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MINERAL RESOURCE
RECORDS DIVISION
Noe, A.C.
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ILLINOIS STATE
GEOLOGICAL SURVEY

REPORT
ON
COAL STRIPPING AREA
AT
CARRIER MILLS NEAR HARRISBURG
ILLINOIS

A. C. NOÉ
DEPARTMENT OF GEOLOGY
THE UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS, U.S.A.



O'GARA GOAL COMPANY

M^c CORMICK BUILDING

CHICAGO

JOSEPH D. ZOOK,
VICE PRESIDENT & GENERAL MANAGER

October 31
1927

Dr. A. C. Noe,
University of Chicago,
Chicago, Illinois.

My dear Doctor:

At the request of our Mr. Halbersleben, I am enclosing records of the elevation covering hand drill and power drill holes on the strip acreage. After these have served their purpose, will you please return for our files.

Very truly yours,

JDZ/EH



Vice President and
General Manager.

P.S. - In accordance with our telephone conversation of this morning, I am also attaching blue print, which you will kindly return as quickly as possible as this is our only copy.

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FOR THE BEGINNING OF OPERATIONS.

The University of Chicago
The Stripping Department

CHICAGO, ILLINOIS

REPORT

AS OF DATE - NOVEMBER 1927

ON

STRIPPING POSSIBILITIES

WEST OF HARRISBURG ,

SALINE COUNTY, ILLINOIS

Plate III is essentially a copy of part of a familiar field map prepared by the Guarantee Trust Company showing the location and number of holes drilled by several companies in western Saline and eastern Williamson counties before 1910. The original map showed depth and thickness of the coal, but this information is omitted as unnecessary for purposes of identification of the holes. In addition to data on the original map, Plate III shows by circles the location of holes drilled since 1910, and the company number of each hole. For some of the borings, corrected locations were obtained in the field. Such necessary changes are indicated by arrows pointing to the symbols representing revised locations.

Plate 1 shows the position and dip and strike of observed faults and rock outcrops, and the location of drill holes and mine shafts. The surface elevation of each boring and shaft, the depth and altitude of the bottom of No. 5 and No. 6 coals, and the thickness of each bed where this information can be given without violating confidential data, are given in Table I, page 13.

Identification on Plate I of holes shown on Plate III is readily made by reference to Table I where the original company number of each hole is given in column 4 listed by township and section. Then by reference to column 5, the map number can be found, by which the hole can be located on Plate I, if direction identification from map to map is uncertain.

The structure of the area is delineated by red contour lines which refer to the altitude of the base of No. 5 coal, relative to sea-level datum. The upper surface of a coal bed is more commonly used as a datum in structure maps appearing in publications of the Illinois State Geological Survey, but in this special report it seems advisable to conform to local engineering practice and use the base of the coal bed as datum.

Reference to Plate I reveals the undulatory structure of the No. 5 coal; it reaches an altitude of 350 feet above sea level in the NE. 1/4 of sec. 1, T. 9S, R. 4E. and an altitude of 25 feet below sea level in the S. 1/2 sec. 24, T. 8S., R. 5E. In areas of outcrop, the map shows the direction of dip by small blue arrows accompanied by figures denoting the amount of dip.

In addition to being tilted, the strata are in places displaced or faulted. Such faults are designated by heavy continuous or interrupted blue lines. Where the blue lines are unbroken, there is no doubt as to the existence and position of the fault. Fault structures are exposed where fault lines are shown crossing an area of outcropping rock. Elsewhere, the fault lines are projected in the general direction of the trend of the outcrops of the faults or are indicated where they seem to be the proper explanation for differences in the elevation of the coal as determined by drilling.

AREA #2

COVER	ACRES	TONS AVAILABLE	TOTAL ACRES	TOTAL TONS AVAILABLE
0-20	155.1	1,341,100	155.1	1,341,100
20-30	186.7	1,617,000	341.8	2,958,100
30-40	183.1	1,585,700	524.9	4,543,800
40-50	299.2	2,591,500	824.1	7,135,300
50-60	253.2	2,193,000	1077.3	9,328,300
OVER-60	114.5	991,600	1191.8	10,319,900
TOTAL	1191.8	10,319,900		

AVERAGE THICKNESS OF COAL--4.98'

AVERAGE COVER 0-30'--20.5'

AVERAGE COVER 0-40'--25.5'

AVERAGE COVER 0-50'--32.6'

AVERAGE COVER 0-60'--37.8'

AREA #1

COVER	ACRES	TONS AVAILABLE	TOTAL ACRES	TOTAL TONS AVAILABLE
Barren	20.3			
0-20	88.2	763,560	88.2	763,560
20-30	118.7	1,028,100	206.9	1,791,660
30-40	182.8	1,583,500	389.7	3,375,160
40-50	211.4	1,830,500	601.1	5,205,660
50-60	205.3	1,777,600	806.4	6,983,260
OVER-60	144.3	1,249,600	950.7	8,232,860
TOTAL	971.0	8,232,860		

AVERAGE THICKNESS OF COAL--4.98'

AVERAGE COVER 0-30--20.7'

AVERAGE COVER 0-40--27.4'

AVERAGE COVER 0-50--33.6'

AVERAGE COVER 0-60--39.0'

CONSOLIDATION AREAS #1 & #2

COVER	ACRES	TONS AVAILABLE	TOTAL ACRES	TOTAL TONS AVAILABLE
Barren	20.3			
0-20	243.3	2,104,660	243.3	2,104,660
20-30	305.4	2,645,100	548.7	4,749,760
30-40	365.9	3,169,200	914.6	7,918,960
40-50	510.6	4,422,000	1425.2	12,340,960
50-60	458.5	3,970,600	1883.7	16,311,560
OVER-60	258.8	2,241,200	2142.5	18,552,760
TOTAL	2162.8	18,552,760		

AVERAGE THICKNESS OF COAL--4.98'

AVERAGE COVER 0-30--20.6'

AVERAGE COVER 0-40--26.3'

AVERAGE COVER 0-50--33.0'

AVERAGE COVER 0-60--38.4'



O'GARA COAL COMPANY

— M^c CORMICK BUILDING —

CHICAGO

JOSEPH D. ZOOK,
VICE PRESIDENT & GENERAL MANAGER

CARL T. HAYDEN
ASST. TO GENERAL MANAGER

November 23, 1927

Dr. A. C. Noe',
University of Chicago,
Chicago, Ill.

My dear Dr. Noe':

I am attaching herewith a copy of the corrected logs of Power Drill Holes No's. 34, 35, and 36, this in connection with the report you recently made for us on our proposed stripping property at Harrisburg.

Yours truly,

A handwritten signature in cursive script, appearing to read "C. T. Hayden".

Assistant to General Manager.

CTH:MT

R E P O R T
O N
S T R I P P I N G P O S S I B I L I T I E S
W E S T O F H A R R I S B U R G , I L L I N O I S

I. SUMMARY

It is recommended that the portion of the field which forms the east flank of Area 1 and the west flank of Area 2 and the connection of both areas in the south of the barren zone be developed first on account of its favorable overburden, and that later the strips south of Area 1 and Area 2 and the strip-pable portion of Area 1 which runs through its center in a northeastern-southwestern direction on both sides of the creek should be developed.

It is also recommended that a sufficient number of diamond drill holes should be placed in those strips which would be developed first. Of the drill holes a limited number are recommended to penetrate through the coal No. 6 and the others could be drilled only to the top of the limestone whereby sufficient data for prospecting can be obtained at a minimum expense.

November 9, 1927

II. SCOPE

The object of this report is to assemble all available evidence, in the field and in the office, about the sandstone overburden in the stripping property of the O'Gara Coal Company west of Harrisburg, Illinois.

III. LOCATION

The stripping property is located in Sections 19, 20, 21, 22, 27, 28, 29 and 30 of R. 5 E. T. 9 S., all in Saline County, Illinois. See Plate 1.

IV. GENERAL GEOLOGIC SITUATION

The so-called "Anvil Rock" sandstone appears in several places in Willisameon, Saline and Gallatin Counties in large lenses, two of which are situated west of Harrisburg. One of these sandstone patches west of Harrisburg is located north of Ledford, and the second one northwest of Carrier Mills on the property of the O'Gara Coal Company.

As shown on the photographs taken in the railroad cut of the Illinois Central, in the southwest corner of Section 30, R. 5 E., T. 9 S., the coal No. 6 is almost directly overlain by limestone. This so-called cap-rock is very regular and offers no great difficulty in blasting. Above the limestone is a shale bed and above it are sandstone beds of varying thickness and hardness. Above the sandstone follows the glacial drift which forms the surface. The general dip of these various formations lies in a northeasterly direction.

The sandstone beds above the limestone need special attention because of their varying thickness and hardness. These factors make it difficult to calculate in advance the stripping cost and it was, therefore, necessary to investigate these sandstone beds in particular.

V. DISTRIBUTION OF THE OVERLYING SANDSTONE

Information about the distribution of the overlying sandstone was obtained by the author partly

in the field, but primarily from the drill holes which had been made by the O'Gara Coal Company. Of these the diamond drill holes are most reliable, the churn drill holes being less accurate, although they have the advantage of going through the rock strata as compared with the hand drill holes which merely reach the top of the rock after penetrating through the loose surface deposits.

Plate 3 contains a map showing the structure below the surface as it would appear if the surface deposits were removed and the various sandstone, limestone, and coal deposits would be visible to the eye from above. The map shows in red color the distribution of coal not overlain by any rocks; in green, the limestone cap-rock overlying the coal but not overlain by sandstone; and in yellow, the sandstone overlying both the coal and the limestone.

On this map can be seen that the portion of the field which surrounds the barren zone in the center is especially free from overlying sandstone.

Five geologic sections and a map indicating the location of these sections show the vertical dis-

tribution of the overburden on typical places in the field.

In order to determine the exact thickness and the degree of hardness of the sandstone a number of diamond drill holes will be necessary. Cores with a diameter of approximately one inch would be sufficient for this purpose.

VI. RECOMMENDATIONS ABOUT LAYOUT OF STRIP MINE

A strip varying in width but in some places more than a quarter of a mile wide surrounds, east, west and south, in the shape of a U, the barren zone lying between Areas 1 and 2. This strip extends from the outcrop of the coal to a line where the overburden reaches a thickness of 40 feet. The U-shaped strip contains very little sandstone. The coal is frequently directly under the surface or has cap-rock covering, but no sandstone. In some instances sandstone covering may exist in small lenses and should be tested by diamond drilling.

It is recommended that this U-shaped strip be operated first and that only later stripping be

extended to the coal outcrops south of Areas 1 and 2 and along the creek running in a southwest-northeast direction through Area 1.

VII. RECOMMENDATIONS ABOUT DIAMOND DRILL HOLES

It is recommended that primarily the U-shaped strip mentioned in Chapter VI should be prospected with the diamond drill and that only a limited number of holes be driven through the No. 6 coal. These holes are indicated on Plate 7 by red stars.

Another series of drill holes could be driven to the limestone only but not through it. They would give a clear conception of the thickness and quality of the sandstone and this is the only important information. By restricting these drill holes to a smaller depth, economy in drilling expenses would result and a larger number of holes would be made possible with an appropriation allowed for a smaller number of deep holes. This second series of drill holes is indicated on Plate 7 by red circles.

After having drilled these two series of holes the information so obtained would indicate

whether a much larger number of holes should be drilled. Only the most desirable holes have been mapped and it is hoped that their number will be sufficient.

It is recommended that a portable drill with gasoline motor, producing a core of about one inch, should be used. Such a drill would make it possible to work during the rainy season when a two-inch drill could no longer be moved.

Q Q R I

Allen & Garcia Company

Analysis of #5 Coal, Core Sample,
1/2" and less crushed

	<u>As Rec'd.</u>	<u>Dry Basis</u>
Moisture	6.00	
Volatile Matter	32.50	34.59
Fixed Carbon	53.20	56.59
Ash	8.30	8.82
Total	100.00	100.00
Coke Residue	61.50	65.42
Sulphur (dry basis)		2.19
B.t.u.	12,320	13,100

/

Fulton-Peoria

Fulton	5	1	15.09	11.02	35.45	38.44	3.22	10,486				
		2		12.98					41.75	45.27	3.79	12,350
		3							47.98	52.02	4.36	14,192
		4										14,495
Peoria	5	1	15.19	11.14	35.60	38.07	3.09	10,544				
		2		13.13					41.98	44.89	3.64	12,432
		3							48.33	51.67	4.19	14,311
		4										14,615
Schuyler (one mine)	5	1	15.19	9.88	34.69	40.24	2.65	10,877				
		2		11.65					40.90	47.45	3.12	12,825
		3							46.29	53.71	3.53	14,516
		4										14,783
Tazewell	5	1	15.14	9.47	35.72	39.67	3.20	10,735				
		2		11.16					42.09	46.75	3.77	12,650
		3							47.38	52.62	4.24	14,239
		4										14,512
Average	5	1	15.15	10.38	35.37	39.10	3.04	14,316				

10 661 AR UC

**Central Illinois
(north)**

Bond (one mine)	6	1	11.92	10.73	35.15	42.20	3.39	10,796				
		2		12.18					39.91	47.91	3.85	12,257
		3							45.45	54.55	4.38	13,957
		4										14,240
Clinton	6	1	12.37	10.23	35.47	41.93	3.38	10,877				
		2		11.67					40.48	47.85	3.86	12,412
		3							45.81	54.19	4.37	14,052
		4										14,329
Christian	6	1	12.70	10.19	36.95	40.16	3.91	10,863				
		2		11.67					42.33	46.00	4.48	12,443
		3							47.93	52.07	5.07	14,090
		4										14,387

Macoupin	6	1	13.32	9.79	37.43	39.46	4.00	10,736
		2		11.29	43.18	45.53	4.61	12,386
		3			48.68	51.32	5.20	13,962
		4						14,256
Madison	6	1	13.04	10.03	37.96	38.97	4.02	10,812
		2		11.54	43.65	44.81	4.62	12,433
		3			49.34	50.66	5.22	14,055
		4						14,356
Montgomery	6	1	13.32	10.17	36.28	40.23	4.23	10,702
		2		11.73	41.86	46.41	4.88	12,347
		3			47.42	52.58	5.53	13,988
		4						14,298
Sangamon	6	1	13.91	9.96	36.91	39.22	4.13	10,696
		2		11.57	42.87	45.56	4.80	12,424
		3			48.48	51.52	5.43	14,050
		4						14,357
Average	6	1	12.94	10.16	36.59	40.31	3.87	14,022 ^{10 793 AR} UC

Franklin-Williamson

Franklin	6	1	9.13	8.58	34.02	48.27	1.45	11,832
		2		9.44	37.44	53.12	1.60	13,021
		3			41.34	58.66	1.77	14,378
		4						14,553
Jefferson (one mine)	6	1	8.50	8.70	34.60	48.20	1.30	11,980
		2		9.50	37.80	52.70	1.40	13,093
		3			41.80	58.20	1.60	14,638
Jackson	6	1	9.44	9.78	34.73	46.05	2.17	11,622
		2		10.79	38.35	50.86	2.40	12,833
		3			42.99	57.01	2.69	14,385
		4						14,608
Perry (east)	6	1	9.88	10.54	34.81	44.77	2.60	11,238
		2		11.70	38.62	49.68	2.89	12,470
		3			43.74	56.26	3.27	14,122
		4						14,370

Williamson	6	1	7.93	9.25	33.65	49.17	2.20	11,931
		2		10.05	36.55	53.40	2.39	12,959
		3			40.63	59.37	2.66	14,407
		4						14,619
Average	6	1	8.98	9.37	34.36	47.29	1.94	11 721 AR 14,355 UC

Jackson

Jackson (Murphysboro District only)	2	1	9.28	5.72	33.99	51.01	1.29	12,487
		2		6.31	37.47	56.22	1.42	13,764
		3			39.99	60.01	1.52	14,691
		4						14,819

Saline-Gallatin

Saline	5	1	6.67	8.28	34.25	50.80	2.50	12,420
		2		8.87	36.70	54.43	2.68	13,308
		3			40.27	59.73	2.94	14,603
		4						14,811
Gallatin (north of Eagle Valley)	5	1	4.85	11.10	35.58	48.47	3.42	12,327
		2		11.67	37.39	50.94	3.59	12,955
		3			42.33	57.67	4.06	14,667
		4						14,956
Average	5	1	5.76	9.69	34.92	49.63	2.96	12 374 AR 14,635 UC

Christian	1	1	11.31	8.86	38.89	40.94	2.34	11,602
		2		9.99	43.85	46.16	2.64	13,082
		3			48.71	51.29	2.93	14,534
		4						14,756

Christian (one mine)	2	1	12.97	6.92	39.17	40.94	3.13	11,591
		2		7.95	45.01	47.04	3.60	13,318
		3			48.90	51.10	3.91	14,468
		4						14,690

La Salle (one mine)	7	1	13.56	7.77	40.87	37.80	3.68	11,347
		2		8.99	47.28	43.73	4.26	13,127
		3			51.95	48.05	4.68	14,424
		4						14,684

Livingston	7	1	11.59	12.65	35.73	40.03	3.94	11,054
		2		14.31	40.41	45.29	4.46	12,503
		3			47.16	52.84	5.20	14,591
		4						14,959
McLean	5	1	13.32	12.47	38.00	36.21	3.73	10,580
		2		14.38	43.84	41.78	4.30	12,206
		3			51.20	48.80	5.02	14,256
		4						14,605
La Salle	5	1	14.76	9.65	41.33	34.26	3.38	10,674
		2		11.32	48.49	40.19	3.97	12,522
		3			54.67	45.33	4.48	14,120
		4						14,399
Centralia								
Marion	6	1	10.31	11.06	36.55	42.08	3.80	11,227
		2		12.33	40.75	46.92	4.24	12,518
		3			46.48	53.52	4.84	14,279
		4						14,589
Washington		1	10.79	11.32	38.35	39.54	3.93	11,006
		2		12.70	42.98	44.32	4.41	12,337
		3			49.24	50.76	5.05	14,132
		4						14,449
Average		1	10.55	11.19	37.45	40.81	3.87	14,205 ^{AR} _{UC}
Moultrie (one mine)	6	1	6.73	11.60	39.06	42.61	4.16	11,906
		2		12.44	41.88	45.68	4.46	12,765
		3			47.82	52.18	5.09	14,579
		4						14,911
White (one mine)	6	1	8.54	8.96	35.37	47.13	2.86	11,918
		2		9.80	38.67	51.53	3.13	13,031
		3			42.87	57.13	3.47	14,447
		4						14,682
Gallatin (Eagle Val- ley only)	6	1	5.77	10.88	35.92	47.43	3.84	12,354
		2		11.55	38.12	50.33	4.08	13,110
		3			43.10	56.90	4.61	14,822
		4						15,133
Perry (west)	6	1	10.30	10.40	36.27	43.03	3.20	11,156
		2		11.59	40.44	47.97	3.57	12,437
		3			45.74	54.26	4.04	14,067
		4						14,335

Central Illinois
(south)

Perry (west)	6	1	10.30	10.40	36.27	43.03	3.20	11,156
		2		11.59	40.44	47.97	3.57	12,437
		3			45.74	54.26	4.04	14,067
		4						14,335
Randolph	6	1	10.07	11.63	36.72	41.58	3.94	10,987
		2		12.93	40.83	46.24	4.38	12,217
		3			46.89	53.11	5.03	14,031
		4						14,347
St. Clair	6	1	11.12	11.32	37.95	39.61	3.80	10,972
		2		12.74	42.70	44.56	4.28	12,345
		3			48.93	51.07	4.90	14,147
		4						14,461
Washington	6	1	10.12	11.71	38.41	39.76	4.13	10,988
		2		13.03	42.73	44.24	4.59	12,225
		3			49.13	50.87	5.28	14,057
		4						14,383
Average	6	1	10.40	11.26	37.34	41.00	3.77	14,075

11 026 AR UC

Longwall

Bureau	2	1	16.27	7.37	38.35	38.01	2.93	10,883
		2		8.80	45.80	45.40	3.50	12,998
		3			50.22	49.78	3.84	14,252
		4						14,478
La Salle	2	1	14.87	8.50	38.36	38.27	3.34	10,987
		2		9.98	45.06	44.96	3.92	12,906
		3			50.06	49.94	4.36	14,337
		4						14,598
Marshall	2	1	15.10	7.18	39.08	38.64	2.79	11,315
		2		8.46	46.03	45.51	3.29	13,327
		3			50.28	49.72	3.59	14,559
		4						14,780
McLean	2	1	11.27	8.80	42.21	37.72	3.03	11,566
		2		9.92	47.57	42.51	3.41	13,035
		3			52.81	47.19	3.79	14,470
		4						14,718

Rock Island (one mine)	1	1	16.61	8.48	35.66	39.25	4.82	10,615
		2		10.17	42.76	47.07	5.78	12,729
		3			47.60	52.40	6.43	14,171
		4						14,493
Warren	1	1	13.15	8.55	39.45	38.85	5.49	11,228
		2		9.85	45.42	44.73	6.32	12,928
		3			50.38	49.62	7.01	14,341
		4						14,685
Average	1	1	14.49	9.04	37.82	38.65	4.69	14,311

10 944 A Recd
Unit

Danville

Vermilion	6	1	14.50	9.40	35.43	40.67	2.54	10,918
		2		10.99	41.44	47.57	2.97	12,770
		3			46.56	53.44	3.34	14,348
		4						14,592
Vermilion	7	1	13.16	9.91	37.79	39.14	2.87	11,132
		2		11.41	43.52	45.07	3.30	12,819
		3			49.12	50.88	3.73	14,470
		4						14,738

Western Illinois

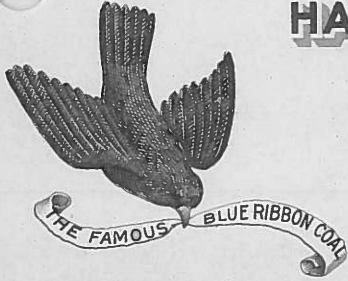
McDonough	2	1	16.63	8.31	34.19	40.87	2.94	10,805
		2		9.97	41.01	49.02	3.53	12,960
		3			45.55	54.45	3.92	14,395
		4						14,645
Knox	2	1	14.63	7.83	37.34	40.20	4.20	11,194
		2		9.17	43.74	47.09	4.92	13,112
		3			48.15	51.85	5.42	14,436
		4						14,722
Schuyler (one mine)	2	1	12.53	7.54	37.84	42.09	4.54	11,731
		2		8.62	43.26	48.12	5.19	13,411
		3			47.34	52.66	5.68	14,676
		4						14,973
Average	2	1	14.60	7.89	36.46	41.05	3.89	14,505

11 243 A Recd
Unit

Wilmington

Grundy	2	1	16.82	5.39	38.25	39.54	2.31	11,115
		2		6.48	45.98	47.54	2.78	13,363
		3			49.17	50.83	2.97	14,289
		4						14,457

HARRISBURG COAL MINING COMPANY



GENERAL OFFICE AND MINES
HARRISBURG, ILL.

PRODUCERS

HIGH TEST NO. 2 VEIN

ALSO

BLUE RIBBON NO. 5 VEIN

CHICAGO, ILLINOIS



CHICAGO OFFICE
McCORMICK BLDG.

September 18th,
1929

QUOTATIONS NOT BINDING UNTIL ACCEPTED IN WRITING AND ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE. ALL ORDERS SUBJECT TO DELAYS BEYOND OUR CONTROL.

Mr. Adolph Carl Noé,
The University of Chicago,
Chicago, Illinois

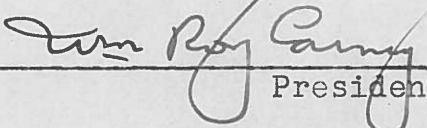
Dear Mr. Noé:

I asked Mr. Massey of Randolph-Perkins Company to criticize your report on Carrier Mills and I enclose you herewith his observations. I wish you would check into this and see if you agree with him and if you would care to change your report after having this information.

Also please advise if you have received my check which I mailed you the day the report was received.

Mr. Massey is ordinarily conservative and I would like to get this difference of the available tonnage straightened out as soon as possible and wish you would call him direct if you want any more information.

Yours very truly,



 President

WRC:AGE

RANDOLPH-PERKINS COMPANY

September 17, 1929

Mr. Wm. Roy Carney,
First National Bank Bldg.,
Chicago, Illinois

Dear Sir:

Referring to the A. C. Noe report on Carrier Mills, I have gone over this very carefully and have obtained results which differ from his figures as indicated below.

I enclose a sheet showing the property which you own, divided into five groupings, with the totals for each piece of property at the right and the totals for each grouping at the bottom. These figures include the P. Parks land. I have also given the acreage not owned but included in this field. The only exception to this is that land which is between 50 and 60 feet deep at the eastern end owned by the Wasson Coal Company and located north of the Festus Arnold and the A. J. Arnold pieces.

On page one, he gives $6\frac{1}{2}$ million net tons of No. 5 coal under 60 feet or less. My figures for $505\frac{1}{2}$ acres plus $113\frac{1}{2}$ acres at 7,560 net tons per acre would be 4,779,640 tons. His figure of 85% under less than 50 feet, I make 83%.

On page two, he states $3\frac{1}{2}$ million tons of No. 5 by slopes. My figure is 3 million or 384 acres plus 258 acres at 4,800 tons net per acre or 3,081,600 tons. His figure of $3\frac{1}{2}$ million tons of No. 6 coal strippable, I would make 2 million tons or 258 acres at 8,400 net tons per acre or 2,167,200 net tons.

On page five, he states there is 100 feet between No. 5 and No. 6. This distance varies in different nearby localities from under 100 feet to 124 feet. I have no means of knowing what the exact interval is at this location.

On page ten, I would revise his figures to read as follows:

1. SUMMARY.

This report deals with the stripping property controlled by Mr. W. Roy Carney which is situated west of Carrier Mills in Saline County, Township 9 South, Range 5 East, Sections 30 and 31; Township 10 South, Range 5 East, Sections 5 and 6; and in Williamson County, Township 9^{South}, Range 4 East, Sections 35 and ~~36~~³⁶; and in Township 10 South, Range 4 East, Sections 1, 2, and ~~3~~^{and Illinois}. This property will be called the Carrier Mills Tract throughout this report.

The data for the report have been secured from test holes drilled by the present owner and from records which have been furnished by its former owner, J. H. Crawford. The author of this report has made a thorough examination of the property and has examined such drill cores and coal samples as were available. The results of this examination, as itemized in the body of the report, may be summarized as follows:

A careful examination of all data available in the office and in the field indicate the presence of abundant excellent coal under exceptionally favorable *mining* conditions. Within the crop and sixty foot contour line, as shown on property map attached, there are practically ~~ten~~ ^{six} and a half million net tons of recoverable coal, after due allowance of loss in mining, that can be won by stripping methods with shovels and equipment now built and operating under similar conditions. Approximately 85% of this coal lies under an overburden of less than 50 feet.

The overburden ^{over coal No 5} is soil, sandy shales, and, in a few ^{very} places, soft sandstone requiring little, if any, shooting.

Where the overburden increases beyond sixty feet, slopes can be driven to greater depths and the production of Coal No. 5 can be continued by underground mining. *A production of 3 1/4 million tons of coal No 5 can be expected from this source*

Coal No. 6 is also present along the northern boundary of this property and could be stripped there. *Approximately 3 3/4 million tons of coal No 6 are available.*

SUMMARY, continued:

The overburden is not saturated with water, as is evidenced by underground workings of existing mines in the neighborhood, by the Illinois Central Cut, which goes through the property, and by the natural drainage system of the locality. The property is well located with regard to power transmission and railway transportation.

Coal No. 5 is considered equal to the best coal in Illinois.

Respectfully submitted

September 10, 1929

STATE OF ILLINOIS
STATE GEOLOGICAL SURVEY DIVISION

M.M. LEIGHTON, CHIEF

URBANA

SECTION OF COAL STUDIES
GILBERT H. CADY, IN CHARGE

November 4, 1927

Dr. A. C. Noe
Faculty Exchange
University of Chicago
Chicago, Illinois

My dear Noe:

The "Anvil Rock" sandstone is mapped by Butts in Shawneetown-Equality area--see Bulletin 47 for map showing distribution of this sandstone in that area. A sandstone about at this horizon extends west to about the Williamson-Saline County line along the outcrop of No. 6. It is well exposed in one of the Illinois Central Railroad cuts west of Carriers Mills, where it is 10 to 15 feet thick. Probably we find it impossible to identify all sandstones in the lower part of the McLeansboro as the same. In places a sandstone comes in 25 to 30 feet above No. 6--that is, above the Banks-ton Creek limestone and in other places there is sandstone possibly below or at the position of this limestone. I have no very positive instances of sharp unconformable relation of sandstone and underlying rock.

This sandstone is not characteristically developed in northwestern Saline County, or in Williamson County and farther west. The enclosed map shows for your information my general idea of the distribution of the "Anvil Rock" sandstone of Butts. This map is not to be reproduced for publication.

I have a picture or two of this sandstone in the cut near Carriers Mills, and will furnish you with copies if you care to have them.

Some time ago you sent me a print of a view taken looking north from Stonefort hill near the old fort. I wonder if you would loan me that negative. I should like to have several prints made. I will return it to you unless I can persuade you to donate it to our collection. It is better than any of mine.

Hope to see you at Danville next week.

Cordially yours,

Gilbert H. Cady

A. C. NOÉ
 DEPARTMENT OF GEOLOGY
 THE UNIVERSITY OF CHICAGO
 CHICAGO, ILLINOIS, U.S.A.

2a

During the coal age a shallow basin extended from the Gulf of Mexico into the middle western portion of the North American continent. What is now the coal field of Illinois, West Kentucky, and Indiana was covered periodically by sea water. At

other times the same territory had a level not much higher than that of the ocean. Upon this flat and very moist land great swamps were formed.

Figure 1.—Map of Southern Illinois showing marine basin covering coal number 6, and the Ozark Mountains.

at the time of the coal age, River sand deposits are located in Red clay.

occasionally the sea level rose high enough to wash sand and mud on top of the vegetation which ^{became} was ~~to~~ compressed to coal. The mud and sand ^{were changed to shale} became slate and sandstone and from the lime shells of sea animals the cap rock was formed above the coal. This process repeated itself as many times as ^{there are} ~~are~~ coal seams in the Illinois, West Kentucky and Indiana basin.

At a time when what we call number 6 coal was formed the sea water covered in southern Illinois about the ground indicated in text figure number 1. The shaded portion represents the area of the Ozark

A. C. NOÉ
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THE UNIVERSITY OF CHICAGO
CHICAGO, ILLINOIS, U.S.A.

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At a time when what we call number 6 coal was formed the sea water covered in southern Illinois about the ground indicated in text figure number 1. The shaded portion represents the area of the Ozark Mountains in Illinois which were at least 1000 feet higher during the coal age than they are now. The small blue lines on the map which run from the crest of the Ozarks into the sea water indicate rivers. These carried sand along and the sand was deposited at the mouth of each river as indicated by red dots on the map. Each red spot corresponds now to a patch of sandstone deposit above the limestone cap rock. The basin of coal number 6, like many other coal basins, is lined with an irregular series of sandstone deposits throughout Gallatin, Saline and Williamson Counties, all river sand deposits from the Ozarks.

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CHICAGO, ILLINOIS, U.S.A.

2 b

Mountains in Illinois which were at least 1000 feet higher during the coal age than they are now. The small blue lines on the map which run from the crest of the Ozarks into the sea water indicate rivers. These carried sand along and the sand was deposited at the mouth of each river as indicated by red dots on the map. Each red spot corresponds now to a patch of sandstone deposit above the limestone cap rock. The basin of coal number 6, like many other coal basins, is lined with an irregular series of sandstone deposits throughout Gallatin, Saline and Williamson Counties, all river sand deposits from the Ozarks.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS



The Hill mine located

It is a small slope, and at its entrance can be seen the overlying shale. The coal appears at a short distance from the mouth of the slope. It steps below the surface, was measured at the air shaft to be 19 feet, of which 10 feet was surface soil, and 9 feet shale above the coal. The coal averages 4 feet 8 inches and lies very horizontal.

Wasson No. 2 Mine.

It is a slope mine located its main entry running due west for a distance of 4,500 feet. The north entry runs for 5,500 feet and shows a drop of the coal of 2%.

The coal is at the bottom of the mine, 47 feet below the surface, but is reported to be at the face of the west entry, only 13 feet below the surface.

In walking down the slope, the overburden can be closely examined. On top of about 10 feet of soil, below which can be seen a gray shale which is separated from the coal by a layer of slaty shale (draw slate) of a thickness of from 2 to 4 inches. There are no boulders, no limestone, slabs, no amasses of sandstone, in the shale.

The coal has a uniform thickness of 4' 8", and lies very level.

The water is at present handled by three gathering pumps and comes exclusively from the bottom - not from above, except for small amounts of surface water during the rainy season.

The roof above the coal is softer south from the main west entry and the development of the mine is therefore exclusively west, north, and east.

CARRIER MILLS PROPERTY

Acreage Owned

<u>OWNER</u>	<u>Barren</u>	<u>#5 up to 50</u>	<u>#5 50 to 60</u>	<u>#5 not under #6</u>	<u>#5 under #6</u>	<u>Total Owned</u>			
A. J. Arnold	95½ ✓	77 ✓	7½ ✓	-	-	180 ✓			
Festus Arnold	-	3 ✓	20 ✓	17 ✓	-	20 ✓			
Marion Harris	43 ✓	40 ✓	53 ✓	80 ✓	29 ✓	90 ✓	95 ✓	215 ✓	
I. F. Parks	33½ ✓	39 ✓	165½ ✓	800 ✓	35 ✓	285 ✓	537½ ✓	258 ✓	777 ✓
J. Turner	16½ ✓	23½ ✓	23½ ✓	-	-	-	-	-	40 ✓
W. Black	-	11½ ✓	11½ ✓	-	-	-	-	-	11½ ✓
B. Wroten	-	19 ✓	28½ ✓	9½ ✓	-	-	-	-	28½ ✓
J. Beasley	8 ✓	0 ✓	42 ✓	51½ ✓	9½ ✓	½ ✓	8.5 ✓	-	60 ✓
M. Harris	28	32 ✓	32 ✓	-	-	-	-	-	60
W. Reed	-	30 ✓	37 ✓	3 ✓	7 ✓	3 ✓	-	-	40 ✓
C. Tanner	1½	34 ✓	37 ✓	3	1½	-	-	-	40
P. Parks	25	15 ✓	12½ ✓	-	-	-	-	-	40
	<u>251</u>	<u>505½</u>	<u>113½</u>	<u>384</u>	<u>258</u>	<u>1512</u>			

Acreage not owned, but in field

W. Killman	107	33 ✓	33 ✓	-	-	-	140
Geo. Neely	-	5 ✓	4 ✓	5 ✓	30 ✓	36 ✓	40
W. D. Beasley	-	28 ✓	50½ ✓	10 ✓	22 ✓	9½ ✓	60
	<u>107</u>	<u>66</u>	<u>87½</u>	<u>15</u>	<u>52</u>	<u>-</u>	<u>240</u>

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16. ^{strip mining} Particularly at Carrier Mills and elsewhere in Illinois 19

~~Profits~~
~~Life of Property~~
~~Markets~~
Power supply.

Exhibit A: Map of strip coal area at Carrier Mills.

Exhibit B: Sections through field. A-A, B-B, C-C, D-D, E-E, F-F, G-G, H-H.

Exhibit C: Location of stripping area in reference to Harrisburg and Marion.

Exhibit D: Map of Illinois indicating location of stripping area.

Exhibit E: Photographs:

Figure 1-8 Surface of field,
Hill Mine and Neely Mine,

Figure 9 Bank at Drake Mine,

Figure 10 Coal No. 6 in ~~20~~ cut. Illinois Central Cut

Figure 11 Small Strip mine in coal No 6

Figure 12 Coal No. 6 in ~~20~~ cut. Illinois Central Cut

Figure 13 Neely Mine

Figure 14 Outcrop of coal No 6 in Illinois Central Cut

2. SCOPE OF THE REPORT.

This report presents the facts bearing on the amount of proved strippable coal in the Carrier Mills Tract located in Saline and Williamson Counties on which the summation is based. It gives in detail data pertaining to location, quantity, and quality of coal, character of overburden, and water conditions in the Carrier Mills Tract.

3. LOCATION.

The stripping property is situated two and a half miles west of Carrier Mills. The railroad station of Carrier Mills is located on the C. C. C. & St. L. R. R., 7 miles southwest of Harrisburg, which, in turn, is located 319 miles almost due south of Chicago. Compare Exhibits C and D.

The Carrier Mills Tract is cut into an Eastern and Western half by the Edgewood Cut-off of the Illinois Central Railway.

4. TOPOGRAPHY.

The Carrier Mills Tract is situated on the southern slope of a low hill which rises from an altitude of ⁴³⁵~~475~~ feet above sea level, as indicated by a bench mark south of the property, to a summit of 500 feet about one mile ^{and a half} north of the ~~property~~ ^{bench mark}.

This hill forms the water shed between the Bankston and the Southford Saline River with ample drainage on both sides.

The relief of the property is very flat and level on the east side and center and becomes more cut up by small ravines on its west end. The level portion is covered with fields and pastures, while the western part is wooded. Compare Figures 1-8 of Exhibit E.

A thin covering of glacial drift lies on the hills, but is not universally distributed. Above the drift or upon the rock surface, where the drift is absent, there is almost everywhere a thin coating of yellow silt ^{loess} or ~~less~~, commonly ^{two} or three feet in thickness. Here and there thicker deposits of glacial drift fill depressions in the rock surface which probably were portions of the preglacial valley system that have not yet been cleaned out by the present streams.

5. DESCRIPTIVE GEOLOGY OF THE REGION.

The region lies at the Southern border of the Illinois coal basin. Three coal seams appear in it. No. 5 Coal, commonly called the Harrisburg coal, is the principal coal seam of commercial value in the Carrier Mills Tract. It is overlapped on the northern edge of the property by Coal No. 6 or Herrin (Blue-band) Coal. Underlying the No. 5 Coal is probably everywhere the coal No. 2 or Murphysboro Coal. The latter was mined by the Harrisburg Coal Company in a shaft mine near Ledford.

The Coal No. 6 is overlain by a limestone cap rock, shale, and sandstone. Between Coals No. 5 and No. 6 are shales and sandstones and between Coal No. 2 and Coal No. 5 are shales and sandstones. While the distances between these Coals vary considerably, an average of 100 feet between Coals No. 5 and No. 6 and of 250 feet between Coals No. 2 and No. 5 is not uncommon in this part of the country.

These strata are all characterized by the gentle northward dip toward the center of the Illinois Coal basin which lies about 60 miles to the north. Here and there are found local interruptions of this northward dip where the strata lie horizontally or are locally inclined more steeply in other directions than to the north or where they have been broken by faults.

6. DRAINAGE AND RAINFALL.

The locality has been seen by the author of this report during various summers and also once in November, and he has been impressed by the dryness of the soil, which does not hold water, but becomes rapidly dry even a few hours after a heavy rainfall. The property has an excellent natural drainage system from north to south and no unusual accumulation of ground water should be expected. It may become necessary to construct a ditch on the north side of the pit in order to prevent infiltration of water from the higher elevations to the face.

Careful inquiries at Wasson Mine Number 2, which is located close to the east end of the Carrier Mills Tract, and at the Neely and Hill Mines, which are located close to the west end of the property, brought the assurance that the handling of water offered no difficult problem and that it all came from the bottom and not from the overburden.

According to the publication of the United States Weather Bureau (Summaries of Climatological Data for The United States by Section, Washington, 1926 and 1928), the average annual rainfall for Harrisburg is 44.84 inches, as compared with an average for the rainfall of the entire state of Illinois of 37.4 inches. The rainfall for the entire year, 1928, amounted to 50.9 inches for Harrisburg, which is considerably higher than the average.

The shale over Coal No. 5 seems to stand up fairly well, even under heavy rainfall, as was observed in the box-cut of the Drake-Brown-Stump Mine, southwest of the town of Harrisburg. A picture of this bank is reproduced in Figure 10 of Exhibit E. This picture was taken shortly after a heavy rainfall.

7. PHYSICAL CHARACTERISTICS AND QUALITY OF COAL
No. 5 OF HARRISBURG.

The Harrisburg Coal No. 5 is bright and hard; very thin bands of bright or glance coal alternate with somewhat thicker bands of dull coal. In general, the bed has a brighter look than the No. 6 coal and is somewhat harder. No. 5 coal is usually very uniform from top to bottom of the seam, and bedded impurities do not occur frequently. In exceptional cases, a streak or layer of clay and sulfur, a fraction of an inch in thickness, occurs at various places, but never extends over a large area, nor is it uniform.

The thickness of the coal seam is very uniform. It was measured to have an average of four feet, eight inches, in the Wasson Mine at the east end of the Carrier Mills Tract and the same average was observed in the Hill Mine at the west end of the property. These facts together with the records of the drill holes indicate a very uniform thickness.

8. PHYSICAL CHARACTERISTICS OF COAL NO. 6.

The coal No. 6 of this region is probably the same as the coal No. 6 of the Herrin and Belleville regions. Its average thickness in this field is about five feet. Its most conspicuous feature is the "blue band", a dirt or clay band, found almost everywhere 18 to 30 inches above the floor, generally consisting of shale or shaley coal. Its thickness varies from one-half to two and one-half inches with an average of about one and two-thirds inches. In this area, No. 6 coal has practically everywhere a limestone cap rock. No. 6 coal commonly rests upon hard gray shale, generally referred to as fire-clay. Compare Figures 11-14 of Exhibit E.

9. CHEMICAL QUALITIES OF COAL No. 5.

The following analysis of the No. 5 Coal taken from a drill core on the Carrier Mills Tract is typical and differs only slightly from a number of other analyses made from the same locality.

	<u>As received</u>	<u>Dry basis</u>
Moisture	6.00	----
Volatile Matter	32.50	34.59
Fixed Carbon	53.20	56.59
Ash	<u>8.30</u>	<u>8.82</u>
Total	100.00	100.00
Coke residue	61.50	65.42
Sulphur (dry basis)		2.19
B.t.u.	12.320	13.100

Bulletin No. 56 of the Illinois State Geological Survey (Illinois Coal by A. Bement, Urbana, 1929) gives the following average analysis for No. 5 coal from Saline County:

	<u>As received</u>	<u>Dry basis</u>
Moisture	6.00 6.69	----
Ash	8.39	8.99
<i>Volatile matter</i>	34.22	36.67
Nitrogen	1.49	1.60
Water of composition	2.59 50.70	6.08 54.34
<i>Fixed</i> Carbon	60.60	74.59
Hydrogen	3.74 2.73	4.09 3.00
Sulphur	2.55	2.75
B.t.u.	12.398	13.287

~~This latter analysis is formulated in a different way, but a~~

CHEMICAL QUALITIES OF COAL No. 5, continued:

A comparison of the figures for moisture, ^{volatile matter} ash content, and sulphur in both analyses shows that the Carrier Mills coal is above the average, while its B.t.u. value is slightly below the average, but approaches it very nearly. The analysis of Coal No. 5 of Carrier Mills Tract shows a coal superior in quality to the No. 6 coal of Williamson and Franklin Counties. Coal No. 5 of Saline County ranks highest among the coals of Illinois

10. ACREAGE.

The total acreage of coal bearing land in the Carrier Mills Tract covers ¹⁴⁹⁸ ~~approximately 1700~~ acres, consisting of ^{810.5} ~~990.5~~ acres of strip coal (No. 5 coal) and ^{687.5} ~~700~~ acres of ^{the same which can} coal, ~~which can~~ ^{be mined} easily accessible by driving slopes under the heavy overburden from the face of the strip mine.

The strippable coal No. 5 lying under less than 60 feet of overburden forms in the Carrier Mills Tract a belt four miles long and one-quarter to one-half miles wide.

The northern portion of the Carrier Mills Tract is overlain by No. 6 coal to an approximate extent of 350 acres.

11. RECORD OF DRILL LOGS.

Two sets of drill records are available.

- (1) A set of diamond drill holes made for Mr. Crawford.
- (2) A set of churn drill holes made for Mr. Carney.

Both sets were executed by reliable drillers. The churn drill records are marked with A before the number.

RECORD OF DIAMOND DRILL HOLES.

Log. No.	Depth to Coal	Coal	Remarks
1	28'4"	4'5"	
2	24'0"	4'6"	
3	22'0"	4'6"	
4	19'0"	4'6"	
5	14'0"	4'6"	
6	13'6"	4'6"	
7			No coal. Outside crop
8			No coal. Outside crop
9	15'0"	4'3"	Crop line.
10.	19'0"	4'6"	
11	23'6"	4'6"	
12	26'6"	4'6"	
13	23'10"	4'6"	
14	25'4"	4'6"	
15	22'6"	3'10"	
16	18'6"	4'1"	
17	15'6"	4'2"	
18	16'6"	4'6"	
19	14'6"	4'6"	
20	15'6"	4'5"	
21			
22	14'0"	4'6"	
23	12'6"	4'6"	
24	12'0"	2'6"	Crop coal
25	18'0"		Crop line
26			No coal at 20'0"
27			No coal at 20'0"
28	18'6"		No coal
29	14'0"	3'6"	
30	15'6"	4'6"	
31	20'6"	4'6"	
32	18'0"	4'6"	
33	15'0"	4'6"	
34			No coal at 19'0"
35	17'0"	4'0"	
36	40'0"	4'7"	
37	45'6"	4'6"	
38	60'0"	4'6"	
39	55'6"	4'6"	
40	68'6"	4'6"	
41	75'0"	4'8"	
42	67'0"	4'8"	
43	46'0"	4'6"	
44	28'0"	4'6"	
45	29'4"	4'6"	
46	62'6"	4'6"	
47	26'0"	4'0"	Crop line
48	33'0"		No coal. Outside crop.

RECORD OF DIAMOND DRILL HOLES, continued:

Log. No.	Depth to Coal	Coal	Remarks
49			No coal at 28'
50	16'0"	4'6"	Crop coal
51	13'0"	2'0"	
52	15'0"	4'6"	
53	22'0"	4'8"	
54			Stopped above the coal in this hole.
55	52'0"	4'6"	
56	26'0"	4'6"	
57	21'0"	4'6"	
58			No coal at 27'
59	34'0"	4'6"	

RECORD OF CHURN DRILL HOLES.

Log No.	Depth to Coal	Coal	Remarks
A1			Quit drilling in blue sandstone at 27'6"
A2	49'2"	4'5"	
A3	23'6"	4'3"	
A4	17'0"	3'9"	
A5	22'6"	3'2"	
A6	31'3"	4'2"	
A7	56'2"	4'6"	
A8	36'7"	4'6"	
A9	17'0"	4'7"	
A10	33'6"	4'8"	
A11	39'0"	4'6"	
A12	40'4"	4'2"	
A13	58'0"	4'6"	
A14	15'0"	2'0"	Crop line
A15	19'0"	4'2"	
A16	29'0"	4'4"	
A17	14'6"	4'2"	
A18	24'0"	4'4"	
A19	37'0"	3'11"	
A20	44'10"	4'5"	
A21	30'10"	4'7"	
A22	29'3"	4'3"	
A22 $\frac{1}{2}$	30'4"	4'4"	
A23	36'4"	4'3"	
A24	58'2"	4'3"	
A25	28'0"	4'2"	
A26	17'10"	4'2"	
A27	15'6"	1'6"	Crop line
A28	17'0"	4'2"	
A29	16'0"	3'6"	
A30	15'0"	2'0"	
A31			No coal
A32	23'9"	4'2"	
A33	17'6"	4'0"	
A34	22'11"	3'0"	
A35	24'9"	4'0"	
A36	16'5"	4'2"	
A37	14'0"		Hole not completed. Bored to coal, but did not drill into coal. No coal.
A38			
A39	35'6"	4'5"	
A40	15'3"	4'0"	
A41	20'3"	4'5"	
A42	19'2"	4'2"	
A43	38'4"	4'8"	
A44	25'3"	4'3"	
A45	38'8"	4'7"	
A46	50'10"	4'4"	
A47	42'6"	4'7"	
A48	49'6"	4'6"	

RECORD OF CHURN DRILL HOLES, continued:

Log. No.	Depth to Coal	Coal	Remarks
A49	35' 4"	4' 2"	
A50	44' 5"	4' 6"	
A51	32' 8"	4' 10"	
A52	41' 4"	4' 8"	
A53	30' 0"		No coal at 30'
A54	15' 0"		No coal at 15'
A55	26' 0"		No coal at 26'
A56	25' 0"		No coal at 25'
A57	27' 0"	4' 2"	
A58	25' 6"	3' 8"	
A59			No coal at 33' 0"
A60	25' 0"	4' 2"	
A61	27' 0"	4' 4"	
A62	35' 2"	4' 3"	
A63			No coal at 32' 0"
A64			No coal at 38' 0"
A65	28' 4"	4' 3"	
A66	34' 9"	4' 0"	
A67	25' 6"	3' 8"	
A68	14' 0"	2' 9"	Crop coal
A69	26' 6"	4' 4"	
A70	19' 0"	3' 9"	
A71			No coal at 20'
A72	14' 0"	4' 2"	
A73			No coal at 65'
A74			No coal at 20'
A75			No coal at 18'
A76	11' 6"	3' 8"	
A77	30' 0"	4' 3"	
A78	23' 0"	4' 1"	
A79	12' 10"	3' 6"	
A80			No coal at 14'
A81	10' 0"		Crop line
A82	14' 0"	3' 6"	
A83	9' 0"	2' 0"	Crop coal
A84	11' 0"		Crop line
A85			No coal at 13'
A86			No coal
A87	49' 0"	3' 8"	
A88	26' 0"	4' 7"	
A89			No coal at 18'
A90	15' 0"		Crop coal at 38'
A91	53' 2"	4' 5"	
A92			Quit in shale above coal
A93			No coal at 35'
A94	47' 0"	4' 2"	
A95	31' 0"	4' 5"	
A96			No coal at 42'
A97	31' 0"	4' 3"	

RECORD OF CHURN DRILL HOLES, continued:

Log. No.	Depth to Coal	Coal	Remarks
A98	39'6"	4'3"	
A99	36'6"	4'2"	
A100	62'3"	4'4"	Limestone band 1'4" thick in shale
A101	56'6"	2'6"	Limestone band of 0'10" in shale
A102	46'7"	4'1"	Limestone band of 1'0" in shale
A103	50'0"	4'2"	Limestone band of 1'9" in shale
A104	24'4"	2'10"	
A105	27'0"		Crop line
A106	26'0"	4'2"	
A107	12'9"	4'1"	
A108			No coal at 25'4"
A109	48'4"	4'2"	
A110	18'6"	4'5"	
A111	13'0"	4'3"	
A112			No coal at 17'0"
A113	44'6"	4'2"	
A114	32'5"	4'5"	
A115	13'0"	4'3"	
A116	10'3"	3'5"	
A117	17'9"	4'3"	

of from 50 to 60 feet.

At present coal prices, a profit of \$1.00 to \$1.50 on strip coal under an overburden of 25 to 30 feet may be assumed. This would represent a profit of about \$11,000,000 for the strip coal above and, at a production of a million tons a year, would result in a yearly profit of \$1,100,000 during a 10-year life of the mine.

*Since the Cassin Mine is situated on the...
...of the...
...of the...
...of the...
...of the...*

13. OVERBURDEN.

The overburden over coal No. 5 up to a depth of 60 feet consists almost exclusively of soil averaging about ten feet and the remainder consists of sandy shale, sometimes having a light brown and sometimes a gray color. The gray shale is fossiliferous and contains very little sand. It represents what is commonly called by miners a blue shale or soapstone. Immediately upon the coal is frequently found a black slate commonly called draw slate. The latter varies in thickness from a fraction of an inch to about six inches.

Only where the No. 5 coal lies at the greater depth than 60 feet, we find the No. 6 coal above, together with its cap rock and fire clay. Also the No. 5 coal occasionally has a limestone cap rock two to twenty feet above the coal, but this limestone above coal No. 5 occurs only in the east of the Saline County coal field and no limestone has been observed in the overburden above the coal No. 5 of the Carrier Mills property.

In a few instances, the cores from the diamond drill holes which were made by Mr. Crawford, previous to the purchase of the property by Mr. Carney, show sandstone. The latter is gray to yellow, finely granulated and, if encountered by the shovels, can probably be removed by the same without shooting. It seems to occur only in small lenses and its occurrence seems to be very much restricted, as can be seen from the drill holes.

14. COAL UNDER MORE THAN 60 FEET.

The Carrier Mills Tract includes coal land sections 36, 31, 25, and 30, where the coal lies under an overburden of more than 60 feet. Under present stripping conditions, it is rarely possible and almost always unprofitable to remove so much overburden. On the other hand, underground mining by slopes from the face of the strip mine into the coal seam is entirely feasible and can be carried on with reasonable profit.

15. COAL No. 6

The probable outcrop of Coal No. 6 is indicated on the map accompanying this report as Exhibit A. It shows that coal No. 6 is present in the northern portion of the Carrier Mills Tract. This coal can be stripped, but it has a cap rock of limestone as shown in the Photographs in Exhibit E and the removal of the overburden will require shooting. Coal No. 6 is stripped in various places in Southern Illinois.

Strip mining
16. PARTICULARLY AT CARRIER MILLS and ^{elsewhere} in Illinois

The Carrier Mills Tract has a large amount of strip coal of good quality under a relatively light overburden of soft material. It is situated near a trunk railroad, the C. C. C. & St. Louis Railway, and has easy access of power from the Grand Tower plant. Its freight rates are those of the Southern field, which amount at present to \$1.95 per ton from Harrisburg to Chicago. The coal from the Carrier Mills Tract has to compete with strip coal from the Southern Field in Williamson and Franklin and Perry County where coal No. 6 is mined, also with the coal No. 5 (Northern) of Fulton County and with the No. 2 coal of Grundy and Will Counties. The differences in rates are not prohibitive for competition with the above mentioned fields as far as the Chicago Market is concerned. Furthermore the Southern No. 5 coal is superior in quality to the above mentioned coals and also much thicker than the coal No. 2 which lies next to Chicago.

Strip mining is, at present, the most profitable method of mining coal. With only about one per cent of the total coal reserves of Illinois available for stripping, it can be assumed that any stripping property which has as abundant a supply of excellent coal, and as favorable mining conditions as the Carrier Mills Tract is assured of a very successful operation under competitive conditions.

EXHIBIT B - SECTIONS

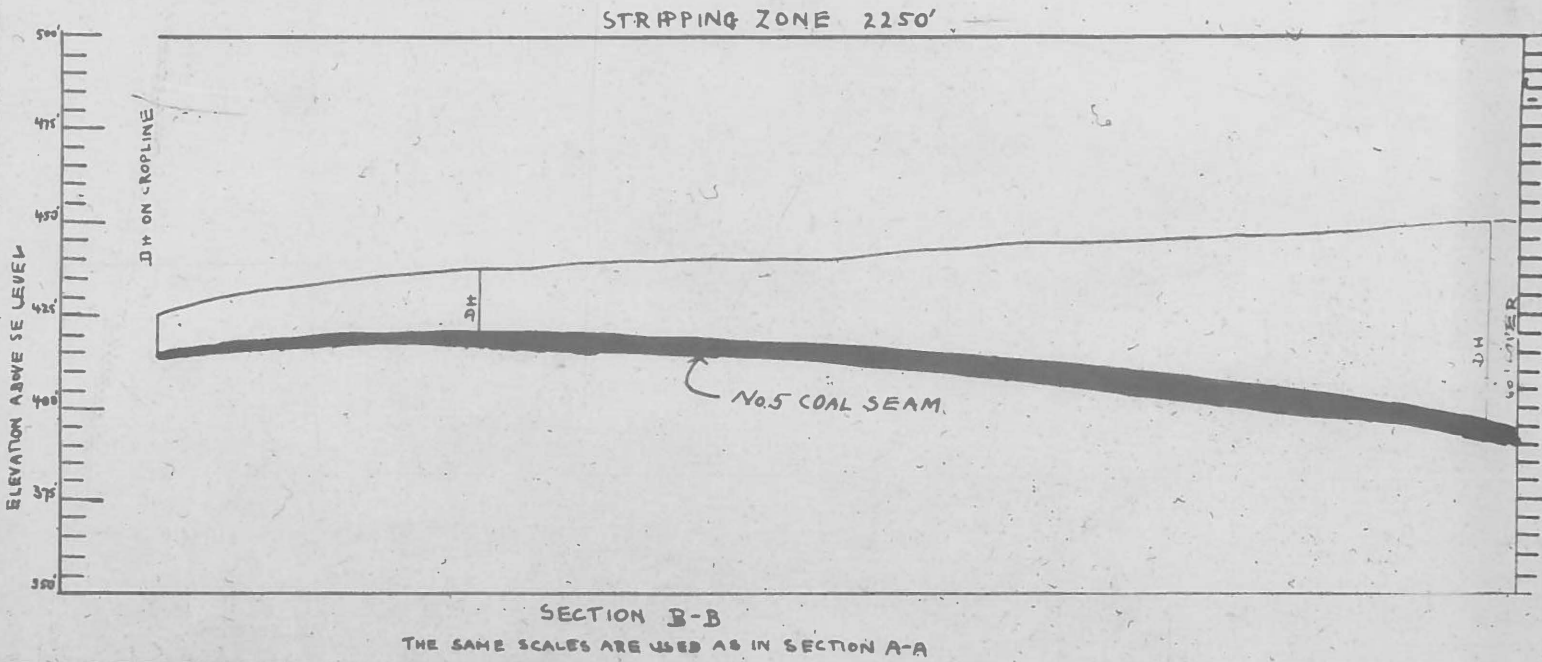
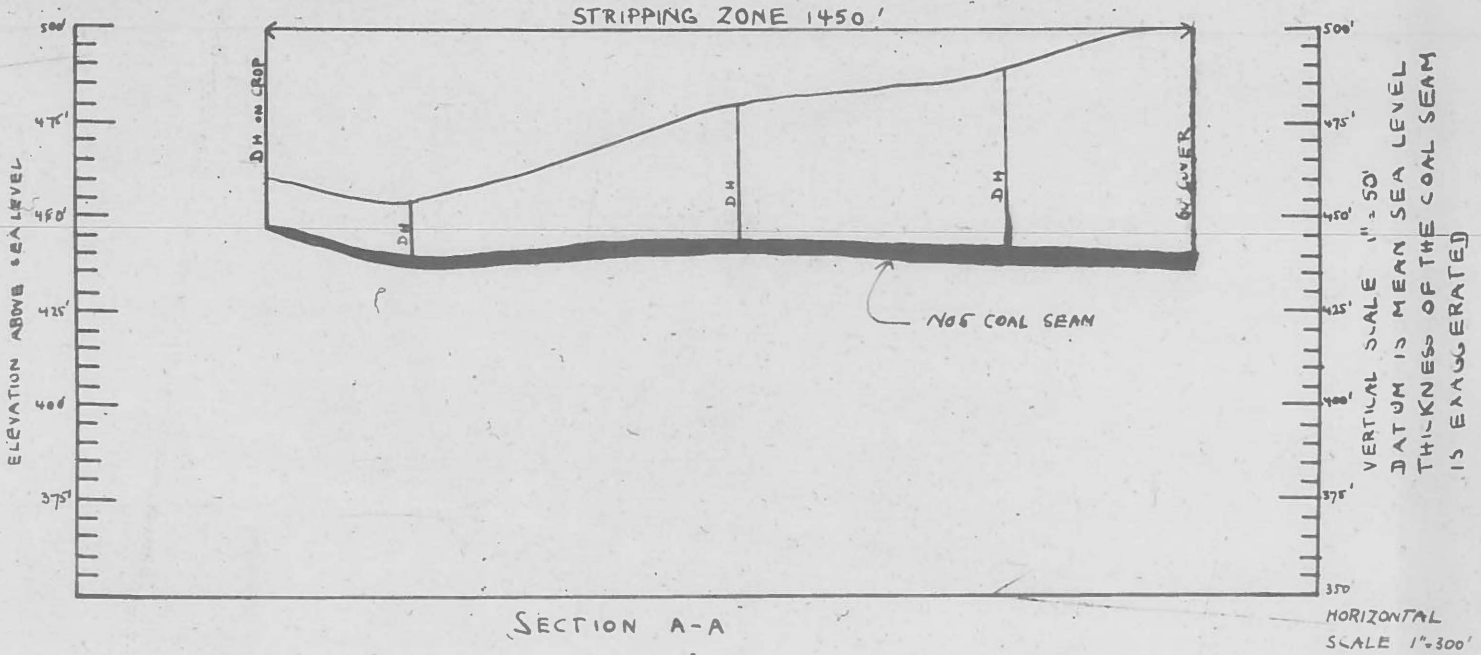
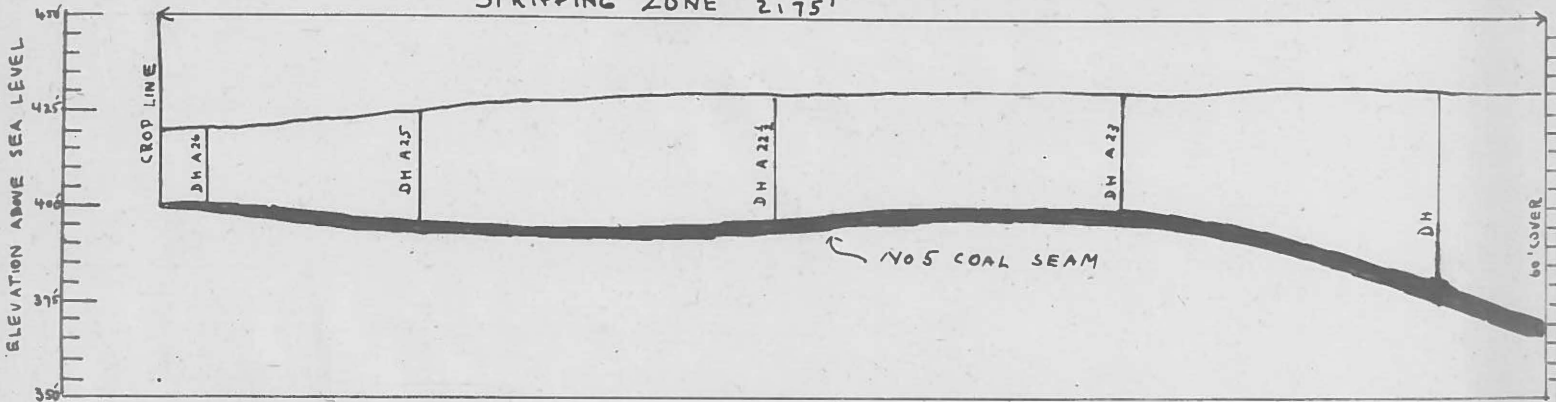


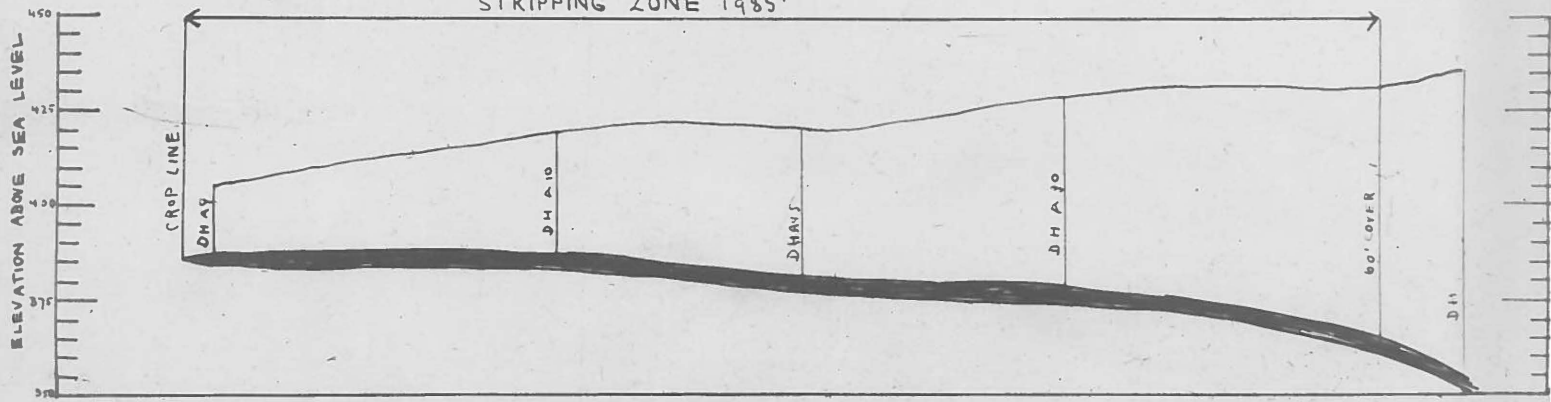
EXHIBIT B - SECTIONS

STRIPPING ZONE 2175'



SECTION C-C
THE SAME SCALES ARE USED AS IN SECTION A-A

STRIPPING ZONE 1985'



SECTION D-D
THE SAME SCALES ARE USED AS IN SECTION A-A

Exhibit E.

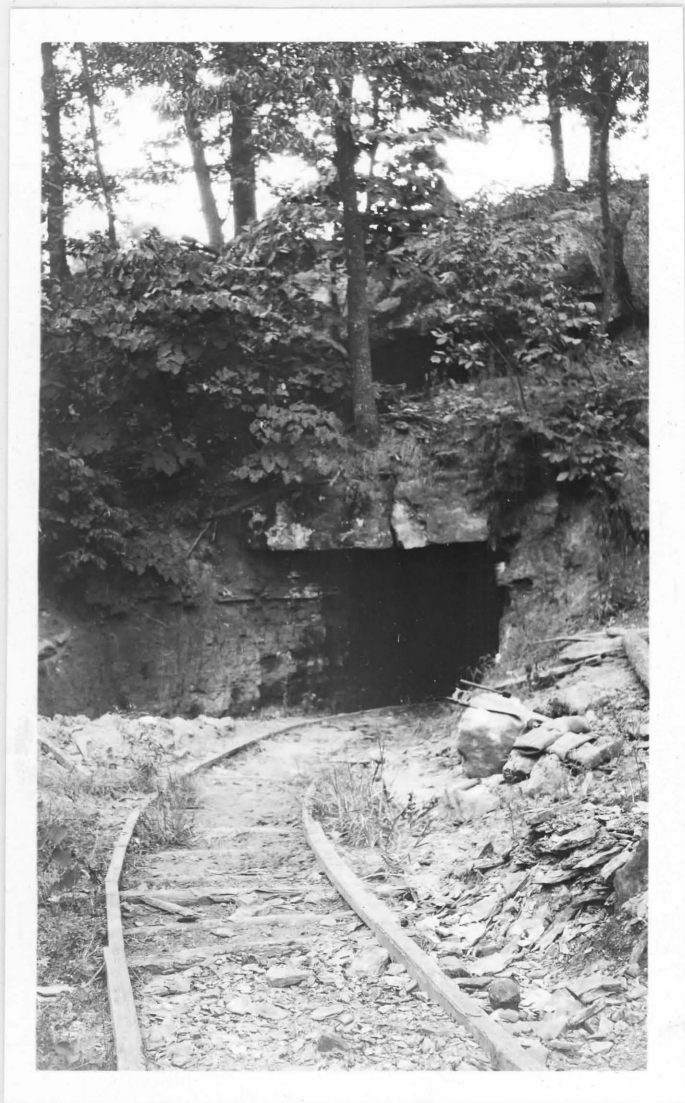


Figure 13. Neely Mine in SE $\frac{1}{4}$ of Section 35, T 9S, R 4E, showing cap rock over coal No. 6. The coal lies a few inches below the cap rock.

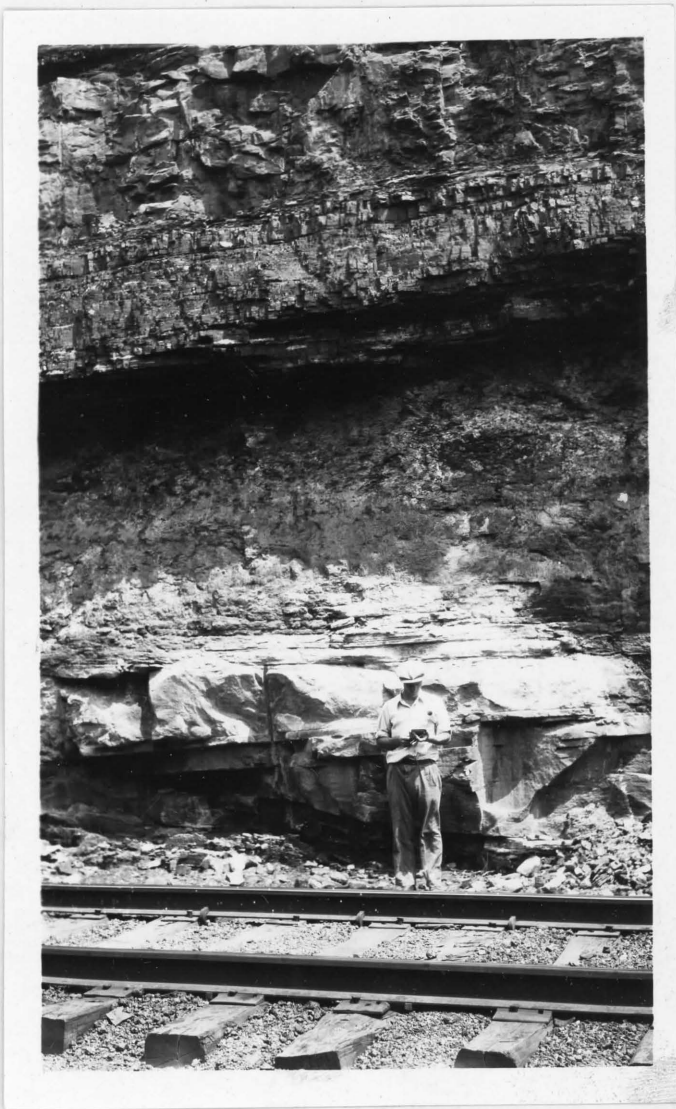


Figure 14. Outcrop of coal No. 6 in Illinois Central cut, SW $\frac{1}{4}$ of Section 30, T 9S, R 5E, showing fire clay and sandstone layer below coal.



Figure 9. Entrance to Hill Mine in SE corner of Section 34, T 9S, R 4E, showing overburden of coal No. 5. The coal begins a few feet from the entrance of the mine.

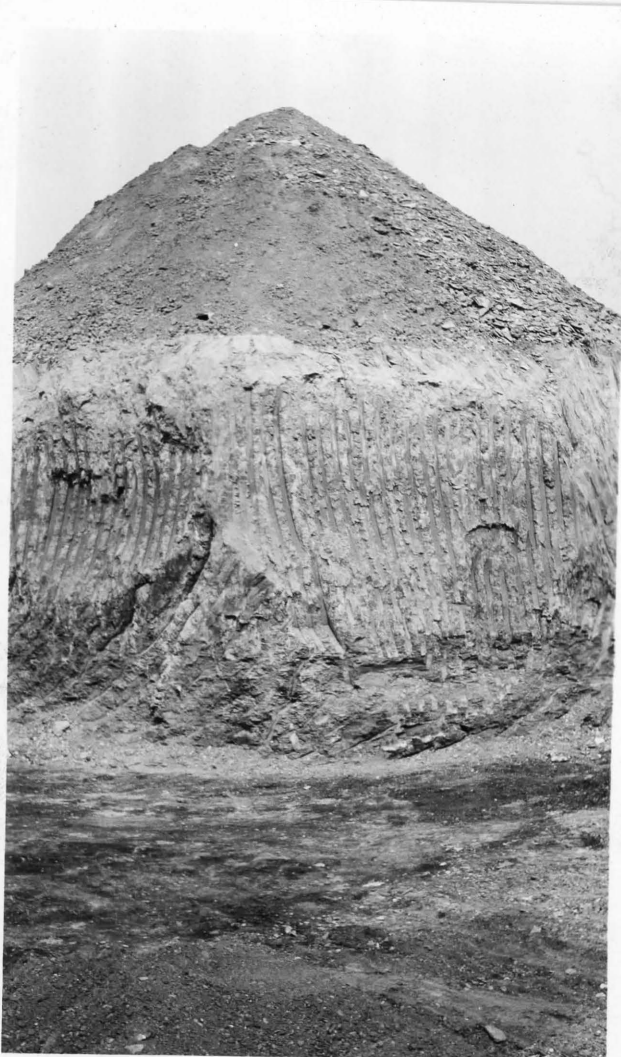


Figure 10. Bank in box cut of Drake-Brown-Stump Mine Southwest of town of Harrisburg. The bank is approximately 35 feet high and stands up almost vertically without signs of sliding into the pit.

Exhibit E.



Figure 11. Small strip mine in coal No. 6 in NE $\frac{1}{4}$ of Section 36, T 9S, R.4E.



Figure 12. View of Illinois Central Railway cut in SW $\frac{1}{4}$ of Section 30, T 9S, R 5E looking North. It shows the outcrop of coal No. 6 with overlying cap rock.

Exhibit E.



Figure 7. Surface view of Carrier Mills Tract West of Illinois Railroad cut looking Southeast from road corner in Section 36, SE $\frac{1}{4}$ T 9S, R 4E.



Figure 8. Surface view of Carrier Mills Tract West of Illinois Railway cut looking Southwest from place near center of Section 36, T 9S, R 4E.

Exhibit E.



Figure 5. Surface view of Carrier Mills Tract on East side of Illinois Central Railroad dam looking Northwest. The railroad dam is visible in the background.



Figure 6. Surface view of Carrier Mills Tract west of Illinois Central Railway cut looking Northeast. The Railroad dam is visible in the background.

Exhibit E.



Figure 3. Surface view of East end of Carrier Mills Tract looking North.



Figure 4. Surface view of Western part of Carrier Mills Tract looking North.

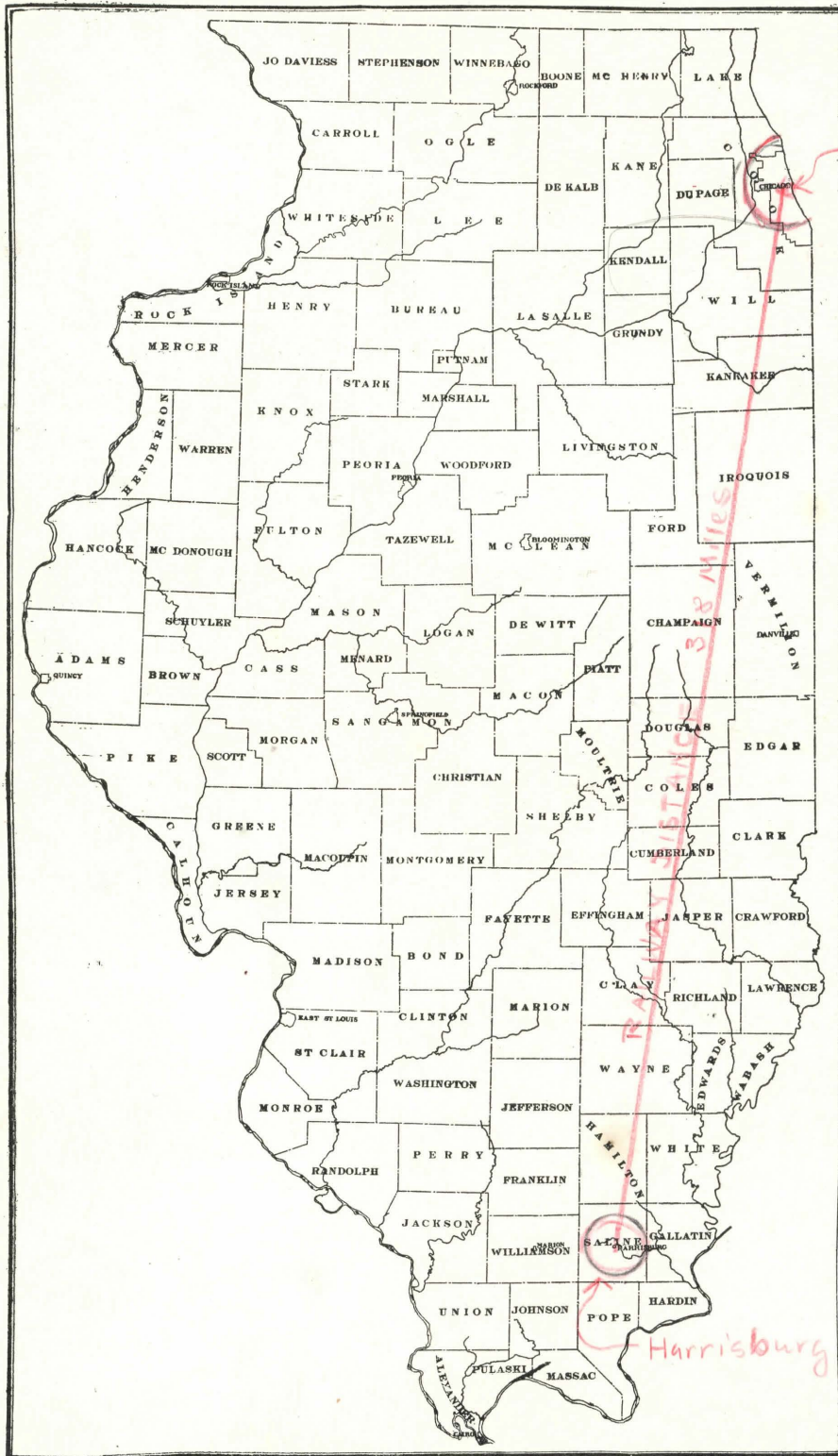
Exhibit E.



Figure 1. Surface view of East end of Carrier Mills Tract looking Southwest.



Figure 2. Surface view of East end of Carrier Mills Tract looking Northwest.



CHICAGO

328 Miles

Harrisburg



Topography by F. W. Hughes and R. F. Brant.
Surveyed in 1923.

Scale 62500
1 2 3 4 Miles
5000 10000 15000 20000 Feet
1 2 3 4 Kilometers

Scale 62500
1 2 3 4 Miles
5000 10000 15000 20000 Feet
1 2 3 4 Kilometers

Scale 62500
1 2 3 4 Miles
5000 10000 15000 20000 Feet
1 2 3 4 Kilometers

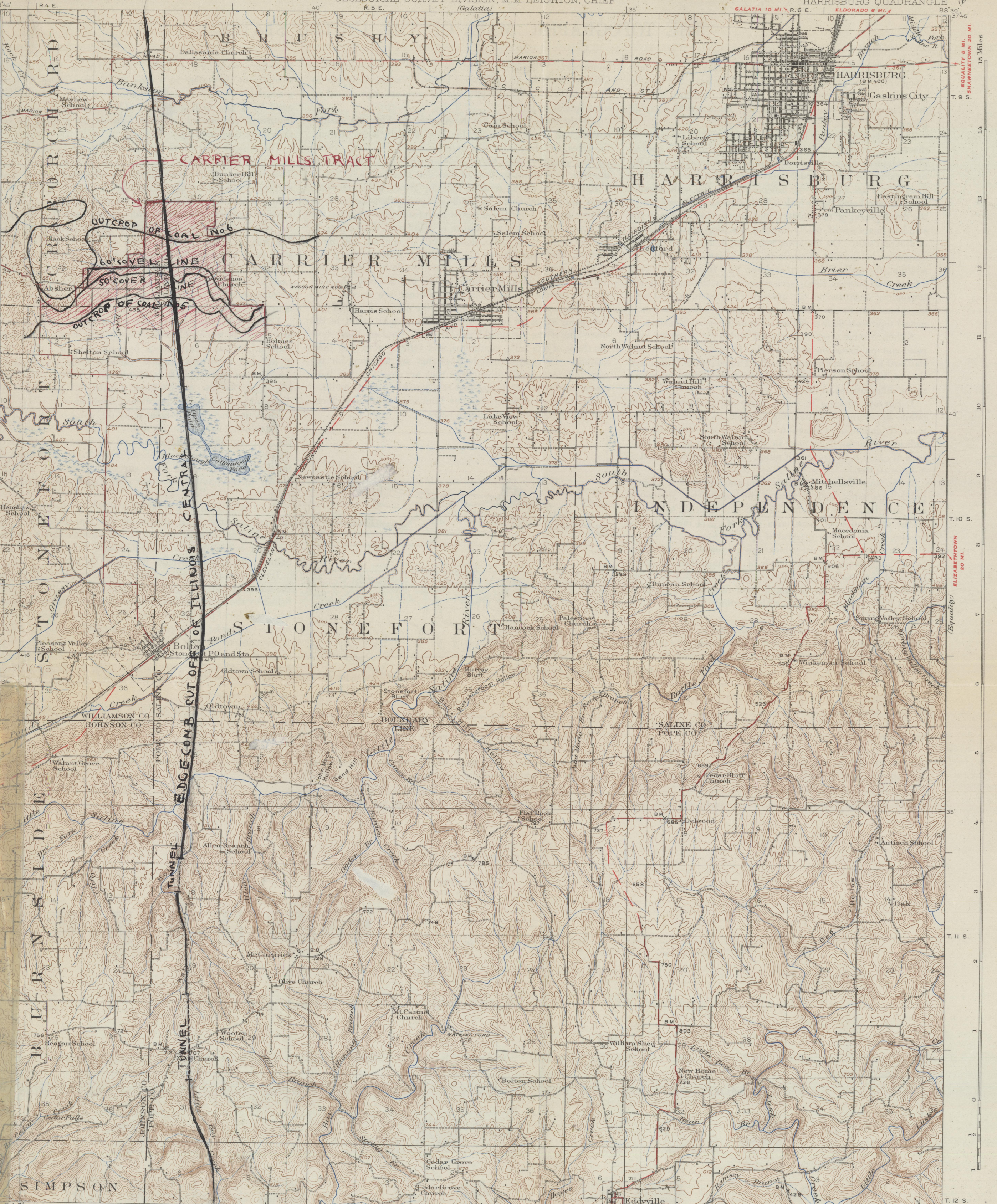
Scale 62500
1 2 3 4 Miles
5000 10000 15000 20000 Feet
1 2 3 4 Kilometers

Contour interval 20 feet.
Datum is mean sea level.

MARION, ILL.
Edition of 1925.

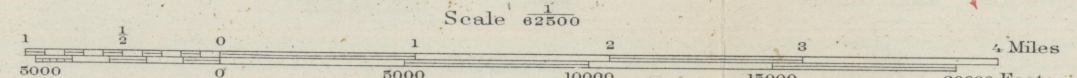
Contour interval 20 feet.
Datum is mean sea level.

HARRISBURG, ILL.
Edition of 1925.



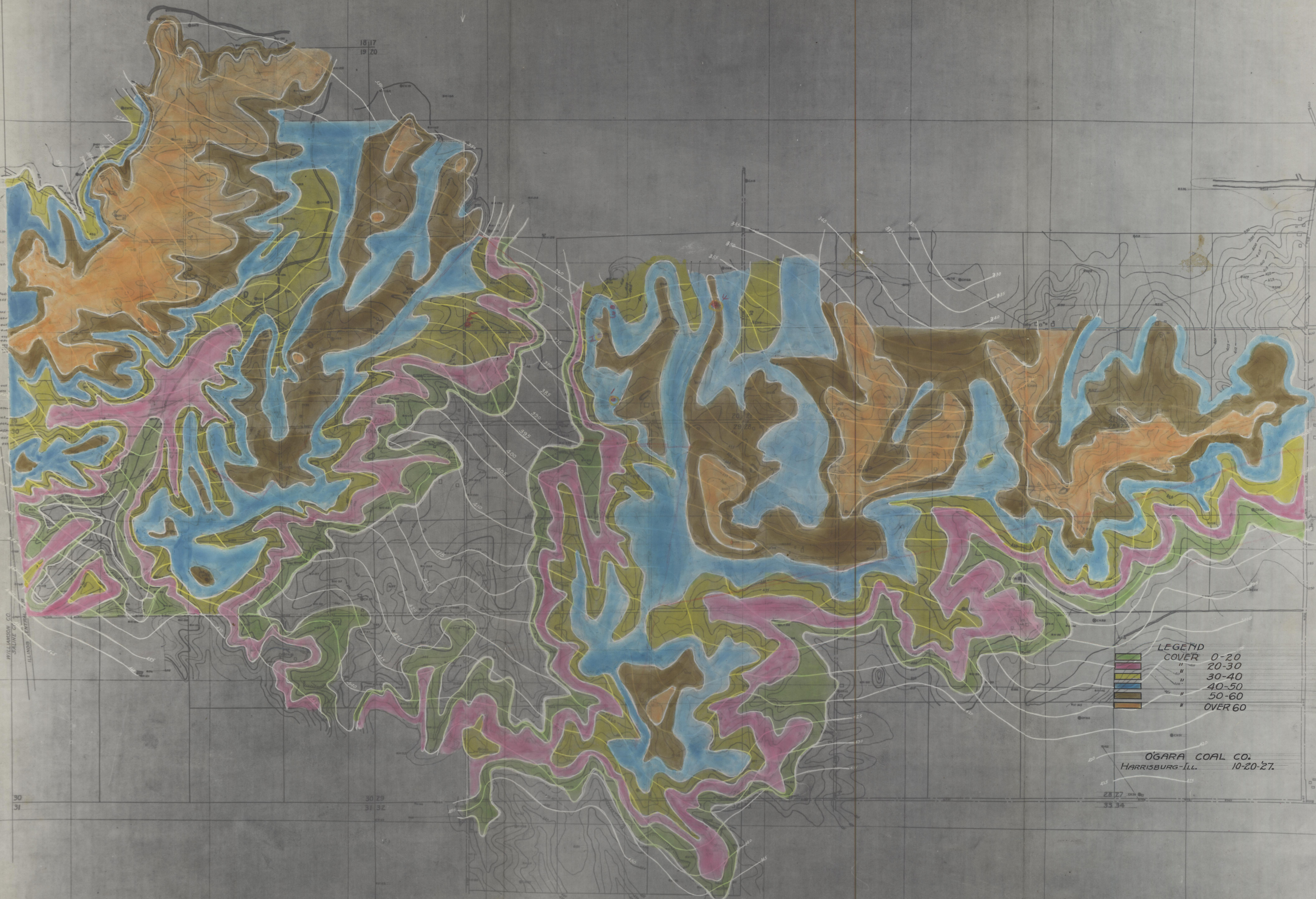
Topography by E.V. Perkinson, F.W. Hughes, F.W. Cook,
W.C. Thompson, Raymond F. Brant, and Louis A. Freeman.
Surveyed in 1921 and 1923.

APPROXIMATE MEAN
DECLINATION, 1923



Contour interval 20 feet
Datum is mean sea level

Polyconic projection, North American datum
5000 yard grid based upon U.S. zone system, C
To join Galatia use dotted projection corners.



WILLIAMSON CO.
SALINE CO.
ILLINOIS

18 17
19 20

LEGEND

	COVER	0-20
	"	20-30
	"	30-40
	"	40-50
	"	50-60
	"	OVER 60

O'GARA COAL CO.
HARRISBURG-ILL. 10-20-27.

30
31

30 29
31 32

28 27
33 34

Harrisburg Coal Mining Company

Data on Available Tonnage on the Carrier Mills Strip Proposition
 Coal with 60' or less overburden called Strip Coal
 The I. F. Parks and Marion Harris Tracts north of the Strip
 Acreage figured as all having mineable coal thereunder.

Item No.	Name	Status of Holding	Total Acreage	Distribution of Acreage			Strip Coal		Mineable Coal East & West of Cut Off
				Strip Coal	Mine Coal	Barren	East of Cut Off Tons	West of Cut Off Tons	
26	A. J. Arnold ✓	Owned in Fee	180 ✓	84.5 East	None	95.5	596000 ✓		
24	Festus Arnold ✓	Owned in Fee	20 ✓	20 East			141000 ✓		
22	Marion Harris ✓	Owned in Fee	215 ✓	80.0 East	95	40	564500 ✓	447000 ✓	
28	I. F. Parks ✓	Coal Leased	777 ✓	116.0 East 84.5 West	537½	39	818500 ✓	556500 ✓ 2359500 ✓	
	Wm. Roy Carney ✓	?	West 40 ✓	23½	West	16½		151000 ✓	
	Wm Roy Carney ✓	?	West 11½ ✓	11½	West			74000 ✓	
	Wm Roy Carney ✓	?	West 28½ ✓	28½	West			179000 ✓	
	Phillip Parks ✓	?	West 40.0 ✓	12½	West	27½		80500 ✓	
	Wm. Roy Carney ✓	?	West 60.0 ✓	51.5	West	8½		331000 ✓	
	Wm Roy Carney ✓	?	40.0 ✓	32	West	8		205500 ✓	
	W. Killmen ✓	?	140.0 ✓	33	West	107		207000 ✓	
	Wm Roy Carney ✓	?	40.0 ✓	33	West	7		207000 ✓	
	W. D. Beasley ✓	?	60 ✓	50½	8.5 "2"	West		317000 ✓	
	Geo. Neely ✓	?	40 ✓	4	36 "2"	West		25000 ✓	
	Wm Roy Carney ✓	?	40 ✓	37	3 "2"	West		232000 ✓	
	T. Nolen ✓	?	20 ✓	1		19		4500 ✓	
	R. Tanner ✓		20 ✓	3		17		12000 ✓	
	A. Hagie ✓		20 ✓	14	6"?"			90000 ✓	
	Lon Bowick ✓		20 ✓	19	½"?"	½ ac.		125000 ✓	
	W. F. Jones ✓		17 ✓	17				93500 ✓	
	"?" Jones ✓		3 ✓	3				9500 ✓	
	E. McSperin ✓		40 ✓	39		1 ac.		244500 ✓	
	M. R. Jones ✓		20 ✓	12.5		7½		78500 ✓	
	Total						2,120,000	3,223,000	2,806,500

Tonnage figure based on 810.5 + 87.5 + 94.0 = 992.0 ✓ recover 160' tone of coal per foot 800. 1872

489-L

Record of Churn Drill Holes

Log No	Surface	Shale	Sandstone	Depth to coal Depth to coal	Coal	Remarks
A 1 v	23' 0"	-	4' 6"	-	-	Quit drilling in blue sandstone at 27' 6"
A 2 v	12' 0"	37' 2"	4' 2"	49' 2"	4' 5"	
A 3 v	12' 0"	11' 6"	5' 6"	23' 6"	4' 3"	
A 4 v	16' 0"	1' 0"	17' 0"	17' 0"	3' 9"	Upper 3" of coal soft
A 5 v	22' 6"	-		22' 6"	3' 2"	
A 6 v	20' 0"	11' 3"		31' 3"	4' 2"	
A 7 v	12' 0"	44' 2"		56' 2"	4' 6"	
A 8 v	15' 0"	21' 7"		36' 7"	4' 6"	
A 9 v	16' 0"	1' 0"		17' 0"	4' 7"	This coal is very high in sulphur
A 10 v	11' 0"	22' 0"		33' 6"	4' 8"	
A 11 v	15' 0"	24' 0"		39' 0"	4' 6"	
A 12 v	12' 0"	28' 4"		40' 4"	4' 2"	
A 13 v	12' 0"	45' 0"		57' 0"	4' 6"	
A 14 v	15' 0"	-		15' 0"	2' 0"	crop line
A 15 v	12' 0"	7' 0"		19' 0"	4' 2"	
A 16 v	12' 0"	17' 0"		29' 0"	4' 4"	Coal very brittle as if near fault
A 17 v	14' 6"	-		14' 6"	4' 2"	coal fair
A 18 v	12' 0"	12' 0"		24' 0"	4' 4"	
A 19 v	15' 0"	22' 0"		37' 0"	3' 11"	
A 20 v	10' 0"	34' 10"		44' 10"	4' 5"	
A 21 v	12' 0"	18' 10"		30' 10"	4' 7"	a parting of 1' 3" thin shales (slate and shales) in coal
A 22 v	12' 0"	17' 3"		29' 3"	4' 3"	Upper 9" of coal dirty, the remainder brittle
A 22 1/2 v	12' 0"	18' 4"		30' 4"	4' 4"	Coal soft & brittle
A 23 v	10' 0"	26' 4"		36' 4"	4' 3"	3" sulphur band in coal
A 24 v	16' 0"	42' 2"		58' 2"	4' 3"	coal fairly hard
A 25 v				28' 0"	4' 2"	
A 26 v				17' 10"	4' 2"	
A 27 v				15' 6"	4' 2"	crop coal level
A 28 v				17' 0"	4' 2"	
A 29 v				16' 0"	3' 6"	shelly coal
A 30 v				15' 0"	2' 0"	shelly coal
A 31 v				-	-	No coal
A 32 v				23' 9"	4' 2"	
A 33 v				17' 6"	4' 0"	
A 34 v				22' 11"	3' 0"	
A 35 v				24' 9"	4' 0"	
A 36 v				16' 5"	4' 2"	
A 37 v				14' 0"	-	Hole not completed. Drove to coal but did not drill coal into
A 38 v				-	-	No coal
A 39 v				35' 6"	4' 5"	
A 40 v				15' 3"	4' 0"	
A 41 v				20' 3"	4' 5"	
A 42 v				19' 12"	4' 2"	
A 43 v				38' 4"	4' 8"	
A 44 v				25' 3"	4' 3"	
A 45 v				38' 8"	4' 7"	
A 46 v				50' 10"	4' 4"	
A 47 v				42' 6"	4' 7"	
A 48 v				49' 6"	4' 6"	
A 49 v				35' 4"	4' 2"	
A 50 v				44' 5"	4' 6"	
A 51 v				32' 8"	4' 10"	
A 52 v				41' 4"	4' 8"	
A 53 v				30' 0"	-	No coal
A 54 v				15' 0"	-	No coal
A 55 v				26' 0"	-	No coal
A 56 v				25' 0"	-	No coal
A 57 v				27' 0"	4' 2"	
A 58 v				25' 6"	3' 8"	woody coal. 9" of sand & clay above coal
A 59 v				33' 0"	-	No coal at 33' 0"
A 60 v				25' 0"	4' 2"	woody coal

Record of Diamond drill holes.

Log. No	Surface	Shale	Sandstone	From Depth to coal	Coal	Remarks
1	11'0"	17'4"		28'4"	4'5"	
2	11'0"	13'0"		24'0"	4'6"	
3	12'0"	10'0"		22'0"	4'6"	
4	12'0"	9'0"		19'0"	4'6"	
5	13'0"	1'10"		14'0"	4'6"	
6	13'0"	-		13'6"	4'6"	
7	18'0"	-		-	-	No coal. Outside crop
8	18'0"	-		-	-	No coal. Outside crop
9	15'0"	-		15'0"	4'3"	Crop line
10	13'0"	6'0"		19'0"	4'6"	
11	12'0"	11'6"		23'6"	4'6"	
12	12'0"	14'6"		26'6"	4'6"	
13	12'0"	11'10"		23'10"	4'6"	
14	12'0"	13'4"		25'4"	4'6"	
15	11'0"	11'6"		22'6"	3'10"	
16	11'0"	7'6"		18'6"	4'1"	
17	10'0"	5'0"		15'6"	4'2"	
18	10'0"	6'6"		16'6"	4'6"	
19	10'0"	4'6"		14'6"	4'6"	
20	10'0"	4'6"		14'6"	4'6"	
21	10'0"	5'6"		15'6"	4'5"	
22	10'0"	4'0"		14'0"	4'6"	
23	10'0"	2'6"		12'6"	4'6"	
24	10'6"	1'6"		12'0"	2'6"	Crop line coal
25	11'0"	7'6"		18'0"	-	No coal. Crop line
26	11'0"	9'0"		20'0"	-	no coal at 20'0"
27	14'0"	6'0"		20'0"	-	no coal at 20'0"
28	13'6"	Summ 5'0"		18'6"	-	no coal
29	12'6"	Summ 1'6"		14'10"	3'6"	
30	12'0"	3'6"		15'6"	4'6"	
31	10'0"	10'6"		20'6"	4'6"	
32	13'0"	5'0"		18'0"	4'6"	
33	15'6"	-		15'0"	4'6"	
34	15'0"	4'10"		19'0"	-	No coal at 19'0"
35	13'6"	2'6"	Summ 1'0"	16'0"	4'0"	
36	5'0"	35'0"		4'0'0"	4'7"	
37	11'0"	34'6"		45'6"	4'6"	
38	11'0"	49'0"		60'0"	4'6"	Outside strip area
39	11'0"	44'6"		55'6"	4'6"	Outside strip area
40	9'0"	59'0"		68'6"	4'6"	Outside strip area
41	8'0"	67'0"		75'0"	4'8"	Outside strip area
42	9'0"	58'0"		67'0"	4'8"	Outside strip area
43	9'0"	37'0"		46'0"	4'6"	Outside strip area
44	9'0"	19'0"		28'0"	4'6"	
45	7'0"	22'4"		29'4"	4'6"	
46	14'0"	48'6"		62'6"	4'6"	Outside strip area
47	14'0"	12'0"		26'0"	4'0"	Crop line
48	12'0"	23'0"		33'0"	-	No coal. Outside crop
49	12'0"	13'0"	Cross ss. 3'0"	-	-	No coal
50	15'0"	1'0"		16'0"	4'6"	Crop coal
51	13'0"	-		13'0"	2'0"	Outside crop line. Sup coal
52	15'0"	-		15'0"	4'6"	
53	14'0"	8'0"		22'0"	4'8"	
54	15'0"	20'0"		-	4'6"	stopped above the coal in this hole.
55	10'0"	42'0"		52'0"	4'6"	
56	12'0"	14'0"		26'0"	4'6"	
57	16'0"	5'0"		21'0"	4'6"	
58	10'0"	-		-	-	No coal. Outside crop line
59	13'0"	11'0"		34'0"	4'6"	

Record of Churn Drill Holes - Continued

Log No	Surface	Shale	Sandstone	Depth to Coal	Coal	Remarks
A 61 ✓				27'0"	4'4"	Coal brittle
A 62 ✓				35'2"	4'3"	Coal soft + brittle
A 63 ✓				32'0"	—	No coal at 32'0"
A 64 ✓				38'0"	—	No coal at 38'0"
A 65 ✓				28'4"	4'3"	e
A 66 ✓				34'9"	4'0"	Coal very poor
A 67 ✓				25'6"	3'8"	Coal of poor quality
A 68 ✓				14'0"	2'9"	Crop coal line
A 69 ✓	8'0"	18'6"		26'6"	4'4"	
A 70 ✓	16'0"	3'0"		19'10"	3'9"	Upper 3" of coal dead
A 71 ✓	9'0"	11'0"	Some sandstone with shale	—	—	No coal
A 72 ✓	7'0"	7'0"		14'0"	4'2"	
A 73 ✓	30'0"	35'0"		—	—	No coal
A 74 ✓	20'0"	—	Some sandstone with shale	—	—	No coal
A 75 ✓	18'0"	—	—	—	—	No coal
A 76 ✓	11'6"	—	—	11'6"	3'8"	Dead coal
A 77 ✓	12'0"	18'0"		30'0"	4'3"	
A 78 ✓	10'0"	13'0"		23'0"	4'11"	
A 79 ✓	8'0"	4'10"		12'10"	3'6"	Coal woody. Lower 4" of shale smut
A 80 ✓	7'0"	—		—	—	No coal
A 81 ✓	10'0"	—		10'0"	2'0"	Crop coal line
A 82 ✓	14'0"	—		14'0"	3'6"	Dead coal
A 83 ✓	9'0"	—		9'0"	2'0"	Crop coal coal
A 84 ✓	11'0"	—		11'0"	—	Crop coal line
A 85 ✓	13'0"	—		—	—	No coal
A 86 ✓	12'0"	26'0"	Some sandstone with shale	—	—	No coal
A 87 ✓	7'0"	42'0"		49'0"	3'8"	Coal brittle
A 88 ✓	8'0"	18'0"		26'0"	4'7"	
A 89 ✓	18'0"	—		—	—	No coal
A 90 ✓	15'0"	—		15'0"	—	Crop coal
A 91 ✓	8'0"	45'2"	24" in shale	53'2"	4'5"	
A 92 ✓	12'0"	68'0"		—	—	Quit in shale above coal
A 93 ✓	35'0"	—		—	—	No coal
A 94 ✓	10'0"	37'0"		47'0"	4'2"	
A 95 ✓	20'0"	11'0"		31'0"	4'5"	
A 96 ✓	42'0"	—		—	—	No coal
A 97 ✓	31'0"	—		31'0"	4'3"	
A 98 ✓	22'0"	17'6"		39'6"	4'3"	
A 99 ✓	23'0"	13'6"		36'6"	4'2"	Coal brittle
A 100 ✓	12'0"	40'3"		62'3"	4'4"	Limestone band 1'4" thick in shale.
A 101 ✓	16'0"	—		56'6"	2'6"	Limestone band of 0'10" in shale
A 102 ✓	17'0"	29'7"		46'7"	4'11"	Limestone band of 1'0" in shale
A 103 ✓	10'0"	40'0"		50'0"	4'2"	Limestone band of 1'9" in shale
A 104				24'4"	2'10"	Dead coal
A 105				27'0"	—	Crop line
A 106				26'0"	4'2"	
A 107				12'9"	4'11"	
A 108				25'4"	—	No coal at 25'4"
A 109				48'4"	4'2"	
A 110				18'6"	4'5"	
A 111				13'0"	4'3"	
A 112				17'0"	—	No coal at 17'0"
A 113				44'6"	4'2"	
A 114				32'5"	4'5"	
A 115				13'0"	4'3"	
A 116				10'3"	3'5"	
A 117				17'9"	4'3"	