	337	TD	CHERRY&KD KERWIN M E	21	3370 C	2388	260	43		490	153*	3	00	588	251*	3	00
8S	10E	14 H4	217	TD	CHERRY&KD KERWIN M E	17	3380 C	2087	260	42		476	138*	3	00	578	240*	4	00
8S	10E	14 H5	218	TD	CHERRY&KD KERWIN M E	20	3420 C	2060	260	42		462	120*	3	00	561	219*	5	00
8S	10E	14 H6	326	TD	CHERRY&KD KERWIN M E	22	3360 C	2054	260	43		252	84	3	00	350	14*	3	00
8S	10E	14 H7	328	TD	CHERRY&KD KERWIN M E	24	3380 C	1945	260*	43		254	84	4	00	352	14*	4	00
8S	10E	14 H8	327	TD	CHERRY&KD KERWIN M E	23	3350 G	2042	260	43		247	88	4	00	346	11*	4	00
8S	10E	15 A8	236	TD	BUEL&HRNDN EGYPTN T T	4A	3530 T	1998	260	42		273	80	5	00	380	27*	4	00
8S	10E	15 B8	235	TD	BUEL&HRNDN EGYPTN T T	3A	3500 G	2417	260	41		271	79	4	00	385	35*	4	00
8S	10E	15 C5	237	TD	KINGWOODOC EGYPTN T T	1	3480 G	2850	260	39		259	89	4	00	365	17*	4	00
8S	10E	15 C7	234	TD	BUEL&HRNDN EGYPTN T T	A2	3440 G	2444	260	41		263	81	4	00	369	25*	5	00
8S	10E	15 D7	231	TD	DUNCAN INC EGYPTN T T	1	3360 G	2446	260	41		258	78	4	00	357	21*	4	00
8S	10E	15 E4	353	TD	LECH&HLBRT ARENSMAN	3	3410 D	2080	260*	43		245	96	4	00	342	1*	4	00
8S	10E	15 E6	219	TD	CARTER OC CURRY J H	1	3410 C	2869	260	41		258	83	3	00	358	17*	4	00
8S	10E	15 E7	226	TD	LECH&HLBRT CURRY J H	5	3330 C	2052	260*	41		250	83			350	17*		
8S	10E	15 E8	222	TD	LECH&HLBRT CURRY J H	1	3330 C	2074	260	41		260	73	3	00	358	25*	5	00
8S	10E	15 F3	359	TD	LECH&HLBRT ARENSMAN	1	3430 D	2390	260*	43		250	93	4	00	346	3*	3	00
8S	10E	15 F4	354	TD	LECH&HLBRT ARENSMAN	2	3400 D	1981	260*	44		250	90	3	00	344	4*	4	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
[illegible]	10E	15 F5	367	TD	CARTER OC CURRY J H	5	3420 D	1976	260*44			252	90	3	00	346	4*	4	00
8S	10E	15 F6	220	TD	CARTER OC CURRY J H	2	3370 G	2094	260 41			247	90	3	00	341	4*	4	00
8S	10E	15 F7	227	TD	LECH&HLBRT CURRY J H	6	3420 C	2080	260*41			259	83	3	00	354	12*	5	00
8S	10E	15 F8	223	TD	LECH&HLBRT CURRY J H	2	3420 C	2075	260 41			263	79	3	00	362	20*	5	00
8S	10E	15 G1	324	TD	CHERRY&KD WRIGHT F J	2	3410 C	2404	260 43			250	91	4	00	346	5*	4	00
8S	10E	15 G2	325	TD	CHERRY&KD WRIGHT F J	3	3360 C	2388	260 43			248	88	3	00	344	8*	4	00
8S	10E	15 G3	348	TD	ASHLND ORC CURRY J H	1	3450 D	1971	260*43			260	85	3	00	356	11*	4	00
8S	10E	15 G4	347	TD	ASHLND ORC CURRY J H	2	3450 D	1982	260*43			256	89	3	00	350	5*	4	00
8S	10E	15 G5	366	TD	CARTER OC CURRY J H	4	3460 D	1987	260*44			256	90	3	00	348	2*	3	00
8S	10E	15 G7	228	TD	LECH&HLBRT CURRY J H	7	3440 C	2068	260 41			254	90	4	00	351	7*	4	00
8S	10E	15 G8	224	TD	LECH&HLBRT CURRY J H	3	3360 G	2071	260*41			246	90			344	8*	4	00
8S	10E	15 H1	323	TD	CHERRY&KD WRIGHT F J	1	3380 C	1952	260 43			246	92	2	00	342	4*	5	00
8S	10E	15 H2	368	TD	CHERRY&KD WRIGHT F J	4	3400 D	1973	260*44			254	86	3	00	354	14*	3	00
8S	10E	15 H3	346	TD	ASHLND ORC CURRY J H	3	3400 D	1972	260*44			256	84	3	00	352	12*	4	00
8S	10E	15 H4	355	TD	ASHLND ORC CURRY J H	4	3430 D	1980	260*44			262	81	3	00	356	13*	4	00
8S	10E	15 H6	221	TD	CARTER OC CURRY J H	3	3430 C	2106	260 41			262	81	3	00	354	11*	4	00
8S	10E	15 H7	229	TD	LECH&HLBRT CURRY J H	8	3460 C	2081	260 41			255	91			354	8*	4	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	10E	15 H8	225	TD	LECH&HLBRT CURRY J H	4	3440 C	2091	260	41		273	71	4	00	371	27*	4	00
8S	10E	16 A1	256	TD	LECH&FUHRR EGYPTN T T	9	3460 C	2425	260*	41		283	63	2	00	374	28*	3	00
8S	10E	16 A2	257	TD	LECH&FUHRR EGYPTN T T	10	3430 G	2417	260	41		267	76	4	00	383	40*	4	00
8S	10E	16 A3	241	TD	BUEL&HRNDN EGYPTN T T	6	3550 C	2442	260	41	2	290	65			390	35*	4	00
8S	10E	16 B1	251	TD	OIL MANGMT EGYPTN T T	7	3510 C	2415	260*	41	4	288	63	2	06	394	43*	4	00
8S	10E	16 B2	252	TD	OIL MANGMT EGYPTN T T	8	3490 C	2436	260	41		280	69	2	00	390	41*	3	00
8S	10E	16 B3	240	TD	BUEL&HRNDN EGYPTN T T	5	3500 C	2422	260	42		275	75	4	00	383	33*	4	00
8S	10E	16 C1	250	TD	LECH&FUHRR EGYPTN T T	6	3520 C	2087	260	41	4	288	64	3	00	396	44*	4	00
8S	10E	16 C2	249	TD	LECH&FUHRR EGYPTN T T	5	3510 C	2083	260	41		279	72	4	00	394	43*	4	00
8S	10E	16 C3	333	TD	HERNDN DRC EGYPTN T T	3	3490 G	2080	260*	41	2	272	77						
8S	10E	16 D3	238	TD	HERNDN DRC EGYPTN T T	2	3360 G	2067	260*	41	2	262	74						
8S	10E	16 D3	319	TD	BUEL J ETL EGYPTN T T	1	3510 C	2960	260	39		283	68	2	06	395	44*	5	00
8S	10E	16 D5	242	TD	DUNCAN N&W EGYPTN T T	1C	3490 C	2912	260	41		305	44	3	00	400	51*	4	00
8S	10E	16 E1	259	TD	PHILLIPS EGYPTN T T	2	3320 G	2073	260	41		275	57	2	06	367	35*	4	00
8S	10E	16 E2	258	TD	PHILLIPS EGYPTN T T	1	3369 C	2083	260*	41		273	64	3	00	380	43*	4	00
8S	10E	16 E3	268	TD	SNCLR WYOM LEACH B K	1	3350 C	2075	260	41		276	59	3	00	382	47*	4	00
8S	10E	16 F1	260	TD	PHILLIPS EGYPTN T T	3	3400 G	2081	260	41		272	68	4	00	367	27*	5	00

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	10E	16 F2	263	TD	PHILLIPS EGYPTN T T	6	3360 C	2077	260*	41		270	66	4	00	366	30*	4	00
8S	10E	16 F3	269	TD	SNCLR WYOM LEACH B K	2	3340 C	2894	260	41		280	54	3	06	375	41*	4	00
8S	10E	16 G1	261	TD	PHILLIPS EGYPTN T T	4	3370 G	2077	260*	41		262	75	4	00	358	21*	4	00
8S	10E	16 G2	265	TD	PHILLIPS EGYPTN T T	8	3400 C	2089	260	41		276	64	3	06	367	27*	4	00
8S	10E	16 G3	270	TD	SNCLR WYOM LEACH B K	3	3420 C	2868	260	41		281	61	3	00	377	35*	3	00
8S	10E	16 H1	266	TD	PHILLIPS EGYPTN T T	9	3510 C	2098	260	41		292	59	3	00	390	39*	4	00
8S	10E	17 A8	271	TD	OIL MANGMT EGYPTN T T	A1	3470 C	2909	260	41		356	9*	3	00	464	117*	5	00
8S	10E	18 A3	272	TD	SNWDEN&MCS EGYPTN T T	1	3470 C	2818	260	41		366	19*	3	00	480	133*	5	00
8S	10E	19 C4	278	TD	OIL MANGMT GOEBEL	1	3620 C	2903	260	42		365	3*	3	00	487	125*	4	00
8S	10E	19 D5	279	TD	MAGNOLIA MCGUIRE J	1	3610 C	2001	260*	42		370	9*	4	00	481	120*		
8S	10E	19 D7	280	TD	MAGNOLIA MCGUIRE J	2	3770 C	3010	260	42		420	43*	4	00	520	143*	4	00
8S	10E	19 E2	275	TD	RITCHIE M FREY	1	3620 C	2040	260	41		364	2*	2	00	480	118*	5	00
8S	10E	19 E3	277	TD	GAMMEL B FRYE	1	3600 G	2775	260	40		375	15*	2	00	502	142*		
8S	10E	19 G5	276	TD	SNWDEN&MCS FREY	1	3560 C	2956	260	40		395	39*	3	00	506	150*	4	00
8S	10E	20 E1	281	TD	DUNCAN INC BLAIR O B	1	3480 C	2940	260	41		314	34	2	00	420	72*	4	00
8S	10E	21 F1	286	TD	CARTER OC JORDAN C L	2	3470 C	2908	260	42		270	77	2	00	378	31*		
8S	10E	21 F3	283	TD	SKELLY OC EGYPTN T T	2	3470 C	1996	260	42		269	78	2	00	377	30*		

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
8S	10E	21 M1	285	TD	CARTER OC JORDAN C L	1	3490 C	2421	260	42		280	69	2	00	380	31*		
8S	10E	21 M2	287	TD	CARTER OC JORDAN C L	3	3490 C	2420	260	42		278	71	2	00	380	31*	5	00
8S	10E	21 M3	284	TD	SKELLY OC EGYPTN T T	1	3490 C	2000	260	42		292	57	2	00	384	35*		
8S	10E	21 M5	282	TD	PHILLIPS EGYPTN T T	1	3590 C	2915	260	42		284	72	2	00	398	42*	5	00
8S	10E	22 C4	362	TD	CARTER OC JOHNSON C	2	3520 D	2470	260	44		626	272*	4	00	702	350*	4	00
8S	10E	22 D5	349	TD	CARTER OC JOHNSON C	1	3520 D	2908	260	44		255	97	3	00	374	22*	4	00
8S	10E	22 G5	350	TD	OIL MANGMT LEACH B K	1	3490 D	2824	260*	44		256	93	3	00	358	9*	4	00
8S	10E	22 G6	288	TD	BUFORD W C EGYPTN T T	1	3480 G	2478	260	39		257	91	3	06	362	14*	4	00
8S	10E	26 A8	289	TD	MARTIN R B AGNEW W	1	3430 G	3047	260	41		472	129*	3	00	589	246*	4	00
8S	10E	28 F5	290	TD	SOHIO PROD NATRL RES	1	3480 C	2784	260	42		276	72	4	00	390	42*	5	00
8S	10E	29 E1	291	TD	HALBERT R OSBORNE L	1	3460 C	2933	260	40		275	71	1	06	393	47*	5	00
8S	10E	30 E1	292	LD	RYAN OC ET TATE L C	1	3460 C	2944	260	43		340	6	3	00	460	114*	5	00
8S	10E	32 D7	293	TD	KINGWOODOC DODGE H P	1	3590 C	2959	260	42		305	54			420	61*	6	00
9S	8E	1 E5	93	WW	DRONE L		3770 H	250	261	6		188	189	10	00				
9S	8E	1 F2	95	DS	DEVOUS J DRONE L		3650 F		261	6	8	380	15*			484	119*		
9S	8E	1 F6	24	DD	DEVOUS DRONE LOU	2	3770 H	190	261	7		186	191	4	02				

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness		Depth (Feet)	Altitude (Feet)	Thickness	
														Ft.	In.			Ft.	In.
9S	8E	1 H6	23	DC	DEVOUS WHITE R	1	3480 H	516	261	7		140	208			255	93		
9S	8E	2 E4	107	OU			3400 F		261										
9S	8E	2 F5	25	DD	DEVOUS C LANE JOE	3	3480 H	103	261	7		98	250	4	03				
9S	8E	3 C1	52	CS	LUCKETT JOE		4000 T	200	261		6	150	250	4	06				
9S	8E	3 C1	106	OU			3500 F		261										
9S	8E	4 A3	53	RS	WALTHAM C		3500 F	32	261	27	7	28	322	4	0.2				
9S	8E	4 A3	108	OU	NO 6 COAL		3269 P		261				327						
9S	8E	4 B8	54	WW	WALTON C		4050 F	100	261			60	345	4	06				
9S	8E	4 D6	294	TD	ARROW DRC HANCOCK IC	1	3560 G	2375	261	41		64	292			182	174	4	00
9S	8E	4 E6	59	RS			3450 F	751	261	27	4	50	295	4	08				
9S	8E	5 A8	63	RS			3580 T		261	29	7								
9S	8E	5 E5	27	RD	TRUAXTRAER	3	3700 T	55	261	29	2	60	310						
9S	8E	5 F1	61	CS	MCLAIN DAN		3600 T	135	261		4	70	290	4	06				
9S	8E	5 G1	26	DD	BYRD PITTS	3	3555 C	194	261	12	7	67	289	4	06	187	169	4	05
9S	8E	6 C1	55	RS			3700 T		261	29	7	30	340						
9S	8E	6 E7	28	RD	TRUAXTRAER MOORE	2	3650 T	35	261	29	8	31	334	2	00				
9S	8E	7 C8	295	TD	WALL J H MOSSMAN C	1	3770 C	565	261	41	8		407			90	287	7	00

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GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness		Depth (Feet)	Altitude (Feet)	Thickness	
														Ft.	In.			Ft.	In.
9S	8E	7 D5	65	CS			3950 T		261							169	226	5	03
9S	8E	7 D8	104	CS	SWABER H		3900 T		261			22	368	3	00				
9S	8E	8 G6	64	RS			3540 T		261	29	7								
9S	8E	9 A1	96	CS			3700 T		274		6					108	262		
9S	8E	9 G4	56	CS	WALTHAM C		3650 F	29	261	27	9	23	342	1	06				
9S	8E	9 H3	66	BA			3300 T		261		4		330	4	06				
9S	8E	10 E6	62	WW	GORDON DR		3850 T		261		7	41	344			166	219		
9S	8E	10 G8	30	SA	GORDON DR GORDON		3600 B		261			41	319	4	02				
9S	8E	10 H6	29	RD	TRUAXTRAER HAMILTON	1	3820 H	59	261	29		54	328	3	02				
9S	8E	11 D8	60	CS			3800 T	84	261			60	320						
9S	8E	13 B2	67	SH	NEW SHAWNE		3700 F		274							95	275	4	06
9S	8E	13 E8	68	CS			4100 T		274							165	245		
9S	8E	14 A3	74	SA	LOGAN HWY		3800 T		274		4					47	333	4	06
9S	8E	14 A7	88	SA	SANKS MINE		3800 H		274							34	346	4	04
9S	8E	14 C2	75	CS	LOGAN H MN		3950 T		274							93	302		
9S	8E	14 C4	69	CS	H HILL SCH		4250 T	65	274										
9S	8E	14 D2	70	CS			3800 T	116	274							116	264	4	06

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GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
9S	8E	14 D8	71	CS			3700 F		274							103	267		
9S	8E	14 E6	72	CS	H HILL CC		4000 F		274		4					126	274		
9S	8E	15 G6	31	CH	GORDON MUR BEATTY		3820 F	244	274		2					118	264	1	06
9S	8E	16 A7	79	SA	E SIDE CC		3620 H		274							40	322	4	07
9S	8E	16 A8	78	SA	SISKMINE		4500 T		274		4		450	4	00				
9S	8E	16 A8	87	SA	GOLDNUGGET		3620 H		274							40	322		
9S	8E	16 C7	77	SA	EQUALTYOLD		4200 T		274				420	4	00				
9S	8E	16 G6	80	OU	COAL SA		3400 T		274										
9S	8E	16 G8	81	SH	PEKIN CC		3719 P		274							140	232	4	07
9S	8E	16 G8	82	SA	NRTHSIDECC		3846 P		274			14	371						
9S	8E	16 H7	84	SA			3850 F		274			10	375						
9S	8E	16 H8	83	SA			3800 T		274				380						
9S	8E	17 F1	90	SA	MCLAIN W H		3750 F		274	94			375	5	02				
9S	8E	17 G2	85	SA			3800 T		274				380						
9S	8E	18 C1	97	SA	GALLATN CC	2	3800 F		274	14						94	286	4	06
9S	8E	18 G4	296	TD	TURNER&CRM MUENSTRMAN	1	3770 C	2610	274	41	8		378			109	268*	2	00
9S	8E	20 H8	86	SA	GALLATNCCC	1	3620 F		274	82						75	287	4	08

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness		Depth (Feet)	Altitude (Feet)	Thickness	
														Ft.	In.			Ft.	In.
9S	8E	23 G6	76	SA	H HILL CC		3900 H		274		4					390	403		
9S	8E	24 D2	36	CH	VANDELL MC	3	3550 T	240	274										
9S	8E	24 F1	35	CH	VANDELL MC	2	3550 T	280	274		4								
9S	8E	24 F1	98	SA	VANDELL MC		3580 F	40	274										
9S	8E	24 H1	34	CH	VANDELL MC	1	3550 T	194	274		4								
9S	8E	25 A2	37	DD	TAYLOR CO	17	3550 F	663	274	12	4								
9S	8E	28 H3	38	DD	BYRD PITTS RUMELY	4	3734 C	510	274	12									
9S	9E	9 A5	297	TD	DELTA DRC STINSON W	1	3580 C	2795	275	39	8	130	228			240	118	5	00
9S	9E	15 E6	341	LD	PHILLIPS FORD WL N	1	3560 D	2807	275	44		162	194			262	94		
9S	9E	16 A8	298	TD	COATES ETL GREENE	1	3520 G	2670	275	39	8	59	293			169	183	4	00
9S	9E	17 A2	305	TD	FIELDS&ZEP GREEN	10	3530 C	1819	275	40	8	54	299			164	189		
9S	9E	17 A4	307	TD	FIELDS B LOGAN C H	2	3620 C	1820	275	40	8	70	292			180	182		
9S	9E	19 C4	19	CH	VANDELL MC	4	3600 T	298	274		7				*0				*0
9S	9E	20 H3	309	TD	ZEPPA J LOGAN C H	1	3560 C	1800	275	40	8	50	306			160	196		
9S	9E	20 H4	308	TD	ZEPPA J EASLEY B H	1	3580 C	1803	275	40	8		367			101	257		
9S	9E	21 D8	312	TD	DELTA DRC WINTERBRGR	1	3670 C	2701	275	39	8		381			96	271		

TABULATED DATA ON KEY BEDS

GALLATIN COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
9S	9E	21 M8	313	TD	FIELDS&ZEP GREEN	 9	3590 C	1782	275	40	8	58	301			168	191		
9S	9E	24 M5	361	LD	BREHM C E OLDHAM C	 1	4010 D	2837	275	44		168	233	6	00	286	115	4	00
9S	9E	26 E6	105	WN	HIGHSCHOOL		4050 T		275		2	220	185						
9S	9E	31 C2	20	CH	EAGLE OG DRONE	3 3	3479 P	3612	275	19									
9S	9E	31 E1	21	CH	DRONE LOU		3613 P	625	275										
9S	9E	36 M8	22	DD	BYRD PITTS	18	3700 T	473	275	12					*0	206	164	4	08
9S	10E	1 A4	314	LD	MAGNOLIA LOGSDON M	 1	3510 C	2860	260	43		302	49	3	00	430	79*	5	00
9S	10E	3 E5	364	TD	SNCLR WYOM MINES E	 1	3510 D	3002	260	44		422	71*	3	00	546	195*	4	00
9S	10E	8 M8	315	TD	JARVISMARC DRONE JIM	 1	3760 C	2904	260	42		642	266*	3	00	754	378*	4	00
9S	10E	9 D2	89	OU			5400 M		260		8	500	40						
9S	10E	15 D1	360	TD	CHERRY&KD GRAY AL	 1	3510 D	2859	275	44		265	86	3	00	393	42*	4	00
9S	10E	16 A5	316	TD	MARTIN R B CLAYTON H	 1	3530 C	2808	275	41		287	66	3	00	404	51*	5	00
9S	10E	31 E2	18	CH	SHAWNEETOG		3500 T	1514	275		8	100	250			214	136	7	00

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TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator / Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.									Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
					HAMILTON JUNE 22 1945													
3S	5E	22 B7	41	TD	SEABOARD KNAPP GRVR 1	4780 G	3497	256	41		1003	525*			1107 2489	629* 2011*		
3S	5E	26 A8	95	TD	SNCLR WYOM ZELLERS M 1	4200 C	3339	256	41		937	517*			1042 2452	622* 2038*		
3S	5E	26 C6	93	TD	D P OC ZELLRS F L 1	4120 G	3376	256	41		947	535*			1043 2462	631* 2050*		
3S	5E	26 C8	94	TD	HALL&JORDN ZELLRS F 1	4150 G	3334	256	41		922	507*			1032 2452	617* 2037*		
3S	5E	27 A1	58	TD	SNCLR WYOM HALL M F 9	4160 C	3325	256	41		931	515*			1041 2451	625* 2035*		
3S	5E	27 A3	99	TD	SNCLR WYOM HALL M F 1	4260 D	3311	256*	41		910	484*			1015	589*		
3S	5E	27 A4	100	TD	SNCLR WYOM HALL M F 2	4220 D	3294	256	41		885	463*			1005 2424	583* 2002*		
3S	5E	27 A5	53	TD	SNCLR WYOM HALL M F 4	4200 D	3289	256*	41		875	455*			985	565*		
3S	5E	27 A6	59	TD	SNCLR WYOM HALL M F 10	4220 D	3295	256*	41		875	453*			1000	578*		
3S	5E	27 B2	57	TD	SNCLR WYOM HALL M F 8	4220 D	3320	256*	41		915	493*			1030	608*		
3S	5E	27 B3	54	TD	SNCLR WYOM HALL M F 5	4180 G	3307	256	41		897	479*			1007 2419	589* 2001*		
3S	5E	27 B4	55	TD	SNCLR WYOM HALL M F 6	4190 D	3291	256*	41		875	456*			985	566*		
3S	5E	27 B6	56	TD	SNCLR WYOM HALL M F 7	4200 D	3295	256	41		875	455*			1005 2394	585* 1974*		
3S	5E	27 B7	62	TD	SHELL OC RATCLF COM 1	4390 D	3312	256*	41		905	466*			1025	586*		
3S	5E	27 C5	63	TD	DEKLB ASSN SCRIVNER C 1	4220 D	3306	256	41		876	454*			1000 2400	578* 1978*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3S	5E	27 C8	68	TD	OHIO OIL TROTTER M	1	4390 D	3307	256*	41		915	476*			1030	591*		
3S	5E	27 D7	69	TD	OHIO OIL TROTTER M	2	4370 D	3306	256	41		935	498*			1050 2406	613* 969*		
3S	5E	27 E2	72	TD	SMITH PET ZELLRS F M	1	4140 D	3320	256	41		890	476*			1010 2410	596* 1996*		
3S	5E	27 E7	96	TD	SEABOARD GARRISON D	1	4320 C	3306	256	41		940	508*			1035 2402	603* 1970*		
3S	5E	27 F7	97	TD	SEABOARD GARRISON D	2	4300 D	3307	256*	41		945	515*			1040	610*		
3S	5E	27 G6	61	TD	FIELDS B KENNEDY A	1	4420 D	3314	256	41		946	504*			1036 2440	594* 1998*		
3S	5E	27 G7	98	TD	FIELDS B GARRISON G	1	4360 C	3307	256	41		950	514*			1025 2410	589* 1974*		
3S	5E	28 A1	107	TD	BRACY H W TENNYSON R	1	4410 C	3322	256	41		918	477*			1033 2423	592* 1982*		
3S	5E	28 C1	106	TD	MULCAHY C SCRIVNER	1	4400 D	3382	256	42		940	500*			1050 2410	610* 1970*		
3S	5E	30 A5	42	LD	SEABOARD XAVIER K	1	4240 D	3404	256	42		935	511*	3	00	1020 2376	596* 1952*	3	00
3S	5E	32 D8	25	TD	CARP A H CLARK E F	1A	5150 D	3476	256	38		1047	532*			1120 2515	605* 2000*		
3S	5E	32 D8	35	TD	CARP ETAL CLARK E F	1	5110 B	3224	256*	37		1040	529*	7	00	1118	607*		
3S	5E	33 E3	74	TD	D P OC MILLER C D	1	4360 C	3383	256	41		920	484*			1012 2457	576* 2021*		
3S	5E	34 E4	85	TD	SNCLR WYOM GAGE E J	3	4390 D	3344	256*	41		945	506*			1060	621*		
3S	5E	34 F1	86	TD	WITT&KROHN GAGE L H	1	4310 D	3350	256*	41		960	529*			1085	654*		
3S	5E	34 F2	87	TD	WITT&KROHN GAGE L H	2	4310 D	3355	256	41		955	524*			1070 2482	639* 2051*		
3S	5E	34 F3	83	TD	SNCLR WYOM GAGE E J	1	4340 D	3351	256*	41		945	511*			1070	636*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3S	5E	34 F4	84	TD	SNCLR WYOM GAGE E J	2	4340 D	3349	256	41		935	501*			1050	616*		
3S	5E	34 F5	75	TD	SNCLR WYOM BRUMLEY J	1	4360 D	3349	256*	41		928	492*			1040	604*		
3S	5E	34 F6	76	TD	SNCLR WYOM BRUMLEY J	2	4270 D	3322	256	41		910	483*			1026 2453	599* 2026*		
3S	5E	34 G1	90	TD	DUNCAN D ZELLERS M	1	4270 C	3355	256*	40		963	536*			1075	648*		
3S	5E	34 G2	77	TD	HALL&JORDN DEERHAKE F	1	4310 C	3363	256*	41		959	528*			1077	646*		
3S	5E	34 G3	78	TD	HALL&JORDN DEERHAKE F	2	4300 D	3349	256	41		930	500*			1040 2458	610* 2028*		
3S	5E	34 G4	79	TD	HALL&JORDN DEERHAKE F	3	4290 D	3329	256*	41		920	491*			1035	606*		
3S	5E	34 H2	82	TD	HALL&JORDN DEERHAKE F	6	4270 D	3338	256	41		940	513*			1065 2458	638* 2031*		
3S	5E	34 H3	80	TD	HALL&JORDN DEERHAKE F	4	4230 D	3327	256*	41		910	487*			1020	597*		
3S	5E	34 H5	88	TD	DUNCAN D HOOK GEO	1	4160 C	3303	256	41		881	465*			996 2422	580* 2006*		
3S	5E	35 G8	92	TD	EXCHNGE OC SILLIMAN E	1	4310 D	3488	256	41		965	534*			1075 2472	644* 2041*		
3S	5E	36 C2	108	TD	OIL CARRS ROSE T O	1	4310 D	3463	256	42		950	519*			1065 2520	634* 2089*		
3S	6E	20 G1	540	TD	NAT ASSOC GOOD W H	1	4190 D	3494	256	45		957	538*			1032 2526	613* 2107*		
3S	6E	22 H1	43	LD	MIDCON PET RUBIN JAN	1	4410 D	3508	256	42		973	532*			1045 2558	604* 2117*		
3S	6E	27 F7	408	TD	MAGNOLIA PEOPLES NB	1	3880 D	3513	256	44		955	567*			1036 2538	648* 2150*		
3S	6E	35 A3	102	TD	WHTE&BLTN SCHNUCK	1	3810 D	3452	256	42		990	609*			1090 2558	709* 2177*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3S	7E	20 N3	109	TD	TEXAS CO BARKER	1	3820 C	3382	257	39		895	513*			995 2459	613* 2077*		
3S	7E	21 N7	110	TD	TEXAS CO PRVDNT INS	1	3820 C	3427	257	40		907	525*			1010 2478	628* 2096*		
3S	7E	23 B2	111	TD	CHERRY&KD LECH FHRER	1	3780 C	3470	257	42		1000	622*			1090 2500	712* 2122*		
3S	7E	24 C1	116	TD	TEXAS CO POORMN A J	B2	3790 D	3451	257	41		925	546*			1025 2480	646* 2101*		
3S	7E	24 D1	115	TD	TEXAS CO POORMN A J	B1	3780 C	3258	257	41		935	557*			1025 2492	647* 2114*		
3S	7E	24 E1	112	TD	CHERRY&K&S GARDNER	1	3740 C	3240	257*	41		935	561*			1030	656*		
3S	7E	24 E2	44	LD	CHERRY&KD GARDNER R	3	3740 G	3254	257	42		945	571*	6	00	1028	654*	3	00
3S	7E	24 F1	113	TD	CHERRY&K&S GARDNER	2	3750 C	3247	257	41		950	575*			1035 2462	660* 2087*		
3S	7E	24 G1	114	TD	RBNSN PUCK MCCULLOUGH	1	3820 C	3273	257*	41		955	573*			1040	658*		
3S	7E	25 A1	507	TD	MAGNOLIA FYIE ANNA	1	3800 C	3228	257	42		895	515*			980 2422	600* 2042*		
3S	7E	25 C1	117	TD	MAGNOLIA FYIE ANNA	2	3790 D	3239	257	42		903	524*			986 2422	607* 2043*		
3S	7E	25 C3	118	TD	MAGNOLIA FYIE ANNA	3	3790 C	3442	257	42		910	531*			1005 2445	626* 2066*		
3S	7E	32 E6	119	TD	WEINERT H HAMI CO LC	1	3800 G	3483	257	38		952	572*			1047 2499	667* 2119*		
4S	5E	1 D1	45	LD	TEXAS CO RAWLS RBRT	1	4400 D	3456	256	43		965	525*	5	00	1065 2506	625* 2066*	5	00
4S	5E	2 D1	169	TD	MAGNOLIA KARCHR UNT	1	4480 B	3460	256	43		984	536*			1120 2576	672* 2128*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4S	5E	3 C3	170	TD	OHIO OIL AYDT R W	1	5530 C	3596	256	41		1080	527*			1195 2631	642* 2078*		
4S	5E	17 D1	508	TD	GULF REF MCGTH MNFD	1	4520 D	3515	256	44		940	488*			1028 2510	576* 2058*		
4S	5E	19 C7	502	TD	MIDSUN OC HALL MARY	1	5240 C	3521	256	41		974	450*			1055 2520	531* 1996*		
4S	5E	25 E4	1	DD	DELAFIELD CRRY MLDNG		4099 P	920	256	6		914	504*	5	03				
4S	5E	26 H1	509	TD	BIGGS&JNSN BARR W T	1	4160 D	3516	256	43		945	529*			1038 2570	622* 2154*		
4S	5E	29 C8	120	TD	YNGBLD&F&G THOMPSON L	1	5150 B	3475	256	41		970	455*			1050 2540	535* 2025*		
4S	5E	36 A3	121	TD	MIDSUN OC MAULDING	1	4650 C	3535	256	41		990	525*			1090 2596	625* 2131*		
4S	6E	1 G8	122	TD	WICKWR&PWR PATTERSN R	1	3790 D	3450	256	41		985	606*			1090 2530	711* 2151*		
4S	6E	2 B5	123	TD	EASON OC LITTLE H C	1	3890 D	3461	256	41		965	576*			1055 2542	666* 2153*		
4S	6E	2 E5	124	TD	HLLMN&BREL MOORE J R	1	3870 D	3466	256	41		972	585*			1058 2530	671* 2143*		
4S	6E	2 G1	125	TD	KINGWOODOC SCHNUCK	1	3810 C	3546	256	39		985	604*			1085 2536	704* 2155*		
4S	6E	3 E1	127	TD	KINGWOODOC WILLMS WES	1	4280 C	3571	256	40		999	571*			1094 2614	666* 2186*		
4S	6E	3 E3	126	TD	KINGWOODOC WILLAMS JW	1	4340 D	3528	256	43		1010	576*			1105 2620	671* 2186*		
4S	6E	7 E5	513	TD	MAGNOLIA KAUFMAN	A1	4250 D	3453	256	43		975	550*			1080 2528	655* 2103*		
4S	6E	12 E1	500	TD	PHILLIPS LEACH B K	1	3790 D	3451	257	44		962	583*			1070 2518	691* 2139*		
4S	6E	13 H4	546	TD	PHILLIPS HOLLA	1	3810 D	3500	257	45		974	593*			1070 2538	689* 2157*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4S	6E	14 E3	510	TD	LECH&HLBRT LEACH GLPN	1	3840 D	3563	256	44		1000	616*			1086 2575	702* 2191*		
4S	6E	15 E1	2	CH	HAWLEY M A SCHULTZ		3844 P	1490	256	8	4	1015	631*	8	00	1110	726*	6	00
4S	6E	16 D8	528	TD	MAGNOLIA HAAS A G	1	4170 D	3550	256	44		1055	638*			1145 2614	728* 2197*		
4S	6E	27 A7	3	DD	ELMGROVECC DALLY JOE		4178 P	1294	256	6		1020	602*	7	06	1097	679*	5	01
4S	6E	28 A3	511	TD	LAYTON ETL JUERGN ETL	1	4080 D	3502	256	44		1012	604*			1086 2570	678* 2162*		
4S	6E	29 A5	128	TD	RYAN OC MITCHELL	1	4020 C	3522	256	41		985	583*			1045 2580	643* 2178*		
4S	6E	33 D3	46	LD	WISER OC ECHOLS W C	1	4120 D	3505	256	43		1003	591*	6	00	1078 2576	666* 2164*	4	00
4S	7E	1 H1	129	TD	GRAY W W GRAY W W	3	3800 C	3275	257	41		905	525*			987 2446	607* 2066*		
4S	7E	6 B1	130	TD	HELMRH&PYN HAMI CO LB	1	3800 C	3528	257	39		962	582*			1062 2537	682* 2157*		
4S	7E	7 E7	517	TD	PHILLIPS WILMA	1	3770 D	3512	257	44		968	591*			1058 2514	681* 2137*		
4S	7E	8 H5	131	TD	TEXAS CO ADAMS N	1	3840 C	3558	257	40		970	586*			1070 2526	686* 2142*		
4S	7E	9 B1	132	TD	TEXAS CO EPPERSON C	1	3800 D	3510	257	42		950	570*			1060 2518	680* 2138*		
4S	7E	11 A1	133	TD	KINGWOODOC THOMAS GEO	1	4040 D	3494	257	42		940	536*			1030 2525	626* 2121*		
4S	7E	14 C7	512	TD	GILL DRC SNEED COMM	1	4180 D	3464	257	43		974	556*			1052 2510	634* 2092*		
4S	7E	16 A5	135	TD	TIDE WATER LYNCH J A	1	4170 D	3480	257	42		970	553*			1035 2514	618* 2097*		
4S	7E	16 A6	136	TD	TIDE WATER LYNCH J A	2	4060 D	3294	257*	43		950	544*			1020	614*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4S	7E	16 A7	134	TD	TEXAS CO ERNEST H M	2	3910 D	3426	257	42		940	549*			1010 2506	619* 2115*		
4S	7E	17 A4	137	TD	TEXAS CO FLANNIGN R	1	3900 D	3284	257	43		955	565*			1045 2503	655* 2113*		
4S	7E	17 A6	521	TD	TEXAS CO FLANNIGN R	5	3900 D	3319	257	44		968	578*			1066 2500	676* 2110*		
4S	7E	17 B1	522	TD	TEXAS CO FLANNIGN R	4	3860 D	3317	257*	44		934	548*			1005	619*		
4S	7E	17 B5	139	TD	TEXAS CO FLANNIGN R	3	3890 D	3500	257	43		965	576*			1060 2510	671* 2121*		
4S	7E	17 C1	138	TD	MAGNOLIA ODELL R	1	3850 D	3490	257	43		940	555*			1035 2518	650* 2133*		
4S	7E	20 B1	148	TD	MAGNOLIA TRAVIS G L	2	4120 D	3527	257	42		945	533*			1020 2528	608* 2116*		
4S	7E	20 B3	149	TD	MAGNOLIA TRAVIS G L	3	4140 D	3460	257	43		970	556*			1045 2536	631* 2122*		
4S	7E	20 C2	146	TD	DUNCAN W THOMPSON M	1	4190 D	3317	257*	42		960	541*			1030	611*		
4S	7E	20 C3	147	TD	MAGNOLIA TRAVIS G L	1	3990 C	3458	257*	42		948	549*			1030	631*		
4S	7E	20 C4	150	TD	MAGNOLIA TRAVIS G L	4	3980 D	3516	257	43		950	552*			1035 2536	637* 2138*		
4S	7E	20 D1	141	TD	TEXAS CO MINTON S	4	4320 D	3319	257	42		960	528*			1045 2540	613* 2108*		
4S	7E	20 E1	47	LD	TEXAS CO MINTON S	1	4250 D	3531	257	42		965	540*	6	00	1045 2544	620* 2119*		
4S	7E	20 E2	142	TD	TEXAS CO MINTON S	5	4170 D	3458	257*	42		965	548*			1040	623*		
4S	7E	20 E3	198	TD	GULF REF SNEED J	1	3940 D	3438	257*	42		950	556*			1010	616*		
4S	7E	20 F5	144	TD	TEXAS CO PEOPLES NB	1	3940 D	3435	257	43		950	556*			1040 2505	646* 2111*		
4S	7E	20 G3	145	TD	GULF REF SNEED J	2	3920 D	3427	257	43		940	548*			1030 2488	638* 2096*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4S	7E	20 M1	143	TD	TEXAS CO MINTON COM	1	3920 D	3273	257	43		935	543*			1025 2498	633* 2106*		
4S	7E	20 M5	140	TD	TEXAS CO DREW COMM	1	3920 D	3277	257	43		950	558*			1050 2504	658* 2112*		
4S	7E	21 D7	157	TD	TEXAS CO MINTON S	3	4390 D	3480	257	42		970	531*			1045 2538	606* 2099*		
4S	7E	21 E6	154	TD	TEXAS CO LEDBETTR D	2	4300 D	3326	257	42		960	530*			1040 2536	610* 2106*		
4S	7E	21 E7	156	TD	TEXAS CO MINTON S	2	4170 D	3454	257	42		945	528*			1030 2516	613* 2099*		
4S	7E	21 G6	155	TD	TEXAS CO LEDBETTR D	3	4280 D	3337	257*	43		970	542*			1045	617*		
4S	7E	21 G8	152	TD	TEXAS CO ERNEST H M	3	4080 D	3291	257*	42		955	547*			1010	602*		
4S	7E	21 H5	153	TD	TEXAS CO LEDBETTR D	1	4270 D	3480	257	42		970	543*			1045 2536	618* 2109*		
4S	7E	21 H7	151	TD	TEXAS CO ERNEST H M	1	4040 C	3501	257	42		950	546*			1020 2516	616* 2112*		
4S	7E	23 E4	535	TD	KINGWOODOC LAND G L	1	4020 D	3492	257	44		936	534*			1022 2514	620* 2112*		
4S	7E	26 A6	160	TD	MAGNOLIA PETERS E	1	4180 D	3308	257	43		936	518*			1040 2539	622* 2121*		
4S	7E	26 A8	161	TD	OHIO OIL YORK MARCO	1	4360 D	3320	257	43		960	524*			1055 2568	619* 2132*		
4S	7E	26 B7	480	TD	OHIO OIL YORK MARCO	2	4380 D	3541	257	43		955	517*			1040 2550	602* 2112*		
4S	7E	26 D4	158	TD	OIL MANGMT KEITH JACB	1	4180 C	3502	257	42		950	532*			1050 2552	632* 2134*		
4S	7E	26 D6	478	LD	OHIO OIL YORK E D	2	4210 C	3300	257	44		956	535*	4	00	1046 2540	625* 2119*	4	00
4S	7E	26 D8	518	TD	NAT ASSOC PETERS I	3	4330 D	3314	257*	44		966	533*			1044	611*		
4S	7E	26 E6	543	TD	SHELL OC REBSTOCK C	1	4130 D	3299	257	43		950	537*			1030 2534	617* 2121*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4S	7E	26 F8	533	TD	NAT ASSOC REBSTOCK	4	4240 B	3302	257	44		954	530*			1042 2540	618* 2116*		
4S	7E	26 G6	159	TD	WOOD RIVER LAWRENCE A	1	4050 C	3450	257	40		915	510*			1010 2538	605* 2133*		
4S	7E	27 B3	497	TD	TEXAS CO BARNETT J	3	4310 B	3490	257	43		990	559*			1070 2572	639* 2141*		
4S	7E	27 D1	162	TD	OHIO OIL YORK E D	1	4410 D	3317	257*	43		970	529*			1060	619*		
4S	7E	27 D2	520	TD	TEXAS CO BARNETT J	4	4350 D	3330	257	44		974	539*			1070 2560	635* 2125*		
4S	7E	27 E2	481	TD	GULF REF YORK ERNST	1	4390 D	3318	257*	43		975	536*			1070	631*		
4S	7E	27 F1	482	TD	GULF REF YORK ERNST	2	4260 D	3310	257	44		965	539*			1056 2548	630* 2122*		
4S	7E	27 H1	444	TD	OHIO OIL PETERS M E	1	4070 C	3326	257	43		958	551*			1034 2512	627* 2105*		
4S	7E	30 E3	163	TD	MENHALL J MURTA	1	4460 D	3566	257	43		1070	624*			1155 2628	709* 2182*		
4S	7E	33 F2	164	TD	AETNA OC GIFFEL E J	1	4680 D	3159	257	42		1070	602*			1145 2644	677* 2176*		
4S	7E	34 D2	536	TD	NAT ASSOC THOMAS J F	1	4170 B	3298	257	44		945	528*			1050 2540	633* 2123*		
4S	7E	34 F1	545	TD	NAT ASSOC GOUDY C A	2	4170 C	3307	257	45		936	519*			1040	623*		
4S	7E	34 G2	515	TD	NAT ASSOC HAWTHRNE C	2	4220 D	3307	257	44		964	542*			1062 2540	640* 2118*		
4S	7E	34 H1	514	TD	NAT ASSOC HAWTHRNE C	1	4280 D	3304	257	44		958	530*			1052 2545	624* 2117*		
4S	7E	34 H2	516	TD	NAT ASSOC HAWTHRNE C	3	4270 G	3316	257	44		972	545*			1062 2551	635* 2124*		
4S	7E	36 F5	197	TD	SMOKEY OC YORK M E	1	4030 D	3522	257	42		990	587*			1070 2556	667* 2153*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5S	5E	5 E6	165	TD	HAMMER A J SEAL	1	4780 C	3463	256	41		950	472*			1025 2515	547* 2037*		
5S	5E	11 A1	166	TD	CARTER OC LESLIE I	1	4910 D	3608	256	42		958	467*			1055 2570	564* 2079*		
5S	5E	13 C6	167	TD	LEDDETTR H HUNT	1	4720 B	3567	256	40		990	518*			1060 2563	588* 2091*		
5S	5E	19 C6	479	LD	MAGNOLIA MATHENEY	1	4470 C	3393	256	44		870	423*	4	00	960 2446	513* 1999*	5	00
5S	5E	22 H2	4	DD	KNIGHT PCC SANDUSKY F	4	5160 P	956	256	5		951	435*	5	04				
5S	5E	22 H5	171	TD	MIDSUN OC HOFFMAN A	1	5250 D	3508	256	41		972	447*			1058 2568	533* 2043*		
5S	5E	27 C4	168	TD	FOTIADES H MANGIS E A	1	5110 D	3482	256	42		945	434*			1020 2525	509* 2014*		
5S	5E	33 G2	172	TD	MAGNOLIA MOORE S A	1	4570 C	3430	256	42		870	413*			955 2462	498* 2005*		
5S	5E	34 H8	6	DD	AMCOKECHEM MOORE S A	1	4909 P	989	256	20		896	405*	5	03	984	493*	3	06
5S	5E	36 A1	7	DD	ROTRAMEL T BENNET S H	1	4900 T	979	256	10		904	414*			973	483*		
5S	6E	3 E1	173	TD	KINGWOODOC JHNSN CA W	1	4850 C	3592	256	41		1054	569*			1135 2632	650* 2147*		
5S	6E	11 E6	174	TD	1 NAT PET MALONE G E	1	4570 D	3542	256	43		1000	543*			1070 2534	613* 2077*		
5S	6E	13 B3	175	TD	BLCKSTCK H WEBB M W	1	4480 C	3518	256	40		910	462*			1000 2516	552* 2068*		
5S	6E	23 E3	176	TD	NADEL&GSMN JONES BELL	1	4340 B	3340	256	43		825	391*			915 2420	481* 1986*		
5S	6E	23 E7	177	TD	TEXAS CO MEADOR M	1	4470 D	3400	256	43		852	405*			945 2427	498* 1980*		
5S	6E	23 G5	178	TD	NADEL&GSMN MEAD H	1	4100 D	3219	256	43		804	394*			890 2396	480* 1986*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5S	6E	27 A3	183	TD	CARTER OC FREIL T M	3	4050 C	3068	256*	41		700	295*			798	393*		
5S	6E	27 A4	185	TD	CARTER OC FREIL T M	6	4080 C	2963	256*	41		705	297*			798	390*		
5S	6E	27 A5	196	TD	PARKER DRC TROBAUGH W	2	4160 D	2983	256	41		720	304*			805 2317	389* 1901*		
5S	6E	27 B2	184	TD	CARTER OC FREIL T M	4	3990 C	3056	256	41		700	301*			790 2296	391* 1897*		
5S	6E	27 B3	200	TD	CARTER OC FREIL T M	2	3980 D	2964	256*	40		703	305*			795	397*		
5S	6E	27 B4	182	TD	CARTER OC FREIL T M	1	4040 B	2956	256*	40		710	306*			795	391*		
5S	6E	27 B5	192	TD	PARKER DRC TROBAUGH W	1	4070 D	3076	256*	41		710	303*			800	393*		
5S	6E	27 C2	188	TD	EXCHNGE OC STELLE JON	4	3930 C	2954	256*	40		704	311*			794	401*		
5S	6E	27 C3	187	TD	EXCHNGE OC STELLE JON	2	4020 C	2958	256*	40		716	314*			805	403*		
5S	6E	27 C4	186	TD	EXCHNGE OC STELLE JON	1	4020 C	2965	256*	40		705	303*			795	393*		
5S	6E	27 C5	179	TD	EXCHNGE OC ABBOTT W A	1	4030 D	2967	256	40		705	302*			795 2320	392* 1917*		
5S	6E	27 D2	190	TD	SNCLR WYOM STELLE JON	6	3990 D	3056	256*	41		710	311*			800	401*		
5S	6E	27 D3	189	TD	EXCHNGE OC STELLE JON	5	3960 C	3049	256*	40		705	309*			795	399*		
5S	6E	27 D5	181	TD	EXCHNGE OC ABBOTT W A	2	3980 C	3057	256*	41		701	303*			796	398*		
5S	6E	27 E2	191	TD	CARTER OC STRUBNGR B	3	3950 G	3043	256*	41		702	307*			795	400*		
5S	6E	27 E3	199	TD	CARTER OC STRUBNGR B	2	3980 D	3040	256*	41		710	312*			795	397*		
5S	6E	27 E4	195	TD	CARTER OC STRUBNGR B	1	4000 C	3082	256*	41		715	315*			802	402*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5S	6E	27 E5	180	TD	SNCLR WYOM MORRIS J F	1	4010 D	3275	256	41		710	309*			797 2320	396* 1919*		
5S	6E	27 F1	193	TD	CARTER OC STRUBNGR B	5	3980 D	3234	256	41		715	317*			805 2280	407* 1882*		
5S	6E	27 F3	194	TD	CARTER OC STRUBNGR B	4	3990 D	3049	256*	41		715	316*			810	411*		
5S	6E	27 H6	20	CH	BRANT C E		4110 P	1919	256			748	337*	7	00				
5S	6E	27 H6	24	DD	AMCOKECHEM MORRIS JOE	12	4064 P	829	256			743	337*	5	09	824	418*	4	09
5S	6E	30 A5	201	TD	SUN OC SWANK WHTE	1	4650 D	3516	256	42		890	425*			955 2490	490* 2025*		
5S	6E	34 A1	235	TD	SHELL OC PORTER N	3	3980 D	2947	256*	40		650	252*			750	352*		
5S	6E	34 A2	219	TD	SHELL OC PORTER N	1	4040 D	2953	256*	40		660	256*			760	356*		
5S	6E	34 A3	231	TD	SHELL OC PORTER N	5	4060 D	2955	256*	40		670	264*			765	359*		
5S	6E	34 A4	230	TD	SHELL OC PORTER N	8	4100 D	2960	256*	40		680	270*			775	365*		
5S	6E	34 A5	220	TD	EXCHNGE OC FREIL M E	15C	4180 D	3049	256*	41		685	267*			780	362*		
5S	6E	34 A6	218	TD	SNCLR WYOM FREIL M E	18C	4180 C	3063	256*	41		685	267*			775	357*		
5S	6E	34 A7	217	TD	LAIN OG HOOD C W	1	4280 C	3246	256	40		695	267*			780 2330	352* 1902*		
5S	6E	34 B1	234	TD	SHELL OC PORTER N	7	4020 D	2952	256*	40		664	262*			758	356*		
5S	6E	34 B3	232	TD	SHELL OC PORTER N	2A	4110 D	3061	256*	41		680	269*			780	369*		
5S	6E	34 B4	233	TD	SHELL OC PORTER N	6	4130 D	2963	256	40		684	271*			798 2294	385* 1881*		
5S	6E	34 B5	221	TD	EXCHNGE OC FREIL M E	13C	4310 D	3094	256*	40		690	259*			785	354*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5S	6E	34 C1	229	TD	EXCHNGE OC FREIL M E	11A	3970 C	2960	256	42		669	272*			759 2272	362* 1875*		
5S	6E	34 C2	228	TD	EXCHNGE OC FREIL M E	9A	4070 D	3061	256*	40		680	273*			770	363*		
5S	6E	34 C3	224	TD	EXCHNGE OC FREIL M E	8B	4100 C	3069	256*	40		684	274*			784	374*		
5S	6E	34 C4	225	TD	EXCHNGE OC FREIL M E	10B	4200 C	2966	256*	40		695	275*			790	370*		
5S	6E	34 C5	215	TD	EXCHNGE OC FREIL M E	12B	4180 C	3200	256*	41		691	273*			786	368*		
5S	6E	34 C6	214	TD	SNCLR WYOM FREIL M E	19B	4300 D	2994	256	41		705	275*			800 2328	370* 1898*		
5S	6E	34 D1	226	TD	EXCHNGE OC FREIL M E	4A	3990 C	3041	256*	40		676	277*			766	367*		
5S	6E	34 D2	227	TD	EXCHNGE OC FREIL M E	1A	4160 D	3055	256*	40		700	284*			785	369*		
5S	6E	34 D3	222	TD	EXCHNGE OC FREIL M E	2B	4200 C	2976	256	40		695	275*			790 2305	370* 1885*		
5S	6E	34 D4	223	TD	EXCHNGE OC FREIL M E	3B	4290 C	2970	256*	40		705	276*			795	366*		
5S	6E	34 D5	216	TD	EXCHNGE OC FREIL M E	7B	4290 C	2985	256*	41		710	281*			800	371*		
5S	6E	34 E1	212	TD	HINKLE&STL L & N RR	2	4030 G	2953	256*	40		667	264*			772	369*		
5S	6E	34 E1	213	TD	KINGWOODOC MORRIS	7	4040 D	3045	256*	41		670	266*			770	366*		
5S	6E	34 E2	210	TD	KINGWOODOC MORRIS F M	1	4160 D	3299	256*	40		685	269*			788	372*		
5S	6E	34 E3	206	TD	GULF REF MORRIS G W	1	4340 C	2982	256*	40		710	276*			805	371*		
5S	6E	34 E4	208	TD	GULF REF MORRIS G W	2	4440 D	3000	256	40		715	271*			815 2346	371* 1902*		
5S	6E	34 E5	204	TD	EXCHNGE OC FREIL M E	5B	4210 C	2990	256*	40		705	284*			805	384*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5S	6E	34 F2	211	TD	STELLE J H L & N RR	1	4140 C	2960	256*	40		685	271*			790	376*		
5S	6E	34 F3	209	TD	KINGWOODOC MORRIS	3	4360 C	2992	256*	40		715	279*			815	379*		
5S	6E	34 F4	207	TD	GULF REF MORRIS G W	3	4660 D	3022	256*	40		745	279*			845	379*		
5S	6E	34 F5	205	TD	HOSS L B CAMPBELL G	1	4600 D	3022	256*	41		735	275*			795	335*		
5S	6E	34 G4	203	TD	GULF REF AUSTIN J	3	4510 D	3120	256	41		735	284*			830 2356	379* 1905*		
5S	6E	34 H3	202	TD	GULF REF AUSTIN J	1	4270 D	2983	256*	40		715	288*			810	383*		
5S	6E	35 A8	377	TD	TEXAS CO EDWARD G G	3	3940 D	2949	256*	40		650	256*			758	364*		
5S	6E	35 C1	241	TD	MCBRIDEINC GEN AM INS	1	3880 C	3500	256	39		700	312*			805 2332	417* 1944*		
5S	6E	35 C8	240	TD	EXCHNGE OC FREIL M E	14A	3990 D	3053	256*	41		662	263*			760	361*		
5S	6E	35 D8	239	TD	HAYES DRC MORRIS	6	4000 D	3044	256*	41		665	265*			760	360*		
5S	6E	35 E8	236	TD	ILL PROD JACKSON	3	3970 C	3041	256	41		665	268*			765 2279	368* 1882*		
5S	6E	35 F1	238	TD	EXCHNGE OC GEN AM INS	1	3920 D	3300	256	40		695	303*			805 2328	413* 1936*		
5S	6E	35 G8	237	TD	HAYES DRC HOOD E	1	3940 C	2968	256	40		665	271*			770 2289	376* 1895*		
5S	6E	36 A1	245	TD	PURE OC UNION CEN	1	3820 D	3035	257*	42		700	318*			785	403*		
5S	6E	36 B2	244	TD	PURE OC UNION CEN	2	3830 D	3085	257	43		700	317*			800 2290	417* 1907*		
5S	6E	36 E1	243	TD	EASON OC PRINCE C M	2	4030 D	3083	257	41		715	312*			810 2310	407* 1907*		
5S	6E	36 H2	242	TD	KINGWOODOC WEIR J	1	4170 D	3315	257	41		750	333*			850 2352	433* 1935*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5S	7E	2 D3	506	TD	KINGWOODOC SWADER J	1	4640 D	3605	257	44		996	532*			1100 2608	636* 2144*		
5S	7E	3 E5	247	TD	OHIO OIL 1 NAT BANK	1	4530 C	3587	257	41		1000	547*			1100 2580	647* 2127*		
5S	7E	10 C4	532	TD	NAT ASSOC JOHNSN V	3	5270 D	3398	257	44		1006	479*			1120 2604	593* 2077*		
5S	7E	10 I3	537	TD	WISER OC JOHNSN V	2	5010 D	3364	257	45		966	465*			2592	2091*		*0
5S	7E	10 G2	539	TD	DUNCAN WJR FLATLEY	1	5140 C	3358	257	45		988	474*			2610	2096*		
5S	7E	10 G5	544	TD	NAT ASSOC DOWNEN C F	5	4870 C	3372	257*	45		960	473*						
5S	7E	11 E8	248	TD	KINGWOODOC MCGUIR J M	1	4940 D	3590	257	40		980	486*			2614	2120*		*0
5S	7E	14 F5	249	TD	LOMELN&WMS BGGRSTFF E	1	4290 D	3547	257	43		905	476*			2564	2135*		
5S	7E	15 H3	498	LD	NAT ASSOC RUBINACKER	1	4880 D	3367	257	44		988	500*	4	00	1085 2586	597* 2098*	5	00
5S	7E	17 G5	250	TD	DELTA OPC HALL CONS	1	4250 D	3498	257	42		934	509*			1045 2590	620* 2165*		
5S	7E	22 C7	251	TD	ZEPHYR DRC STEPHENS W	.1	4600 C	3576	257	41		922	462*			1051 2583	591* 2123*		
5S	7E	31 A4	252	TD	CAMERON OC GRIFFITH E	1	3970 G	3159	257	41		662	265*			762 2307	365* 1910*		
5S	7E	31 A6	258	TD	PURE OC CONSOL MIT	1	3890 C	3220	257	42		666	277*			754 2281	365* 1892*		
5S	7E	31 A7	318	TD	PURE OC UNION CEN	1	3820 C	3032	257*	42		675	293*			775	393*		
5S	7E	31 D6	253	TD	TEXAS CO LOGAN M P	1	3890 D	3219	257	41		690	301*			790 2298	401* 1909*		
5S	7E	31 D8	254	TD	TEXAS CO LOGAN M P	2	3920 D	3062	257	42		695	303*			795 2300	403* 1908*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5S	7E	31 E8	483	TD	SNCLR WYOM PRINCE J W	2	3940 C	3067	257*	41		695	301*			795	401*		
5S	7E	31 F8	246	TD	KINGWOODOC PRINCE	1	3960 D	3257	257	40		698	302*			794 2315	398* 1919*		
5S	7E	31 G8	255	TD	KINGWOODOC SMITH F L	1	4000 D	3225	257	41		705	305*			800 2318	400* 1918*		
5S	7E	31 H1	28	DD	AMCOKECHEM MUNSLL F M	14	3940 B	802	257	20	4	696	302*	5	07	796	402*	4	09
5S	7E	33 E5	530	TD	NAT ASSOC TYLER J M	1	4960 D	3378	257	44		854	358*			960 2496	464* 2000*		
5S	7E	33 F4	531	TD	NAT ASSOC TYLER J M	2	4810 D	3259	257	44		832	351*			928 2498	447* 2017*		
5S	7E	35 C1	256	TD	REESE&HETH KLEMM	1	4820 C	3486	257	42		850	368*			2556	2074*		
6S	5E	6 A1	257	TD	CLLHN&MRMY ULRICH	1	5420 D	3490	256	41		945	403*			1030 2532	488* 1990*		
6S	5E	11 A1	260	TD	SHELL OC COX L	B1	5220 D	3387	256*	41		810	288*			880	358*		
6S	5E	11 A2	259	TD	SHELL OC HATCHER B	A1A	5480 D	3440	256	42		840	292*			910 2422	362* 1874*		
6S	5E	11 A4	21	DD	AMCOKECHEM DARNAL	8	5604 P	943	256	20		886	326*	7	08	939	379*	4	04
6S	5E	11 E5	103	TD	REWARD OC HUNGATE L	1	5490 C	3353	256	42		894	345*			964 2460	415* 1911*		
6S	5E	12 A1	273	TD	TEXAS CO SMITH E	4	4500 D	3330	256	42		780	330*			840 2332	390* 1882*		
6S	5E	12 A2	274	TD	TEXAS CO SMITH E	1	4440 D	3276	256*	41		776	332*			835	391*		
6S	5E	12 A3	272	TD	SHELL OC VENTRESS C	4	4620 D	3267	256*	41		790	328*			845	383*		
6S	5E	12 A4	262	TD	SHELL OC VENTRESS C	1	4920 C	3194	256*	41		820	328*			870	378*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	5E	12 A5	271	TD	SHELL OC VENTRESS C	3	5330 D	3329	256	41		865	332*			910 2405	377* 1872*		
6S	5E	12 A7	261	TD	REWARD OC ANDERSN AB	2	4890 D	3147	256*	41		810	321*			865	376*		
6S	5E	12 A8	270	TD	REWARD OC ANDERSN AB	1	5430 D	3195	256*	41		854	311*			904	361*		
6S	5E	12 B7	263	TD	REWARD OC ANDERSN AB	4	4770 C	3251	256	41		792	315*			842 2350	365* 1873*		
6S	5E	12 C1	267	TD	PURE OC COX J A	1	4360 D	3313	256	42		770	334*			830 2322	394* 1886*		
6S	5E	12 C2	269	TD	SHELL OC COX E	1	4390 D	3305	256*	42		770	331*			820	381*		
6S	5E	12 C3	268	TD	SHELL OC COX E	2	4480 D	3104	256	43		775	327*			820 2310	372* 1862*		
6S	5E	12 E2	265	TD	SHELL OC BEU L J	1	4670 D	3142	256	42		800	333*			865 2358	398* 1891*		
6S	5E	12 G1	266	TD	SUN OC MOSS GIDN	2	5440 D	3281	256	43		884	340*			950 2456	406* 1912*		
6S	5E	12 G4	264	TD	SUN OC MOSS GIDN	1	5220 D	3420	256	41		872	350*			935 2420	413* 1898*		
6S	5E	13 A2	283	TD	OHIO OIL WHITMORE M	1	4600 D	3305	256*	42		785	325*			850	390*		
6S	5E	13 A3	282	TD	TEXAS CO LOCKWD T	6	4670 C	3345	256*	41		785	318*			845	378*		
6S	5E	13 A8	280	TD	SHELL OC CRABTREE J	B7	4800 C	3353	256*	42		780	300*			835	355*		
6S	5E	13 B5	281	TD	TEXAS CO LOCKWD M	5	4870 C	3370	256	41		790	303*			845 2360	358* 1873*		
6S	5E	13 D1	445	TD	SHELL OC SMITH C A	6A	5130 D	3374	256	42		830	317*			895 2386	382* 1873*		
6S	5E	13 E4	279	TD	SHELL OC NOHAVA J	2	5030 D	3296	256	41		805	302*			865 2374	362* 1871*		
6S	5E	13 E7	277	TD	TEXAS CO LOCKWD T	4	5160 D	3285	256	41		815	299*			875 2388	359* 1872*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	5E	13 F1	284	TD	SHELL OC SMITH C A	4	5170 C	3404	256	41		840	323*			895 2400	378* 1883*		
6S	5E	13 G3	415	TD	REWARD OC SMITH KNGT	2	4780 C	3345	256*	41		800	322*			850	372*		
6S	5E	13 H1	278	TD	TEXAS CO SMITH E	3	4730 C	3350	256*	42		800	327*			865	392*		
6S	5E	13 H5	276	TD	SHELL OC ANDERSN AB	1	5120 D	3380	256	41		835	323*			880 2390	368* 1878*		
6S	5E	13 H8	275	TD	SHELL OC LOCKWD L F	2	5530 D	3427	256	41		865	312*			910 2430	357* 1877*		
6S	5E	14 A2	294	TD	SHELL OC TRST SCHLL	2	4490 D	3333	256*	42		748	299*			805	356*		
6S	5E	14 A5	293	TD	KEWANEE OG CULWAR	A1	4510 D	3347	256*	42		750	299*			820	369*		
6S	5E	14 A8	287	TD	REWARD OC LOCKWD SAM	3	4450 D	3134	256*	41		745	300*			830	385*		
6S	5E	14 B4	291	TD	KEWANEE OG CULPEPER C	4	4670 D	3222	256	41		760	293*			830 2336	363* 1869*		
6S	5E	14 C2	292	TD	SHELL OC CRABTREE J	3	5070 D	3364	256	41		800	293*			855 2370	348* 1863*		
6S	5E	14 D1	290	TD	SHELL OC CRABTREE J	1	4910 D	3362	256*	41		790	299*			840 2355	349* 1864*		
6S	5E	14 D5	288	TD	KEWANEE OG CULWAR	B6	4880 D	3281	256	42		760	272*			850 2365	362* 1877*		
6S	5E	14 F4	289	TD	SHELL OC FLANNIGAN	1	5560 C	3440	256	41		860	304*			905 2420	349* 1864*		
6S	5E	14 G5	286	TD	GULF REF CLARK J O	1	5340 D	3258	256*	42		840	306*			902	368*		
6S	5E	14 H4	285	TD	KINGWOODOC HATCHER	1	5730 D	3232	256	41		870	297*			940 2449	367* 1876*		
6S	5E	15 A1	297	TD	GULF REF LOCKWD A	1	4610 D	3225	256	42		761	300*			850 2380	389* 1919*		
6S	5E	15 A5	296	TD	CURTIS PRO FOSTER	1	5490 C	3392	256	41		865	316*			956 2482	407* 1933*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	5E	15 B2	295	TD	GULF REF LOCKWD A	2	5090 D	3415	256	43		809	300*			898 2430	389* 1921*		
6S	5E	15 E7	505	TD	SHELL OC HARRELSN B	1	4650 D	3240	256	44		778	313*			868 2390	403* 1925*		
6S	5E	17 C2	8	DD	AMCOKECHEM POYNER A B	7	5750 B	1000	256	20		922	347*	6	05	994	419*	5	06
6S	5E	22 F5	298	TD	RING D S CRADDOCK	1	5230 C	3225	262	41		870	347*			950 2450	427* 1927*		
6S	5E	22 G4	299	TD	SUPRIOR OC DARNELL F	5	5070 D	3225	262	41		840	333*			930 2422	423* 1915*		
6S	5E	23 B1	307	TD	OIL CARRS WARREN T A	1	4260 D	3104	262	43		730	304*			812 2326	386* 1900*		
6S	5E	23 B3	306	TD	SCHULTE E WARREN F	1	4320 D	3193	262	43		760	328*			816 2353	384* 1921*		
6S	5E	23 D4	303	TD	MAGNOLIA SLOAN C R	7	4340 D	3136	262	41		744	310*			805 2342	371* 1908*		
6S	5E	23 D5	304	TD	LAYTN&MYRS SMITH J L	1	4360 D	3342	262	43		735	299*			815 2342	379* 1906*		
6S	5E	23 E1	302	TD	WHSNT&TRD LOCKWD J D	8	4320 D	3170	262	42		730	298*			795 2322	363* 1890*		
6S	5E	23 G7	305	TD	OIL MANGMT LOCKWD J D	2	4510 C	3144	262	41		775	324*			840 2368	389* 1917*		
6S	5E	23 H2	301	TD	SHELL OC CRABTREE J	B3	4490 C	3351	262	41		746	297*			808 2314	359* 1865*		
6S	5E	23 H5	300	TD	HALBRT ETL LOCKWD J B	1	4380 C	3258	262	40		740	302*			815 2320	377* 1882*		
6S	5E	24 A4	313	TD	REDWINE N MEZO J L	1	4210 D	3285	262	42		730	309*			810 2342	389* 1921*		
6S	5E	24 D3	312	TD	MAGNOLIA HAMI MCFAR	1	4320 D	3137	262	42		730	298*			820 2340	388* 1908*		
6S	5E	24 D5	314	TD	MAGNOLIA HAMILTON J	3	4260 D	3308	262	42		740	314*			810 2322	384* 1896*		
6S	5E	24 F3	311	TD	TEXAS CO SMITH L W	2	4450 D	3281	262	42		764	319*			825 2353	380* 1908*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	5E	24 F8	309	TD	CAMERON OC LOCKWOOD B1		4430 C	3120	262	41		735	292*			805 2342	362* 1899*		
6S	5E	24 G7	308	TD	SHELL OC CRABTREE J B2		4520 C	3347	262	41		735	283*			806 2334	354* 1882*		
6S	5E	24 H4	310	TD	TEXAS CO LOCKWD M 10		4700 D	3343	262	42		780	310*			850 2349	380* 1879*		
6S	5E	25 H5	315	TD	EASON OC CULPEPER R 1		4280 D	3290	262	43		735	307*			810 2337	382* 1909*		
6S	5E	26 E5	9	DD	AMCOKECHEM CARROL GUS	4	4556 P	851	262	20		795	339*	9	01	846	390*	4	10
6S	5E	26 H3	316	TD	KIOWA DRC BARKER P R 1		4290 D	3187	262	43		760	331*			820 2364	391* 1935*		
6S	5E	27 A1	317	TD	TIDE WATER DENNIS L A 1		5110 D	3426	262	42		840	329*			900 2468	389* 1957*		
6S	5E	35 B5	320	TD	GULF REF PARKS M E 1		5300 D	3267	262	43		830	300*			895 2492	365* 1962*		
6S	5E	35 D3	50	LD	OHIO OIL MOORE M C 6		5000 C	3420	262	42		795	295*	6	00	868 2444	368* 1944*	4	00
6S	5E	35 D5	376	TD	OHIO OIL MOORE M C 3		5260 C	3255	262	42		820	294*			895 2482	369* 1956*		
6S	5E	35 F3	375	TD	OHIO OIL MOORE M C 2		5070 C	3450	262	42		805	298*			870 2455	363* 1948*		
6S	5E	35 F7	378	TD	OHIO OIL MOORE M C 4		5530 C	3281	262	42		853	300*			930 2506	377* 1953*		
6S	5E	35 H5	319	TD	OHIO OIL MOORE M C 5		5630 D	3369	262	42		880	317*			940 2506	377* 1943*		
6S	5E	36 D5	519	TD	OHIO OIL MOORE M C 7		4610 D	3498	262	44		746	285*			835 2420	374* 1959*		
6S	6E	1 C1	323	TD	CARTER OC HALE I 2		3780 D	3213	257	41		637	259*			755 2215	377* 1837*		
6S	6E	1 E1	322	TD	CARTER OC HALE I 3		3790 B	3027	257	41		679	300*			775 2242	396* 1863*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	6E	1 H2	321	TD	CARTER OC HALE I	5	3810 D	3279	257	42		695	314*			795 2272	414* 1891*		
6S	6E	2 A6	379	TD	TEXAS CO EDWARD ADA	3	4190 C	3060	256	41		644	225*			742 2394	323* 1975*		
6S	6E	2 B8	324	TD	TEXAS CO EDWARD ADA	4	4180 D	3081	256	42		640	222*			740 2299	322* 1881*		
6S	6E	2 E8	325	TD	CARTER OC GRIMES J F	2	4050 G	3048	256	41		637	232*			732 2292	327* 1887*		
6S	6E	2 H8	326	TD	OHIO OIL GRIMES R E	1	3980 C	2952	256	40		650	252*			750 2285	352* 1887*		
6S	6E	3 A5	329	TD	OHIO OIL MOORE A B	3	4270 D	3068	256	41		680	253*			760 2320	333* 1893*		
6S	6E	3 B2	331	TD	OHIO OIL MATHENY O	7	4490 D	3089	256	41		665	216*			765 2330	316* 1881*		
6S	6E	3 B7	382	TD	TEXAS CO FLINT C A	1	4170 D	3187	256	41		680	263*			770 2322	353* 1905*		
6S	6E	3 C6	332	TD	OHIO OIL MOORE A B	4	4240 B	3058	256	41		690	266*			780 2315	356* 1891*		
6S	6E	3 D4	330	TD	OHIO OIL MATHENY O	1	4310 D	2976	256	40		680	249*			760 2302	329* 1871*		
6S	6E	3 F3	381	TD	TEXAS CO HOOD C W	9	4090 D	3052	256	41		658	249*			750 2282	341* 1873*		
6S	6E	3 G7	328	TD	TEXAS CO PITTMAN E	1	4300 D	3220	256	41		685	255*			775 2510	345* 2080*		
6S	6E	3 H2	327	TD	TEXAS CO EDWARD G C	1	4010 C	3051	256	40		655	254*			750 2279	349* 1878*		
6S	6E	3 H4	380	TD	TEXAS CO HOOD C W	2	4080 D	3055	256	40		672	264*			770 2290	362* 1882*		
6S	6E	4 B4	334	TD	EASON OC HOGAN P T	1	4390 D	3232	256	42		685	246*			765 2346	326* 1907*		
6S	6E	4 E3	333	TD	CAMERON OC ROTH D S	1	4720 D	3141	256	42		745	273*			825 2376	353* 1904*		
6S	6E	4 H1	10	CH	MORRISON C PITTMAN F	1 1	4591 P	2564	256*	20		718	259*	6	00				

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	6E	4 H1	36	DD	AMCOKECHEM PITTMAN	11	4586 P	803	256	20	3	719	260*	6	05	797	338*	5	00
6S	6E	6 F2	503	TD	KINGWOODOC PARKER T A	1	5140 D	3433	256	44		860	346*			932 2435	418* 1921*		
6S	6E	7 B5	335	TD	TEXAS CO DIAL COMM	1	4240 D	3278	256	42		749	325*			825 2329	401* 1905*		
6S	6E	7 B7	484	TD	SHELL OC JOHNSN C W	1	4310 D	3175	256	43		757	326*			830 2322	399* 1891*		
6S	6E	7 F8	336	TD	OHIO OIL DIAL A E	1	5310 D	3208	256	42		855	324*			925 2435	394* 1904*		
6S	6E	10 F4	338	TD	TEXAS CO LAGER B	1	4280 D	3200	256	41		675	247*			755 2324	327* 1896*		
6S	6E	10 H5	337	TD	OHIO OIL BETHELL J	1	4200 D	3069	256	41		658	238*			745 2312	325* 1892*		
6S	6E	11 A3	349	TD	TEXAS CO HNDRSN COM	2	4130 D	3108	256	43		650	237*			750 2305	337* 1892*		
6S	6E	11 B6	348	TD	TEXAS CO HNDRSN COM	1	4130 D	3092	256	42		655	242*			730 2297	317* 1884*		
6S	6E	11 B7	104	TD	MAGNOLIA BETTS BRKR	1	4090 C	3300	256	42		680	271*			760 2325	351* 1916*		
6S	6E	11 D6	346	TD	TEXAS CO MCDONALD E	1	4230 D	3081	256	41		660	237*			750 2309	327* 1886*		
6S	6E	11 E4	48	LD	TEXAS CO MCDONALD E	6	4030 C	3076	256	42		645	242*	5	06	730 2278	327* 1875*	4	00
6S	6E	11 E7	345	TD	OHIO OIL DURNELL F	1	4250 D	3110	256	41		660	235*			754 2307	329* 1882*		
6S	6E	11 F2	339	TD	TEXAS CO DAVNPRT G	1	3870 D	3284	256	42		635	248*			725 2270	338* 1883*		
6S	6E	11 G4	340	TD	FORD GEO ANDERSON	1	4050 D	3254	256	42		645	240*			735 2290	330* 1885*		
6S	6E	11 H7	347	TD	TEXAS CO TURNER J R	2	4110 C	3068	256*	41		634	223*			745	334*		
6S	6E	11 H8	11	DD	AMCOKECHEM MCDONALD	5	4193 P	754	256	20		640	221*	5	03	747	328*	6	01

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	6E	12 A7	343	TD	CARTER OC MAYBERRY J	2	3950 D	3078	257	42		680	285*			760 2304	365* 1909*		
6S	6E	12 B3	356	TD	CARTER OC JOHNSN CAR	2	4150 D	3090	257	42		672	257*			780 3212	365* 2797*		
6S	6E	12 B8	342	TD	CARTER OC MAYBERRY J	1	3890 B	3068	257	42		650	261*			750 2286	361* 1897*		
6S	6E	12 C5	105	TD	TEXAS CO IRWIN M	2	3910 C	3066	257	42		665	274*			750 2278	359* 1887*		
6S	6E	12 D1	351	TD	SHELL OC DAILY W W	3	3830 C	3038	257	41		615	232*			726 2244	343* 1861*		
6S	6E	12 D4	352	TD	CARTER OC SHORT P	1	3850 C	3055	257	42		638	253*			738 2266	353* 1881*		
6S	6E	12 D8	341	TD	CARTER OC MAYBERRY M	1	3830 D	3058	257	42		665	282*			740 2272	357* 1889*		
6S	6E	12 F2	355	TD	SHELL OC DAILY W W	7	3810 C	3243	257	41		620	239*			725 2226	344* 1845*		
6S	6E	12 F8	354	TD	SHELL&PURE RAWLS J E	3	3880 D	3060	257	42		658	270*			752 2278	364* 1890*		
6S	6E	12 H1	350	TD	SHELL OC DAILY W W	6	3810 D	3032	257	41		610	229*			710 2211	329* 1830*		
6S	6E	12 H6	353	TD	SHELL OC RAWLS J E	2	3800 D	3062	257	42		658	278*			750 2268	370* 1888*		
6S	6E	13 C5	12	DD	ROTRML TOM CLARK E W		3966 P	795	256	9		703	306*	7	09	788	391*	5	06
6S	6E	13 E2	446	TD	MARKHM DRC PEARSN G E	1	4430 D	2514	257	43		730	287*			838 2385	395* 1942*		
6S	6E	13 F8	363	TD	TEXAS CO HATTON M F	1	4060 D	3129	257	42		685	279*			780 2340	374* 1934*		
6S	6E	13 G1	357	TD	TEXAS CO JOHNSN R R	12	4120 D	3110	257	42		670	258*			770 2329	358* 1917*		
6S	6E	13 H4	358	TD	POLOTIS A MAYBERRY	2	4290 D	3124	257	42		702	273*			790 2361	361* 1932*		
6S	6E	13 H6	360	TD	TEXAS CO HALL J C	C1	4080 D	3100	257*	42		690	282*			780 2325	372* 1917*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	6E	13 M8	359	TD	TEXAS CO JOHNSN J A	2	4080 D	3105	257	42		695	287*			770 2325	362* 1917*		
6S	6E	14 M2	362	TD	TEXAS CO JOHNSN J A	1	4140 D	3124	256*	42		665	251*			765	351*		
6S	6E	14 M3	361	TD	KINGWOODOC WARING	1	4190 C	3358	256	40		680	261*			770 2329	351* 1910*		
6S	6E	17 E5	523	TD	TEXAS CO HARRISON R	1	4380 D	3150	256	44		746	308*			805 2375	367* 1937*		
6S	6E	17 E7	13	DD	AMCOKECHEM PRINCE	2	4497 P	835	256	20		768	318*	9	01	825	375*	4	07
6S	6E	18 B7	364	TD	SMOKEY OC CLUCK J B	1	4960 C	3342	256	41		830	334*			895 2400	399* 1904*		
6S	6E	18 D6	365	TD	PURE OC ALLEN MER	1	5130 D	3415	256	43		845	332*			910 3415	397* 2902*		
6S	6E	18 F4	486	TD	TEXAS CO DAVIS MRT	1	4680 D	3330	256	43		790	322*			860 2380	392* 1912*		
6S	6E	18 F6	367	TD	TEXAS CO GOTT F	1	5320 D	3209	256*	42		860	328*			925	393*		
6S	6E	18 G8	366	TD	TEXAS CO HALL J C	1	4680 C	3323	256	42		805	337*			855 2365	387* 1897*		
6S	6E	18 M5	501	TD	TEXAS CO HALL J C	A3	4480 D	3325	256	42		790	342*			845 2350	397* 1902*		
6S	6E	19 D8	504	TD	MAGNOLIA CLARK J S	1	4370 D	3309	262	44		744	307*			834 2375	397* 1938*		
6S	6E	21 G3	368	TD	TEXAS CO MANN J	1	4010 D	3375	262	43		690	289*			782 2390	381* 1989*		
6S	6E	22 A3	448	TD	TEXAS CO JOHNSN G T	3	3850 D	3280	262	43		650	265*			750 2334	365* 1949*		
6S	6E	22 B6	447	TD	TEXAS CO TEDFORD C	2	3880 D	3112	262	43		648	260*			740 2349	352* 1961*		
6S	6E	22 F1	23	DD	AMCOKECHEM	10	3794 P	784	262	20		681	302*	6	08	778	399*	4	09
6S	6E	22 F6	369	TD	TEXAS CO JHNSN A G	1	3860 D	3355	262	41		645	259*			740 2360	354* 1974*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	6E	24 M1	524	TD	TEXAS CO WEBB E M	1	3940 D	2456	261	44		684	290*			788 2344	394* 1950*		
6S	6E	25 H8	370	TD	OHIO OIL MILLER V H	1A	3760 B	3360	261	40		690	314*			790 2349	414* 1973*		
6S	6E	25 K3	547	DD	AMCOKECHEM UNDERWOOD	17	3730 C	844	261	20		632	259*	4	04	806	433*	3	08
6S	6E	26 B6	374	TD	TEXAS CO JOHNSN R F	1	3880 C	3110	262	43		638	250*			740 2300	352* 1912*		
6S	6E	26 C3	525	TD	TEXAS CO JOHNSN R F	2	3780 D	3116	262	44		646	268*			744 2312	366* 1934*		
6S	6E	26 C7	373	TD	TUESDAY OC HALL PHIL	3	3810 C	3110	262	41		640	259*			745 2300	364* 1919*		
6S	6E	26 E8	372	TD	TEXAS CO IRWIN O	6	3880 C	3100	262	42		652	264*			755 2327	367* 1939*		
6S	6E	26 G8	371	TD	TEXAS CO IRWIN H	1	3810 D	3135	262	42		658	277*			758 2334	377* 1953*		
6S	6E	27 B2	389	TD	TEXAS CO JOHNSON C	4	3840 C	3109	262	43		638	254*			750 2304	366* 1920*		
6S	6E	27 B7	387	TD	TEXAS CO WILSON F R	2	3870 D	3115	262	43		648	261*			750 2325	363* 1938*		
6S	6E	27 D2	388	TD	TEXAS CO IRWIN O	7	3830 C	3100	262	42		630	247*			730 2311	347* 1928*		
6S	6E	27 D8	386	TD	TEXAS CO MCGILL R L	3	3880 D	3102	262	42		640	252*			740 2342	352* 1954*		
6S	6E	27 E4	385	TD	TEXAS CO SHAVITZ F	4	3860 D	3101	262	42		634	248*			735 2307	349* 1921*		
6S	6E	27 E8	383	TD	TEXAS CO HALL RNYR	3	3880 D	3127	262	42		635	247*			730 2340	342* 1952*		
6S	6E	27 G3	384	TD	YNGBLD J L JOHNSN R M	1	3860 D	3316	262	41		650	264*			750 2320	364* 1934*		
6S	6E	27 G5	52	LD	PIERSON LEE	3	3850 G	3112	262	43		643	258*	5	00	745	360*	3	00
6S	6E	27 G6	344	TD	PERRN&PRSN LEE J R	1	3880 D	3076	262	42		644	256*			742 2339	354* 1951*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	6E	28 A1	391	TD	TEXAS CO WILSON F R	4	4180 C	3176	262	43		685	267*			782 2384	364* 1966*		
6S	6E	28 C1	449	TD	TEXAS CO MCGILL R L	6	3920 D	3116	262	43		654	262*			754 2348	362* 1956*		
6S	6E	28 E1	390	TD	TEXAS CO HALL R	5	3920 C	3137	262	43		635	243*			735 2348	343* 1956*		
6S	6E	29 G8	22	DD	AMCOKECHEM	9	4044 P	842	262	20		735	331*	6	06	838	434*	4	01
6S	6E	31 C2	392	TD	KINGWOODOC LASSWELL D	1	4880 D	3433	262	41		770	282*			860 2470	372* 1982*		
6S	6E	33 G1	14	DD	AMCOKECHEM COTTER E	3	4097 P	835	262	20	3	667	257*	5	11	768	358*	4	03
6S	6E	34 B2	526	TD	TEXAS CO RANDOLPH G	1	4230 D	3172	262	44		657	234*			773 2344	350* 1921*		
6S	6E	34 B4	485	TD	TEXAS CO JOHNS S L	3	4190 D	3152	256	44		665	246*			765 2359	346* 1940*		
6S	6E	34 B8	534	TD	TEXAS CO JOHNSN T T	1	4160 D	3153	262	44		667	251*			770 2374	354* 1958*		
6S	6E	34 C5	396	TD	TEXAS CO COTTER G	1	4070 D	3131	262	43		657	250*			760 2348	353* 1941*		
6S	6E	34 E1	394	TD	TEXAS CO BROWN COM	2	3970 D	3288	262	43		645	248*			750 2326	353* 1929*		
6S	6E	34 E7	397	TD	TEXAS CO RUSSELL F	1	4020 D	3300	262	43		660	258*			760 2352	358* 1950*		
6S	6E	34 G3	393	TD	TEXAS CO BOND M	1	3910 D	3080	262	41		645	254*			748 2312	357* 1921*		
6S	6E	34 G6	395	TD	TEXAS CO COTTER E	1	3920 D	3138	262	42		650	258*			755 2339	363* 1947*		
6S	6E	34 H2	51	LD	TEXAS CO JOHNSON C	5	3870 C	3103	256	43		646	259*	6	00	752 2305	365* 1918*	4	00
6S	6E	35 C8	402	TD	TEXAS CO SMITH M E	1	4050 C	3165	262	42		650	245*			760 2328	355* 1923*		
6S	6E	35 D4	401	TD	MAGNOLIA IRWIN W	1	4060 D	3163	262	42		660	254*			760 2352	354* 1946*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	6E	35 G3	399	TD	OIL CARRS IRWIN ORVL	1	3810 B	3094	262	43		630	249*			730 2308	349* 1927*		
6S	6E	35 G7	398	TD	TEXAS CO SMITH M A	2	3880 C	3145	262	43		630	242*			740 2314	352* 1926*		
6S	6E	35 H2	400	TD	OIL CR ETL IRWIN ORVL	2	3770 B	3104	262	43		625	248*			730 2304	353* 1927*		
6S	7E	3 C8	541	TD	NAT ASSOC LITTLE G	1	4480 D	3419	257	44		792	344*			895 2454	447* 2006*		
6S	7E	3 E2	403	TD	DELTA ETAL JOHNSN CAR	1	4270 C	3407	257	42		770	343*			890 2466	463* 2039*		
6S	7E	5 B8	405	TD	SHELL OC BEAGLE N J	7	3770 D	3027	257	42		634	257*			745 2271	368* 1894*		
6S	7E	5 D6	406	TD	MCBRIDEINC WINTERS C	1	3800 D	3235	257	42		680	300*			770 2312	390* 1932*		
6S	7E	5 D8	49	LD	SHELL OC KERN J C	1	3900 D	3059	257	42		655	265*	5	00	760 2284	370* 1894*	5	00
6S	7E	5 G8	404	TD	CAMERON OC HALL BGRST	1	3960 C	3065	257	42		685	289*			780 2325	384* 1929*		
6S	7E	6 A1	414	TD	SHELL OC BEAGLE N J	9	3760 D	3014	257	43		610	234*			710 2248	334* 1872*		
6S	7E	6 A8	412	TD	PURE OC CUPPY E	23	3790 C	3013	257	41		605	226*			720 2202	341* 1823*		
6S	7E	6 B5	413	TD	PURE OC CUPPY E	3	3790 D	2981	257	40		590	211*			695 2222	316* 1843*		
6S	7E	6 D4	411	TD	KINGWOODOC WILSON	1	3780 C	3213	257	40		610	232*			700 2237	322* 1859*		
6S	7E	6 E8	410	TD	KINGWOODOC DODD G E	8	3810 D	3014	257	41		670	289*			750 2246	369* 1865*		
6S	7E	6 G2	409	TD	CAMERON OC JOHNSN B F	2	4050 C	3073	257	42		675	270*			760 2303	355* 1898*		
6S	7E	6 H8	407	TD	PURE OC PHILLIPS M	A1	3810 C	3030	257	42		680	299*			770 2259	389* 1878*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	7E	7 A1	424	TD	PURE OC MAYBERRY K	5	3740 D	3030	257	43		620	246*			732 2271	358* 1897*		
6S	7E	7 A8	425	TD	CAMERON OC KERN	8	3890 G	3058	257	42		622	233*			727 2272	338* 1883*		
6S	7E	7 B3	418	TD	PURE OC MAYBERRY K	1	3780 D	3035	257	41		580	202*			720 2255	342* 1877*		
6S	7E	7 B5	426	TD	CAMERON OC KERN J C	1	3890 D	3005	257	41		590	201*			720 2253	331* 1864*		
6S	7E	7 D3	423	TD	TEXAS CO JOHNSN R R	4	3850 C	3015	257*	41		590	205*			725	340*		
6S	7E	7 D5	420	TD	TEXAS CO CLARK J E	2	3850 D	3010	257	41		600	215*			720 2232	335* 1847*		
6S	7E	7 D8	422	TD	PURE OC FAIRWTHR S	A3	3860 D	3045	257	41		600	214*			714 2244	328* 1858*		
6S	7E	7 F2	421	TD	SHELL OC RITCHESN A	4	3790 C	3015	257	41		585	206*			710 2228	331* 1849*		
6S	7E	7 F5	417	TD	TEXAS CO DAVIS M	4	3790 D	2986	257*	41		590	211*			715	336*		
6S	7E	7 G4	416	TD	TEXAS CO DAVIS M	3	3770 D	2670	257	40		580	203*			700 2214	323* 1837*		
6S	7E	7 G7	427	TD	PURE OC CUPPY E	10	3820 D	2996	257	41		595	213*			720 2199	338* 1817*		
6S	7E	7 H6	419	TD	PURE OC CUPPY E	9	3810 D	2995	257*	41		590	209*			710	329*		
6S	7E	8 B6	429	TD	TEXAS CO MILLER V H	2	3740 C	3075	257	42		625	251*			712 2302	338* 1928*		
6S	7E	8 D6	433	TD	TEXAS CO MILLER V H	1	3750 D	3075	257	42		630	255*			752 2288	377* 1913*		
6S	7E	8 D8	434	TD	OHIO OIL HALL C W	1	3760 D	3009	257	41		595	219*			738 2265	362* 1889*		
6S	7E	8 F6	432	TD	PURE OC CONSOL WEA	1	3750 C	3027	257	42		632	257*			755 2274	380* 1899*		
6S	7E	8 F8	435	TD	TEXAS CO CLARK WM	2	3770 D	3031	257*	42		615	238*			745	368*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	7E	8 G7	430	TD	TEXAS CO DAVIS M	13	3750 C	3038	257*	42		618	243*			735	360*		
6S	7E	8 G8	428	TD	TEXAS CO DAVIS M	12	3770 D	3024	257	41		615	238*			715 2247	338* 1870*		
6S	7E	8 H6	431	TD	GULF REF NEEL S	1	3750 D	3027	257	42		635	260*			745 2286	370* 1911*		
6S	7E	13 G7	529	TD	REWARD OC WALKER C C	1	5120 D	3514	257	44		822	310*			946 2556	434* 2044*		
6S	7E	17 B8	443	TD	GULF REF JOHNSN B W	1	3750 D	3209	257	42		598	223*			720 2285	345* 1910*		
6S	7E	17 D2	455	TD	WASHBURN J ARNOLD	1	3750 C	3340	257	43		638	263*			760 2316	385* 1941*		
6S	7E	17 D6	438	TD	PURE OC LAYMAN J C	A3	3730 D	2770	257	42		605	232*			730 2292	357* 1919*		
6S	7E	17 E7	453	TD	TEXAS CO HALL J C	B10	3740 D	2764	257*	42		610	236*			738	364*		
6S	7E	17 F6	454	TD	PURE OC LAYMAN J C	A2	3740 C	3062	257	42		630	256*			760 2307	386* 1933*		
6S	7E	17 F8	452	TD	TEXAS CO HALL J C	B3	3720 D	3213	257*	42		620	248*			745	373*		
6S	7E	17 G7	451	TD	TEXAS CO HALL J C	B8	3750 C	2768	257	42		635	260*			760 2304	385* 1929*		
6S	7E	17 H8	450	TD	TEXAS CO HALL J C	B1	3750 D	3032	257	42		622	247*			755 2292	380* 1917*		
6S	7E	18 A1	474	TD	TEXAS CO HALL J C	B9	3770 D	3060	257*	42		605	228*			735	358*		
6S	7E	18 A3	473	TD	MENHALL J HARRAWOOD	1	3920 D	3065	257	42		644	252*			770 2283	378* 1891*		
6S	7E	18 A5	470	TD	TEXAS CO SIERKS M	1	3920 D	3090	257*	43		660	268*			760	368*		
6S	7E	18 B6	458	TD	PURE OC JOHNSN CON	1	4060 D	3122	257	43		668	262*			790 2324	384* 1918*		
6S	7E	18 C1	472	TD	TEXAS CO HALL J C	B7	3760 C	3048	257	42		590	214*			725 2266	349* 1890*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	7E	18 C3	471	TD	SHELL OC MORRIS G W	4	3810 D	3059	257*	42		615	234*			725	344*		
6S	7E	18 C4	439	TD	SHELL OC MORRIS G W	6	3880 D	2417	257*	43		622	234*			734	346*		
6S	7E	18 C6	456	TD	SHELL OC MORRIS SHT	2	3900 D	3069	257*	42		620	230*			734	344*		
6S	7E	18 C6	457	TD	SHELL OC WEBB E	3	4070 D	2467	257*	43		660	253*			760	353*		
6S	7E	18 C8	469	TD	PURE OC ST CLAIR G	A3	4110 D	2474	257	43		680	269*			800 2388	389* 1977*		
6S	7E	18 D3	440	TD	SHELL OC MORRIS G W	5	3810 C	2416	257	43		610	229*			732 2240	351* 1859*		
6S	7E	18 D5	441	TD	SHELL OC WEBB E	4	3940 D	2432	257*	43		625	231*			742	348*		
6S	7E	18 E1	468	TD	TEXAS CO HALL J C	B6	3740 C	3059	257*	42		605	231*			730	356*		
6S	7E	18 E6	442	TD	SHELL OC MORRIS SHT	3	4150 D	3106	257*	43		648	233*			758	343*		
6S	7E	18 E7	462	TD	SHELL OC SHELTON J	1	4090 D	3117	257	42		645	236*			750 2310	341* 1901*		
6S	7E	18 F4	467	TD	KINGWOODOC SHELTON J	1	3790 D	3028	257	42		604	225*			708 2254	329* 1875*		
6S	7E	18 G1	466	TD	SHELL OC SUMMERS M	4	3740 D	3075	257*	42		612	238*			725	351*		
6S	7E	18 G3	465	TD	SHELL OC SUMMERS M	3	3790 D	3052	257*	42		600	221*			720	341*		
6S	7E	18 G8	461	TD	TEXAS CO JOHNSN R R	13	3990 C	3078	257	42		645	246*			760 2301	361* 1902*		
6S	7E	18 H2	464	TD	SHELL OC SUMMERS M	2	3820 D	3057	257	42		605	223*			715 2276	333* 1894*		
6S	7E	18 H4	463	TD	SHELL OC SUMMERS M	1	3830 D	3033	257*	41		585	202*			705	322*		
6S	7E	18 H6	460	TD	SHELL OC MORRIS G W	2	3900 D	3060	257	42		605	215*			720 2265	330* 1875*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
6S	7E	18 M8	459	TD	TEXAS CO JOHNSN R R	11	3960 D	3075	257*	41		635	239*			750	354*		
6S	7E	19 G3	437	TD	GULF REF HARRAWD D	1	3900 D	3078	261	43		656	266*			780 2310	390* 1920*		
6S	7E	19 G5	475	TD	MENHALL J HARRAWD R	1	3830 C	2772	261	43		650	267*			770 2308	387* 1925*		
6S	7E	19 M4	476	TD	MAT PET HARRAWD CM	1	3890 B	3063	261	43		650	261*			785 2296	396* 1907*		
6S	7E	19 M8	487	TD	TEXAS CO WHEELER A	6	3930 D	2450	261	44		670	277*			790 2332	397* 1939*		
6S	7E	20 M8	477	TD	MENHALL J HAMMOND T	1	3750 B	3066	261	43		590	215*			710 2309	335* 1934*		
6S	7E	24 C6	488	TD	TEXAS CO MCMAHON J	1	4370 D	3384	261	43		740	303*			835 2442	398* 2005*		
6S	7E	28 E1	489	TD	RYAN OC HUNT W A	1	3690 C	3332	261	41		650	281*			2388	2019*		
6S	7E	30 B2	490	TD	HERNDN DRC PORTER J H	1	3730 C	3346	261	40		648	275*			2376	2003*		
6S	7E	32 A7	491	TD	MCBRIDEINC MARSCH L	1	3660 D	3472	261	43		680	314*			795 2383	429* 2017*		
6S	7E	33 M4	499	LD	INB FRM BR SEYMOUR	1	3660 G	3349	261	44		651	285*	4	00	764 2401	398* 2035*	5	00
6S	7E	36 M6	492	TD	MARTIN R B MCKENZIE C	1	4420 C	3295	261	41		680	238*			790 2409	348* 1967*		
7S	5E	3 F5	18	BC	TRI COUNTY WEBER SON	1012	4539 P	845	262	21		758	304*			837	383*		
7S	5E	4 E4	19	DD	AMCOKECHEM JHNSN WRGT	6	4510 H	792	262	20	3	729	278*	9	00	787	336*	5	05
7S	5E	14 C4	39	BS	AMCOKECHEM JONES G H	22	4650 C	833	262	20	3	731	266*	6	08	828	353*	5	00
7S	5E	17 A6	527	TD	SNCLR WYOM RUSSELL C	1	4400 D	3139	262	44		670	230*			776 2350	336* 1910*		

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
7S	5E	17 M4	542	TD	SWANN A K HEDGES W J	1	4830 D	3422	262	44		700	217*			2400	1917*		
7S	5E	18 A5	27	DD	AMCOKECHEM PLASTER J	16	4505 P	786	262	20		688	238*	6	06	778	328*	3	09
7S	6E	4 B8	29	DD	AMCOKECHEM DEAN	20	4257 P	829	262	22		725	299*	7	02	822	396*	6	03
7S	6E	7 E2	30	DD	AMCOKECHEM	21	4030 P	790	262	22		702	299*	6	08	782	379*	4	10
7S	6E	8 C6	31	DD	AMCOKECHEM LEWIS J	22	3998 P	778	262	22		694	294*	7	00	772	372*	5	03
7S	6E	8 E5	538	TD	PHILLIPS FED COKE	1	4010 D	3362	262	43		701	300*			784 2384	383* 1983*		
7S	6E	9 A3	493	TD	ALMA OC DAVIS P	1	4011 C	3388	262	39		675	274*			760 2345	359* 1944*		
7S	6E	9 F1	32	DD	AMCOKECHEM BURNNETT W	24	4052 P	764	262	20		673	268*	6	08	758	353*	4	08
7S	6E	14 G2	16	DC	TRI COUNTY ALLEN GEO	1008	3944 P	776	262	20		679	285*			770	376*		
7S	6E	15 H8	17	DC	TRI COUNTY DAVIS A	1010	3878 P	731	262	21		643	255*			725	337*		
7S	6E	16 G5	26	DD	AMCOKECHEM	13	3896 P	764	262	20		663	273*	7	00	757	367*	6	09
7S	6E	17 D1	495	TD	ADKINS E S FEDCOKECHM	2	3970 D	3344	262	41		670	273*			745 2292	348* 1895*		
7S	6E	17 D4	494	TD	ADKINS E S FEDCOKECHM	1	4110 D	3266	262	41		702	291*			780 2318	369* 1907*		
7S	6E	17 D5	34	DD	AMCOKECHEM	23	4119 P	772	262	22		698	286*	7	11	765	353*	5	04
7S	6E	18 F3	33	DD	AMCOKECHEM HARGRAVE J	19	4230 P	793	262	22		706	283*	8	02	786	363*	5	08

TABULATED DATA ON KEY BEDS

HAMILTON COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6				Line 1 — Coal No. 5 2 — Little Menard			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness		Depth (Feet)	Altitude (Feet)	Thickness	
														Ft.	In.			Ft.	In.
7S	7E	15 D6	15	BC	TRI COUNTY KENNEDY F	1001	3594 P	660	261	20		547	188*			654	295*		
7S	7E	15 H5	436	TD	CAMERON OC DONLEY M	1	3810 C	3279	257	42		588	207*			710 2310	329* 1929*		
7S	7E	17 A6	496	TD	ROBINSON C PORTER R&W	1	3840 C	3660	262	39		550	166*			665 2280	281* 1896*		
7S	7E	18 T6	548	BD	AMCOKECHEM JOHNSON A	24	3980 C	696	261	21	3	594	196*	5	10	690	292*	5	08

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TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
					RICHLAND FEB 1 1946														
2N	8E	1 A8	198	TD	PURE OC CHAFFIN E S C PALZO & G D	C1	4110 D	3110		44		946 724 540 1210	535* 313* 129* 799*			1010 904 2400	599* 493* 1989*		
2N	8E	1 C8	186	TD	PURE OC KLNGSMTH H S C PALZO & G D	A1	4370 D	3110		44		974 758 576 1240	537* 321* 139* 803*			1088 928 2430	651* 491* 1993*		
2N	8E	1 G6	89	TD	PURE OC FRYMAN CON S C PALZO & G D	B1	4460 D	3100		44		994 750 580 1270	548* 304* 134* 824*			 948 2421	 502* 1975*		
2N	8E	1 G8	350	TD	PURE OC GRUBB M M PALZO	4	4470 D	3083		44		1003 1276	556* 829*			1066 954 	619* 507* 		
2N	8E	1 H7	182	TD	PURE OC GRUBB M M PALZO & G D	2	4450 D	3085		44		996 1282	551* 837*			1064 954 2403	619* 509* 1958*		
2N	8E	2 D5	183	TD	PURE OC SHARP G W PALZO & G D	B1	4120 D	2982		44		968 814 1250	556* 402* 838*			1034 924 2386	622* 512* 1974*		
2N	8E	2 F1	180	TD	PURE OC GRUBB M M S C PALZO & G D	3	4340 D	3065		44		985 575 1264	551* 141* 830*			1050 937 2403	616* 503* 1969*		
2N	8E	2 F5	185	TD	PURE OC ORR E A S C PALZO & G D	A2	4370 D	3070		45		994 730 575 1270	557* 293* 138* 833*			1058 946 2414	621* 509* 1977*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	8E	2 F7	184	TD	PURE OC PIERCE H B PALZO & G D	A1	4320 D	3080		45		998 1270	566* 838*			1060 954 2422	628* 522* 1990*		
2N	8E	2 G2	179	TD	PURE OC GRUBB M M PALZO & G D	5	4230 D	3045		44		970 800 1260	547* 377* 837*			1044 930 2395	621* 507* 1972*		
2N	8E	2 H1	181	TD	PURE OC GRUBB M M PALZO & G D	1	4330 C	3055		44		985 780 1270	552* 347* 837*			1045 930 2389	612* 497* 1956*		
2N	9E	5 G6	10	TD	WERNR&MLLR SMITH CRRL S C & NO 4	1	4450 C	3140		41		983 776 589	538* 331* 144*			1054 942 1148	609* 497* 703*		
2N	9E	6 D8	187	TD	PURE OC WHRRLL CON S C PALZO & G D	1	4420 D	3088		44		963 746 570 1236	521* 304* 128* 794*			1030 922 2434	588* 480* 1992*		
2N	9E	7 G7	11	TD	PURE OC VAN MATRE G D	1	4140 C	3036		38		940 725	526* 311*			1015 900 2416	601* 486* 2002*		
2N	9E	11 D2	226	TD	BREHM C E BREHM M F S C PALZO & G D	1	4300 D	3270		45		990 750 558 1280	560* 320* 128* 850*			1060 946 2574	630* 516* 2144*		
2N	9E	12 H7	12	TD	PURE OC BORAH O C NO 4 G D	1A	4130 C	3185		41		968 742	555* 329*			1048 907 1138 2543	635* 494* 725* 2130*		
2N	9E	13 D8	228	TD	PURE OC HOWARD J C S C PALZO & G D	A1	4070 D	3243		45		968 726 540 1206	561* 319* 133* 799*			1025 930 2590	618* 523* 2183*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	10E	5 A8	304	TD	STANLND OG JENNINGS G 1 S C PALZO & G D		4380 D	3290		44		1006 758 554 1310	568* 320* 116* 872*			1080 936 2575	642* 498* 2137*		
2N	10E	5 G8	197	TD	PURE OC SLCHNMYR P A1 S C PALZO & G D		4410 D	3230		45		1006 756 554 1285	565* 315* 113* 844*			1078 932 2530	637* 491* 2089*		
2N	10E	6 A2	192	TD	PHILLIPS RICHLAND 2 S C PALZO & G D		4280 D	3156		45		976 738 540 1258	548* 310* 112* 830*			1054 918 2568	626* 490* 2140*		
2N	10E	6 B1	193	TD	PHILLIPS RICHLAND 1 S C PALZO & G D		4330 D	3161		44		990 746 554 1240	557* 313* 121* 807*			1065 926 2573	632* 493* 2140*		
2N	10E	6 B5	229	TD	PURE OC WILSON C L B1 S C PALZO & G D		4070 D	3172		45		942 700 500 1230	535* 293* 93* 823*			1014 880 2542	607* 473* 2135*		
2N	10E	6 D1	194	TD	PHILLIPS KUHL 1 S C PALZO & G D		4250 D	3280		44		970 728 520 1250	545* 303* 95* 825*			1046 904 2560	621* 479* 2135*		
2N	10E	6 D3	191	TD	PHILLIPS TRACY 1 S C PALZO & G D		4070 D	3144		44		952 712 516 1240	545* 305* 109* 833*			1024 886 2556	617* 479* 2149*		
2N	10E	6 F3	195	TD	PHILLIPS BOHLANDER 2 S C PALZO & G D		4160 D	3238		44		960 712 520 1240	544* 296* 104* 824*			1030 890 2556	614* 474* 2140*		
2N	10E	7 C7	321	TD	PURE OC MULLINAX J A1 S C PALZO & G D		4060 C	3134		45		970 724 520 1266	564* 318* 114* 860*			1054 900 2544	648* 494* 2138*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	10E	7 D3	326	TD	ROSS C R BOWEN ETAL S C PALZO & G D	1	4180 D	3157		45		975 733 537 1263	557* 315* 119* 845*			1049 913 2564	631* 495* 2146*		
2N	10E	7 D5	231	TD	COOP REF ROTRAMEL C S C PALZO & G D	1	4050 D	3126		45		956 714 524 1245	551* 309* 119* 840*			1034 894 2542	629* 489* 2137*		
2N	10E	7 E6	230	TD	COOP REF EDE ETAL S C PALZO & G D	2	4040 D	3126		45		960 720 514 1246	556* 316* 110* 842*			1034 894 2544	630* 490* 2140*		
2N	10E	7 G2	330	TD	PHILLIPS DELILAH S C PALZO & G D	6	4160 D	3143		45		978 738 523 1268	562* 322* 107* 852*			1054 918 2551	638* 502* 2135*		
2N	10E	7 H1	196	TD	PHILLIPS DELILAH S C PALZO & G D	1	4290 D	3281		44		1000 750 544 1296	571* 321* 115* 867*			1074 938 2562	645* 509* 2133*		
2N	10E	10 D1	13	TD	1 NAT PET RICHEY S C & NO 4 G D	1	4550 C	3368		43		1048 825 602	593* 370* 147*			1128 1003 1230 2695	673* 548* 775* 2240*		
2N	10E	14 A8	189	TD	JACKSN L B MCDONALD R PALZO & G D	1	4770 D	3365		44		1020 776 1320	543* 299* 843*			1102 976 2700	625* 499* 2223*		
2N	10E	17 A7	349	TD	PURE OC RITTER CON PALZO & G D	B1	4360 D	3222		45		980 737 1262	544* 301* 826*			1046 910 2615	610* 474* 2179*		
2N	10E	18 E1	225	TD	PURE & JWC LAME A S C PALZO & G D	A1	4250 D	3245		45		974 734 550 1275	549* 309* 125* 850*			1048 910 2604	623* 485* 2179*		
2N	10E	19 G1	232	TD	PURE OC KIMMEL U S C PALZO & G D	1	4320 D	3266		45		974 722 540 1258	542* 290* 108* 826*			1040 906 2624	608* 474* 2192*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator / Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.									Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	10E	20 G5	223	TD	PHILLIPS NITRAM 1 S C PALZO & G D	4340 D	3304		45		996 745 454 1286	562* 311* 20* 852*			1070 930 2606	636* 496* 2172*		
2N	10E	20 H6	233	TD	CARTER J W BORAH O C 1 S C PALZO & G D	4330 D	3203		45		990 742 544 1222	557* 309* 111* 789*			1063 920 2610	630* 487* 2177*		
2N	10E	22 A3	14	TD	MARTIN R B SMITH R C 1 NO 4 G D	4580 D	3300		42		1012 764	554* 306*			1100 970 1177 2700	642* 512* 719* 2243*		
2N	10E	26 A5	305	TD	MARTIN R B BOYD C 1 PALZO & G D	4630 D	3257		43		1016 765 1310	553* 302* 847*			1100 924 2644	637* 461* 2181*		
2N	10E	26 A7	306	TD	ASHLND ORC DESCHR ETL 1 PALZO & G D	4580 D	3310		43		1012 766 1296	554* 308* 838*			1095 975 2640	637* 517* 2182*		
2N	10E	26 B4	235	TD	ASHLND ORC POWELL J A 1	4580 D	3250		44		990 742	532* 284*			 950	 492*		
2N	10E	26 C5	234	TD	ASHLND ORC BOYD C 2 PALZO & G D	4570 D	3330		44		994 744 1294	537* 287* 837*			1076 954 2650	619* 497* 2193*		
2N	10E	26 C8	15	TD	MARTIN R B DEISCHER 1 NO 4 G D	4530 C	3268		41		996 750	543* 297*			1078 955 1168 2655	625* 502* 715* 2202*		
2N	10E	26 D1	16	TD	ROBNSN ETL JENNER 1 NO 4 G D	4710 C	3326		40		977 743	506* 272*			1057 936 1150 2655	586* 465* 679* 2184*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	11E	30 C 8	17	TD	ZEPHYR DRC SIMPSON FH 1 G D		5120 D	3365		42		1080 776	508* 264*			1100 977 2671	588* 465* 2159*		
2N	14W	4 E 1	307	TD	ASHLND ORC FRDLY COMM 1 PALZO & G D		4390 D	3202	234	43		970 725 1260	531* 286* 821*			1065 900 2516	626* 461* 2077*		
2N	14W	8 C 2	20	TD	SUN OC CLDFLTR JL 1		4940 C	3276	234	41		988 758	494* 264*			1070	576*		
2N	14W	8 C 3	22	TD	OHIO OIL WHITAKER P 1 S C & NO 4 G D		4920 D	3139	234	41		990 755 592	498* 263* 100*			1073 930 1170 2578	581* 438* 678* 2086*		
2N	14W	8 E 3	21	TD	CRAFT ETL DAUBS M 1 NO 4 G D		5070 D	3169	234	41		1010 769	503* 262*			1091 949 1188 2584	584* 442* 681* 2077*		
2N	14W	8 F 2	19	TD	ARROW&TERR BUNCH A 1 NO 4 G D		4940 C	3167	234	41		997 766	503* 272*			1084 940 1168 2576	590* 446* 674* 2082*		
2N	14W	8 G 3	18	TD	SNCLR WYOM BOLEY R 1 S C & NO 4 G D		4920 C	3140	234	41		1003 771 595	511* 279* 103*			1087 943 1183 2575	595* 451* 691* 2083*		
2N	14W	13 C 2	23	TD	SEABOARD WETZEL H 1 S C & NO 4 G D		5200 C	3067	234	41	2	903 694 496	383* 174* 24			1020 868 1080 2421	500* 348* 560* 1901*		
2N	14W	16 A 8	320	TD	JOHNSTON R HUNDLEY J 1 PALZO & G D		4880 C	3133	234	45		1002 765 1307	514* 277* 819*			1103 954 2570	615* 466* 2082*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator / Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.									Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	14W	16 G7	24	TD	DUNCNW ETL BIERHAUS W 1 NO 4 G D	4730 D	3206	234	41		983 750	510* 277*			1064 933 1154 2568	591* 460* 681* 2095*		
2N	14W	17 A5	26	TD	SIEGEL I W WEESNER E 1 NO 4 G D	5010 G	3174	234	42		995 753	494* 252*			1087 930 1177 2572	586* 429* 676* 2071*		
2N	14W	17 B1	329	TD	JOHNSTON R RIDGLEY 3 S C PALZO & G D	4960 D	3144	234	45		1016 771 580 1300	520* 275* 84* 804*			1104 965 2560	608* 469* 2064*		
2N	14W	17 C3	8	LD	LVNGSTN A HOLTZ B H 1 NO 4	4900 D	3197	234	43		1000 754	510* 264*	4	00	1088 938 1190	598* 448* 700*	1	06
2N	14W	17 E6	25	TD	OHIO OIL LAMBERT M 1 NO 4 G D	4960 C	3148	234	41		996 756	500* 260*			1080 933 1179 2574	584* 437* 683* 2078*		
2N	14W	20 B5	328	TD	BRDIGE F A HILL W P 3 PALZO & G D	4840 D	3156	234	45		988 737 1284	504* 253* 800*			1071 923 2573	587* 439* 2089*		
2N	14W	20 C7	28	TD	OHIO OIL WALDEN M 1 G D	4940 C	3201		41		986 754	492* 260*			1074 928 2592	580* 434* 2098*		
2N	14W	20 F2	216	TD	OHIO OIL CHILDS C 1 NO 4	4760 D	3200	234	43		996 750	520* 274*			1084 926 1160	608* 450* 684*		
2N	14W	20 G4	27	TD	OHIO OIL HULL G G 1 NO 4 G D	4940 C	3167	234	41		998 758	504* 264*			1093 935 1183 2575	599* 441* 689* 2081*		
2N	14W	21 A2	32	TD	BONPAS DEV WOODS J 3	4440 D	3069	234	42		938 695	494* 251*			1018	574*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	14W	21 A4	31	TD	BONPAS DEV WOODS J	2	4650 C	3096	234	42		954 711	489* 246*			1034	569*		
2N	14W	21 A5	33	TD	CENTRLPIPE YONKA WLTR NO 4 G D	1	4560 D	3164	234	42		966 712	510* 256*			1038 898 1123 2510	582* 442* 667* 2054*		
2N	14W	21 B1	30	TD	BONPAS DEV WOODS J G D	1	4360 C	3100	234	41		937 690	501* 254*			874 2498	438* 2062*		
2N	14W	21 C2	303	TD	BONPAS DEV AHLFIELD PALZO & G D	1	4390 C	3102	234	42		970 690 1240	531* 251* 801*			1040 885 2512	601* 446* 2073*		
2N	14W	21 C4	29	TD	LONGHRN OC AHLFIELD L G D	1	4620 G	3198	234	42		971 721	509* 259*			1067 908 2523	605* 446* 2061*		
2N	14W	22 B6	200	TD	LETHRS ETL YONAKA A	1	4100 T	3062	234	39	3	690	280*						
2N	14W	22 G5	302	TD	FUNK L TARPLEY PALZO	1	4260 D	3110	234	43		927 685 1214	501* 259* 788*			1012 862	586* 436*		
2N	14W	28 G4	34	TD	CENTRLPIPE MCVEIGH NO 4 G D	1	4480 D	3154	234	42		946 696	498* 248*			1035 886 1104 2518	587* 438* 656* 2070*		
2N	14W	29 A6	43	TD	BRWN W ETL KOERTGE G NO 4 G D	1	4820 C	3200	234	41		947 706	465* 224*			1037 894 1123 2514	555* 412* 641* 2032*		
2N	14W	29 A7	36	TD	OHIO OIL CLDFLTR CO	2	4846 C	3146		41		951 714	466* 229*			1037	552*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	14W	29 B5	41	TD	SNCLR WYOM CLDFLTR C	5	4800 C	3113	234	41		951 714	471* 234*			1037	557*		
2N	14W	29 B7	35	TD	OHIO OIL CLDFLTR CO	1	4920 C	3130		41		967 724	475* 232*			1050	558*		
2N	14W	29 C4	42	TD	NELSON DEV EVANS H&A	1	4770 C	3133	234	41		968 723	491* 246*			1052	575*		
2N	14W	29 C5	38	TD	SNCLR WYOM CLDFLTR C	2	4770 C	3111	234	41		956 716	479* 239*			1040	563*		
2N	14W	29 C7	40	TD	SNCLR WYOM CLDFLTR C	4	4950 C	3131		41		978 734	483* 239*			1062	567*		
2N	14W	29 D5	51	TD	SNCLR WYOM CLDFLTR CO G D	1	4890 C	3125	234	41		970 734	481* 245*			1058 920 2542	569* 431* 2053*		
2N	14W	29 D7	39	TD	SNCLR WYOM CLDFLTR C	3	4970 C	3132		41		980 744	483* 247*			1068	571*		
2N	14W	29 E4	37	TD	NELSON DEV CLDFLTR C G D	1	4710 C	3130	234	41		969 735	498* 264*			1053 918 2538	582* 447* 2067*		
2N	14W	29 E5	44	TD	OHIO OIL KOERTGE H	1	4880 C	3129	234	41		975 737	487* 249*			1063	575*		
2N	14W	29 E7	49	TD	OHIO OIL KOERTGE H	3	4940 D	3136		41		975 740	481* 246*			1060	566*		

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RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
2N	14W	29 F6	50	TD	OHIO OIL KOERTGE H NO 4 G D	2	4870 D	3128	234	41		972 735	485* 248*			1058 924 1145 2542	571* 437* 658* 2055*		
2N	14W	29 G4	331	TD	BRIDGE F A MATHES C H PALZO & G D	1	4790 D	3140	234	45		963 725 1262	484* 246* 783*			1046 916 2548	567* 437* 2069*		
2N	14W	29 G5	48	TD	OHIO OIL KOERTG CLD NO 4 G D	1	4830 D	3148	234	42		968 734	485* 251*			1056 925 1145 2552	573* 442* 662* 2069*		
2N	14W	30 B1	46	TD	OHIO OIL STEVENS E NO 4 G D	1	4800 G	3129		41		952 717	472* 237*			1039 902 1135 2569	559* 422* 655* 2089*		
2N	14W	30 C1	45	TD	OHIO OIL STEVENS E	2	5005 C	3170		42		976 738	475* 237*			1060	559*		
2N	14W	30 E2	47	TD	ARROW&TERR KOERTGE H NO 4 G D	1	5040 D	3190		41		987 742	483* 238*			1072 941 1165 2590	568* 437* 661* 2086*		
3N	8E	1 F1	199	TD	PURE OC HASLER I S C PALZO & G D	A1	4420 D	3180		45		1085 885 705 1375	643* 443* 263* 933*			1170 1050 2500	728* 608* 2058*		
3N	8E	12 E5	53	TD	HELSEN V I TAYLR RDNW S C PALZO & G D	1	4410 C	3099		37		1076 810 680 1310	635* 369* 239* 869*			1135 1022 2475	694* 581* 2034*		
3N	8E	13 A2	236	TD	DUNCAN W MORRIS C G PALZO & G D	1	4470 D	2990		44		1004 804 1276	557* 357* 829*			1066 960 2418	619* 513* 1971*		

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RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	8E	13 A5	55	TD	FRAZR&SPED BRANT F M NO 4 G D	1	4420 G	3072		42		1027 841	585* 399*			1087 987 1177 2427	645* 545* 735* 1985*		
3N	8E	13 E1	188	TD	PURE OC PLEASANT W S C PALZO & G D	1	4550 B	3103		44		1026 818 635 1290	571* 363* 180* 835*			1086 972 2420	631* 517* 1965*		
3N	8E	13 E3	237	TD	BLACK PALMER P A S C PALZO & G D	1	4510 B	3019		45		1030 825 650 1300	579* 374* 199* 849*			1094 986 2430	643* 535* 1979*		
3N	8E	24 A4	291	TD	PURE OC RUSK E S C PALZO & G D	1	4490 D	3026		44		1006 826 600 1275	557* 377* 151* 826*			1065 960 2422	616* 511* 1973*		
3N	8E	24 B2	301	TD	PURE OC RUSK E S C PALZO & G D	2	4520 D	3010		44		990 590 1254	538* 138* 802*			1048 940 2419	596* 488* 1967*		
3N	8E	24 D5	111	TD	PURE OC MARTIN WM PALZO & G D	2	4380 D	2988		44		1000 1264	562* 826*			1056 944 2420	618* 506* 1982*		
3N	8E	24 F3	332	TD	PURE OC MARTIN ART PALZO & G D	4	4530 D	3018		44		1016 1270	563* 817*			1076 962 2426	623* 509* 1973*		
3N	8E	24 H1	238	TD	FULK&CRVNS MRTN A ETL PALZO & G D	2	4460 B	2995		44		1018 816 1286	572* 370* 840*			1076 960 2577	630* 514* 2131*		
3N	8E	25 B4	295	TD	PURE OC PARSNS CON S C PALZO & G D	2	4470 D	3100		43		1000 773 590 1260	553* 326* 143* 813*			1060 956 2423	613* 509* 1976*		
3N	8E	25 D1	217	TD	PURE OC KLNGENSMTH NO 4	1	4490 D	3080		43		993 774	544* 325*			1055 950 1145	606* 501* 696*		

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RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	8E	25 D6	218	TD	PURE OC KLGMT CON S C PALZO & G D	B1	4490 D	3025		44		1010 800 610 1294	561* 351* 161* 845*			1070 966 2430	621* 517* 1981*		
3N	8E	25 E1	294	TD	PURE OC ODELL L H S C PALZO & G D	1	4440 D	3055		43		995 795 586 1252	551* 351* 142* 808*			1054 948 2417	610* 504* 1973*		
3N	8E	25 F5	296	TD	PURE OC PIPHER CON S C PALZO & G D	1	4200 D	3030		44		980 782 590 1250	560* 362* 170* 830*			1040 940 2400	620* 520* 1980*		
3N	8E	25 F7	293	TD	PURE OC PIPHER H S C PALZO & G D	2	4170 D	2995		44		965 790 598 1225	548* 373* 181* 808*			1025 935 2400	608* 518* 1983*		
3N	8E	25 G6	297	TD	PURE OC PIPHER H S C PALZO & G D	1	4420 D	3100		44		1004 820 620 1270	562* 378* 178* 828*			1060 914 2420	618* 472* 1978*		
3N	8E	25 H5	219	TD	PURE OC PIPHER H S C PALZO & G D	3	4210 D	2995		44		980 580 1250	559* 159* 829*		*0	1040 940 2395	619* 519* 1974*		
3N	8E	35 B1	222	TD	PURE OC SMITH CT S C PALZO & G D	A3	4440 D	3075		44		996 808 658 1288	552* 364* 214* 844*			1061 940 2418	617* 496* 1974*		
3N	8E	35 B3	341	TD	PURE OC SMITH CT PALZO & G D	A4	4310 D	3078		44		983 1270	552* 839*			1046 938 2400	615* 507* 1969*		
3N	8E	35 D3	292	TD	PURE OC KSKDDN CON S C PALZO & G D	1	4440 D	3088		44		1002 594 1280	558* 150* 836*		*0	1055 950 2420	611* 506* 1976*		
3N	8E	36 A6	220	TD	PURE OC GRUBB AL S C PALZO & G D	A2	4480 D	3090		44		992 722 580 1284	544* 274* 132* 836*			1056 950 2410	608* 502* 1962*		

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RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	8E	36 C8	340	TD	PURE OC GUY0T C S C PALZ0 & G D	A2	4410 D	3072		44		990 764 622 1280	549* 323* 181* 839*			1054 936 2404	613* 495* 1963*		
3N	8E	36 D2	221	TD	PURE OC PHILP0TT G PALZ0 & G D	1	4540 D	3096		44		970 1240	516* 786*			1036 918 2424	582* 464* 1970*		
3N	8E	36 D5	239	TD	PURE OC BOONE H G S C PALZO & G D	2	4530 D	3090		45		984 800 584 1250	531* 347* 131* 797*			1050 928 2425	597* 475* 1972*		
3N	8E	36 E8	339	TD	PURE OC GRUBB ART S C PALZO & G D	D2	4350 D	3068		45		975 775 602 1240	540* 340* 167* 805*			1040 932 2409	605* 497* 1974*		
3N	8E	36 G2	215	TD	PURE OC GRUBB ART N0 4	B1	4490 D	3066	232	43		977 760	528* 311*			1040 932 1129	591* 483* 680*		
3N	8E	36 G8	224	TD	PURE OC GRUBB CON S C PALZO & G D	B1	4390 D	3065		45		984 785 590 1244	545* 346* 151* 805*			1094 944 2415	655* 505* 1976*		
3N	9E	2 B6	300	TD	CARDNAL OC MILLER S C PALZ0 & G D	1	4630 C	3025		44		1000 780 590 1240	537* 317* 127* 777*			1064 945 2390	601* 482* 1927*		
3N	9E	2 E2	56	TD	PURE OC MILLER D M S C G D	1	4730 C	2995		41		1000 820 625	527* 347* 152*			1068 958 2418	595* 485* 1945*		
3N	9E	3 C7	58	TD	PURE OC SNYDER A M S C G D	5	4880 C	3017		42		1035 813 633	547* 325* 145*			1100 2390	612* 1902*		

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RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	9E	3 D8	201	TD	PURE OC SNYDER A M S C & NO 4	7	4940 D	2645		43		1024 812 628	530* 318* 134*			1086 973 1154	592* 479* 660*		
3N	9E	3 F1	57	TD	STENGLE AL DAVNPRT A S C G D	1	4790 C	2985		40		1033 833 643	554* 354* 164*			978 2409	499* 1930*		
3N	9E	3 G5	310	TD	PURE OC SNYDER A S C PALZO	8	4890 D	3025		44		1025 814 635 1325	536* 325* 146* 836*			1092 974	603* 485*		
3N	9E	4 A3	117	TD	PURE OC COEN J O S C G D	36	4910 C	2650		43		1024 806 630	533* 315* 139*			1087 976 2384	596* 485* 1893*		
3N	9E	4 A7	311	TD	PURE OC COEN J O S C PALZO & G D	42	4910 D	2650		44		1030 804 635 1280	539* 313* 144* 789*			1090 980 2384	599* 489* 1893*		
3N	9E	4 C3	115	TD	PURE OC COEN J O G D	33	4960 C	2650		42		1025 807	529* 311*			1086 973 2388	590* 477* 1892*		
3N	9E	4 C4	116	TD	PURE OC COEN J O S C	34	4960 C	2650		43		1030 813 635	534* 317* 139*			983	487*		
3N	9E	4 C6	312	TD	PURE OC COEN J O S C PALZO & G D	40	4930 D	2650		44		1020 796 640 1265	527* 303* 147* 772*			1085 975 2378	592* 482* 1885*		
3N	9E	4 C7	313	TD	PURE OC COEN J O S C PALZO & G D	41	4910 D	2650		44		1024 820 642 1265	533* 329* 151* 774*			1096 978 2382	605* 487* 1891*		
3N	9E	4 D2	114	TD	PURE OC COEN J O G D	31	4940 C	2640		42		1019 802	525* 308*			1080 967 2384	586* 473* 1890*		

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RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	9E	5 C1	314	TD	PURE OC PALMER TAY 12 S C PALZO & G D		4910 D	2650		44		1030 810 635 1265	539* 319* 144* 774*			1090 982 2384	599* 491* 1893*		
3N	9E	5 G2	118	TD	GULF REF EBERHRDT MSWD1 S C & NO 4		5080 D	1744		40		1053 843 657	545* 335* 149*			1114 1005 1195	606* 497* 687*		
3N	9E	6 D3	120	TD	PURE OC NOE A B1 S C & NO 4		4630 C	3070		41		1078 868 696	615* 405* 233*			1140 1029 1218	677* 566* 755*		
3N	9E	7 A3	242	TD	PURE OC CROUSE CON 1 S C PALZO & G D		4670 D	3000		45		1042 840 662 1310	575* 373* 195* 843*			1102 1002 2412	635* 535* 1945*		
3N	9E	7 A5	243	TD	PURE OC SUMMERS C 1 PALZO & G D		4580 D	3070		45		1046 844 1320	588* 386* 862*			1110 1010 2426	652* 552* 1968*		
3N	9E	8 B8	244	TD	PURE OC HART W H 1 S C PALZO & G D		4670 D	3036		45		1015 796 640 1280	548* 329* 173* 813*			1078 975 2380	611* 508* 1913*		
3N	9E	8 H8	121	TD	OHIO OIL ARBUTHNOT 1 S C G D		4691 P	2988		37		1036 825 652	567* 356* 183*			1102 991 2402	633* 522* 1933*		
3N	9E	9 C5	338	TD	BLACK J L ROBROS ETL 1 S C PALZO & G D		4870 D	2609		44		1010 814 620 1254	523* 327* 133* 767*			1076 968 2389	589* 481* 1902*		
3N	9E	9 D2	77	TD	PURE OC HILL L R 1 S C G D		4840 D	2650		42		1021 802 618	537* 318* 134*			1088 976 2397	604* 492* 1913*		
3N	9E	9 E2	75	TD	PURE OC COEN J O 30 S C & NO 4 G D		4880 C	2650		42		1019 797 628	531* 309* 140*			1084 974 1155 2398	596* 486* 667* 1910*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	9E	9 E4	73	TD	PURE OC COEN J 0 NO 4 G D	28	4880 C	2660		42		1020 	532* 	 *0 	 	1082 964 1159 2396	594* 476* 671* 1908*	 	
3N	9E	9 E5	74	TD	PURE OC COEN J 0 S C & NO 4 G D	29	4870 C	2650		42		1016 622 	529* 135* 	 *0 	 	1082 974 1160 2387	595* 487* 673* 1900*	 	
3N	9E	9 F3	202	TD	PURE OC COEN J 0 S C & NO 4	32	4890 C	2640		42		1019 797 622 	530* 308* 133* 	 	 	1083 970 1158 	594* 481* 669* 	 	
3N	9E	9 F5	76	TD	PURE OC COEN J 0 NO 4 G D	38	4890 D	2632		43		1015 	526* 	 	 	1078 970 1158 2390	589* 481* 669* 1901*	 	
3N	9E	9 H4	203	TD	PURE OC COEN J 0 S C & NO 4	37	4920 D	2650		43		1024 803 623 	532* 311* 131* 	 	 	1086 975 1166 	594* 483* 674* 	 	
3N	9E	9 H8	315	TD	PURE OC COEN J 0 S C PALZO & G D	39	4860 D	2650		44		1025 812 628 1270	539* 326* 142* 784*	 	 	1085 976 2382	599* 490* 1896*	 	
3N	9E	10 D7	204	TD	PURE OC HEGG H S C & NO 4	1	4830 C	3050		42		1005 788 604 	522* 305* 121* 	 	 	1068 958 1139 	585* 475* 656* 	 	
3N	9E	10 E6	337	TD	BLACK J L HUNT A N S C PALZO & G D	1	4820 D	2591		43		994 776 592 1236	512* 284* 110* 754*	 	 	1064 948 2390	582* 466* 1908*	 	
3N	9E	10 F4	336	TD	BLACK J L HUNT A N S C PALZO & G D	2	4680 D	2587		44		988 780 590 1230	520* 312* 122* 762*	 	 	1056 940 2390	588* 472* 1922*	 	
3N	9E	10 F7	6	LD	CARTER OC WINTERS C S C & NO 4 G D	2	4830 D	2589		42		1015 802 620 	532* 319* 137* 	5 	00 	1084 967 1150 2380	601* 484* 667* 1897*	3 	00

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator / Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.									Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	9E	10 G8	78	TD	CARTER OC WINTERS C 1 S C & NO 4 G D	4820 D	2627		42		1020 806 613	538* 324* 131*			1086 972 1106 2374	604* 490* 624* 1892*		
3N	9E	13 A1	80	TD	WILSON DRC WILSON R 1 S C & NO 4 G D	4150 G	2750		39		979 745 560	564* 330* 145*			1041 929 1124 2457	626* 514* 709* 2042*		
3N	9E	13 H3	79	PT	HUNT ET AL STALEY 1	4520 P	1895		30		1005 765	553* 313*			1072	620*		
3N	9E	14 F1	245	TD	PURE OC HILL E M 1 S C PALZO & G D	4440 D	3105		45		990 760 575 1215	546* 316* 131* 771*			1050 944 2433	606* 500* 1989*		
3N	9E	15 E3	54	TD	BLACK J L MOSELY JNO 1 S C G D	4620 D	2995		43		1004 787 602	542* 325* 140*			1078 960 2412	616* 498* 1950*		
3N	9E	16 A2	299	TD	PURE OC MCBRIDE WL 1 S C PALZO & G D	4750 D	3060		44		996 595 1254	521* 120* 779*			1060 956 2421	585* 481* 1946*		
3N	9E	16 E7	81	TD	DEKALB OC MICHAEL J 1 S C G D	4900 T	2987		38	2	985 580	495* 90*			2390	1900*		
3N	9E	18 A8	316	TD	PURE OC MADDOX J A 1 S C PALZO & G D	4560 D	3085		44		1000 795 614 1266	544* 339* 158* 810*			1066 946 2417	610* 490* 1961*		
3N	9E	18 B8	298	TD	PURE OC MADDOX J A 2 PALZO & G D	4560 D	2993		45		1000 1270	544* 814*			1066 955 2415	610* 499* 1959*		
3N	9E	18 F4	248	TD	PURE OC TOLIVER E 1 S C PALZO & G D	4610 D	3055		45		1025 821 634 1286	564* 360* 173* 825*			1086 982 2408	625* 521* 1947*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	9E	18 F6	246	TD	PURE OC PLEASANT W 2 PALZO & G D		4560 D	3000		45		1030 826 1300	574* 370* 844*			1092 982 2413	636* 526* 1957*		
3N	9E	18 H4	247	TD	PURE OC SCHWARTZ W 2 S C PALZO & G D		4660 D	3000		45		1040 831 653 1306	574* 365* 187* 840*			1100 1000 2412	634* 534* 1946*		
3N	9E	19 A2	250	TD	PURE OC RUSK R M A5 PALZO & G D		4680 D	3018		45		990 1256	522* 788*			1050 946 2432	582* 478* 1964*		
3N	9E	19 B1	249	TD	PURE OC RUSK R M A3 PALZO & G D		4670 D	3013		45		983 1240	516* 773*			1044 938 2416	577* 471* 1949*		
3N	9E	19 B4	190	TD	PURE OC RUSK R M A1 S C G D		4610 D	3055		43		987 594	526* 133*		*0	1031 940 2402	570* 479* 1941*		
3N	9E	19 C8	333	TD	PURE OC GRUBB AL B1 S C PALZO & G D		4560 D	3015		44		996 590 1256	540* 134* 800*			1056 944 2415	600* 488* 1959*		
3N	9E	19 D3	251	TD	BRIDGE F A SAGER R 1 PALZO & G D		4600 D	3051		44		986 1250	526* 790*			1044 944 2415	584* 484* 1955*		
3N	9E	19 E4	309	TD	PURE OC EVANS W C1 S C PALZO & G D		4620 D	3005		44		990 796 600 1250	528* 334* 138* 788*			1050 945 2411	588* 483* 1949*		
3N	9E	19 E8	335	TD	PURE OC ALLARD R M A1 S C PALZO & G D		4560 D	3020		44		1004 810 602 1226	548* 354* 146* 770*			1064 944 2416	608* 488* 1960*		
3N	9E	19 F1	334	TD	PURE OC KURTZ J 1 PALZO & G D		4640 D	3046		44		980 770 1245	516* 306* 781*			1040 935 2417	576* 471* 1953*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	9E	20 A8	254	TD	PURE OC RUSK R M PALZO & G D	A4	4640 D	3022		45		981 767 1246	517* 303* 782*			1040 940 2424	576* 476* 1960*		
3N	9E	20 C6	325	TD	CARTER OC SHATTO R PALZO & G D	4	4670 D	3030		45		974 755 1240	507* 288* 773*			1040 932 2418	573* 465* 1951*		
3N	9E	20 E6	253	TD	PURE OC FLANDERS M PALZO & G D	2	4690 D	3010		45		966 762 1220	497* 293* 751*			1026 926 2422	557* 457* 1953*		
3N	9E	20 E8	252	TD	PURE OC FLANDERS M PALZO & G D	1	4640 D	3001		45		966 1226	502* 762*			1076 924 2412	612* 460* 1948*		
3N	9E	23 D1	83	TD	AM NAT DRC EVERSON S C	1	4530 G	3080		38		1007 767 593	554* 314* 140*			1062	609*		
3N	9E	27 E5	84	TD	TEXAS CO SHAN H S C G D	1	4770 D	3100		41		1007 783 600	530* 306* 123*			1071 963 2482	594* 486* 2005*		
3N	9E	29 G6	256	TD	PURE OC WRIGHT H S PALZO & G D	1	4450 D	3018		45		962 763 1230	517* 318* 785*			1026 918 2412	581* 473* 1967*		
3N	9E	29 H5	322	TD	PURE OC WRIGHT H S S C PALZO & G D	2	4540 C	3020		45		970 780 558 1224	516* 326* 104* 770*			1032 926 2415	578* 472* 1961*		
3N	9E	29 H7	255	TD	PURE OC RUSK R M PALZO & G D	A6	4630 C	3025		45		983 767 1250	520* 304* 787*			1044 940 2416	581* 477* 1953*		
3N	9E	30 A6	214	TD	PURE OC HOUT C M NO 4	1	4520 D	3075		43		961 746	509* 294*			1026 920 1115	574* 468* 663*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	9E	30 D2	317	TD	PURE OC LONG W W S C PALZO & G D	A2	4560 D	3070		44		974 765 574 1240	518* 309* 118* 784*			1040 928 2421	584* 472* 1965*		
3N	9E	30 E4	344	TD	PURE OC LONG W W S C PALZO & G D	A1	4570 D	3075		44		980 758 575 1240	523* 301* 118* 783*			1040 920 2412	583* 463* 1955*		
3N	9E	30 E7	319	TD	PURE OC SHATTO CON PALZO & G D	1	4550 D	3061		44		978 787 1240	523* 332* 785*			1040 930 2424	585* 475* 1969*		
3N	9E	30 F1	318	TD	PURE OC LONG W W PALZO & G D	A3	4610 D	3068		44		974 760 1246	513* 299* 785*			1034 926 2417	573* 465* 1956*		
3N	9E	30 F2	324	TD	PURE OC LONG W W PALZO & G D	A4	4620 C	3035		45		974 1246	512* 784*			1036 920 2411	574* 458* 1949*		
3N	9E	30 G6	345	TD	PURE OC VANBLRCM C S C PALZO & G D	1	4590 D	3008		44		992 584 1260	533* 125* 801*			1050 940 2413	591* 481* 1954*		
3N	9E	30 H1	257	TD	PURE OC RUSK R M PALZO & G D	A7	4630 D	3105		45		986 1250	523* 787*			1046 944 2420	583* 481* 1957*		
3N	9E	31 E5	5	LD	PURE OC MYERS E A NO 4 G D	1	4510 D	3098		43		967 746	516* 295*	3	00	1031 919 1120 2425	580* 468* 669* 1974*	4 2	00 00
3N	9E	32 F8	258	TD	FULK P MURVIN J G S C PALZO & G D	1	4500 D	3115		45		980 766 596 1260	530* 316* 146* 810*			1056 934 2430	606* 484* 1980*		
3N	9E	33 H8	88	TD	MARTN&GDSN TAYLOR W O S C & NO 4 G D	1	4690 C	3145		42		995 770 593	526* 301* 124*			1059 955 1145 2481	590* 486* 676* 2012*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	10E	1 B8	59	TD	OLSON OC BOYD W S C & NO 4 G D	1	5030 C	3326		42		1071 850 674	568* 347* 171*			1141 1012 1226 2584	638* 509* 723* 2081*		
3N	10E	3 G5	60	WW	OLNEY WELL PHILLIPS V		4840 H	2218		37	2	1080 850	596* 359*			1155	671*		
3N	10E	5 E4	61	TD	PAPOOSE OC LYNCH S C G D	1	4440 B	3124		38		1007 778 605	563* 334* 161*			2520	2076*		
3N	10E	6 C3	284	TD	KIOWA DRC BETBNR A C S C PALZO & G D	1	4390 B	3132		44		1010 780 628 1280	571* 341* 189* 841*			1074 956 2475	635* 517* 2036*		
3N	10E	8 C1	343	TD	1 NAT PET PADDOCK R S C PALZO & G D	1	4210 B	3253		43		1016 813 610 1270	595* 392* 189* 849*			968 2513	547* 2092*		
3N	10E	10 C3	62	TD	HIAWTHA OG POWELL K NO 4 G D	1	4730 C	3182		42		1052 825	579* 352*			1130 997 1216 2551	657* 524* 743* 2078*		
3N	10E	11 C3	63	TD	HIAWTHA OG WHARF A J NO 4 G D	1	4774 C	3301		43		1066 825	589* 348*			1140 1013 1238 2568	663* 536* 761* 2091*		
3N	10E	14 D4	342	TD	KINGWOODOC CUTSHALL S PALZO & G D	1	4460 B	3253		44		1040 800 1290	594* 354* 844*			1100 982 2568	654* 536* 2122*		
3N	10E	19 B2	283	TD	FRAZIER C SCHLMYR E PALZO & G D	1	4140 B	3197		44		956 730 1230	542* 316* 816*			1026 914 2504	612* 500* 2090*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	10E	20 D4	64	TD	OHIO OIL NELSON G C 1 S C & NO 4 G D		4190 C	3299		42		997 765 565	578* 346* 146*			1065 954 1155 2542	646* 535* 736* 2123*		
3N	10E	21 H1	259	TD	MURRAY R R KURTZ F W 1 PALZO & G D		4250 B	3278		45		1016 796 1260	591* 371* 835*			1096 972 2544	671* 547* 2119*		
3N	10E	22 E1	308	TD	NEELY R H BAUGHMAN 1 G D		4766 C	3252		37		1070 820	593* 343*			2602	2125*		
3N	10E	28 A6	282	TD	PURE OC ROSS TRESS 1 PALZO & G D		4400 D	3280		45		1004 1280	564* 840*			1075 960 2594	635* 520* 2154*		
3N	10E	32 E3	351	TD	PURE OC EBERHRDT E A1		4400 C	3250		46		1034 776	594* 336*			1124 968	684* 528*		
3N	10E	33 G4	260	TD	PURE&OHIO GREEN R L 1 PALZO & G D		4400 B	3200		45		995 765 1254	555* 325* 814*			1064 940 2600	624* 500* 2160*		
3N	10E	33 H5	281	TD	PURE&OHIO KOERTG CON 1 PALZO & G D		4390 B	3280		44		1005 770 1290	566* 331* 851*			1080 960 2592	641* 521* 2153*		
3N	11E	19 A8	9	LD	SOHIO PROD HEAP E 1 NO 4 G D		4930 C	3309		43		1073 836	580* 343*	4	00	1154 1013 1251 2669	661* 520* 758* 2176*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
3N	14W	3 E3	65	TD	SEABOARD STEBER A	1	5360 D	3126	234	42		1064 832	528* 306*			1130 995 1230 2542	594* 459* 694* 2006*		
3N	14W	6 D7	213	TD	SOHIO PROD BALMER W S C & NO 4	1	5140 D	3349		43		1148 922 732	634* 408* 218*			1228 1073 1326	714* 559* 812*		
3N	14W	11 A5	280	TD	MLLR&MCBRD ATKINS H M PALZO & G D	1	5380 B	3160	234	44		1110 870 1350	572* 332* 812*			1195 1040 2550	657* 502* 2012*		
3N	14W	12 A7	66	TD	NADEL&GSMN MCEVELLY NO 4 G D	1	5560 C	3099	234	42		1070 844	514* 288*			1147 1000 1241 2480	591* 444* 685* 1924*		
3N	14W	18 B5	67	TD	SNCLR WYOM LEGAN T NO 4 G D	1	5090 C	3382		41		1090 867	581* 358*			1174 1270 2670	665* 761* 2161*		
3N	14W	26 A5	68	TD	NADEL&GSMN EATON T F NO 4 G D	1	5080 D	3185	234	42		1060 848	552* 340*			1155 1000 1230 2547	647* 492* 722* 2039*		
3N	14W	32 A5	7	LD	SEABOARD KIMMEL M G D	1	4930 C	3231	234	42		1016 790	523* 297*	2	00	1112 963 2590	619* 470* 2097*		
3N	14W	33 E5	69	TD	HASSLER J BUNN S L NO 4 G D	1	4720 D	3180	234	43		1025 786	553* 314*			1108 948 1195 2560	636* 476* 723* 2088*		
3N	14W	34 A4	71	TD	CASE&POMRY BOWERS NO 4 G D	1	4840 G	3127	234	41		1035 789	551* 305*			1131 957 1189 2557	64?* 473* 705* 2073*		
3N	14W	34 A5	70	TD	CASE&POMRY BUNN A E NO 4 G D	1	4910 C	3211	234	41		1025 790	534* 299*			1103 953 1196 2576	612* 462* 705* 2085*		

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RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	9E	9 A3	279	TD	PURE OC GRAY W T S S C PALZO & G D	1	4800 D	3195	213	44		1120 907 720 1340	640* 427* 240* 860*			1180 1070 2510	700* 590* 2030*		
4N	9E	12 C5	278	TD	PURE OC RUNYEN R F S C PALZO & G D	1	5380 D	2955	213	44		1044 886 670 1304	506* 298* 132* 766*			1096 988 2372	558* 450* 1834*		
4N	9E	12 D1	123	TD	PURE OC BAUMAN M S C & NO 4	1	5610 C	2985	213	40		1063 872 693	502* 311* 132*			1134 1020 1208	573* 459* 647*		
4N	9E	12 E7	125	TD	PURE OC ROBERTS A S C	A1	5330 C	2970	213	42		1040 846 666	507* 313* 133*			1104 988	571* 455*		
4N	9E	13 E5	277	GW	PURE OC MOORE K C PALZO & G D	1	5320 D	2976	213	44		1065 846 1340	533* 314* 808*			1123 1010 2370	591* 478* 1838*		
4N	9E	13 E8	126	TD	OHIO OIL CHAPMAN CW S C	1	5590 C	3020	213	39		1080 872 702	521* 313* 143*			1137 1028	578* 469*		
4N	9E	13 G8	127	TD	PURE OC CHAPMAN CW S C	1	5510 C	2955	213	42		1078 869 687	527* 318* 136*			1133 1023	582* 472*		
4N	9E	14 A1	128	TD	PURE OC STORER C	1A	5110 G	3025	213	39		1035 827	524* 316*			1094 984	583* 473*		
4N	9E	22 B7	129	TD	PURE OC HASLER A S C & NO 4	A1	5290 C	3036	213	42		1100 898 716	571* 369* 187*			1161 1054 1233	632* 525* 704*		

TABULATED DATA ON KEY BEDS

RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	9E	22 D2	130	TD	PURE OC HAYS H D NO 4	1	5280 C	3015	213	42		1076 888	548* 360*			1134 1034 1208	606* 506* 680*		
4N	9E	23 A2	132	TD	MABEE J E SPARR M NO 4	1	5040 G	2619	213	39		1015 812	511* 308*			1074 972 1134	570* 468* 630*		
4N	9E	23 A5	135	TD	PURE OC WAKFLD F L	2	5080 G	2614	213	38		1043 862	535* 354*			1115	607*		
4N	9E	23 B1	209	TD	MABEE J E SPARR M	6	5040 C	2604	213	39		1015 815	511* 311*						
4N	9E	23 C1	210	TD	MABEE J E SPARR M	7	5110 C	2598	213	39		1022 806	511* 295*			1077 977	566* 466*		
4N	9E	23 C2	206	TD	MABEE J E SPARR M NO 4	3	5140 C	2618	213	39		1032 835	518* 321*			1087 986 1152	573* 472* 638*		
4N	9E	23 C3	205	TD	PURE OC CAZEL H S C & NO 4	4A	5110 G	3015	213	39		1037 843 652	526* 332* 141*			1092 992 1167	581* 481* 656*		
4N	9E	23 D1	133	TD	MABEE J E SPARR M	8	5120 G	2614	213	39		1022 810	510* 298*			1080 976	568* 464*		
4N	9E	23 D2	207	TD	MABEE J E SPARR M	4	5160 C	2595	213	39		822	306*						
4N	9E	23 E7	131	TD	PURE OC ENGLEDOW C	1	5240 C	3015	213	42		1090 910	566* 386*			1158 1045	634* 521*		

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RICHLAND COUNTY

Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	9E	24 F2	211	TD	ALLEN&HRWL SECHREST NO 4	1	4880 G	2588	213	39		1017 807	529* 319*			1081 974 1144	593* 486* 656*		
4N	9E	24 G3	143	TD	PURE OC SAYRE O	2A	4900 G	2969	213	39		1019 807	529* 317*			1077 964	587* 474*		
4N	9E	25 G4	146	TD	PURE OC LUCAS ETAL	1	4880 C	2585	213	42		1011 821	523* 333*			1069 958	581* 470*		
4N	9E	26 B4	148	TD	PURE OC HARRELL P NO 4	1	4930 C	2586		42		1022 820	529* 327*			1082 978 1150	589* 485* 657*		
4N	9E	26 C8	323	TD	PURE OC HASKELL E S C PALZO & G D	1	5030 B	2980	213	45		1042 820 656 1284	539* 317* 153* 781*			1098 996 2390	595* 493* 1887*		
4N	9E	26 H2	150	TD	PURE OC WAKFLD F L	6A	5000 G	3050	213	39		1007 822	507* 322*			1064	564*		
4N	9E	27 D2	327	TD	PURE OC WASSON L A S C PALZO & G D	2	5060 C	2989	213	45		1042 820 650 1280	536* 314* 144* 774*			1100 992 2401	594* 486* 1895*		
4N	9E	27 E7	2	LD	PURE OC MURVIN W S C	B2	5300 C	3063	213	42	2	1107 900 703	577* 370* 173*			1060	530*		
4N	9E	27 G7	151	TD	PURE OC MURVIN W S C & NO 4	B1	5380 C	2710	213	42		1090 892 703	552* 354* 165*			1148 1042 1223	610* 504* 685*		
4N	9E	28 D3	152	TD	PURE OC BOLEY L R S C & NO 4	A1	5090 C	3003	213	41		1081 870 705	572* 361* 196*			1147 1040 1207	638* 531* 698*		

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Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	9E	28 E5	276	TD	PURE OC PELAUM E S C PALZO & G D	B1	4950 D	3112	213	44		1100 886 710 1304	605* 391* 215* 809*			1170 1050 2458	675* 555* 1963*		
4N	9E	32 E2	154	TD	DUNCANBROS SCHILLING NO 4	1	5010 C	3002		40		1079 881	578* 380*			1140 1029 1210	639* 528* 709*		
4N	9E	33 E4	159	TD	PURE OC WILSON W E NO 4	A3	5310 D	3045		43		1076 858	545* 327*			1127 1022 1200	596* 491* 669*		
4N	9E	33 E5	158	TD	SHFFER ETL PFLAUM NO 4	1	5250 C	3011		41		1068 851	543* 326*			1117 1011 1198	592* 486* 673*		
4N	9E	33 G7	156	TD	SHFFR&MTCH BOLEY L R NO 4	1	5020 G	3002		42		1075 861	573* 359*			1143 1021 1207	641* 519* 705*		
4N	9E	35 D6	261	TD	PURE OC BERGER E PALZO & G D	1	4820 D	3060		45		1045 818 1275	563* 336* 793*			1114 994 2396	632* 512* 1914*		
4N	9E	35 H4	155	TD	PURE OC BETBNR A C	1	4850 D	3020		43		1021 812	536* 327*			1077 976	592* 491*		
4N	9E	36 E5	275	TD	PURE OC DIESSER T PALZO & G D	1	4810 D	3017		44		1024 796 1265	543* 315* 784*			1090 974 2404	609* 493* 1923*		
4N	10E	1 A6	91	TD	GULF ET AL DEITRICH H NO 4 G D	1	5130 D	3170	213	42		1128 902	615* 389*			1177 1050 1273 2520	664* 537* 760* 2007*		

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Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	10E	6 B8	162	TD	PURE OC WACHTEL J 5A S C & NO 4		5170 C	2940	213	40		1025 835 638	508* 318* 121*			1073 997 1043	556* 480* 526*		
4N	10E	6 G2	161	TD	PURE OC KERMICLE E A4		4840 C	2896	213	41		1021 800	537* 316*			1068 947	584* 463*		
4N	10E	7 E3	163	TD	PURE OC HOEL CONSL 1		5200 C	2940	213	40		1037 825	517* 305*			1088 968	568* 448*		
4N	10E	10 E4	285	TD	TEXAS CO KESLER I 1 S C PALZO & G D		4770 D	3151	213	44		1033 810 630 1310	556* 333* 153* 833*			1078 960 2438	601* 483* 1961*		
4N	10E	15 A5	164	TD	PYRAMD PET HOUSER 1 S C		4740 G	3024	213	39		1014 797 614	540* 323* 140*			940	466*		
4N	10E	15 C2	286	TD	TEXAS CO KOWA WM 1 PALZO & G D		4740 D	3035	213	44		1004 790 1275	530* 316* 801*			1050 940 2433	576* 466* 1959*		
4N	10E	18 D8	165	TD	DYSON&ANDR ASH 1 NO 4		5360 C	2943	213	40		1040 836	504* 300*			1092 980 1163	556* 444* 627*		
4N	10E	18 E8	166	TD	DYSON&ANDR ASH 2 NO 4		5310 C	2945	213	40		1032 822	501* 291*			1083 974 1159	552* 443* 628*		
4N	10E	19 G5	167	TD	PURE OC GERTSCH P 1 S C		4780 D	3020	213	43		1012 797 620	534* 319* 142*			1063 950	585* 472*		
4N	10E	22 A1	168	TD	PYRAMD PET SLY GEO 1 S C		4430 C	3036	213	38		1020 798 618	577* 355* 175*						

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Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	10E	22 A3	169	TD	TEXAS CO WINTERS W N0 4	1	4700 G	3081	213	38		1042 824	572* 354*			1102 980 1183	632* 510* 713*		
4N	10E	22 E6	3	LD	TEXAS CO HASSLNGR K S C & N0 4 G D	1	4710 C	3136	213	42		1030 809 638	559* 338* 167*	5	00	1082 965 1155 2455	611* 494* 684* 1984*		
4N	10E	22 F1	262	TD	TEXAS CO SCHERER C PALZO & G D	4	4500 D	3131	213	44		770 1255	320* 805*		*0	1050 920 2443	600* 470* 1993*		
4N	10E	22 F4	287	TD	TEXAS CO BAIRD M S C PALZO & G D	2	4650 D	3140	213	44		1015 790 604 1260	550* 325* 139* 795*			1065 946 2450	600* 481* 1985*		
4N	10E	22 G2	288	TD	TEXAS CO SCHERER C S C G D	2	4780 D	3032	213	44		1026 801 624	548* 323* 146*			1080 900 2458	602* 422* 1980*		
4N	10E	22 H1	289	TD	TEXAS CO SCHERER C PALZO & G D	3	4780 B	3153	213	44		1020 800 1308	542* 322* 830*			1070 950 2462	592* 472* 1984*		
4N	10E	23 B1	267	TK	TEXAS CO SCHERER J S C PALZO & G D	3	4690 D	3073	213	45									
4N	10E	23 C2	268	TK	TEXAS CO SCHERER J S C PALZO & G D	4	4830 B	3077	213	45									
4N	10E	23 D1	266	TD	TEXAS CO SCHERER J PALZO & G D	1	4820 C	3078	213	45		1030 830 1310	548* 348* 828*			1100 980 2495	618* 498* 2013*		
4N	10E	23 E4	265	TK	TEXAS CO FRITSCHL W S C PALZO & G D	7	4900 B	3181	213	45									

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	10E	23 F3	264	TD	TEXAS CO FRITSCHL W S C PALZO & G D	5	4860 D	3087	213	45		1030 821 656 1310	544* 335* 170* 824*			1100 976 2494	614* 490* 2008*		
4N	10E	23 G7	170	TD	GULF REF DEHLINGR R S C & NO 4	1	4490 D	3289	213	39		1005 785 607	556* 336* 158*			1050 925 1140	601* 476* 691*		
4N	10E	23 H1	263	TD	TEXAS CO FRITSCHL W PALZO & G D	4	4890 D	3184	213	45		1014 798 1250	525* 309* 761*			1062 950 2495	573* 461* 2006*		
4N	10E	24 A8	346	TD	TEXAS CO FRITSCHL W PALZO & G D	8	4940 D	3088	213	45		1060 838 1325	566* 344* 831*			1110 990 2506	616* 496* 2012*		
4N	10E	24 C8	271	TD	TEXAS CO FRITSCHL W S C PALZO & G D	3	4880 D	3090	213	45		1032 826 653 1315	544* 338* 165* 827*			1103 980 2506	615* 492* 2018*		
4N	10E	24 D7	272	TD	TEXAS CO FRITSCHL W S C G D	6	4900 D	3090	213	45		1028 825 647	538* 335* 157*			1100 976 2519	610* 486* 2029*		
4N	10E	24 G6	269	TD	TEXAS CO FRITSCHL W PALZO & G D	1	4950 C	3195	213	45		1008 806 1310	513* 311* 815*			1076 956 2530	581* 461* 2035*		
4N	10E	24 G8	270	TD	TEXAS CO FRITSCHL W PALZO & G D	2	4960 D	3091	213	45		1014 806 1266	518* 310* 770*			1066 958 2507	570* 462* 2011*		
4N	10E	24 H3	171	TD	GULF ET AL FRITSCHL W S C & NO 4	1	5010 D	3112	213	42		1067 848 676	566* 347* 175*			1115 988 1210	614* 487* 709*		
4N	10E	26 B8	173	TD	SYLVESTR F MILLER	1	4950 T	3137		38		1092 879	597* 384*			1153	658*		

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	10E	26 G7	175	TD	PYRAMD PET U OF CHI S C & NO 4	3	4460 C	3060	213	38		1025 809 625	579* 363* 179*			1077 956 1167	631* 510* 721*		
4N	10E	26 H1	347	TK	TEXAS CO FRITSCHL W S C PALZO & G D	9	4760 D	3083	213	45									
4N	10E	26 H3	348	TD	SLAGTR AJR WTTLWRTH A S C PALZO & G D	1	4490 B	3050	213	45		1026 785 610 1300	571* 336* 161* 851*			1075 935 2472	626* 486* 2023*		
4N	10E	26 H8	174	TD	PYRAMD PET U OF CHI	1	4460 C	3036	213	38		1025 800	579* 354*						
4N	10E	27 C6	177	TD	MENHALL CO MILLER B S C & NO 4	1	4680 D	3082	213	42		1048 826 631	580* 358* 163*			1104 985 1177	636* 517* 709*		
4N	10E	27 E8	176	TD	KINGWOODOC ALLEN	1	4640 C	3045	213	38		1040 820	576* 356*			1100	636*		
4N	10E	34 F6	72	TD	SOWSTRN OG CITY OLNEY S C & NO 4	1	4650 C	3096		43		1071 847 666	606* 382* 201*			1132 1000 1212	667* 535* 747*		
4N	10E	35 H8	178	TD	KINGWOODOC MCCANE	1	4940 G	3141		38		1122 897	628* 403*			1183	689*		
4N	11E	6 E1	99	TD	MAGNOLIA STERCHI S NO 4	1	5070 C	3062	213	41		1072 854	565* 347*			1117 1003 1210	610* 496* 703*		

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
4N	11E	6 G1	136	TD	OLSON OC NUDING A F NO 4	1	5060 C	3055	213	41		1086 863	580* 357*			1130 1015 1227	624* 509* 721*		
4N	14W	6 F8	92	TD	NOLF E G NUDING A F G D	1	4940 D	3041	213	41		1062 842	568* 348*			1105 992 2480	611* 498* 1986*		
4N	14W	6 G5	137	TD	NOLF OC STERCH HRS NO 4	2	5000 C	3056	213	42		1084 861	584* 361*			1128 1012 1228	628* 512* 728*		
4N	14W	10 F1	138	TD	BOLES E A PETTY W	1	4840 G	3094	212	42		1027	543*						
4N	14W	11 F7	4	LD	LEE R TRST MILLER J NO 4 G D	1	4830 C	3057	212	42		1013 793	530* 310*	4	00	1077 946 1175 2424	594* 463* 692* 1941*	3	00
4N	14W	16 F1	139	TD	SUN OC RENNIER S C & NO 4	1	5670 C	3202	212	43		1126 912 728	559* 345* 161*			1187 1293	620* 726*		
4N	14W	23 A5	140	TD	YORK ET AL RICHEY NO 4	1	4800 D	3073	212	41		984 768	504* 288*			1046 916 1144	566* 436* 664*		
4N	14W	30 C8	141	TD	GULF ET AL BOHRER L S C & NO 4	1	4900 D	3235	213	42		1111 888 696	621* 398* 206*			1170 1030 1270	680* 540* 780*		

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	9E	25 C1	102	TD	POWERS R R WRIGHT F NO 4 G D	1	4920 G	2921	213	42		1043 797	551* 305*			1089 977 1147 2347	597* 485* 655* 1855*		
5N	9E	28 E5	103	TD	GULF REF WAKEFLD L NO 4 G D	1	4970 B	3183	213	42		1152 926	655* 429*			1205 1274 2446	708* 777* 1949*		
5N	9E	31 H8	273	TD	KINGWOOD OC KLINGER G S C PALZO & G D	1	4880 C	3177		45		1100 904 708 1345	612* 416* 220* 857*			1150 1054 2486	662* 566* 1998*		
5N	9E	36 B5	105	TD	PURE OC CAVINS W G D	1	4900 C	2950	213	41		1013 805	523* 315*			1059 947 2337	569* 457* 1847*		
5N	10E	25 C5	212	TD	GULF REF STERCHI H S C & NO 4	3	5010 C	3013	213	43		1085 868 702	584* 367* 201*			1124 1010 1201	623* 509* 700*		
5N	10E	25 C7	106	TD	GULF REF MOSSER C G D	2	4970 C	2995	213	43		1082 865	585* 368*			1121 1010 2438	624* 513* 1941*		
5N	10E	25 E7	290	TD	GULF REF HARDING L G D	1	4920 D	2990	213	44		1080 838	588* 346*			1120 1008 2430	628* 516* 1938*		
5N	10E	26 A1	109	TD	GULF REF STIFF C G D	2	4940 B	2998	213	42		1084 860	590* 366*			1124 1008 2433	630* 514* 1939*		
5N	10E	26 E4	110	TD	PURE OC STIFF E G D	1	4820 C	2993	213	43		1057 836	575* 354*			1096 980 2400	614* 498* 1918*		

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Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	10E	26 G1	107	TD	SUN OC HARDING L	1	4850 D	2993	213	42		1078	593*						
5N	10E	26 G3	108	TD	SUN OC MILLER O G D	1	4810 D	2954	213	42		1068 846	587* 365*			1111 992 2408	630* 511* 1927*		
5N	10E	29 C2	112	TD	PURE OC BARTLETT F G D	1	4500 C	3117	213	39	8	1000 781	550* 331*			933 2301	483* 1851*		
5N	10E	30 E3	90	TD	PURE OC HEAP M G D	1	4870 C	3455	213	39		1025 805	538* 318*			1063 959 2305	576* 472* 1818*		
5N	10E	31 D5	100	TD	PURE OC MURRY G	2A	4850 C	2900	213	39		995 787	510* 302*			931	446*		
5N	10E	31 D7	241	TD	PURE OC KROPP E E S C	1A	4860 C	2902	213	39		1002 813 606	516* 327* 120*						
5N	10E	33 A2	274	TD	PURE OC STIFF J E PALZO & G D	A1	4760 B	3057	213	45		1046 824 1255	570* 348* 779*			1090 980 2380	614* 504* 1904*		
5N	10E	35 E1	1	LD	GULF REF RITTER J C G D	1	5100 B	3033	213	42		1097 876	587* 366*	4	00	1138 1035 2450	628* 515* 1940*		
5N	10E	35 G1	93	TD	GULF ET AL STIFF C NO 4 G D	1	5000 B	3011	213	42		1102 875	602* 375*			1145 1024 1229 2436	645* 524* 729* 1936*		
5N	10E	35 G3	94	TD	GULF REF BERRY L G D	1	4980 B	3018	213	42		1092 869	594* 371*			1134 1018 2430	636* 520* 1932*		

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Location of Hole			County Number	Type of Hole	Operator	Op'r's Number	Surface Altitude	Total Depth	Quad. Number	Year Drilled	Doubtful Information	Line 1 — Coal No. 6 2 — West Franklin 3 — Shoal Creek 4 — Palzo				Line 1 — Coal No. 5 2 — Coal No. 7 3 — Coal No. 4 4 — Glen Dean			
Twp.	Range	Sec.										Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.	Depth (Feet)	Altitude (Feet)	Thickness Ft.	Thickness In.
5N	10E	36 E7	227	TD	GULF REF RITTER J C PALZO & G D	2	5050 B	3037	213	42		1090 854 1300	585* 349* 795*			1130 1006 2596	625* 501* 2091*		
5N	10E	36 G7	95	TD	GULF REF HAHN C NO 4 G D	1	5030 B	3020	213	42		1086 867	583* 364*			1130 1002 1208 2438	687* 499* 705* 1935*		
5N	10E	36 H6	240	TD	GULF REF STERCHI H PALZO & G D	4	5030 B	3055	213	43		1082 870 1454	579* 367* 951*			1204 1026 2437	701* 523* 1934*		
5N	11E	31 A1	97	TD	JABLNSKI F STERCHI G D	1	5170 C	3053	213	42		1105 881	588* 364*			1149 1039 2502	632* 522* 1985*		
5N	14W	31 A5	98	TD	HELMRH&PYN STERCH HRS NO 4 G D	2	5040 C	3085	213	42		1095 870	591* 366*			1140 1025 1240 2478	636* 521* 736* 1964*		
5N	14W	31 C3	96	TD	HELMRH&PYN VN ALMEN J NO 4 G D	1	5040 C	3032	213	42		1088 861	584* 357*			1132 1016 1230 2475	628* 512* 726* 1971*		
5N	14W	31 C7	101	TD	LEBOW S VN ALMEN P NO 4 G D	1	5200 C	3075	213	42		1113 888	593* 368*			1154 1039 1244 2507	634* 519* 724* 1987*		

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