UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

PREPARATION CHARACTERISTICS OF ILLINOIS COALS

TECHNICAL PAPER 724

UNITED STATES DEPARTMENT OF THE INTERIOR
J. A. KRUG, Secretary
BUREAU OF MINES
JAMES BOYD, Director

Technical Paper 724

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1949

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 30 cents

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INTRODUCTION

By THOMAS FRASER[3]

For many years the Bureau of Mines has compiled and published, for use of Government officials and the public, analytical data showing the composition and quality of coals from coal-mining areas in the United States and Alaska. Since the preparation characteristics of our coal deposits have become a factor equal in importance to their chemical composition, a new series of Bureau publications was started in 1947 designed to show the amenability of our American coals to intensive preparation. Technical Paper 701 on Maryland coal was the first of the series to be issued. This second publication reports the washability and screen analyses of the important Illinois coal beds, showing the quality of product that would result when the raw coal is subjected to preparatory treatment.

The coal industry of Illinois has had a long and diversified experience in the development of mechanical coal-preparation practices. Several small washeries were placed in operation during the seventies in connection with an attempt to build up a coking industry using the Belgian beehive oven. The first of these washeries was an Osterspey jig plant erected at East St. Louis in 1870 to wash screenings from the Belleville district for the Illinois Patent Coke Co.

This was among the first coal washeries erected in the United States. Other similar small plants were built in central and northern Illinois during the decade following this initial experiment; but the final outcome of those early attempts to produce metallurgical coke was unfavorable, and accordingly the washing of coal for this special purpose came to an end in the early eighties. During several years plant construction was almost at a standstill, although coal production for general domestic and industrial use was expanding rapidly.

Around the end of the century another period of widespread washery development started, this time to meet the extremely competitive conditions in the middle western coal market for general-purpose fuel. During this period the lump-coal-mining scale was abandoned, and the pressure to find a market for small coal led to erection of many plants to prepare washed screenings and the small nut sizes. By 1912, when

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Professor Lincoln [4] published his classic report on the coal-washing industry of Illinois, that State was again leading in the production of mechanically washed coal, with 35 operating plants.

After this period of washing construction, interest again subsided; in the decade following, new plant construction virtually stopped; and, with few exceptions, the plants described by Lincoln were abandoned. When the third and current era of mechanical coal cleaning started in the late twenties, it inherited virtually nothing from this early practice. The extensive coal-preparation industry of Illinois, which has grown up so rapidly with vigorous development of underground mechanization and large-scale stripping operations, consists entirely of new and modern plants. The present pattern of the industry with respect to process and equipment preferences is shown in table 1. Although several new processes have come into the field

TABLE 1.—*Types of coal-cleaning plants operating in Illinois in 1947*

	Number of plants	Total cleaned coal, tons	Predominant size of coal cleaned (inches)
Baum jigs	29	19,093,009	6 x 0.
Mechanical jigs	6	1,986,664	3 x 0.
Launderers	7	5,178,010	4 x 0.
Shaking tables	3	38,469	
Heavy mediums	7	4,586,350	6 top size.
Pneumatic [1]	1	2,481,046	¾ top size.

[1] Tonnage represents coal cleaned at 7 plants, 1 operating pneumatic equipment only and 6 operating both wet and pneumatic equipment.

since those pioneer plants were erected in 1870, it is noteworthy that the jig is still the predominating type of washing equipment; but the modern, air-actuated, coal-washing jig box handles 10 to 50 times the through put of its 1870 mechanically driven prototype. In this industry, the most spectacular advance has been in the mechanical perfection of large-scale, material-handling equipment and in over-all plant engineering.

Rapid growth of mechanical preparation during the third period, still in progress, is shown by the statistical data of table 2.

During this long period of development in coal-preparation practice in Illinois, many fundamental data have been published on the physical

TALBE 2.—*Mechanical cleaning in Illinois*

Year	Number of plants	Cleaned coal, tons	Percentage of total output	Year	Number of plants	Cleaned coal, tons	Percentage of total output
1935	14	3,154,128	7.1	1942	56	27,209,284	41.8
1936	19	5,613,522	11.0	1943	53	30,321,306	41.7
1937	28	7,720,089	14.9	1944	54	32,965,139	42.9
1938	35	10,377,366	24.8	1945	55	30,710,862	42.1
1939	45	14,108,576	30.2	1946	57	28,164,779	44.4
1940	47	18,840,805	37.2	1947	53	33,363,568	49.2
1941	49	22,126,723	40.4				

[4] Lincoln, F. C., Coal Washing in Illinois: University of Illinois Eng. Exp. Sta., Bull. 69, 1913, 108 pp.

and petrographic characteristics of the coals of that State.[5] Lincoln compiled a general account of the history, practice, results, and cost of coal washing in Illinois from erection of the first washery in 1870 up to the end of the second period of washery construction about 1912. Most of the plants studied by Lincoln are no longer in operation, but study of the data presented in his report shows a record not unfavorable in comparison to present-day practice so far as ash reduction is concerned. Nebel, working with Lincoln on the fundamental characteristics of Illinois coals, produced a treatise on the specific gravity of coal that has since been widely quoted as the basic pioneer work on that subject. In 1925, Fraser and Yancey,[6] of the Federal Bureau of Mines, studied the preparation characteristics of slack coal from the No. 6 bed in Sangamon, Christian, Montgomery, and Macoupin Counties. Their investigation was undertaken at a time when marketing of the smaller sizes of Illinois coal was a much more difficult problem than it is today. Several years later, the same two investigators [7] conducted a general study of the washability of various types of American coals. For Illinois, the report gives results of cleaning tests on a coal from the No. 6 bed in Franklin County and one coal from the No. 2 bed in Marshall County. In 1929, Callen and Mitchell [8] investigated the preparation characteristics of samples from seven mines in Franklin, LaSalle, Marshall, Peoria, and Williamson Counties. Some of this work was done in mining areas that since have been abandoned or have lost much of their importance due to the depletion of reserves during the past 20 years, but the data are still of substantial value in evaluating the Illinois coals in general. More recently, Mitchell and McCabe,[9] of the Illinos Geological Survey, made a very thorough study of the washability characteristics, size range, and chemical analyses of screenings from 10 Illinois mines.

Notwithstanding the wealth of information in the literature, the characteristically rapidly moving coal-production industry is today encountering preparation problems requiring still broader knowledge of the coal. Rapid development of the strip method of operation to an important position in the industry has spread the interest in coal over a much wider geographical area. Reserves thought to be relatively unimportant 20 years ago now are large-scale producers. Likewise, in the deep-mining division, partial depletion of older mines and substantially complete allocation of remaining reserves in the older preferred fields to existing operations have forced new developments out into adjoining areas. Thus there has been a geographical broadening of the major mining operations in Illinois accentuated during the wartime expansion of production.

At the same time, there has been a rapid broadening, potentially

[5] Nebel, Merle L., Specific-Gravity Studies of Illinois Coal: University of Illinois Eng. Exp. Sta. Bull. 89, 1916, 49 pp.
Parr, S. W., and Barker, Perry, The Occluded Gases in Coal: University of Illinois Eng. Exp. Sta. Bull. 32, 1909, 28 pp.
McGovney, C. S.: Tests of Washed Grades of Illinois Coal: University of Illinois Eng. Exp. Sta. Bull. 39, 1909, 146 pp.
[6] Fraser, Thomas, and Yancey, H. F., Cleaning Tests of Central Illinois Coal: Bureau of Mines Tech. Paper 361, 1925, 23 pp.
[7] Yancey, H. F., and Fraser, Thomas, Coal-Washing Investigations, Methods, and Tests: Bureau of Mines Bull. 300, 1929, 259 pp.
[8] Callen, Alfred C., and Mitchell, David R., Washability Tests of Illinois Coals: University of Illinois Eng. Exp. Sta. Bull. 217, 1930, 114 pp.
[9] Mitchell, David R., and McCabe, L. C., Washability Characteristics of Illinois Coal Screenings: Illinois Geol. Survey Rept. of Investigations 48, 1937, 84 pp.

at least, in the use distribution of middle western coals. Rising costs of eastern high-volatile coking coals delivered at middle western steel centers, coupled with uncertainty of supply and of transportation facilities for these preferred coals, are again bringing Illinois coal into metallurgical use. Although sporadic instances of the use of Illinois coals for production of metallurgical coke have occurred before in times of emergency, it appears that the practice of using a substantial proportion of Illinois coal in coking-coal blends is now firmly established at some plants, and the economic pressure in this direction is rapidly increasing.

Looking farther ahead, the Bureau of Mines Office of Synthetic Liquid Fuels has developed a special interest in the appraisal of large reserves of coal that might be available and suitable for conversion into liquid fuel. The prospect of establishment of an extensive synthetic liquid fuel industry based on coal introduces another new and important factor into interpretation of coal-preparation data. Such an industry would require a great volume of coal for processing operations. In these operations the ash content of the coal is of such economic importance as to justify separation of the coal at gravities substantially below those currently used in coal-preparation practice. These possibilities give practical significance to data on the characteristics of low-gravity fractions of the coal and of separate petrographic constituents that heretofore had been generally considered to be of only academic interest.

In view of these production and use trends, the coal fields of Illinois and the adjacent mines of Indiana, Kentucky, and Missouri constitute a most important source of basic raw fuel. Extensive reserves remain in place in persistent and uniformly thick beds adapted to large-scale production; a resourceful and aggressive industry, forced by a normally very competitive situation, has developed outstandingly effective mining techniques for low-cost production: and these mechanized operations in turn have brought about the development of modern mechanical preparation plants to handle the raw product, which in general is moderately responsive to preparatory treatment. These favorable factors combine to make this area interesting to promoters of new enterprises based on cheap fuel. The current survey of the preparation characteristics of the important Illinois coals was laid out to conform to the changing geographical pattern of production and remaining reserve and to anticipate the growing interest in cleaner finished products for special uses. The float-and-sink tests have been extended into the lower specific gravity ranges so that any possibilities of recovering exceptionally low ash material might be developed.

ACKNOWLEDGMENTS

Valuable assistance was given by Dr. Gilbert H. Cady, head of coal division and R. W. Roley, mining engineer, State of Illinois Geographical Survey Division. The author acknowledges indebtedness to the officials and employees of the many Illinois coal companies for their assistance in arranging for the field work and collecting of coal samples; and to A. L. Bailey and C. E. Purdue, Bureau of Mines, who assisted in the field work.

The laboratory float-and-sink testing and the analytical work were done by the Coal Analysis Section at the Central Experiment Station, Pittsburgh, Pa.

SUMMARY

In the series of samples examined for this report, representing the important coal beds now being mined extensively in Illinois, the recoverable clean coal readily obtainable by conventional coal-washing facilities operating at around 1.60 specific gravity ranged from 6.0 to 13.0 percent ash. Test separations of these same samples at 1.30 specific gravity, which is substantially below the range of practicable operation of commercial washing equipment, indicate that many of these coals contain some material as low as 4.0 percent ash, but the quantity of this low-ash material is generally less than half of the original raw coal. A résumé of these data is shown in table 3, covering the 12 tipple samples of commercial raw screenings.

TABLE 3.—*Summary of specific-gravity separations of samples of screenings* [1]

Sample	Bed	County	Ash content, percent on dry basis		
			Raw coal	1.60 sp. gr. float	1.30 sp. gr. float
1	6	Franklin	9.4	6.0 *a*	3.1 *f*
2	6	Macoupin	16.6	8.6 *a*	4.9 *f*
5	6	Madison	15.9	9.2 *a*	4.9 *f*
6	6	Fulton	26.4	8.9 *a*	4.5 *f*
7	5	do	26.8	13.1 *a*	8.4 *f*
8	2	Grundy	18.7	7.4 *a*	3.9 *f*
9	6	Franklin	10.4	6.9 *a*	3.4 *f*
10	5	Sangamon	17.6	9.5 *a*	4.5 *f*
11	5	do	15.1	10.0 *a*	6.2 *f*
15	7	Vermilion	14.5	8.2 *a*	5.1 *f*
16	2	LaSalle	14.0	6.9 *a*	4.6 *f*
17	6	Perry	17.8	9.7 *a*	4.8 *f*

[1] The letters after the float-ash figures indicate the difficulty of washing by Bird's scale, which is as follows: *a*. Simple; *b*, moderately difficult; *c*, difficult; *d*, very difficult; *e*, exceedingly difficult; *f*, formidable. (*See* Bird, B. M., Performance of the Chance Sand Flotation Process at the Plant of the Bell & Zoller Coal & Mining Co., Ziegler, Ill.; Mechanization, May 1938.)

A review of these data in comparison with the early washing results presented by Lincoln in 1912 indicates that there has been no marked change in the quality of the rock-free coal matter recoverable by washing at high gravity. The early record does not contain complete float-and-sink data of the coals; but average washed-coal-ash data from Lincoln's work, transcribed in table 4, show products much like those recoverable by high-gravity separation of the new samples from roughly analogous areas in table 3.

TABLE 4.—*Average washed-coal-ash data from Lincoln's report of 1912*

Source	Ash content, percent on dry bases	
	Pan jig washeries	Lubrig jig washeries
Northern field	8.34	
Central field	12.03	11.41
Southern field	9.81	8.99

More complete information on the preparation characteristics of the raw coals was included in the reports of later years. A résumé of the data published by Mitchell and McCabe (1937), transcribed in table 5, indicates, with respect to both the rock-free heavy-gravity float and the purer coal material floating at 1.30 specific gravity, that, field by field, the inherent quality of the coal being produced is not greatly different from that noted in Lincoln's report. Notwithstanding the revolutionary changes in mining technology during the period since 1912, with widespread introduction of mechanized methods that virtually eliminate personal attention to the loading of clean coal at the face, there would appear to be no deterioration in the raw mined coal that cannot be corrected by proper preparatory treatment.

TABLE 5.—*Summary of specific-gravity separations of samples of raw screenings, by Mitchell and McCabe*

Sample	Bed	County	Ash content, percent on dry basis	
			1.70 sp. gr. float	1.30 sp. gr. float
A	1	Henry	11.0	5.5
B	2	Woodford	5.7	3.5
C	5	Peoria	12.7	7.1
D	7	Vermilion	9.4	4.7
E	5	Sangamon	11.0	6.3
F	6	Christian	9.7	4.5
G	6	St. Clair	10.1	4.9
H	6	Marion	9.9	5.1
I	6	Williamson	7.2	4.1
J	5	Saline	7.5	4.7

The effect of mechanization of production methods in loading dirtier coal might be reflected in the quantity of extraneous rock sent to the preparation plants; but even this idea, widely held in the industry, is not definitely shown by the series of published reports quoted above. Lincoln has not shown sink percentages, but the data on refuse rejected at typical early plants may be taken as fairly indicative of the quantity of refuse material loaded with the screenings. Table 6 is a résumé of these data arranged chronologically and, as nearly as possible, by corresponding geographical areas. Obviously the interrelation of these several groups of samples is only very roughly parallel; but, taken as a whole, they indicate rather strikingly that the quantity of refuse material loaded with the coal has not increased substantially during this long period of mechanization.

TABLE 6.—*Percentage of refuse in typical samples of Illinois raw screenings*

County	Bed	1912-Lincoln [1]	1935-Mitchell [2]	1947-Crentz [2]
Grundy	2			19.4
Woodford	2		18.4	
LaSalle	2			12.1
Peoria	5		10.9	
Fulton	5			20.0
Do	6			29.3
Northern field (average)		28.0		
Vermilion	7		14.0	9.0
Sangamon	5			10.3
Do	5		10.0	15.6
Christian	6		17.8	
Macoupin	6			16.5
Madison	6			14.3
St. Clair	6		16.5	
Central field (average)		15.0		
Perry	6			18.1
Marion	6		14.9	
Franklin	6			5.9
Do	6			6.5
Williamson	6		7.4	
Saline	5		8.6	
Southern field (average)		11.0		

[1] Percent washery rejects.
[2] Percent of 1.50 specific-gravity sink.

This general conclusion is further supported by average washery losses currently reported to the Coal Economics Branch of the Bureau on annual production reports. Table 7 shows the average percentages of washery rejection at coal washeries operated in Illinois in 1947 broken down into three broad classes of operations. Similarity of these data to those reported by Lincoln in 1912 is remarkable.

TABLE 7.—*Average preparation loss at washeries operating in Illinois in 1947*

	Number of plants	Total raw coal shipped to cleaning plants, tons	Total cleaned coal, tons	Percent refuse coal to raw coal
Strip-mined coal	20	18,654,374	14,965,327	19.78
Mechanically loaded coal	29	20,802,836	18,342,268	11.83
Other underground coal	4	61,956	55,973	9.66

With regard to the size consist of screenings, a factor of great importance in appraising an industrial fuel, the earliest reliable published data are in a report prepared by E. A. Holbrook[10] in 1916. Holbrook examined 11 samples of Illinois commercial screenings shipped from mines in various parts of the State in 1914. There was some variation in top size of these samples as tested, but the data have been recomputed to relate all to the basis of 100 percent through 1½ inches. The summary, table 8, shows the percentages of ¼-inch by 0 fines in parallel with like data of the year 1935 from McCabe and those of the present series.

[10] Holbrook, E. A., Dry Preparation of Bituminous Coal at Illinois Mines: University of Illinois Eng. Exp. Sta. Bull. 88, 1916, 24 pp.

TABLE 8.—*Fines in typical samples of Illinois industrial screenings, percent*

County	Bed	1914–Holbrook	1935–McCabe	1947–Crentz
Grundy	2	24.4		[1] 27.5
Woodford	2		45.0	
LaSalle	2			38.5
Peoria	5		33.0	
Fulton	5			[1] 24.5
Do	6			[1] 34.5
Vermilion	7	21.9	52.0	38.5
Sangamon	5	30.1	35.0	37.0
Christian	6	21.7	37.0	
Macoupin	6			45.0
Madison	6	27.1		42.0
St. Clair	6		39.5	
Perry	6	27.7		
Marion	6		38.0	
Jefferson	6			46.0
Franklin	6	16.3		46.0
Williamson	6		40.5	
Jackson	2	19.7		
Saline	5	29.2	35.0	40.5
Do	5	34.2		
Gallatin	5			27.0

[1] Strip-mined coal.

Here again the data have been arranged roughly by geographical areas and beds, but obviously only broad comparisons are justified. As a whole, these data indicate a substantial increase in fines during the period from 1914 to 1935, with only a very small change between 1935 and 1947, the period of the rapid mechanization of loading operations.

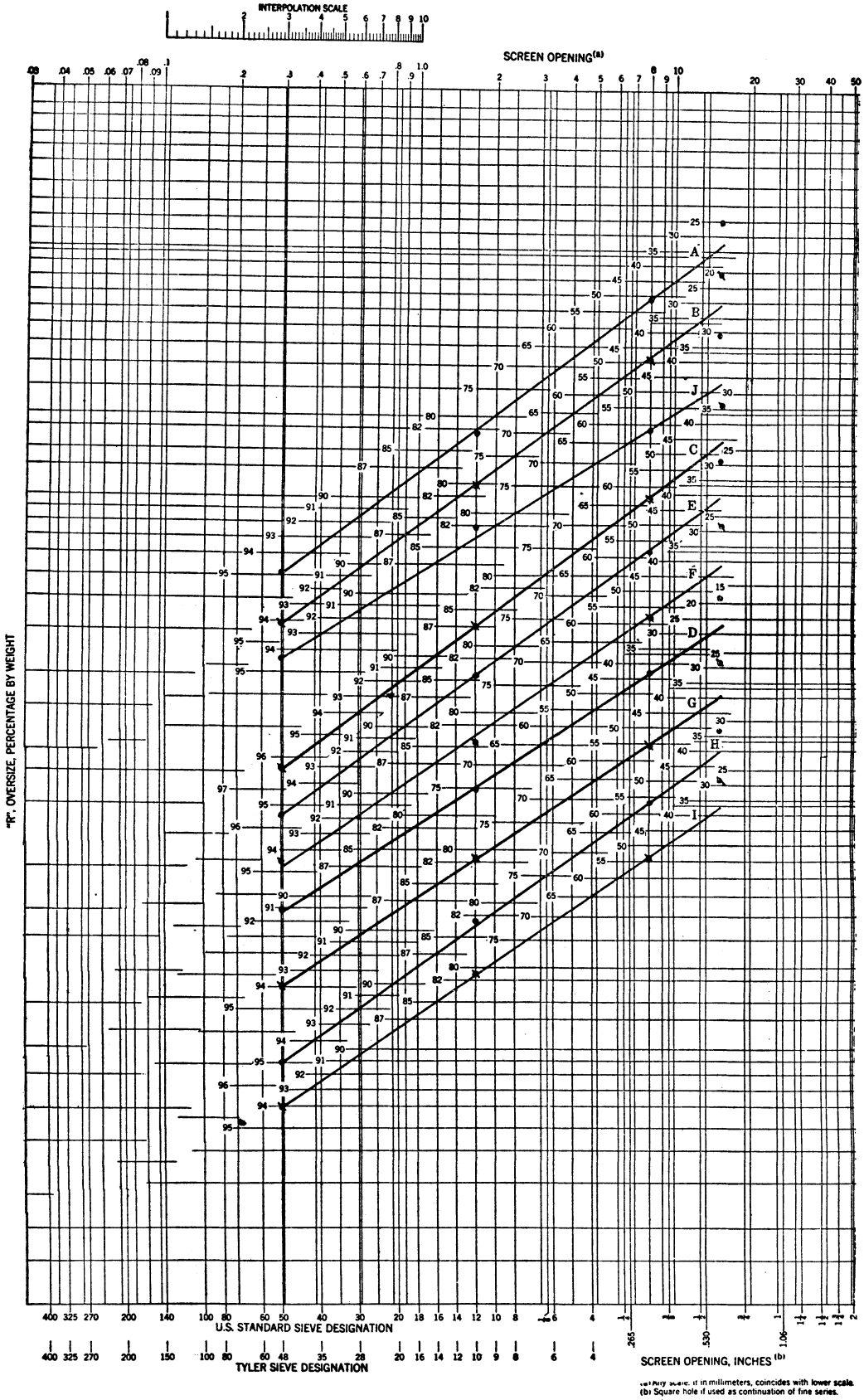
Complete size-consist data on the 1935 and 1947 series of samples shown on the Rosin and Rammler [11] curves, figure 1 and figure 2, show striking similarity. With the exception of three samples of 1947 series, the slopes of all size-consist lines lie within the range of 32° to 37°.

In the current series of samples, Nos. 6, 7, and 8, from Fulton and Grundy Counties, are washed-coal samples, in which some of the fines have been removed by the dewatering screens; hence these samples are coarser than raw-coal samples from the same sources. An exceptionally coarse raw-coal sample (No. 3) was obtained at a hand-mining operation in the Gallatin County field, which obviously is not comparable to the other date presented in table 8.

The three samples of washed screenings all contained 1 percent or less of minus-100-mesh material, whereas the raw screening samples ranged from 3 to 4 percent in that size.

With respect to ash distribution by sizes, the Illinois coals are alike in that the raw screenings tend to increase in ash in the finer sizes

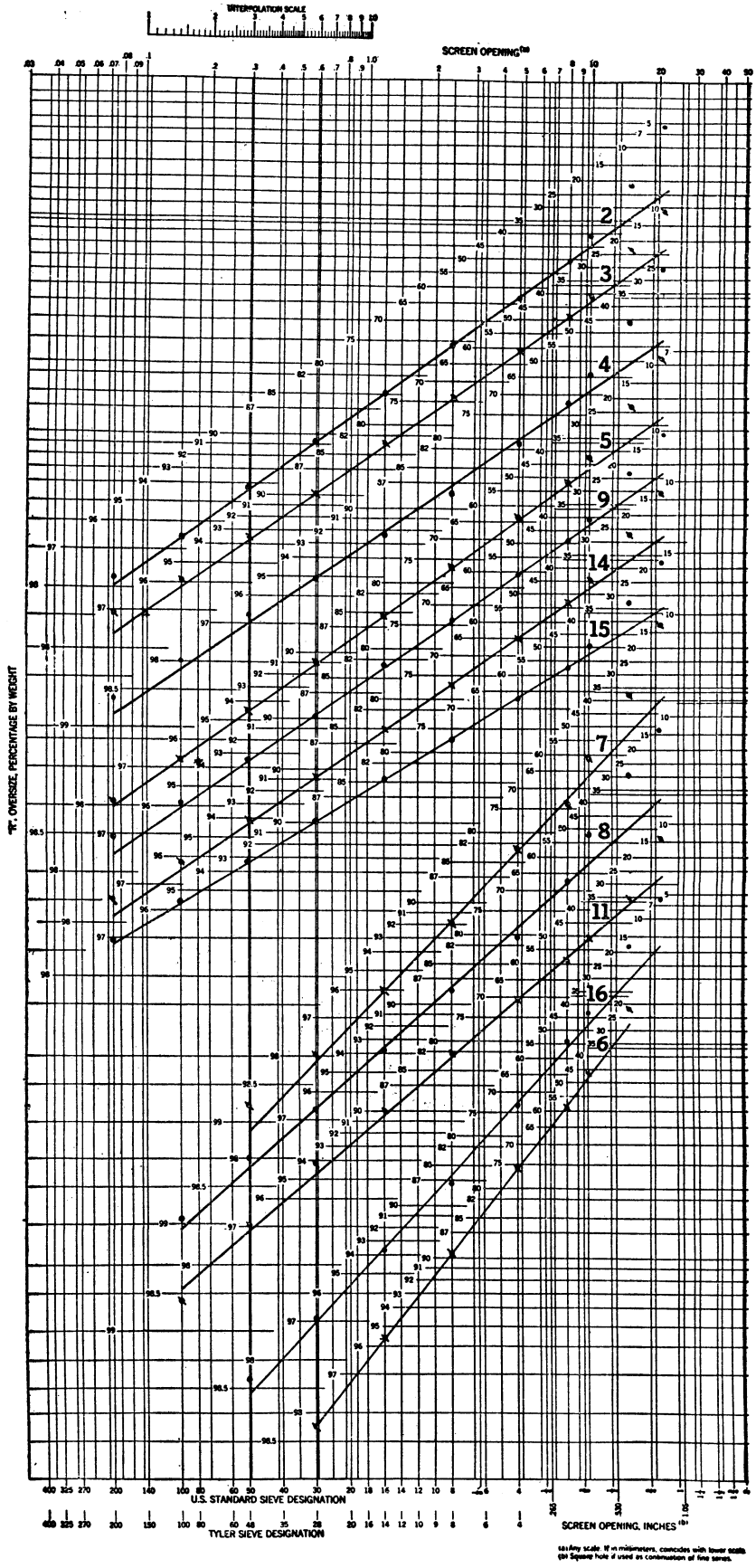
[11] Landers, W. S., and Reid, W. T., A Graphical Form for Applying the Rosin and Rammler Equation to the Size Distribution of Broken Coal: Bureau of Mines Inf. Circ. 7346, 1946, 5 pp.



GRAPHICAL FORM FOR REPRESENTING DISTRIBUTION OF SIZES OF BROKEN COAL.

(From: Landers, W.S., and Reid, W.T., A Graphical Form for Applying the Rosin and Rammler Equation to the Size Distribution of Broken Coal: Bureau of Mines Inf. Circular 7346, 1946.)

FIGURE 1.—Size consist of samples of Illinois screenings by McCabe in 1937.



GRAPHICAL FORM FOR REPRESENTING DISTRIBUTION OF SIZES OF BROKEN COAL

(From: Loudon, W.S., and Reid, W.T., A Graphical Form for Applying the Rosin and Rammler Equation to the Size Distribution of Broken Coal: Bureau of Mines Inf. Circular 7265, 1943.)

FIGURE 2.—Size consist of samples of Illinois screenings by Crentz in 1948.

down to and including the 100- by 200-mesh fraction, while the 200-mesh by 0 size reverses to a substantially lower ash content than the 100- by 200-mesh. Typical examples of this trend are shown graphically in figure 3. A similar trend was shown by McCabe's samples of 1935.

However, the finer sizes are more responsive to ash reduction by specific-gravity separation, indicating that fine crushing or selective treatment of the fines should be considered in preparing these coals for special uses, depending upon low ash content of the fuel.

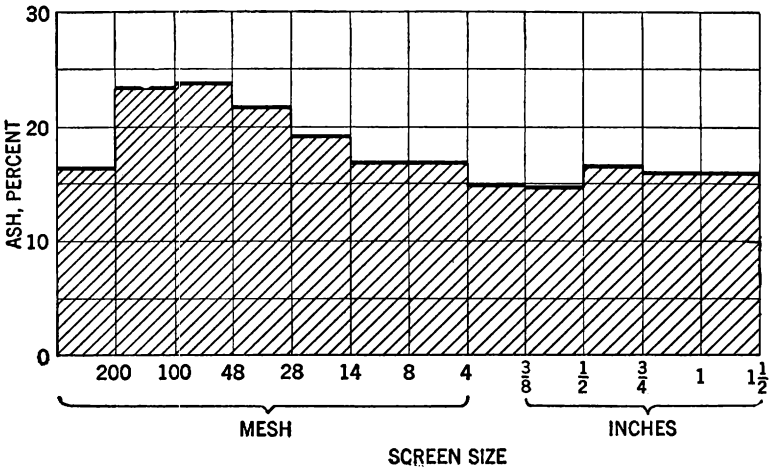


FIGURE 3.—Examples of relation of particle size to ash content in Illinois raw screenings.

The relation of particle size to the quality of float product available in these coals is shown in tables 9 and 10.

TABLE 9.—*Relation of float ash to particle size, tipple samples*

Sample	Bed	County	Ash in float at 1.60 specific gravity, percent		
			1½ x ⅜-in.	⅜-in. x 14-mesh	14- x 100-mesh
1	6	Franklin	6.7	5.5	5.1
2	6	Macoupin	9.0	7.8	7.1
5	6	Madison	9.5	9.0	8.1
6	6	Fulton	8.0	10.7	13.4
7	5	do	13.0	13.2	14.1
8	2	Grundy	5.9	9.9	12.4
9	6	Franklin	7.3	6.4	5.6
10	5	Sangamon	10.5	9.3	8.1
11	5	do	10.6	9.2	7.9
15	7	Vermilion	8.5	7.6	6.7
16	2	LaSalle	7.1	6.7	6.0
17	6	Perry	9.9	9.3	8.9

TABLE 10.—*Relation of float ash to particle size, tipple samples*

Sample	Bed	County	Ash in float at 1.35 specific gravity, percent		
			1½- x ⅜-in.	⅜-in. x 14-mesh	14- x 100-mesh
1	6	Franklin	5.1	4.0	3.5
2	6	Macoupin	7.0	5.4	3.5
5	6	Madison	7.2	6.4	4.2
6	6	Fulton	5.7	6.2	4.7
7	5	do	11.0	9.3	6.4
8	2	Grundy	4.6	5.6	5.4
9	6	Franklin	5.0	4.5	3.8
10	5	Sangamon	7.8	6.5	4.1
11	5	do	8.4	6.9	4.6
15	7	Vermilion	6.6	5.2	4.2
16	2	LaSalle	5.8	5.1	3.8
17	6	Perry	6.8	6.0	4.6

All the samples showed substantial reductions in sulfur content by removal of the heavy sink material, constituting the slate and pyrite, but very little further reduction is gained by cutting at the lower gravities. It appears that even fine crushing would not materially affect this condition, since even the 14-mesh by 100-mesh fractions show little reduction in sulfur by separation at low gravity. Typical examples of float-sulfur distribution by sizes are shown in table 11, giving the float sulfur at 1.60 specific gravity, and table 12, giving the float sulfur at 1.30 specific gravity.

TABLE 11.—*Sulfur in the floats at 1.60 specific gravity by sizes, percent*

Sample	Bed	County	Sulfur in float at 1.60 specific gravity, percent		
			1½ x ⅜-in.	⅜ in. x 14-mesh	14- x 100-mesh
1	6	Franklin	1.1	1.1	1.1
2	6	Macoupin	3.7	3.6	3.4
5	6	Madison	4.2	3.9	3.1
6	6	Fulton	3.1	3.1	2.6
7	5	do	2.8	2.6	2.4
8	2	Grundy	2.3	1.7	1.8
9	6	Franklin	1.2	1.2	1.0
10	5	Sangamon	4.6	4.2	3.8
11	5	do	4.0	3.7	3.3
15	7	Vermilion	3.7	3.7	3.4
16	2	LaSalle	3.5	3.2	3.0
17	6	Perry	3.3	3.1	2.8

TABLE 12.—*Sulfur in floats at 1.30 specific gravity by sizes, percent*

Sample	Bed	County	Sulfur in floats at 1.30 specific gravity, percent		
			1½- x ⅜-in.	⅜-in. x 14-mesh	14- x 100-mesh
1	6	Franklin	1.1	0.9	0.9
2	6	Macoupin	3.4	3.4	3.1
5	6	Madison	3.6	3.4	3.2
6	6	Fulton	2.6	2.6	2.2
7	5	do	2.5	2.4	2.1
8	2	Grundy	1.8	1.6	1.5
9	6	Franklin	1.2	1.1	.9
10	5	Sangamon	3.5	3.3	3.0
11	5	do	3.1	3.1	2.8
15	7	Vermilion	3.2	3.0	2.7
16	2	LaSalle	2.8	2.7	2.5
17	6	Perry	3.0	2.7	2.6

Of all the screening samples, only those representing the low-sulfur area of No. 6 coal in southern Illinois that has been outlined by Cady [12] showed products adapted to meet current specifications for metallurgical coke with respect to sulfur.

However, tipple samples of Nut and small Egg sizes from the No. 5 bed in Saline County and the No. 6 bed in Jefferson County showed substantial yields of low-sulfur float coal, and the face samples taken in the mines corroborate the feasibility of recovering float coal of a sulfur content within the tolerances for metallurgical coke. Summaries of the cumulative sulfur data on these face samples are given in table 13, which also includes data on face samples from the No. 2 bed in northern Illinois showing some coal of this category in the small sizes.

TABLE 13.—*Sulfur distribution in specific-gravity fractions of some low-sulfur coals in Saline, Jefferson, and Grundy Counties*

Specific-gravity fractions	Saline County			Jefferson County			Grundy County		
	1½- x ⅜-in.	⅜-in. x 14-mesh	14- x 100-mesh	1½- x ⅜-in.	⅜-in. x 14-mesh	14- x 100-mesh	1½- x ⅜-in.	⅜-in. x 14-mesh	14- x 100-mesh
Under 1.30	0.71	0.74	0.84	0.93	0.90	0.92	1.63	1.39	1.03
1.30 x 1.35	.80	.85	.88	.99	.98	.98	1.72	1.49	1.11
1.35 x 1.40	.83	.89	.90	1.03	1.01	1.01	1.78	1.56	1.19
1.40 x 1.45	.85	.91	.91	1.03	1.02	1.02	1.82	1.62	1.24
1.45 x 1.50	.86	.92	.92	1.03	1.02	1.02	1.86	1.67	1.29
1.50 x 1.55	.87	.94	.92	1.08	1.03	1.03	1.88	1.71	1.33
1.55 x 1.60	.88	.95	.93	1.09	1.03	1.03	1.90	1.75	1.36
1.60 x 1.65	.88	.95	.93	1.09	1.03	1.03	1.92	1.77	1.38
1.65 x 1.70	.91	.96	.94	1.11	1.03	1.03	1.95	1.80	1.41
1.70 x 1.75	.92	.97	.94	1.14	1.04	1.03	1.97	1.83	1.44
1.75 x 1.80	.92	.97	.95	1.14	1.04	1.03	2.00	1.85	1.47
Over 1.80	1.02	1.27	1.28	1.73	1.31	1.32	3.66	3.05	3.36

In considering the practicability of recovering low-ash coal, for special purposes, by separation at very low gravities, the possible yields of coal of this grade and the quality of the remaining secondary product are of vital importance. These characteristics of the tipple samples examined in this series are shown in table 14.

TABLE 14.—*Yields of low-ash coal and secondary coal*

Sample	Bed	County	Float on 1.30 specific gravity		Float on 1.30 x 1.60 specific gravity		Loss
			Yield	Ash	Yield	Ash	1.60 sink
1	6	Franklin	51.1	3.1	43.3	9.5	5.6
2	6	Macoupin	51.3	4.9	34.9	13.9	13.8
5	6	Madison	40.6	4.9	46.9	13.0	12.5
6	6	Fulton	43.7	4.5	29.6	15.5	26.7
7	5	do	31.5	8.4	45.4	16.4	23.1
8	2	Grundy	54.8	3.9	27.8	14.1	17.4
9	6	Franklin	56.5	3.4	37.5	12.0	6.0
10	5	Sangamon	30.8	4.5	56.1	12.2	13.1
11	5	do	45.7	6.2	45.3	13.8	9.0
15	7	Vermilion	56.5	5.1	31.9	13.8	11.6
16	2	LaSalle	61.4	4.6	25.2	12.5	13.4
17	6	Perry	33.9	4.8	51.3	12.9	14.8

[12] Cady, Gilbert H., Mines Producing Low-Sulfur Coal in the Central District: Illinois Geol. Survey Bull. 23, Coop. Mining Series, 1919, 14 pp.

LOCATION AND STRATIGRAPHY OF ILLINOIS COAL FIELDS

By G. H. Cady [13]

In Illinois, the Pennsylvanian system has been subdivided into four groups called, in the order of deposition, the Caseyville, Tradewater, Carbondale, and McLeansboro. The Caseyville group contains only thin beds of no commercial importance. The Rock Island (No. 1) bed, found in western and northwestern Illinois, the Murphysboro bed, found in Jackson County, and the Davis and DeKovan beds, found in Gallatin and Saline Counties, are all within the Tradewater group. The first two named have been completely or largely worked out, and the last two have never been developed commercially. At present therefore the coal beds of the Tradewater group other than the Rock Island (No. 1) bed need not be considered as important commercial sources of coal. The boundary between the Tradewater and Carbondale groups is at the base of the Palzo sandstone, which commonly lies at the top of the DeKoven coal bed. The Carbondale group contains the LaSalle (No. 2), the Springfield and Harrisburg (No. 5), and the Herrin (No. 6) coal beds. The only bed commercially mined in the State belonging to the McLeansboro group is the Danville (No. 7).

The commercially important coal beds in Illinois are five in number, namely, in the order of deposition, the Rock Island (No. 1), the LaSalle (No. 2), the Springfield or Harrisburg (No. 5), the Herrin (No. 6), and the Danville (No. 7). The Rock Island (No. 1) coal bed is mined at one mine shipping by rail located in southwest Henry County but has previously been extensively mined in Rock Island, Mercer, and Fulton Counties, where only local mining operations now produce coal from this bed. The LaSalle (No. 2) coal bed has an extensive distribution, particularly in the northern part of the coal field. It is the thinnest of the commercially exploited beds. Mines producing coal from this bed and shipping by rail consist of several strip mines in Grundy, Will, Kankakee, and LaSalle Counties, which contribute the bulk of the output, and two underground operations, one in LaSalle and one in Woodford County. In the LaSalle mining district, from which is obtained all the underground output that is shipped by rail, roof conditions permit the longwall system of mining. This is one of the older mining regions of the State; mining has been largely abandoned, owing to the impossibility of competing successfully with the output from thicker beds in the southern part of the State.

The No. 5 coal bed is mined here and there in the northern half of the coal field, where it is known as the Springfield bed, particularly in Sangamon, Peoria, Fulton, Logan, and Schuyler Counties; but mining, except in Sangamon and Logan Counties, is largely by strip mines. The No. 5 bed is also mined extensively in Saline County by mines shipping by rail. In this part of the State it is known as the Harrisburg bed. This bed is mined by a number of local operations

[13] Head of Coal Division, State of Illinois Geological Survey.

and one or two shipping strip mines in Williamson County and by a number of local underground and strip mines in Randolph, Williamson, Saline, and Gallatin Counties. The importance of underground mine production from this bed in central and western Illinois is declining rapidly because of unfavorable underground mining conditions as compared with those associated with No. 6 coal bed and with No. 5 coal bed in Saline County.

The No. 5 coal bed is absent beneath a large part of southwestern Illinois in Macoupin, Madison, Bond, Clinton, Washington, Christian, St. Clair, Randolph, and Perry Counties, although it has limited distribution in parts of Christian, St. Clair, Randolph, and Perry Counties. It is approximately coextensive with No. 6 coal bed in Gallatin, Saline, southern White, southern Hamilton, and southern Jefferson, Franklin, Williamson, and Jackson Counties. The No. 5 bed contains no persistent bedded impurities but is characterized by "clay veins" or "horsebacks" in the Sangamon and Peoria districts.

The Herrin (No. 6) is by far the most important coal bed. Its thickness ranges from about 4 feet to exceptional thicknesses of about 14 feet in Franklin County. In general, mining is carried on in coal 6 to 9 feet thick. No. 6 bed is benched, in this way differing from No. 2 and No. 5 beds and more or less resembling No. 1 and No. 7 beds. A persistent layer of clay called the "blue band," generally not more than 3 inches thick, lies from as low as 6 to 8 inches to as much as 30 inches above the bottom of the coal but has a fairly uniform position within the bed in the different mining districts. This and other partings of clay, shale, fusain, and pyrite give the bed a benched structure. The blue band is indistinctly represented in the No. 6 coal bed in La-Salle and in Vermilion Counties. The No. 6 coal bed is also characteristically accompanied by a fairly heavy limestone cap rock, the Herrin limestone, commonly 3 to 4 feet thick but not unusually twice this thickness. Where the coal bed becomes 8 feet thick or more the material above usually consists of a weak, very fine gray shale or "soapstone." In such localities the coal bed usually has relatively low sulfur and ash contents, particularly the former. In some places the sulfur content is less than 1 percent.

In 1947 there were only three small mines, all in Vermilion County, which mined the Danville (No. 7) coal bed for shipment by rail. The coal has been mined by larger mines until recently in the Danville region and has been mined in many places in this region and near Sparland in Marshall County by local drift and shaft mines. Much of the coal obtained from this bed has been produced by stripping operations. Production from this bed has been decreasing in importance for several years.

STATUS OF THE INDUSTRY

PRODUCTION STATISTICS

Illinois is one of the larger coal producers of the Nation. Table 15 shows a record of the coal produced in Illinois since 1936.

TABLE 15.—*Annual production of coal in Illinois, 1936–47 net tons* [1]

Year:	Tons
1936	50, 927, 000
1937	51, 602, 000
1938	41, 912, 000
1939	46, 783, 000
1940	50, 610, 000
1941	54, 703, 000
1942	65, 071, 000
1943	72, 631, 000
1944	76, 792, 000
1945	73, 011, 000
1946	63, 469, 000
1947	67, 860, 011

[1] Bureau of Mines, Mineral Industry Survey: M. M. S. 1558, 1947.

A large proportion of the State's output comes from large, well-equipped underground mines using the most modern mechanized means of recovering and loading the coal, but there is a large and rapidly growing production from opencut operations. Illinois has pioneered the strip-mining industry, and it is today the largest producer of strip-mined coal in the country.

The substantial tonnage obtained by this method is shown in table 16.

TABLE 16.—*Stripping operations in Illinois, 1943–47*

	Number of strip pits	Number of power shovels	Coal produced by stripping, tons
1943	38	121	16, 617, 826
1944	38	120	17, 979, 872
1945	43	129	16, 909, 100
1946	46	126	15, 161, 818
1947	43	136	17, 717, 192

Rapid growth of large-scale strip mining and completely mechanized underground operations have necessitated intensive development of mechanical preparation.

FACTORS AFFECTING PREPARATION OF COAL IN ILLINOIS

NO. 2 BED

The bed is relatively free of partings and is overlain with a roof of black or gray shale, often called "soapstone." This kind of roof favors the operation of underground mining using the longwall method of extraction. However, small pieces of this soft shale fall into the mined coal and are too small to be removed entirely in face preparation. The coal bed is underlain with soft fire clay. This floor is sometimes uneven, and clay gets into the fine coal during bottom cutting.

Much of the coal produced from the No. 2 bed is obtained by stripping. The uneven top and bottom cause shale and underclay to be included with the coal in loading. To save the expense of constructing roads in many of the strip pits, the coal is hauled by truck on top of the exposed, but as yet unbroken, coal bed. Dirt is then ground into the coal bed to be loaded with it.

NO. 5 BED

This bed does not contain any persistent characteristic bedded impurities. In the Saline and Eagle Valley mining districts, the bed is quite uniform, being overlain with a hard gray-shale roof, and has a smooth fire-clay floor.

As the bed extends northward into the Springfield and Fulton-Peoria mining districts, the quality of the coal declines. Present in the bed are clay- or sandstone-filled crevices, called "horsebacks," extending vertically from the top to the bottom of the bed. Pyrite is present in both horizontal and vertical planes in lenses and bands. The black-shale roof is overlain by a weak cap-rock limestone, usually less than 2 feet thick. Separating the shale and the caprock is a weak layer of clay shale. The lower few inches of the black-shale roof falls as soon as the coal is removed, seriously contaminating the product. The shale roof contains spherical concretions that add to the difficulty of roof control and securing of a clean coal product.

It is characteristic of Illinois coal beds that, where the roof rock is gray shale, the underlying bed is thicker and contains less pyritic sulfur than a black shale or limestone cover.

NO. 6 BED

Unlike the No. 2 and No. 5 coal beds in Illinois, the No. 6 bed is distinctly benched and can be separated into bottom and middle benches. This separation is brought about by a layer of underclay several inches thick. The parting known as the "blue band" is characteristic of the bed, and although it becomes thin and even is locally missing in the northern part of the State, it is used as a positive means of identification. This band in itself would materially increase the ash content of the coal as loaded unless eliminated at the face or in the preparation plant. Another serious preparation problem, particularly in stripping operations, is caused by the presence of the soft fire clay underlying the bed. Because of the uneven bottom some of this fire clay is loaded with the coal. During the washing process, the clay goes readily into the wash water as a suspension, giving the clean coal an unsightly gray appearance as well as affecting to some extent the specific-gravity control of the washing plant when a closed water circuit is maintained and the clay suspension allowed to build up. The quality of the washed product frequently is lessened by the fireclay blinding the dewatering screens, causing the clay-laden wash water to be loaded with the cleaned coal.

NO. 7 BED

The No. 7 bed is the least important of the four beds under investigation. It is worked commercially in Vermilion County near Danville, where the bed averages about 5 feet in thickness. Although this bed has no characteristic parting similar to the No. 6 bed, a shale binder about 1 inch in thickness occurred where the underground samples were collected. Far more serious from a preparation standpoint is the fire-clay floor, which heaves very badly at some places. The roof is composed of very soft shale which readily slakes and spalls when exposed to the air. This condition is not only difficult to control, but frequently the fallen shale contaminates the coal.

TEST PROCEDURE

Five strip mines and 12 shaft mines, located throughout the State and representing coal from all the important beds, were chosen. Table 17 lists the mines from which mine and tipple samples were collected to determine the preparation characteristics of the various coal beds. The sample numbers appearing in the first column correspond to the numbers appearing on the map in figure 4, which shows the wide area covered in the investigation. Complete washability data on each of these mines, except No. 1 and No. 10, are compiled and tabulated in the last chapter of this publication, entitled "Washability Data on Samples Collected in Mines." At sample locations 1 and 10, only tipple samples were obtained. The float-and-sink test data of these coals are reported in the chapter entitled "Experimental Results."

FIGURE 4.—Location of mines from which washability samples were collected.

TABLE 17.—*Listing of mines from which samples were obtained*

Sample No.	Producer	Mine	County	Bed	Mining district [1]	Rank, H. V.[2] A, B, or C
1	Chicago, Wilmington, and Franklin Coal Company.	New Orient	Franklin	No. 6	Franklin-Williamson	B
2	Consolidated Coal Co.	Consolidated No. 7	Macoupin	do	Southwestern Illinois	C
3	do	Jefferson No. 20	Jefferson	do	Franklin-Williamson	B
4	Gallatin County Coal Co.	Gallatin	Gallatin	No. 5	Eagle Valley	A
5	Lumaghi Coal Co	Cantine No 2	Madison	No. 6	Southwestern Illinois	C
6	Midland Electric Coal Co.	Middle Grove	Fulton	do	Fulton-Peoria	C
7	do	Vulcan	do	No. 5	do	C
8	Northern Illinois Coal Corp.	Wilmington No. 10	Grundy	No. 2	Wilmington	C
9	Old Ben Coal Corp.	No. 9	Franklin	No. 6	Franklin-Williamson	B
10	Panther Creek Mines Inc.	Panther Creek No. 4	Sangamon	No. 5	Springfield	C
11	do	Panther Creek No. 5	do	do	do	C
12	Sahara Coal Co.	Bankston Creek No. 6	Saline	No. 6	Saline-Gallatin	B
13	do	Sahara No. 5	do	No. 5	do	B
14	do	Sahara No. 16	do	do	do	B
15	Tilton Mining Co.	Tilton	Vermilion	No. 7	Danville	C
16	Union Coal Co.	Union	LaSalle	No. 2	LaSalle	C
17	United Electric Coal Co.	Fidelity	Perry	No. 6	Southwestern Illinois	C

[1] Designation of mining districts as used in: Cady, G. H., Analyses of Illinois Coals: Bureau of Mines Tech. Paper 641, 1942, pp. 4–9.
[2] Standard Specifications for Classification of Coals by Rank, A. S. T. M. Designation D 388–38.

SAMPLING

At most of the locations selected, both tipple samples and mine or face samples were collected. Where possible, a tipple sample of coal having approximately 4-inch top size and two mine samples were removed for float-and-sink testing. In addition, a tipple sample of slack coal was obtained for screen analysis.

The tipple samples were collected by cutting the coal stream with a suitable container while the coal was being loaded into a railroad car through a chute or by means of a loading boom. At least 30 increments were taken for each sample over a 7-hour period, resulting in a gross sample of about 1,000 pounds in case of the large tipple sample and about 750 pounds for the screen-analysis test sample. At certain mines it was customary to pick the coal while in transit along the loading boom. Where this condition occurred, the picking operation was suspended temporarily while the sample increment was being collected.

The mine samples were obtained in accordance with the procedure outlined in Technical Paper 586,[14] the accepted standard. Binders and partings were included in the sample, even in those cases where this matter would normally be removed on the picking table.

The cross section of the mine sample varied with the height of the coal bed, but a sample weighing at least 100 pounds was obtained in each instance.

To prepare the mine or face samples for the float-and-sink tests, the sample was crushed to 1½-inch top size and screened at ⅜-inch, 14-mesh, and 100-mesh. The three double-screened sizes were handled in the float-and-sink procedure. The size of the sample frequently necessitated riffling to produce a test lot that would not be unnecessarily time-consuming during the float-and-sink test operation. In every case, the 100-mesh by 0 coal was not tested by float-and-sink but analyzed for ash and sulfur.

The large tipple sample was not crushed but screened at 1½-inch, ⅜-inch, 14-mesh, and 100-mesh, and the four double-screened sizes were tested by the float-and-sink procedure separately. In the case of a few of the mines, a large resultant was not being prepared. There a sample of screened coal of Egg or Stove size was collected, and only the one size float-and-sink tested after rescreening to remove the degration caused by handling and transporting the sample.

FLOAT-AND-SINK TESTS

Most of the mine and tipple samples were tested on specific gravities ranging from 1.30 to 1.80 at intervals of 0.05. All of the tests were made using carbon tetrachloride as the medium for the 1.59 specific gravity. Lighter gravities were prepared by adding gasoline to the carbon tetrachloride, while gravities heavier than 1.59 were produced by mixing bromform and carbon tetrachloride.

[14] Fieldner, A. C., and Selvig, W. A., Notes on the Sampling and Analysis of Coal: Bureau of Mines Tech. Paper 586, 1941, 48 pp.

Float-and-sink testing of coal has been well-established practice for many years and has frequently been described in the literature. For example, a recent Bureau of Mines publication [15] gives a brief description of the process.

Another Bureau publication [16] by Coe explains in detail the construction and interpretation of the washability charts used in this paper.

EXPERIMENTAL RESULTS DATA ON TIPPLE SAMPLES

No. 2 BED

Figures 5 to 13 show the washability of two tipple samples collected at mines operating in the No. 2 bed. The 1½-inch by 0 sample from Grundy County was collected in a strip pit, while the other, a 4-inch by 0 sample, was deep-mined coal from La Salle County.

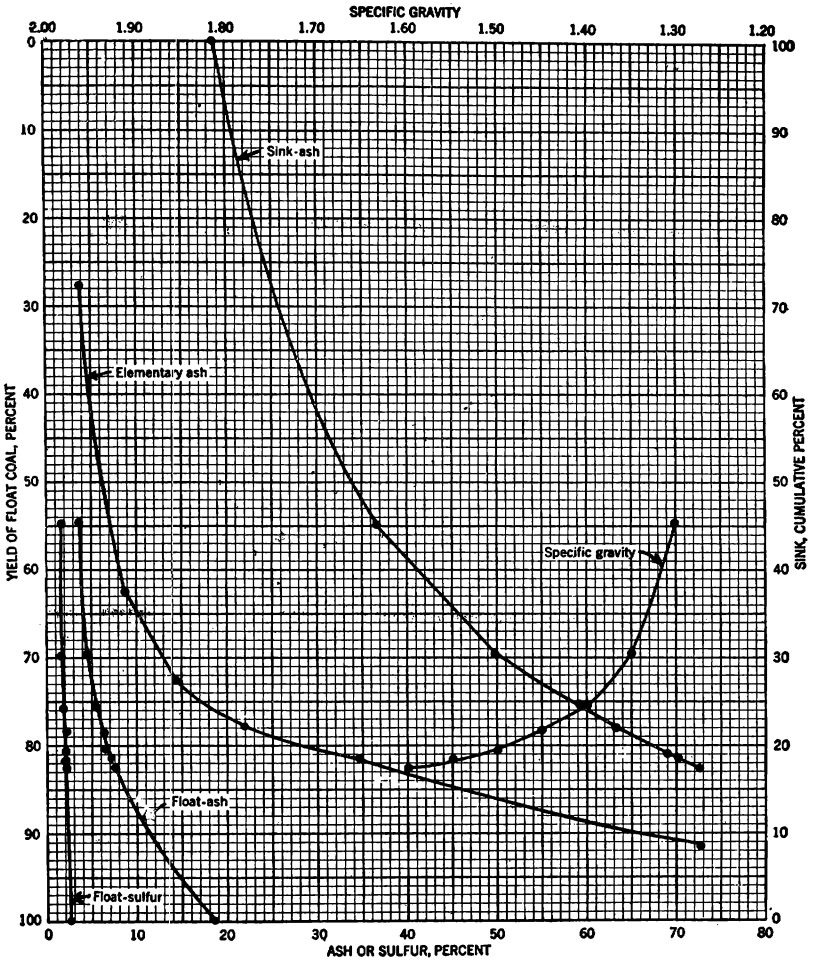
These data show the amenability of the No. 2 bed to mechanical cleaning. Washed coal from this section of the State contains some of the lowest-ash coal produced in Illinois.

This bed contains a rather large percentage of high-gravity, high-ash material that must be removed to prepare a satisfactory fuel. This condition is particularly true of the smaller sizes. However, such incombustible material is easily removable, and a final cleaned product of about 8 percent or less ash content results within a commercial gravity range.

Like most of the Illinois coal beds, the No. 2 bed has a high sulfur content, in some places running as much as 5 percent. Separation at gravities ordinarily used in commercial practice results in a substantial decrease percentagewise, but the clean product cannot be considered a low-sulfur coal. However, as the coal is not being considered as a metallurgical source, the sulfur content is not too serious a handicap.

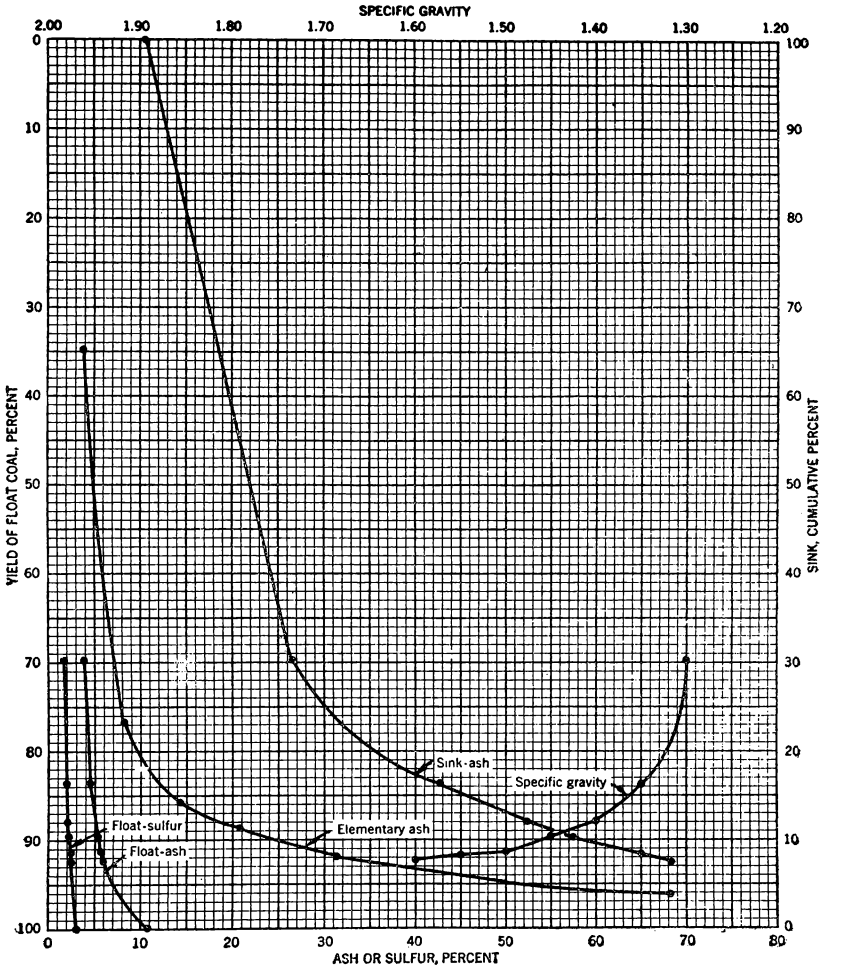
[15] Fraser, Thomas, Crentz, William L., Cooper, H. M., Abernethy, R. F., and Barrett, O. T., Low-Gravity Float-and-Sink Separation of Bituminous Coal Samples: Bureau of Mines Rept. of Investigations 3812, 1945, 11 pp.

[16] Coe, G. D., An Explanation of Washability Curves for the Interpretation of Float-and-Sink Data on Coal: Bureau of Mines Inf. Circ. 7045, 1938, 10 pp.



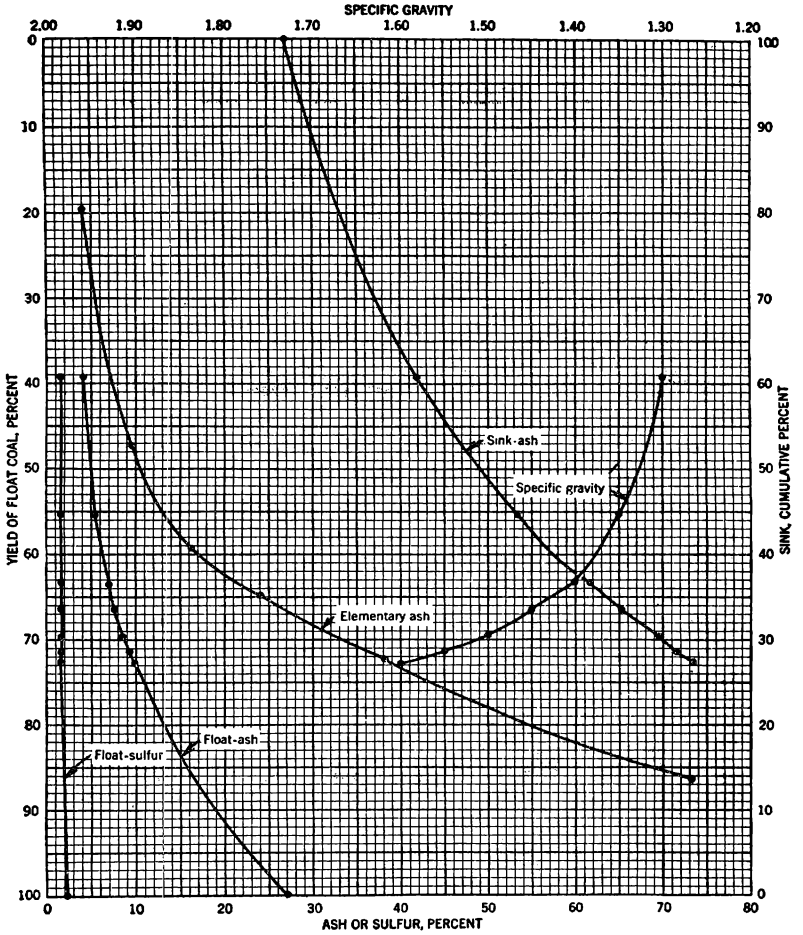
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30		54.84	3.94	1.74	54.84	3.94	1.74	100.00	18.68	2.73	
1.30–1.35		14.59	8.58	2.67	69.43	4.92	1.94	45.16	36.58	3.92	
1.35–1.40		6.17	14.39	2.62	75.60	5.69	1.99	30.57	49.94	4.52	
1.40–1.45		2.52	21.68	3.39	78.12	6.20	2.04	24.40	58.94	5.00	
1.45–1.50		2.53	21.68	3.40	80.65	6.69	2.08	21.88	62.23	5.18	
1.50–1.55		1.00	34.90	2.87	81.65	7.04	2.09	19.35	68.66	5.42	
1.55–1.60		1.00	34.89	2.88	82.65	7.37	2.10	18.35	70.50	5.56	
Sink–1.60		17.35	72.55	5.71	100.00	18.68	2.73	17.35	72.55	5.71	

FIGURE 5:—Composite of washing characteristics of tipple sample of 1½-inch x 0 coal from No. 2 bed, Grundy County, Ill. (Size, 1½-inch x 100-mesh.)



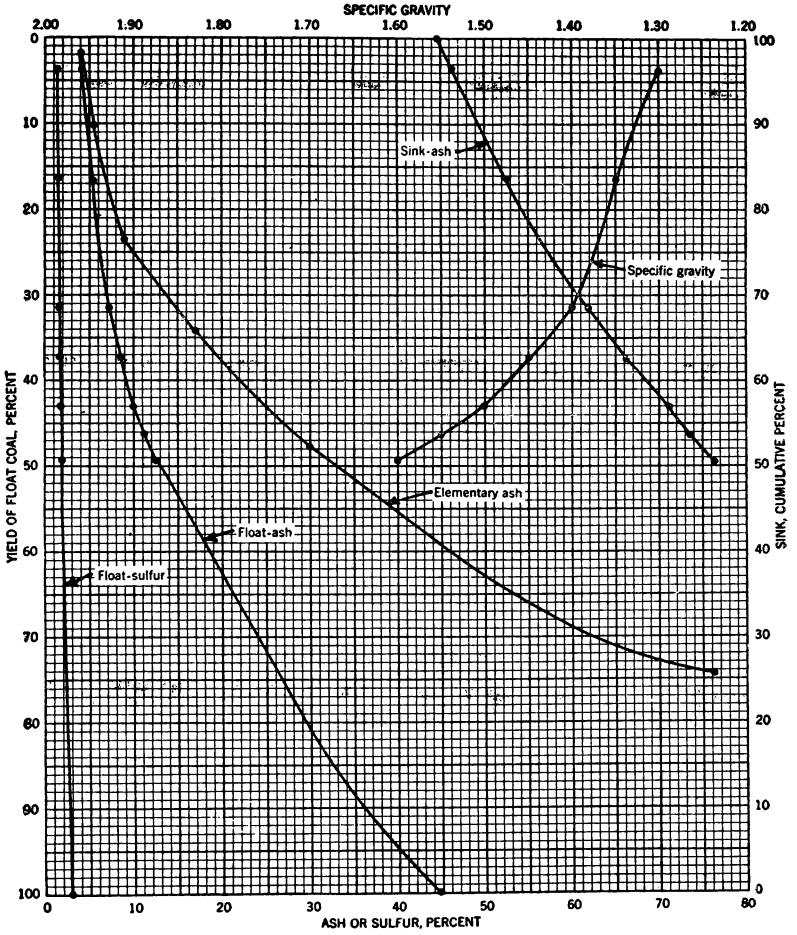
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	38,650	69.83	3.92	1.78	69.83	3.92	1.78	100.00	10.80	2.98	-------
1.30-1.35	7.751	14.00	8.20	3.21	83.83	4.63	2.02	30.17	26.71	5.75	18.05
1.35-1.40	2.237	4.05	14.39	4.43	87.88	5.08	2.13	16.17	42.73	7.95	5.80
1.40-1.45	970	1.75	20.90	6.08	89.63	5.39	2.21	12.12	52.20	9.12	3.51
1.45-1.50	970	1.76	20.90	6.08	91.39	5.69	2.28	10.37	57.48	9.63	2.14
1.50-1.55	212	0.38	31.29	6.99	91.77	5.80	2.30	8.61	64.96	10.36	0.77
1.55-1.60	213	0.39	31.29	6.99	92.16	5.91	2.32	8.23	66.52	10.51	-------
Sink-1.60	4,336	7.84	68.27	10.69	100.00	10.80	2.98	7.84	68.27	10.69	-------
Total	55,339	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 6.—Washing characteristics of tipple sample of 1½-inch x 0 coal from No. 2 bed, Grundy County, Ill. (Size, 1½-inch x ⅜-inch.)



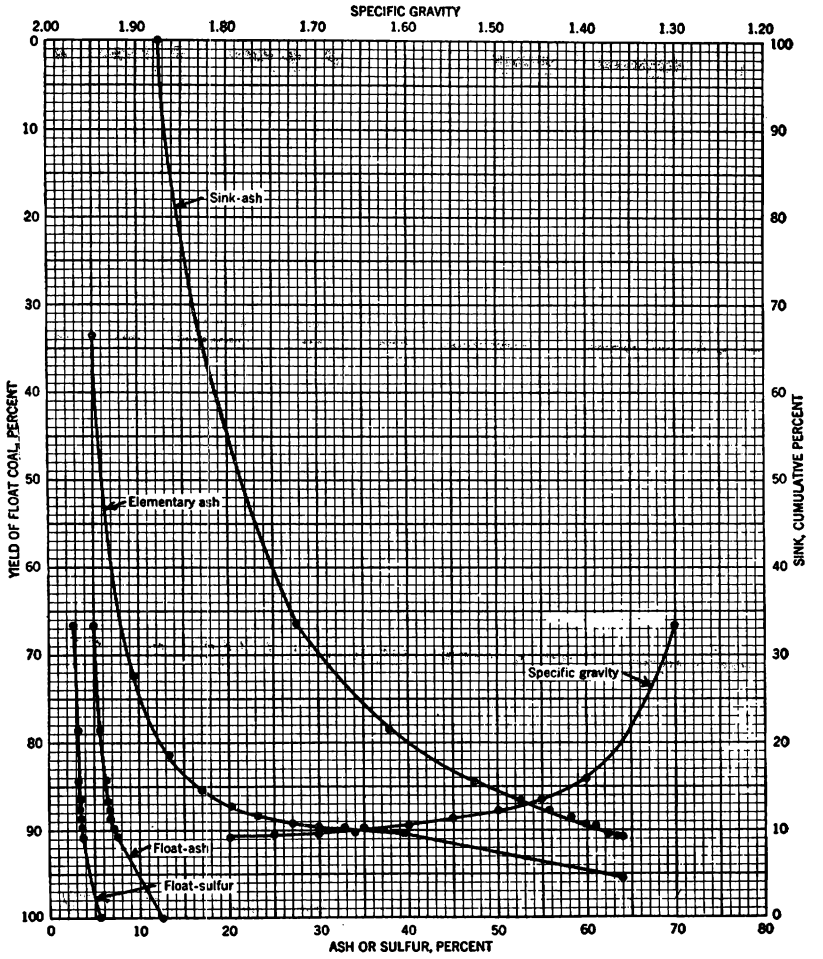
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	ash	Sulfur	
Float-1.30	11,609	39.22	4.01	1.62	39.22	4.01	1.62	100.00	27.07	2.24	
1.30-1.35	4,737	15.99	9.60	2.04	55.21	5.63	1.74	60.78	41.94	2.63	24.09
1.35-1.40	2.398	8.10	16.35	1.47	63.31	7.00	1.71	44.79	53.49	2.85	11.26
1.40-1.45	937	3.16	24.10	1.34	66.47	7.81	1.69	36.69	61.69	3.15	6.33
1.45-1.50	938	3.17	24.10	1.34	69.64	8.55	1.67	33.53	65.23	3.32	4.81
1.50-1.55	487	1.64	38.15	1.29	71.28	9.24	1.66	30.36	69.53	3.53	3.29
1.55-1.60	487	1.65	38.15	1.29	72.93	9.89	1.66	28.72	71.32	3.66	
Sink-1.60	8,015	27.07	73.34	3.80	100.00	27.07	2.24	27.07	73.34	3.80	
Total	29,608	100.00									

FIGURE 7.—Washing characteristics of tipple sample of 1½-inch x 0 coal from No. 2 bed, Grundy County, Ill. (Size, ⅜-inch x 14-mesh.)



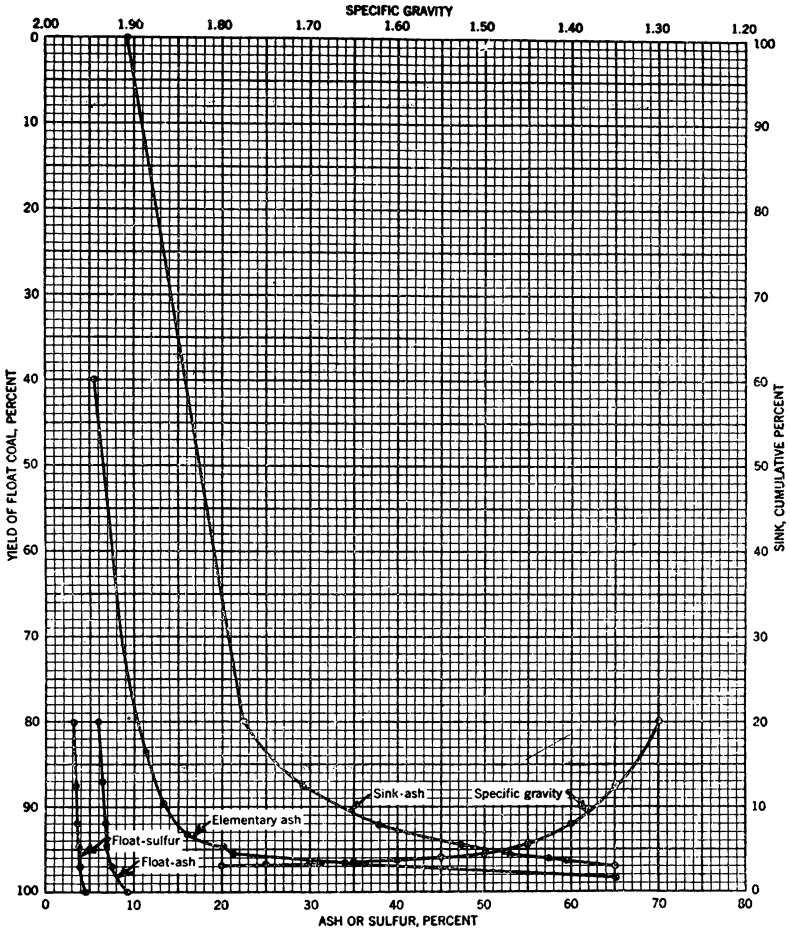
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	211	3.75	4.19	1.54	3.75	4.19	1.54	100.00	44.71	3.00	----
1.30-1.35	714	12.65	5.71	1.44	16.40	5.36	1.46	96.25	46.29	3.05	27.52
1.35-1.40	839	14.87	8.97	1.54	31.27	7.08	1.50	83.60	52.43	3.30	20.78
1.40-1.45	334	5.91	17.10	2.04	37.18	8.67	1.59	68.73	61.83	3.68	11.83
1.45-1.50	334	5.92	17.10	2.04	43.10	9.83	1.65	62.82	66.04	3.83	9.02
1.50-1.55	175	3.10	30.03	2.70	46.20	11.18	1.72	56.90	71.13	4.02	6.20
1.55-1.60	175	3.10	30.03	2.70	49.30	12.37	1.78	53.80	73.50	4.09	----
Sink-1.60	2,862	50.70	76.16	4.18	100.00	44.71	3.00	50.70	76.16	4.18	----
Total	5,644	100.00	----	----	----	----	----	----	----	----	----

FIGURE 8.—Washing characteristics of tipple sample of 1½-inch x 0 coal from No. 2 bed, Grundy County, Ill. (Size, 14-mesh x 100-mesh.)



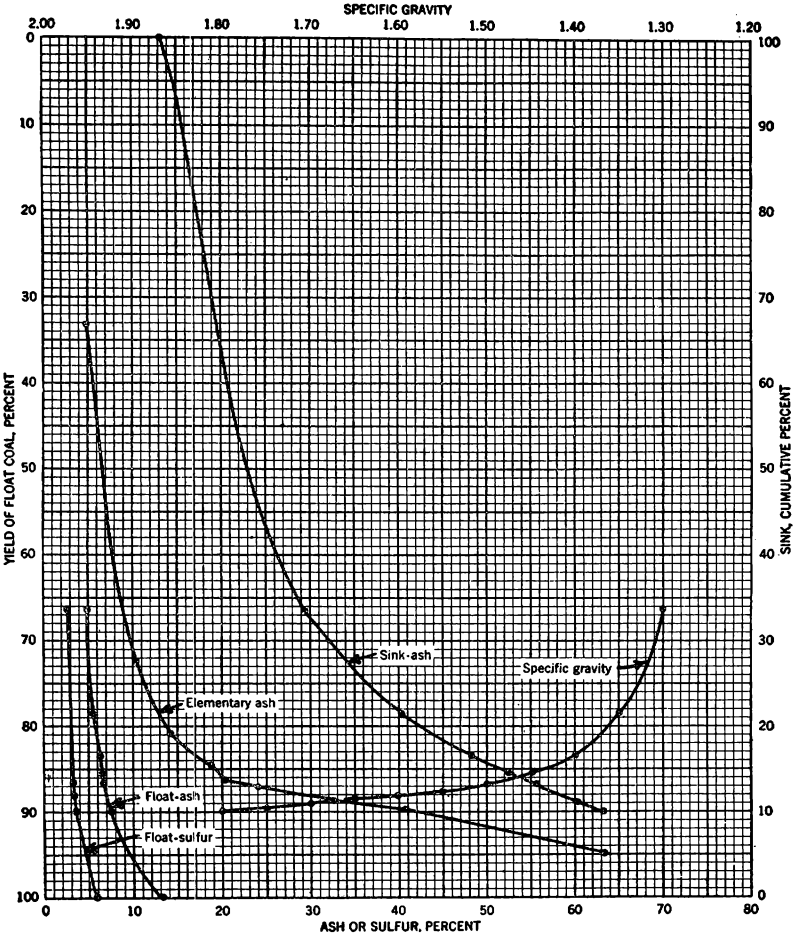
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30		66.61	5.00	2.87	66.61	5.00	2.87	100.00	12.64	5.34	
1.30-1.35		11.80	9.52	4.24	78.41	5.68	3.08	33.39	27.88	10.28	
1.35-1.40		5.79	13.01	5.39	84.20	6.18	3.24	21.59	37.91	13.58	
1.40-1.45		2.47	17.02	7.15	86.67	6.49	3.35	15.80	47.03	16.59	
1.45-1.50		1.26	20.14	8.48	87.93	6.69	3.42	13.33	52.59	18.34	
1.50-1.55		.78	23.10	9.70	88.71	6.83	3.48	12.07	55.98	19.37	
1.55-1.60		.59	26.91	9.27	89.30	6.97	3.51	11.29	58.25	20.03	
1.60-1.65		.35	29.94	11.83	89.65	7.06	3.55	10.70	59.98	20.63	
1.65-1.70		.43	32.74	11.61	90.08	7.18	3.58	10.35	61.00	20.92	
1.70-1.75		.37	33.76	14.48	90.45	7.29	3.63	9.92	62.22	21.33	
1.75-1.80		.26	39.53	12.77	90.71	7.38	3.66	9.55	63.32	21.59	
Sink-1.80		9.29	63.99	21.84	100.00	12.64	5.34	9.29	63.99	21.84	

FIGURE 9.—Composite of washing characteristics of tipple sample of 4-inch x 0 coal from No. 2 bed, La Salle County, Ill. (Size, 4-inch x 100-mesh.)



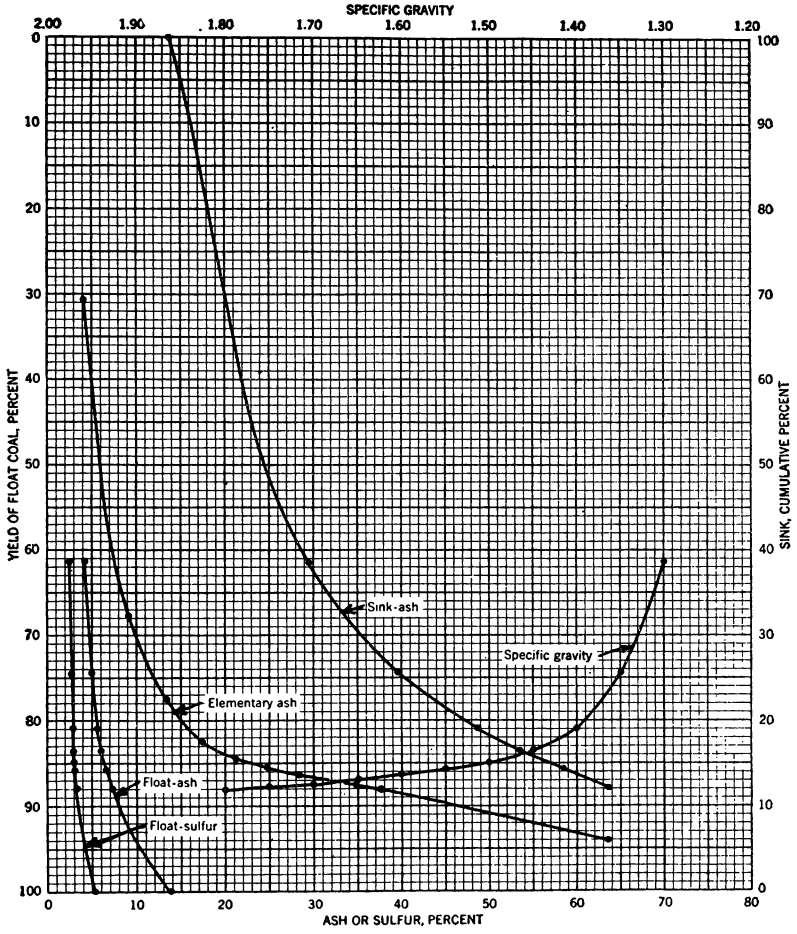
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	62,596	79.98	5.88	3.14	79.98	5.88	3.14	100.00	9.20	4.55	
1.30-1.35	5,897	7.53	11.34	5.85	87.51	6.35	3.37	20.02	22.47	10.20	12.02
1.35-1.40	3,515	4.49	13.36	7.65	92.00	6.69	3.58	12.49	29.17	12.83	6.89
1.40-1.45	1,878	2.40	16.20	9.84	94.40	6.93	3.74	8.00	38.05	15.73	3.34
1.45-1.50	738	.94	20.19	11.34	95.34	7.06	3.82	5.60	47.41	18.26	1.50
1.50-1.55	441	.56	21.30	13.46	95.90	7.15	3.87	4.66	52.90	19.65	.87
1.55-1.60	241	.31	28.45	10.75	96.21	7.22	3.89	4.10	57.22	20.50	.50
1.60-1.65	151	.19	30.68	14.81	96.40	7.26	3.92	3.79	59.57	21.29	.41
1.65-1.70	170	.22	33.97	12.16	96.62	7.32	3.93	3.60	61.10	21.64	.37
1.70-1.75	115	.15	31.92	17.98	96.77	7.36	3.96	3.38	62.86	22.25	.27
1.75-1.80	94	.12	43.08	14.96	96.89	7.41	3.97	3.23	64.30	22.45	
Sink-1.80	2,431	3.11	65.12	22.74	100.00	9.20	4.55	3.11	65.12	22.74	
Total	78,267	100.00									

FIGURE 10.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 2 bed, La Salle County, Ill. (Size, 4-inch x 1½-inch.)



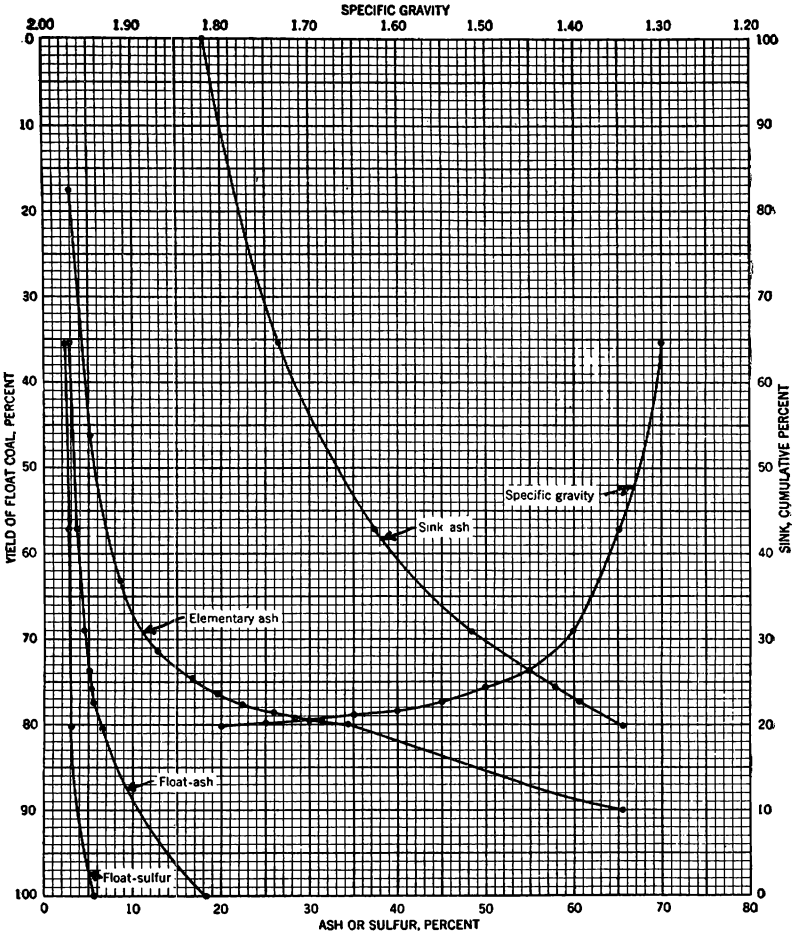
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	37,195	66.29	4.95	2.78	66.29	4.95	2.78	100.00	13.24	5.93	-------
1.30-1.35	6,804	12.13	10.40	4.49	78.42	5.79	3.04	33.71	29.54	12.12	17.18
1.35-1.40	2,835	5.05	14.20	5.85	83.47	6.30	3.21	21.58	40.30	16.41	7.14
1.40-1.45	1,173	2.09	18.91	7.70	85.56	6.61	3.32	16.53	48.27	19.63	3.34
1.45-1.50	702	1.25	20.30	9.68	86.81	6.81	3.42	14.44	52.52	21.36	1.99
1.50-1.55	418	.74	24.14	11.15	87.55	6.95	3.48	13.19	55.58	22.47	1.37
1.55-1.60	353	.63	26.86	10.42	88.18	7.10	3.53	12.45	57.44	23.14	1.00
1.60-1.65	208	.37	29.64	13.83	88.55	7.19	3.57	11.82	59.07	23.82	.87
1.65-1.70	278	.50	32.75	13.30	89.05	7.33	3.63	11.45	60.03	24.14	1.05
1.70-1.75	306	.55	33.91	16.16	79.60	7.50	3.70	10.95	61.27	24.64	.85
1.75-1.80	171	.30	40.78	13.86	89.70	7.61	3.74	10.40	62.72	25.09	-------
Sink-1.80	5,670	10.10	63.37	25.42	100.00	13.24	5.93	10.10	63.37	25.42	-------
Total	56,113	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 11.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 2 bed, La Salle County, Ill. (Size, 1½-inch x ⅜-inch.)



Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	21,772	61.33	4.18	2.69	61.33	4.18	2.69	100.00	13.90	5.22	-------
1.30–1.35	4,649	13.10	9.11	3.46	74.43	5.05	2.83	38.67	29.32	9.24	19.71
1.35–1.40	2,347	6.61	13.50	4.20	81.04	5.74	2.94	25.57	39.67	12.20	9.11
1.40–1.45	888	2.50	17.61	5.36	83.54	6.09	3.01	18.96	48.79	14.99	3.94
1.45–1.50	510	1.44	21.14	6.33	84.98	6.35	3.07	16.46	53.53	16.45	2.29
1.50–1.55	301	.85	24.92	7.53	85.83	6.53	3.11	15.02	56.63	17.42	1.56
1.55–1.60	252	.71	28.12	8.43	86.54	6.71	3.15	14.17	58.53	18.01	1.17
1.60–1.65	164	.46	31.08	9.43	87.00	6.84	3.19	13.46	60.14	18.52	.97
1.65–1.70	182	.51	33.69	10.40	87.51	6.99	3.23	13.00	61.16	18.84	.86
1.70–1.75	125	.35	34.89	10.83	87.86	7.10	3.26	12.49	62.29	19.18	.67
1.75–1.80	112	.32	37.83	11.75	88.18	7.22	3.29	12.14	63.08	19.42	-------
Sink-1.80	4,196	11.82	63.76	19.63	100.00	13.90	5.22	11.82	63.76	19.63	-------
Total	35,498	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 12.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 2 bed, La Salle County, Ill. (Size, ⅜-inch x 14-mesh.)



Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	2,921	35.25	2.89	2.48	35.25	2.89	2.48	100.00	18.25	5.62	
1.30-1.35	1,812	21.87	5.32	2.95	57.12	3.82	2.66	64.75	26.61	7.32	33.78
1.35-1.40	987	11.91	8.77	3.33	69.03	4.67	2.78	42.88	37.46	9.56	16.60
1.40-1.45	389	4.69	12.90	3.87	73.72	5.20	2.85	30.97	48.50	11.95	6.64
1.45-1.50	162	1.95	16.84	4.51	75.67	5.50	2.89	26.28	54.85	11.49	3.58
1.50-1.55	135	1.63	19.58	5.06	77.30	5.79	2.93	24.33	57.90	14.10	2.69
1.55-1.60	88	1.06	22.47	5.84	78.36	6.02	2.97	22.70	60.65	14.75	1.52
1.60-1.65	38	.46	26.01	6.67	78.82	6.14	2.99	21.64	62.52	15.19	1.10
1.65-1.70	53	.64	28.39	7.03	79.46	6.32	3.03	21.18	63.31	15.38	1.01
1.70-1.75	31	.37	31.65	7.47	79.83	6.43	3.05	20.54	64.40	15.64	.71
1.75-1.80	28	.34	34.28	7.94	80.17	6.55	3.07	20.17	65.00	15.79	
Sink-1.80	1,643	19.83	65.53	15.92	100.00	18.25	5.62	19.83	65.53	15.92	
Total	8,287	100.00									

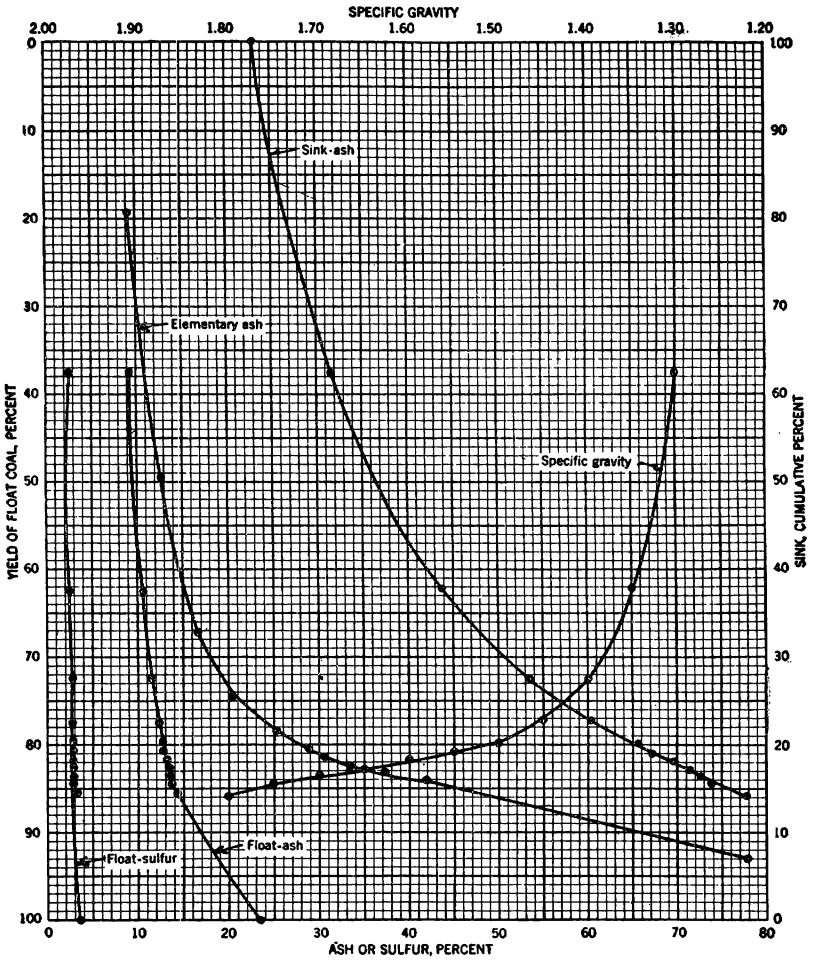
FIGURE 13.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 2 bed, La Salle County, Ill. (Size, 14-mesh x 100-mesh.)

NO. 5 BED

Five tipple samples were collected from this bed. Two were prepared coal 4 by 1½-inch in size, two were 4-inch by 0 resultants and one was 1¼-inch by 0 slack coal. One of these samples was Fulton County strip coal and therefore shows a somewhat high percentage of 1.80 specific gravity sink material.

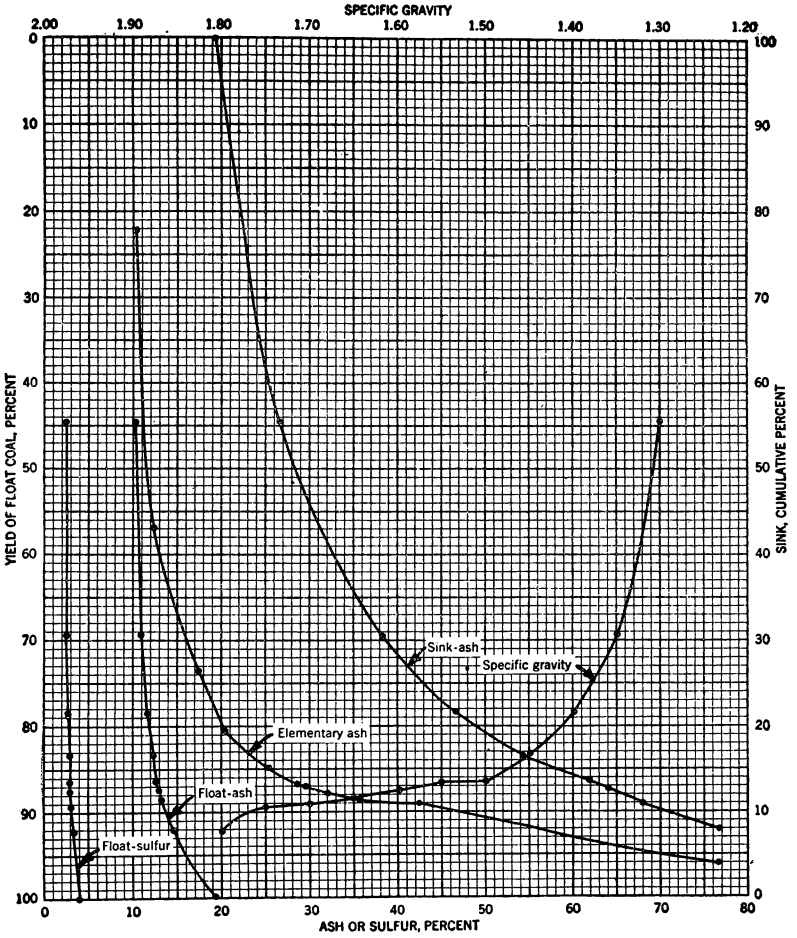
The washability-test data are shown in figures 14 to 29. Certain generalizations can be made from a study of these data. It can be seen that the No. 5 bed in the center of the State and continuing toward the north is higher in ash than the same bed in southern Illinois. Even after washing at a commercial gravity, the product is frequently over 10 percent in ash content in the central and north-central mining areas. Figure 20 is interesting not only because of the low-ash washed coal that can be prepared but also because of the low sulfur content of the bed.

Figure 19 shows the washing tests on the highest-rank coal found in Illinois. Gallatin County, where this sample was collected, produces the only high-volatile A bituminous coal mined in the State.



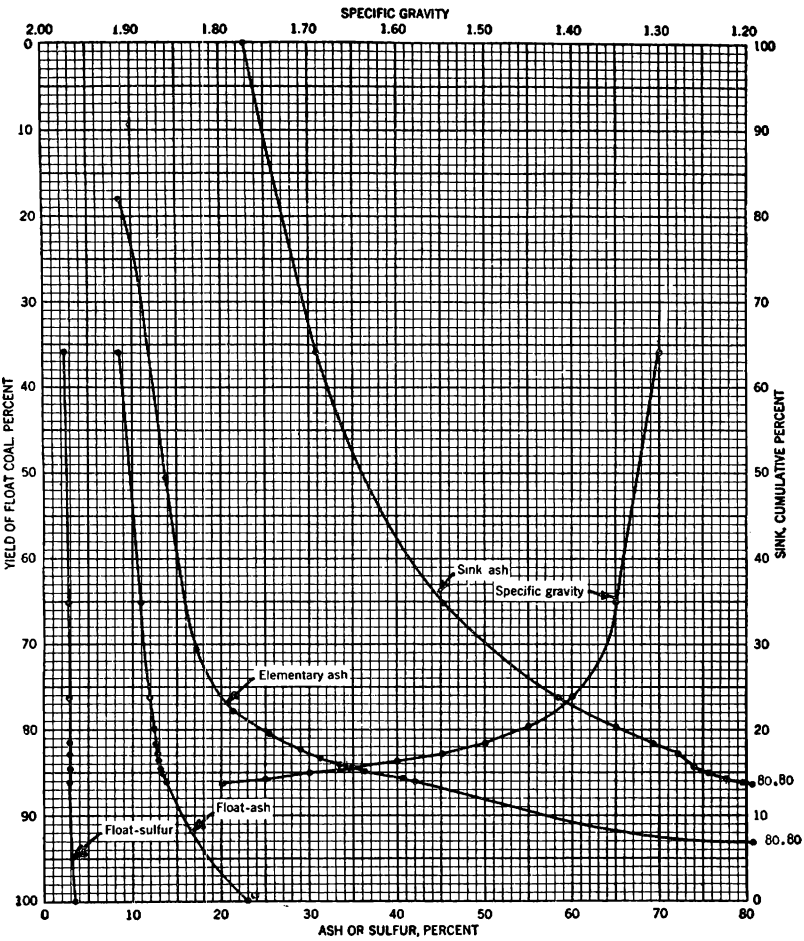
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30		37.59	9.39	2.51	37.59	9.39	2.51	100.00	23.18	3.61	
1.30–1.35		24.59	12.76	2.58	62.18	10.72	2.54	62.41	31.49	4.27	
1.35–1.40		10.13	16.89	3.21	72.31	11.59	2.63	37.82	43.66	5.36	
1.40–1.45		4.72	20.40	4.02	77.03	12.13	2.72	27.69	53.46	6.15	
1.45–1.50		2.93	25.05	4.44	79.96	12.60	2.78	22.97	60.25	6.59	
1.50–1.55		.98	28.51	4.26	80.94	12.79	2.80	20.04	65.39	6.90	
1.55–1.60		1.00	30.71	5.57	81.94	13.01	2.83	19.06	67.29	7.04	
1.60–1.65		.88	33.48	5.03	82.82	13.23	2.86	18.06	69.32	7.12	
1.65–1.70		.75	37.06	7.16	83.57	13.44	2.89	17.18	71.15	7.23	
1.70–1.75		.65	41.77	4.52	84.22	13.66	2.91	16.43	72.71	7.23	
1.75–1.80		1.69	41.82	11.34	85.91	14.21	3.07	15.78	73.98	7.34	
Sink–1.80		14.09	77.84	6.86	100.00	23.18	3.61	14.09	77.84	6.86	

FIGURE 14.—Composite of washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Fulton County, Ill. (Size, 4-inch x 100-mesh.)



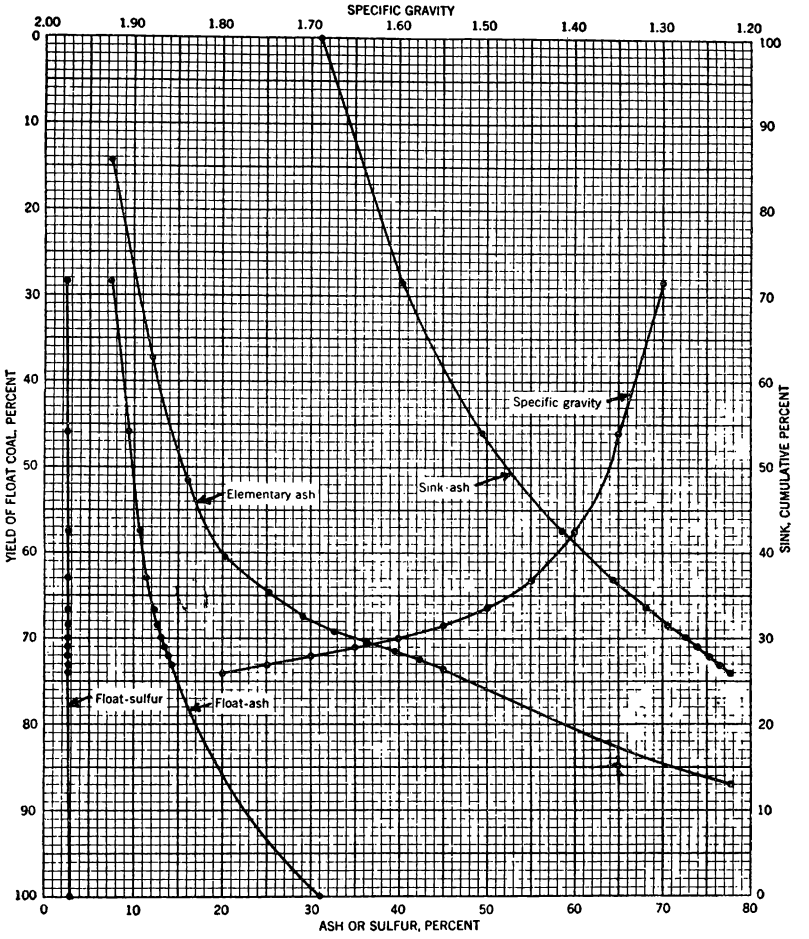
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	72,235	44.36	10.22	2.56	44.36	10.22	2.56	100.00	19.32	3.96	
1.30-1.35	40,823	25.06	12.30	2.53	69.42	10.97	2.55	55.64	26.57	5.08	33.90
1.35-1.40	14,402	8.84	17.58	3.40	78.26	11.72	2.65	30.58	38.26	7.17	13.85
1.40-1.45	8,165	5.01	20.41	4.67	83.27	12.24	2.77	21.74	46.67	8.71	8.21
1.45-1.50	5,216	3.20	25.36	5.11	86.47	12.73	2.85	16.73	54.54	9.92	3.44
1.50-1.55	385	.24	28.69	5.68	86.71	12.77	2.86	13.53	61.44	11.05	1.05
1.55-1.60	1,325	.81	29.34	8.32	87.52	12.92	2.91	13.29	62.03	11.15	1.69
1.60-1.65	1,438	.88	32.04	6.06	88.40	13.11	2.94	12.48	64.15	11.33	1.38
1.65-1.70	817	.50	35.58	12.14	88.90	13.24	3.00	11.60	66.59	11.74	.88
1.70-1.75	620	.38	42.49	4.71	89.28	13.56	3.00	11.10	67.99	11.72	3.23
1.75-1.80	4,649	2.85	41.27	13.36	92.13	14.42	3.32	10.72	67.23	11.97	
Sink-1.80	12,814	7.87	76.63	11.46	100.00	19.32	3.96	7.87	76.63	11.46	
Total	162,889	100.00									

FIGURE 15.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Fulton County, Ill. (Size, 4-inch x 1½-inch.)



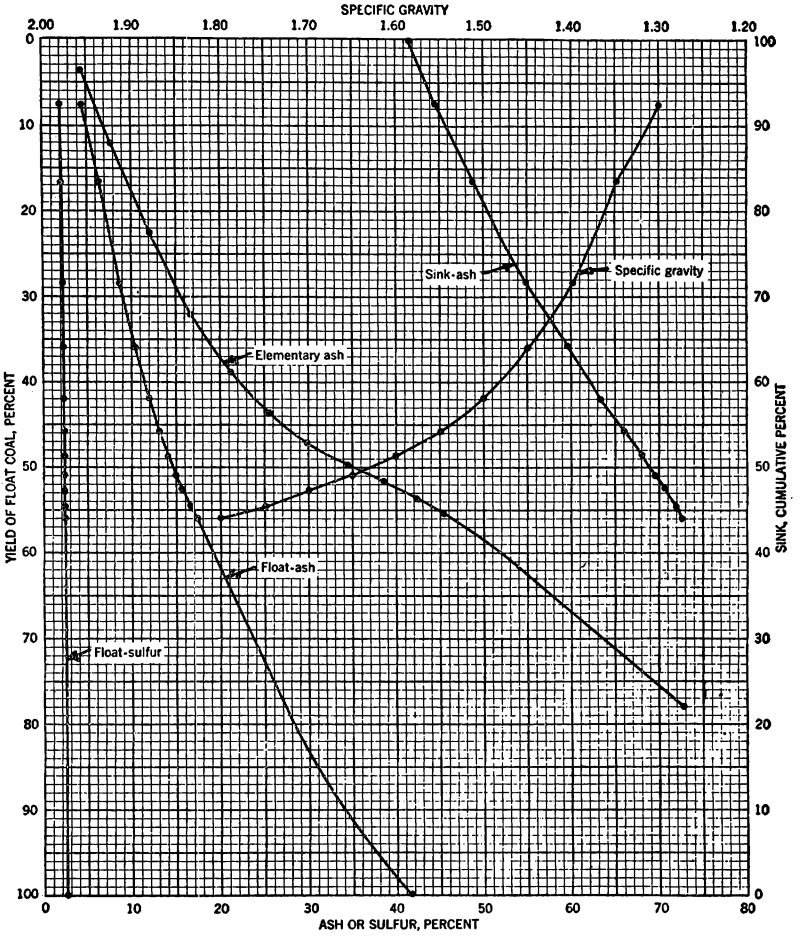
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	40,937	35.94	8.74	2.48	35.94	8.74	2.48	100.00	22.96	3.52	--------
1.30-1.35	33,226	29.17	13.69	2.67	65.11	10.96	2.57	64.06	30.93	4.11	40.22
1.35-1.40	12,587	11.05	17.14	3.36	76.16	11.85	2.68	34.89	45.34	5.32	14.63
1.40-1.45	4,082	3.58	21.35	3.87	79.74	12.28	2.73	23.84	58.42	6.22	5.61
1.45-1.50	2,310	2.03	25.51	4.54	81.77	12.61	2.78	20.26	64.97	6.64	3.19
1.50-1.55	1,317	1.16	29.02	5.16	82.93	12.84	2.81	18.23	69.36	6.87	1.95
1.55-1.60	895	.79	31.38	4.84	83.72	13.01	2.83	17.07	72.10	6.99	1.42
1.60-1.65	718	.63	33.45	5.26	84.35	13.17	2.85	16.28	74.08	7.09	1.41
1.65-1.70	893	.78	36.24	6.49	85.13	13.38	2.88	15.65	75.71	7.17	1.51
1.70-1.75	828	.73	40.61	5.89	85.86	13.61	2.91	14.87	77.79	7.20	1.13
1.75-1.80	452	.40	42.07	4.52	86.26	13.74	2.92	14.14	79.70	7.27	--------
Sink-1.80	15,649	13.74	80.80	7.35	100.00	22.96	3.52	13.74	80.80	7.35	--------
Total	113,894	100.00	-----	-------	--------	-------	-------	--------	-------	-------	--------

FIGURE 16.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Fulton County, Ill. (Size, 1½-inch by ⅜-inch.)



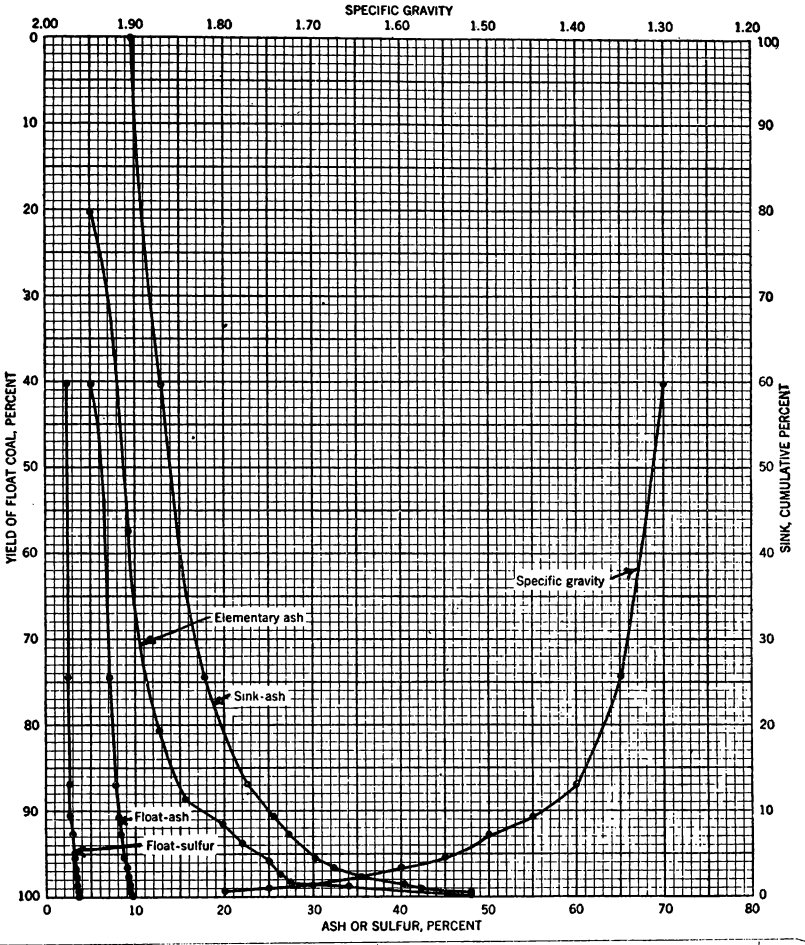
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	7,598	28.46	7.57	2.37	28.46	7.57	2.37	100.00	31.06	2.96	-------
1.30-1.35	4,649	17.41	12.14	2.55	45.87	9.30	2.44	71.54	40.41	3.19	29.08
1.35-1.40	3,116	11.67	16.08	2.72	57.54	10.68	2.50	54.13	49.50	3.40	17.19
1.40-1.45	1,475	5.52	20.43	3.01	63.06	11.53	2.54	42.46	58.69	3.59	8.76
1.45-1.50	866	3.24	25.29	3.25	66.30	12.20	2.58	36.94	64.40	3.67	5.36
1.50-1.55	567	2.12	29.16	3.47	68.42	12.73	2.60	33.70	68.16	3.71	3.63
1.55-1.60	402	1.51	32.64	3.38	69.93	13.16	2.62	31.58	70.78	3.73	2.56
1.60-1.65	280	1.05	36.58	3.49	70.98	13.51	2.63	30.07	72.70	3.75	2.21
1.65-1.70	309	1.16	39.56	3.35	72.14	13.93	2.64	29.02	74.01	3.75	2.13
1.70-1.75	260	.97	42.48	3.13	73.11	14.30	2.65	27.86	75.44	3.77	1.95
1.75-1.80	263	.98	45.12	2.86	74.09	14.71	2.65	26.89	76.63	3.79	-------
Sink-1.80	6,917	25.91	77.82	3.83	100.00	31.06	2.96	25.91	77.82	3.83	-------
Total	26,702	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 17.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Fulton County, Ill. (Size, ⅜-inch x 14-mesh.)



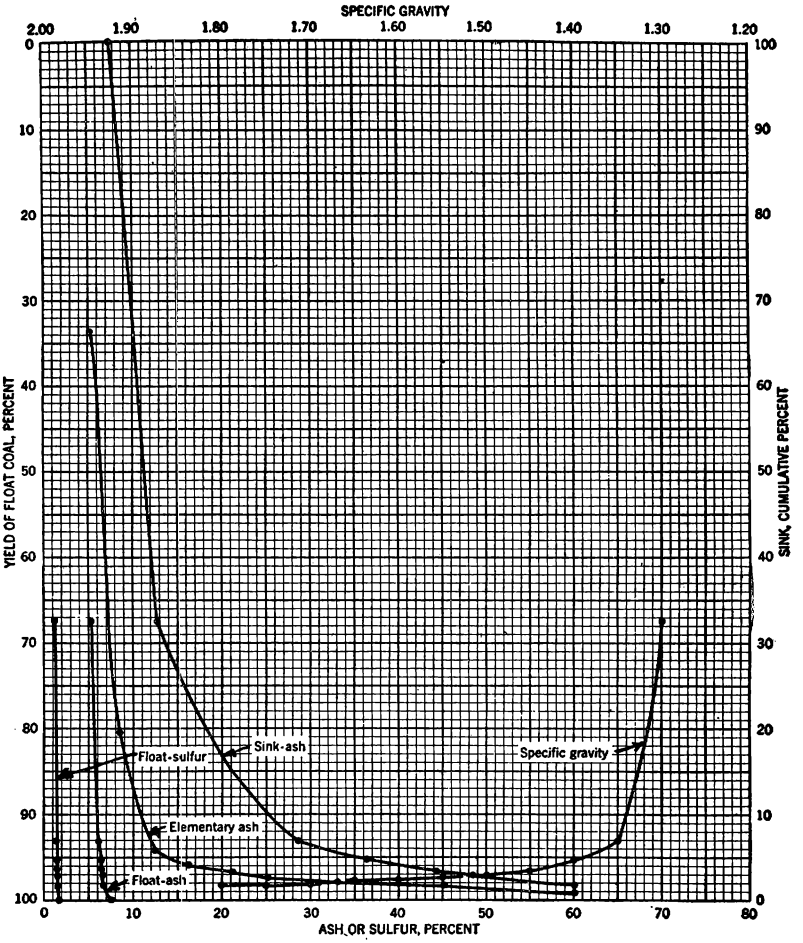
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulatvie percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	500	7.38	4.48	2.09	7.38	4.48	2.09	100.00	41.83	2.60	
1.30–1.35	625	9.22	7.86	2.27	16.60	6.36	2.19	92.62	44.80	2.64	20.95
1.35–1.40	795	11.73	12.04	2.32	28.33	8.71	2.24	83.40	48.89	2.68	19.37
1.40–1.45	518	7.64	16.64	2.39	35.97	10.39	2.27	71.67	54.92	2.74	13.62
1.45–1.50	405	5.98	21.37	2.52	41.95	11.96	2.31	64.03	59.49	2.79	9.71
1.50–1.55	253	3.73	25.64	2.61	45.68	13.08	2.33	58.05	63.41	2.81	6.64
1.55–1.60	197	2.91	29.86	2.65	48.59	14.08	2.35	54.32	66.01	2.83	5.26
1.60–1.65	159	2.35	34.51	2.66	50.94	15.02	2.37	51.41	68.05	2.84	4.06
1.65–1.70	116	1.71	38.63	2.63	52.65	15.79	2.38	49.06	69.66	2.85	3.63
1.70–1.75	130	1.92	42.34	2.54	54.57	16.72	2.38	47.35	70.78	2.85	3.34
1.75–1.80	96	1.42	45.44	2.45	55.99	17.45	2.38	45.43	71.98	2.87	
Sink–1.80	2,982	44.01	72.84	2.88	100.00	41.83	2.60	44.01	72.84	2.88	
Total	6,776	100.00									

FIGURE 18.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Fulton County, Ill. (Size, 14-mesh x 100-mesh.)



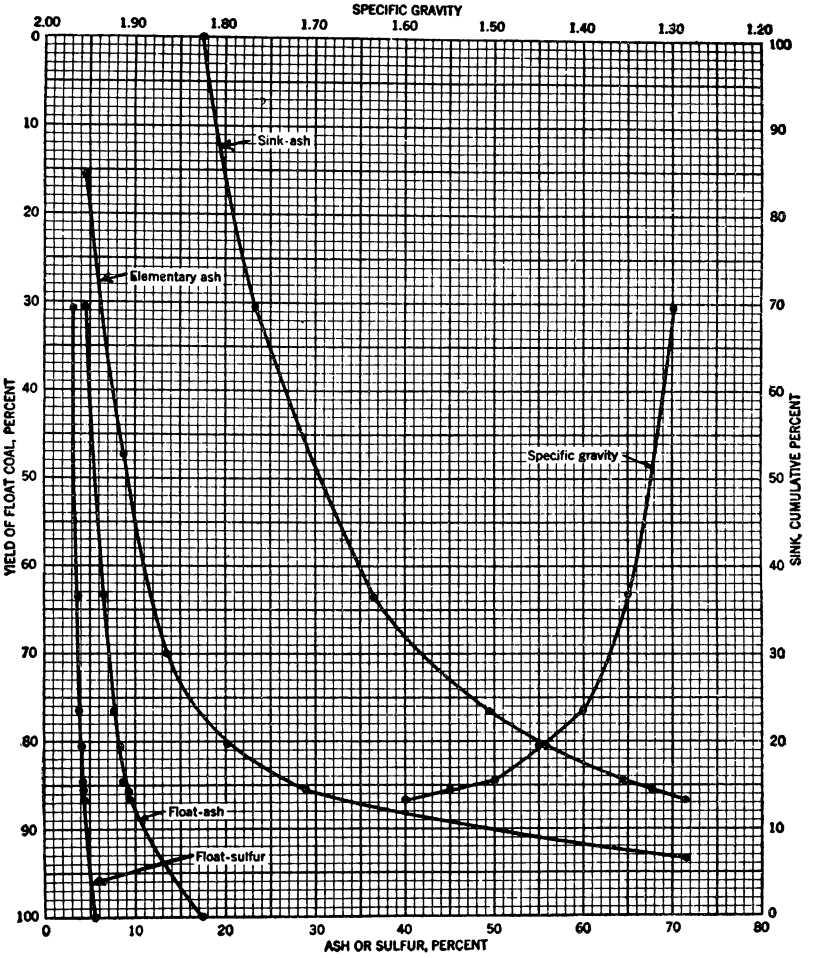
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	101,945	40.24	5.08	2.41	40.24	5.08	2.41	100.00	9.81	3.79	-------
1.30-1.35	86,636	34.20	9.30	2.61	74.44	7.02	2.50	59.76	12.99	4.72	46.65
1.35-1.40	31,525	12.45	12.80	4.00	86.89	7.85	2.72	25.56	17.94	7.54	16.26
1.40-1.45	9,639	3.81	15.69	6.66	90.70	8.18	2.88	13.11	22.82	10.90	5.67
1.45-1.50	4,718	1.86	19.82	7.95	92.56	8.41	2.98	9.30	25.74	12.64	4.59
1.50-1.55	6,917	2.73	22.11	9.81	95.29	8.80	3.18	7.44	27.22	13.81	4.13
1.55-1.60	3,545	1.40	25.09	11.59	96.69	9.04	3.30	4.71	30.18	16.13	2.53
1.60-1.65	2,863	1.13	26.37	14.97	97.82	9.24	3.44	3.31	32.33	18.05	1.98
1.65-1.70	2,150	.85	27.87	17.48	98.67	9.40	3.56	2.18	35.42	19.65	1.16
1.70-1.75	785	.31	34.02	15.15	98.98	9.48	3.59	1.33	40.25	21.03	.65
1.75-1.80	853	.34	30.45	20.86	99.32	9.55	3.65	1.02	42.14	22.82	-------
Sink-1.80	1,731	.68	47.99	23.80	100.00	9.81	3.79	.68	47.99	23.80	-------
Total	253,307	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 19.—Washing characteristics of tipple sample of 4-inch x 1½-inch coal from No. 5 bed, Gallatin County, Ill. (Size, 4-inch x 1½-inch.)



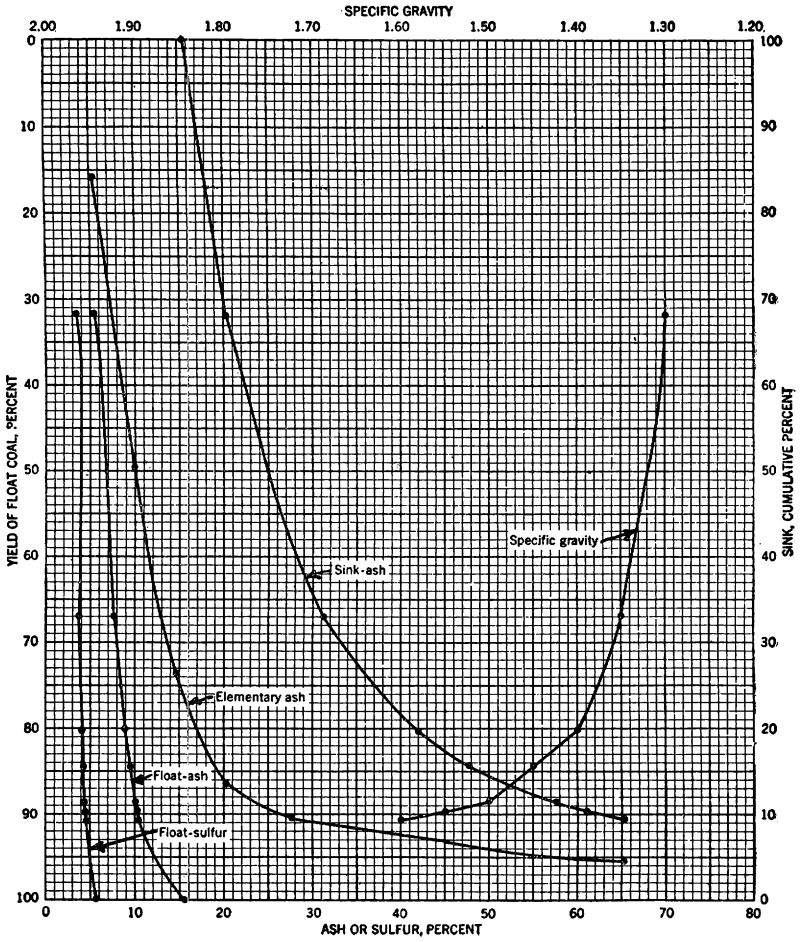
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	184,726	67.49	5.18	1.15	67.49	5.18	1.15	100.00	7.67	1.66	
1.30–1.35	69,967	25.57	8.51	1.91	93.06	6.09	1.36	32.51	12.83	2.71	27.77
1.35–1.40	6,010	2.20	12.46	3.72	95.26	6.24	1.41	6.94	28.76	5.65	3.54
1.40–1.45	3,656	1.34	16.18	4.66	96.60	6.38	1.46	4.74	36.33	6.55	1.87
1.45–1.50	1,446	.53	21.12	3.69	97.13	6.46	1.47	3.40	44.27	7.30	.90
1.50–1.55	1,019	.37	25.12	3.03	97.50	6.53	1.48	2.87	48.55	7.96	.54
1.55–1.60	453	.17	25.31	8.60	97.67	6.56	1.49	2.50	52.01	8.69	.38
1.60–1.65	567	.21	32.63	3.44	97.88	6.62	1.49	2.33	53.96	8.70	.50
1.65–1.70	807	.29	33.14	5.58	98.17	6.70	1.51	2.12	56.08	9.22	.32
1.70–1.75	82	.03	45.11	4.03	98.20	6.71	1.51	1.83	59.71	9.80	.05
1.75–1.80	52	.02	45.11	4.03	98.22	6.72	1.51	1.80	59.95	9.89	
Sink–1.80	4,876	1.78	60.12	9.96	100.00	7.67	1.66	1.78	60.12	9.96	
Total	273,661	100.00									

FIGURE 20.—Washing characteristics of tipple sampel of 4-inch x 1½-inch coal from No. 5 bed, Saline County, Ill. (Size, 4-inch x 1½-inch.)



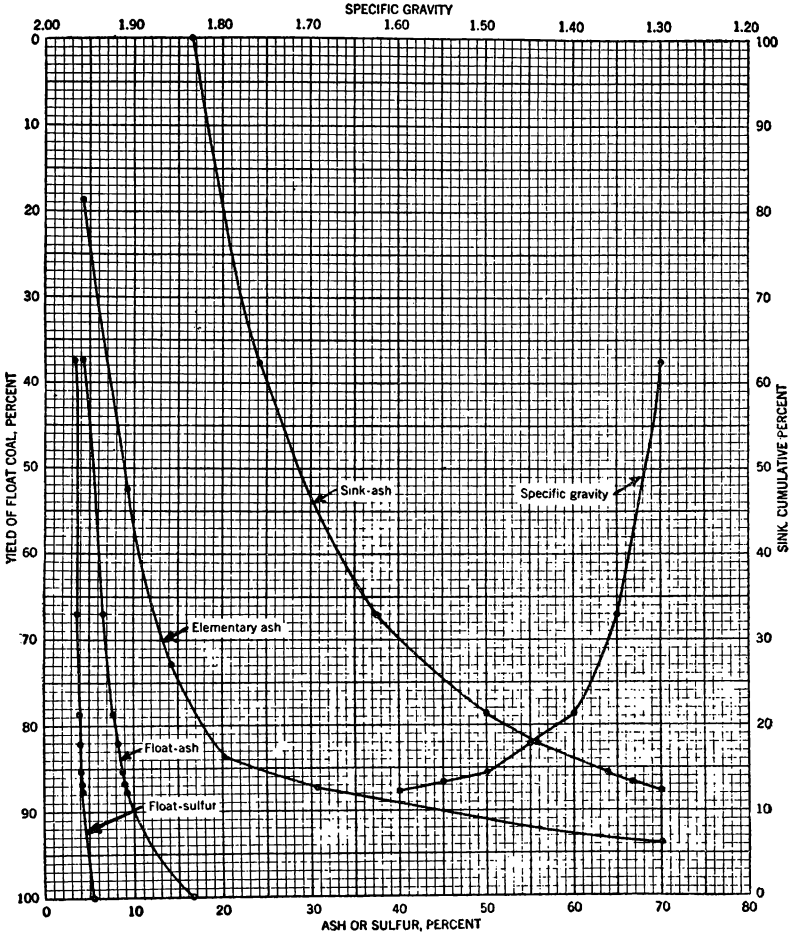
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30		30.84	4.53	3.32	30.84	4.53	3.32	100.00	17.59	5.49	
1.30–1.35		32.43	8.66	3.91	63.27	6.65	3.62	69.16	23.42	6.46	
1.35–1.40		13.43	13.49	5.11	76.70	7.85	3.88	36.73	36.45	8.70	
1.40–1.45		3.86	19.53	6.85	80.56	8.40	4.03	23.30	49.68	10.77	
1.45–1.50		3.87	19.53	6.85	84.43	8.91	4.15	19.44	55.67	11.55	
1.50–1.55		1.23	28.82	8.49	85.66	9.20	4.22	15.57	64.65	12.72	
1.55–1.60		1.24	28.82	8.48	86.90	9.48	4.28	14.34	67.73	13.08	
Sink–1.60		13.10	71.41	13.52	100.00	17.59	5.49	13.10	71.41	13.52	

FIGURE 21.—Composite of washing characteristics of tipple sample of 1¼-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, 1¼-inch x 100-mesh.)



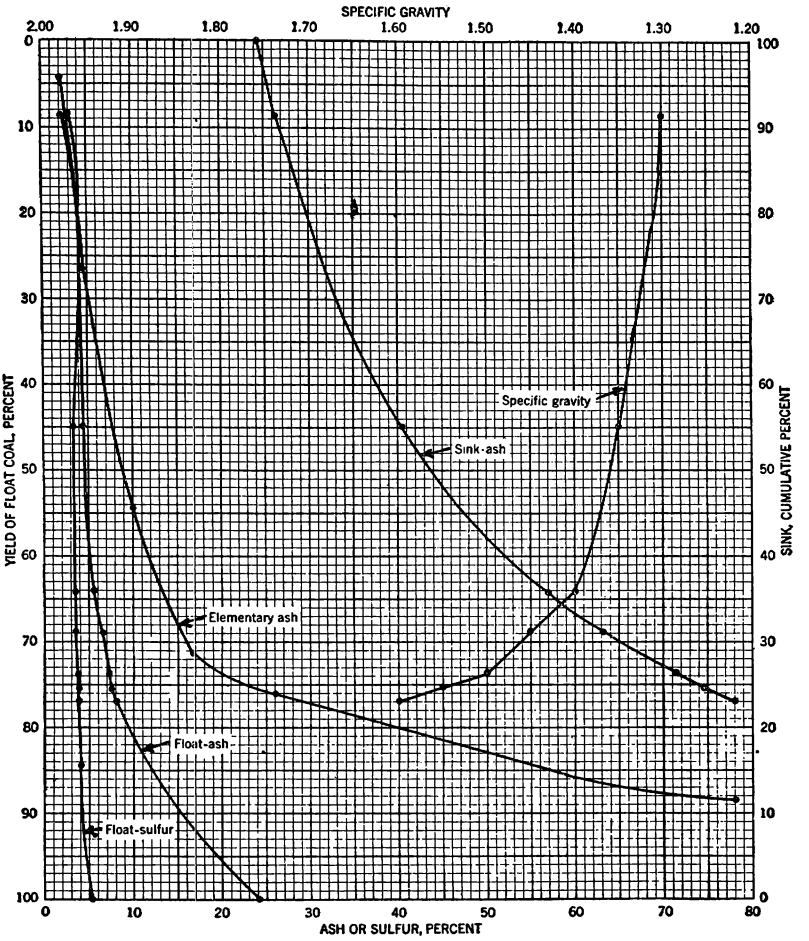
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	12,924	31.88	5.45	3.47	31.88	5.45	3.47	100.00	15.54	5.70	
1.30–1.35	14,213	35.05	9.98	4.11	66.93	7.82	3.81	68.12	20.26	6.74	48.20
1.35–1.40	5,332	13.15	14.71	5.66	80.08	8.95	4.11	33.07	31.16	9.52	17.34
1.40–1.45	1,701	4.19	20.42	7.74	84.27	9.52	4.29	19.92	42.02	12.08	8.39
1.45–1.50	1,701	4.20	20.42	7.74	88.47	10.04	4.45	15.73	47.78	13.23	5.35
1.50–1.55	467	1.15	27.79	9.78	89.62	10.27	4.52	11.53	57.75	15.23	2.30
1.55–1.60	467	1.15	27.79	9.78	90.77	10.49	4.59	10.38	61.06	15.84	
Sink–1.60	3,742	9.23	65.21	16.59	100.00	15.54	5.70	9.23	65.21	16.59	
Total	40,547	100.00									

FIGURE 22.—Washing characteristics of tipple sample of 1¼-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, 1¼-inch x ⅜-inch).



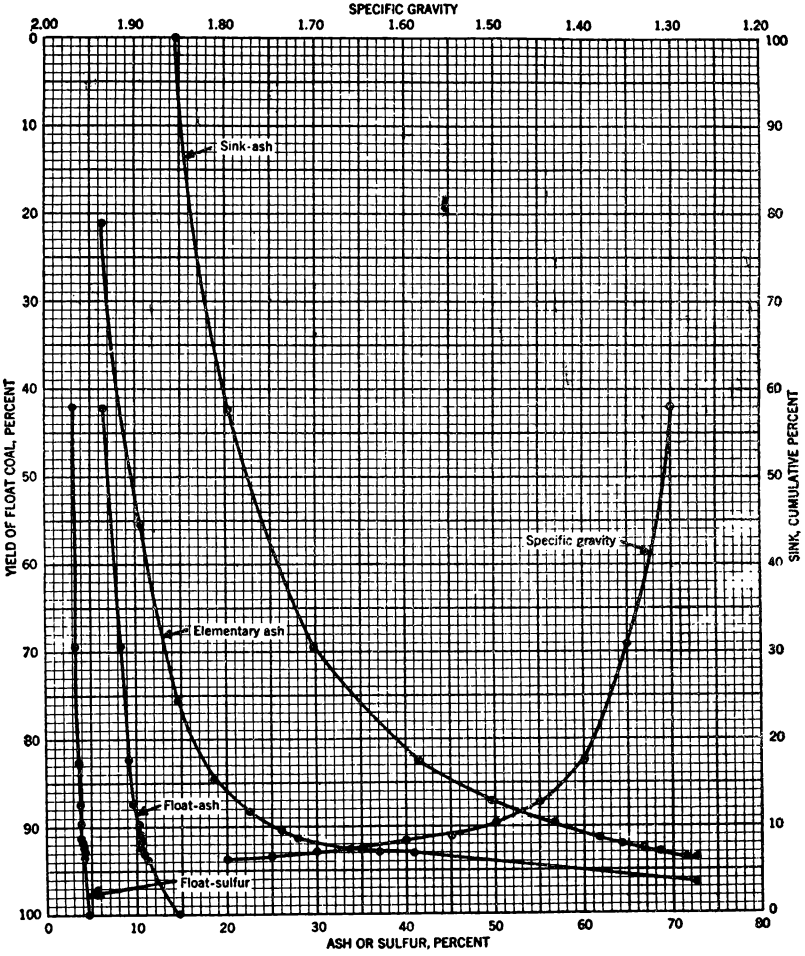
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	11,120	37.57	4.23	3.27	37.57	4.23	3.27	100.00	16.66	5.45	----
1.30-1.35	8,735	29.51	9.40	3.99	67.08	6.50	3.59	62.43	24.14	6.77	41.23
1.35-1.40	3,470	11.72	14.52	5.37	78.80	7.70	3.85	32.92	37.35	9.26	15.09
1.40-1.45	999	3.37	20.17	7.05	82.17	8.21	3.98	21.20	49.98	11.41	6.75
1.45-1.50	1,000	3.38	20.17	7.05	85.55	8.68	4.10	17.83	55.61	12.24	4.52
1.50-1.55	337	1.14	30.80	8.80	86.69	8.97	4.17	14.45	63.90	13.45	2.28
1.55-1.60	338	1.14	30.80	8.80	87.83	9.25	4.23	13.31	66.73	13.85	----
Sink-1.60	3,602	12.17	70.10	14.32	100.00	16.66	5.45	12.17	70.10	14.32	----
Total	29,601	100.00	----	----	----	----	----	----	----	----	----

FIGURE 23.—Washing characteristics of tipple sample of 1¼-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, ⅜-inch x 14-mesh.)



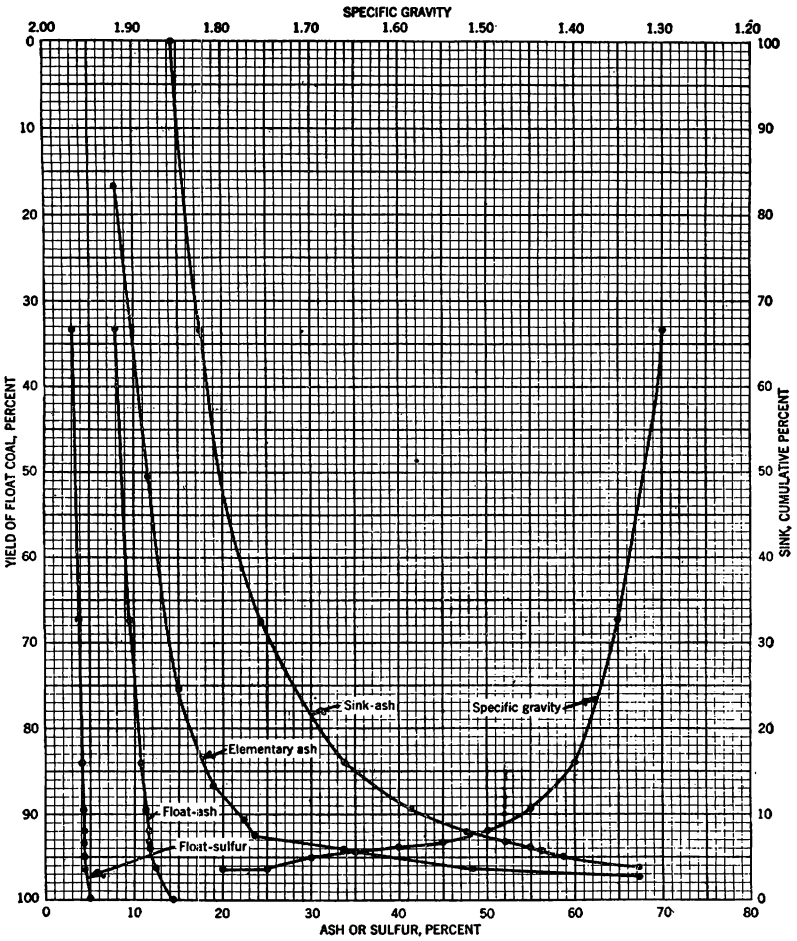
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	379	8.62	2.18	3.02	8.62	2.18	3.02	100.00	24.23	5.20	
1.30-1.35	1,593	36.33	4.49	3.33	44.95	4.05	3.27	91.38	26.31	5.41	55.45
1.35-1.40	838	19.12	10.02	3.93	64.07	5.83	3.47	55.05	40.71	6.78	23.86
1.40-1.45	208	4.74	16.72	4.97	68.81	6.58	3.57	35.93	57.04	8.30	9.49
1.45-1.50	208	4.75	16.72	4.97	73.56	7.23	3.66	31.19	63.16	8.80	6.42
1.50-1.55	73	1.67	26.07	6.19	75.23	7.65	3.72	26.44	71.51	9.49	3.35
1.55-1.60	74	1.68	26.07	6.19	76.91	8.05	3.77	24.77	74.57	9.71	
Sink-1.60	1,012	23.09	78.10	9.97	100.00	24.23	5.20	23.09	78.10	9.97	
Total	4,385	100.00									

FIGURE 24.—Washing characteristics of tipple sample of 1¼-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, 14-mesh x 100-mesh.)



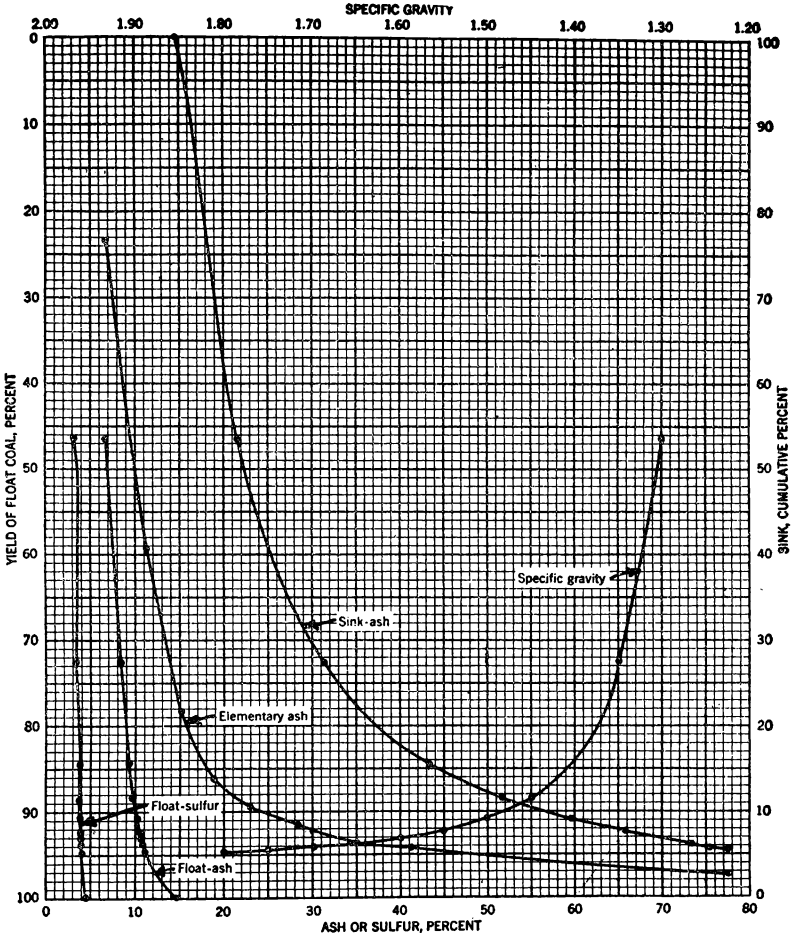
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30		42.03	6.58	3.09	42.03	6.58	3.09	100.00	14.93	4.56	
1.30-1.35		27.20	10.91	3.86	69.23	8.28	3.39	57.97	20.98	5.63	
1.35-1.40		13.22	14.57	5.09	82.45	9.29	3.66	30.77	29.89	7.19	
1.40-1.45		4.70	18.42	6.10	87.15	9.78	3.80	17.55	41.43	8.78	
1.45-1.50		2.55	22.40	7.23	89.70	10.14	3.89	12.85	49.85	9.76	
1.50-1.55		1.40	26.21	8.03	91.10	10.39	3.96	10.30	56.64	10.39	
1.55-1.60		.75	27.97	9.18	91.85	10.53	4.00	8.90	61.43	10.76	
1.60-1.65		.52	34.37	7.16	92.37	10.67	4.02	8.15	64.51	10.90	
1.65-1.70		.52	36.97	8.52	92.89	10.81	4.04	7.63	66.56	11.16	
1.70-1.75		.56	36.26	11.62	93.45	10.97	4.09	7.11	68.73	11.35	
1.75-1.80		.21	40.17	7.37	93.66	11.03	4.10	6.55	71.50	11.33	
Sink-1.80		6.34	72.54	11.46	100.00	14.93	4.56	6.34	72.54	11.46	

FIGURE 25.—Composite of washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, 4-inch x 100-mesh.)



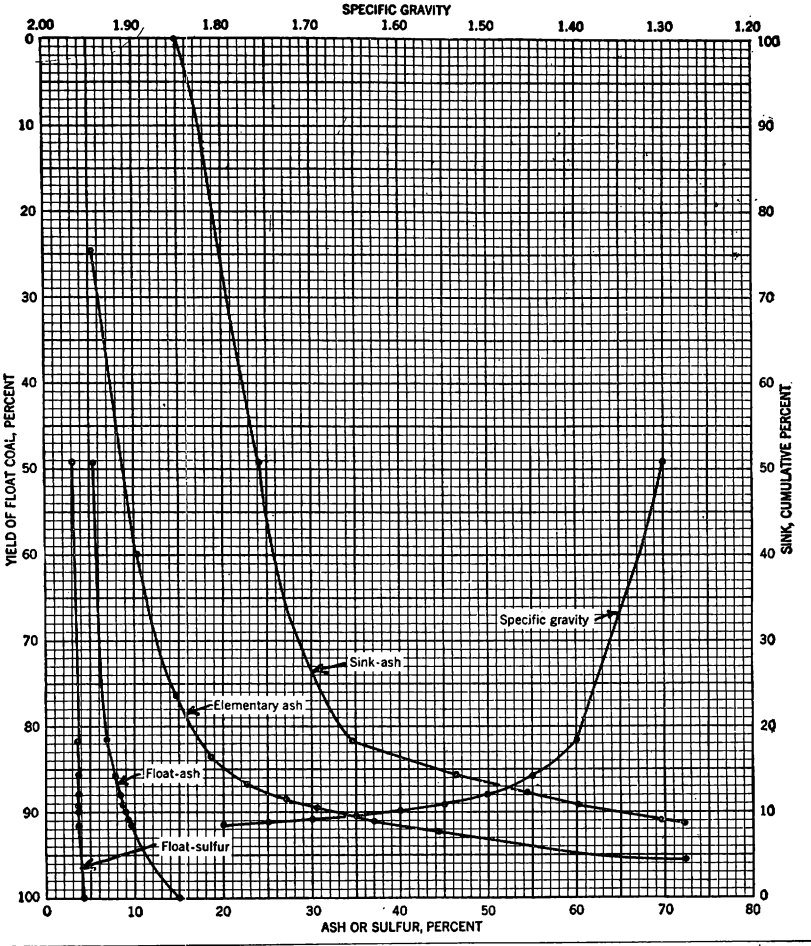
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	32,659	33.41	7.94	3.06	33.41	7.94	3.06	100.00	14.48	4.96	
1.30–1.35	33,226	33.98	11.55	3.93	67.39	9.76	3.50	66.59	17.76	5.91	50.57
1.35–1.40	16,216	16.59	14.90	5.38	83.98	10.78	3.87	32.61	24.24	7.97	21.92
1.40–1.45	5,216	5.33	18.97	6.61	89.31	11.26	4.03	16.02	33.91	10.65	8.01
1.45–1.50	2,620	2.68	22.48	8.59	91.99	11.59	4.17	10.69	41.36	12.67	3.94
1.50–1.55	1,228	1.26	23.62	10.42	93.25	11.75	4.25	8.01	47.68	14.04	1.92
1.55–1.60	644	.66	26.69	11.59	93.91	11.86	4.30	6.75	52.17	14.71	.99
1.60–1.65	325	.33	33.66	3.68	94.24	11.94	4.30	6.09	54.93	15.05	1.14
1.65–1.70	796	.81	39.69	8.83	95.05	12.17	4.34	5.76	56.15	15.70	2.06
1.70–1.75	1,226	1.25	35.15	13.46	96.30	12.47	4.46	4.95	58.85	16.82	1.33
1.75–1.80	77	.08	48.43	6.69	96.38	12.50	4.46	3.70	66.85	17.96	
Sink–1.80	3,537	3.62	67.26	18.21	100.00	14.48	4.96	3.62	67.26	18.21	
Total	97,770	100.00									

FIGURE 26.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, 4-inch x 1½-inch.)



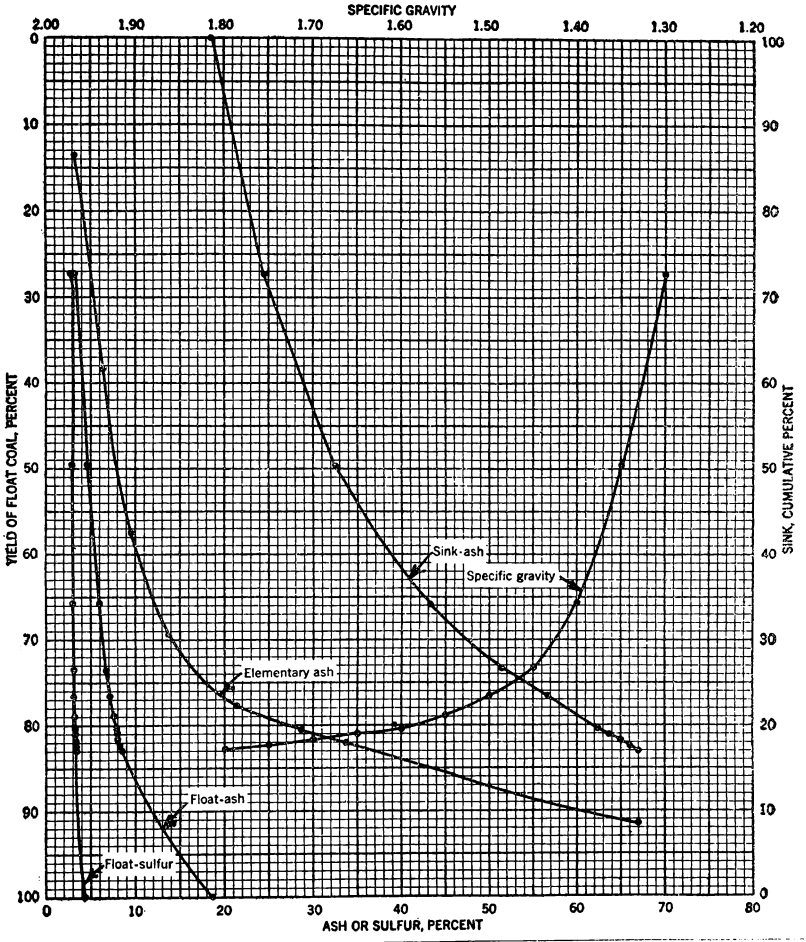
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	32,772	46.49	6.80	3.13	46.49	6.80	3.13	100.00	14.70	4.44	
1.30-1.35	18,257	25.90	11.21	3.97	72.39	8.38	3.43	53.51	21.56	5.59	37.65
1.35-1.40	8,278	11.75	15.12	5.28	84.14	9.32	3.69	27.61	31.26	7.10	15.88
1.40-1.45	2,908	4.13	18.94	6.27	88.27	9.77	3.81	15.86	43.22	8.46	6.68
1.45-1.50	1,797	2.55	23.08	6.99	90.82	10.14	3.90	11.73	51.77	9.23	4.05
1.50-1.55	1,057	1.50	28.36	7.54	92.32	10.44	3.96	9.18	59.73	9.85	2.25
1.55-1.60	526	.75	28.20	9.64	93.07	10.58	4.00	7.68	65.86	10.30	1.36
1.60-1.65	427	.61	35.87	8.65	93.68	10.75	4.03	6.93	69.94	10.37	.93
1.65-1.70	223	.32	35.17	10.08	94.00	10.83	4.05	6.32	73.23	10.53	.53
1.70-1.75	150	.21	41.20	9.91	94.21	10.90	4.07	6.00	75.26	10.56	.39
1.75-1.80	130	.18	41.31	9.98	94.39	10.96	4.08	5.79	76.49	10.58	
Sink-1.80	3,955	5.61	77.62	10.60	100.00	14.70	4.44	5.61	77.62	10.60	
Total	70,480	100.00									

FIGURE 27.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, 1½-inch x ⅜-inch.)



Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	18,370	49.12	5.43	3.09	49.12	5.43	3.09	100.00	14.98	4.36	
1.30-1.35	8,165	21.83	10.19	3.66	70.95	6.89	3.27	50.88	24.20	5.58	32.54
1.35-1.40	4,007	10.71	14.71	4.70	81.66	7.92	3.45	29.05	34.73	7.02	14.90
1.40-1.45	1,566	4.19	18.73	5.89	85.85	8.45	3.57	18.34	46.42	8.37	6.30
1.45-1.50	788	2.11	22.72	6.67	87.96	8.79	3.65	14.15	54.62	9.11	3.31
1.50-1.55	447	1.20	27.08	7.24	89.16	9.04	3.70	12.04	60.21	9.54	1.92
1.55-1.60	270	.72	30.78	7.33	89.88	9.21	3.72	10.84	63.87	9.79	1.29
1.60-1.65	214	.57	33.76	7.32	90.45	9.36	3.75	10.12	66.23	9.97	.99
1.65-1.70	157	.42	35.43	6.87	90.87	9.49	3.76	9.55	68.16	10.13	.74
1.70-1.75	121	.32	37.09	6.75	91.19	9.58	3.77	9.13	69.67	10.28	.67
1.75-1.80	130	.35	38.07	5.91	91.54	9.69	3.78	8.81	70.85	10.40	
Sink-1.80	3,164	8.46	72.21	10.59	100.00	14.98	4.36	8.46	72.21	10.59	
Total	37,399	100.00									

FIGURE 28.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, ⅜-inch x 14-mesh.)

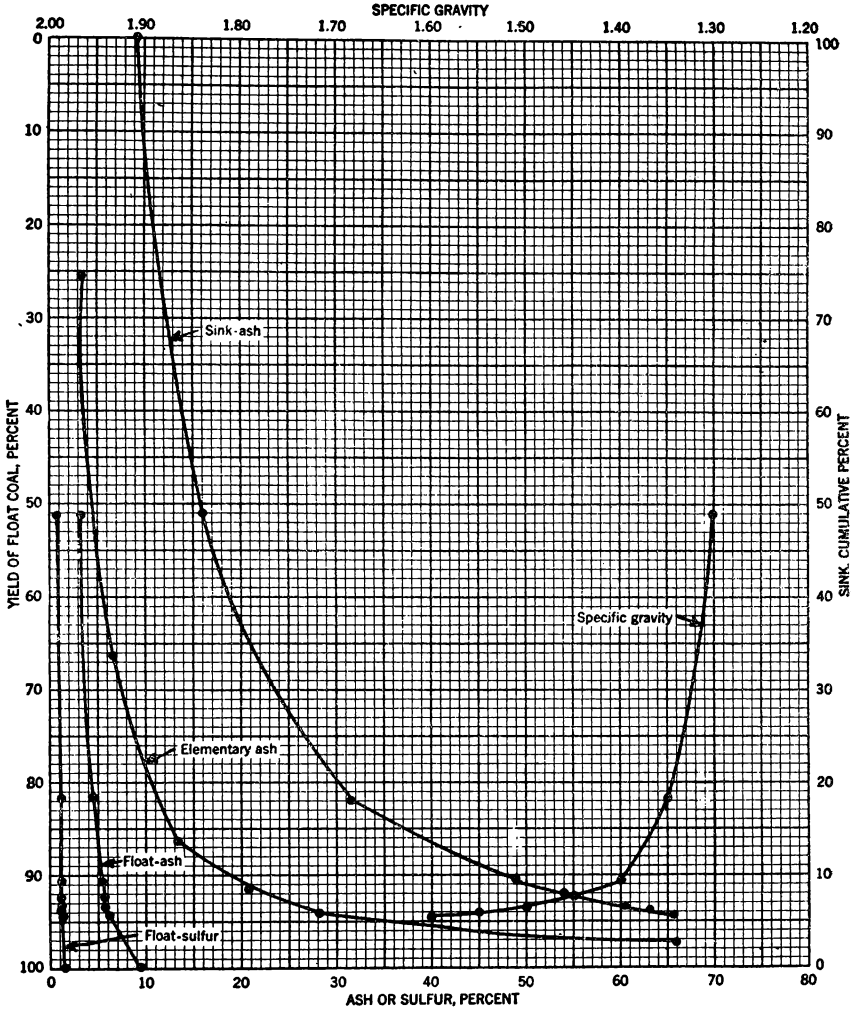


Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	2,641	27.23	3.19	2.81	27.23	3.19	2.81	100.00	18.65	4.18	-------
1.30–1.35	2,173	22.40	6.28	3.13	49.63	4.58	2.95	72.77	24.44	4.70	38.51
1.35–1.40	1,563	16.11	9.74	3.56	65.74	5.85	3.10	50.37	32.51	5.40	23.64
1.40–1.45	730	7.53	13.86	4.04	73.27	6.67	3.20	34.26	43.22	6.26	11.01
1.45–1.50	338	3.48	17.83	4.45	76.75	7.18	3.26	26.73	51.49	6.88	5.59
1.50–1.55	205	2.11	21.37	5.00	78.86	7.56	3.30	23.25	56.53	7.25	3.50
1.55–1.60	135	1.39	24.71	5.32	80.25	7.85	3.34	21.14	60.04	7.47	2.09
1.60–1.65	68	.70	28.66	5.67	80.95	8.03	3.36	19.75	62.52	7.63	1.49
1.65–1.70	77	.79	31.22	5.70	81.74	8.26	3.38	19.05	63.77	7.70	1.31
1.70–1.75	50	.52	33.71	5.57	82.26	8.42	3.39	18.26	65.18	7.78	1.04
1.75–1.80	50	.52	36.28	5.15	82.78	8.59	3.41	17.74	66.10	7.85	-------
Sink–1.80	1,670	17.22	67.00	7.93	100.00	18.65	4.18	17.22	67.00	7.93	-------
Total	9,700	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 29.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 5 bed, Sangamon County, Ill. (Size, 14-mesh x 100-mesh.)

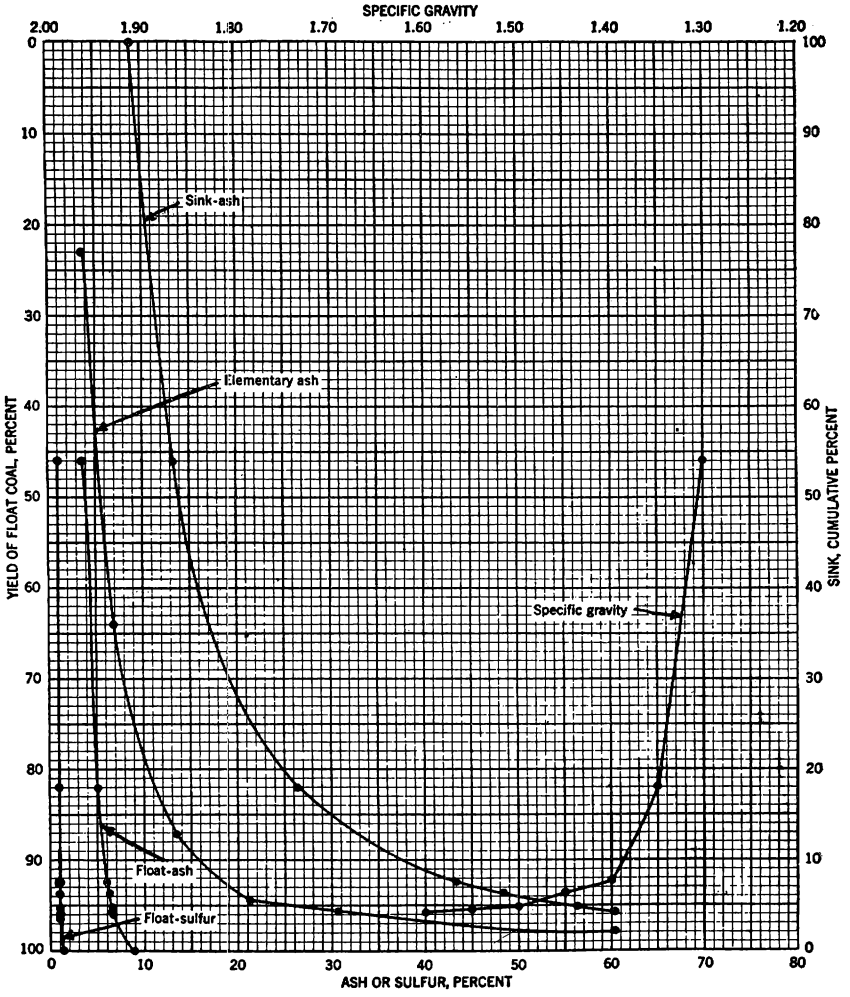
NO. 6 BED

From this bed, samples were collected from two strip and five deep mines. Figures 30 to 58 are the washing tests of the tipple samples. These data show that washing at commercial gravities will produce a clean coal of less than 10 percent ash. It will be noted that the bed ash content increases noticeably in a westwardly direction. However, even in those mines where the seam is dirty, a washed coal can be prepared that is comparable in quality to those operations where the bed ash is lower. The No. 6 bed in Jefferson and Franklin Counties again shows the extremely low sulfur content peculiar to this area of the State. With the exception of the strip samples from Fulton County, a higher-quality product may be obtained from the smaller than from the larger sizes by washing at the same gravity. This condition indicates that the impurities are being released as the coal is broken. The small quantity of near-gravity material at the specific gravities usually considered to be commercially feasible shows the No. 6 bed to be an easily cleaned coal.



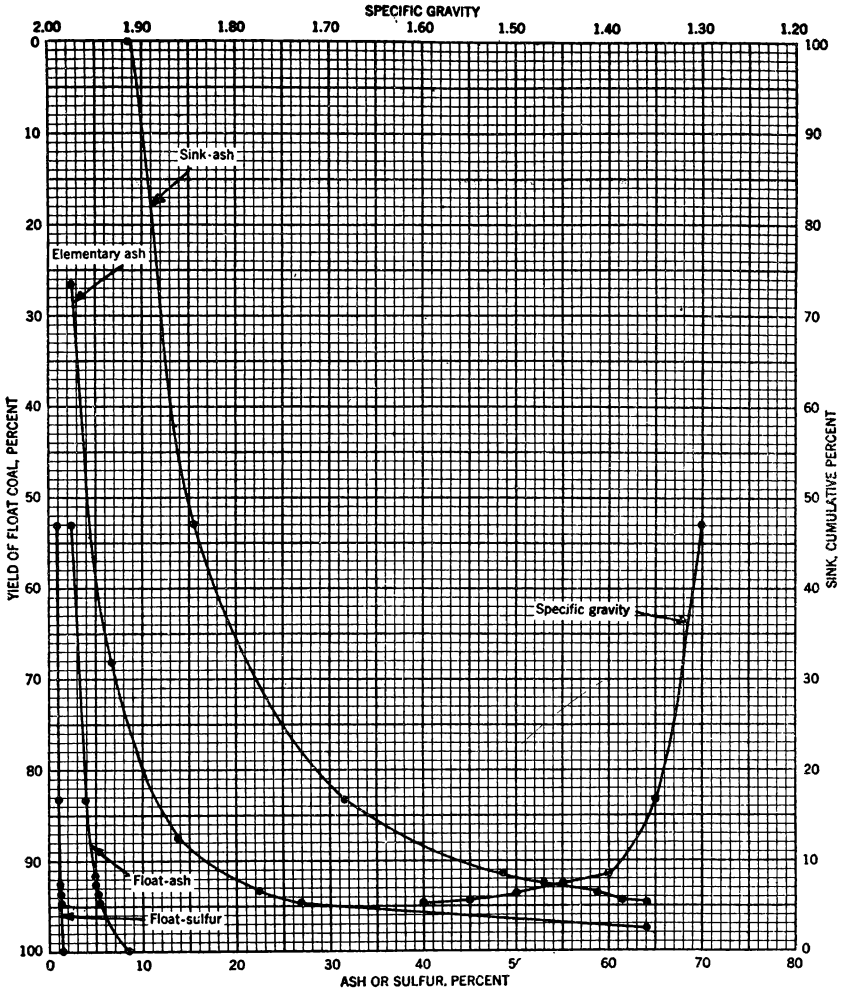
Specific-gravity fractions	Weight, grams	Elementary data: Percent			Computed cumulative data: Float, cumulative percent			Computed cumulative data: Sink, cumulative percent			Near. gravity ±0.05 percent
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30		51.09	3.07	0.96	51.09	3.07	0.96	100.00	9.39	1.46	
1.30-1.35		30.73	6.84	1.13	81.82	4.49	1.02	48.91	16.00	1.98	
1.35-1.40		8.89	13.49	1.52	90.71	5.37	1.07	18.18	31.47	3.42	
1.40-1.45		1.40	20.79	1.96	92.11	5.60	1.09	9.29	48.68	5.24	
1.45-1.50		1.40	20.80	1.96	93.51	5.83	1.10	7.89	53.63	5.82	
1.50-1.55		.43	28.12	2.38	93.94	5.93	1.10	6.49	60.72	6.66	
1.55-1.60		.44	28.14	2.38	94.38	6.04	1.11	6.06	63.03	6.96	
Sink-1.60		5.62	65.76	7.32	100.00	9.39	1.46	5.62	65.76	7.32	

FIGURE 30.—Composite of washing characteristics of tipple sample of 1½-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, 1½-inch x 100-mesh.)



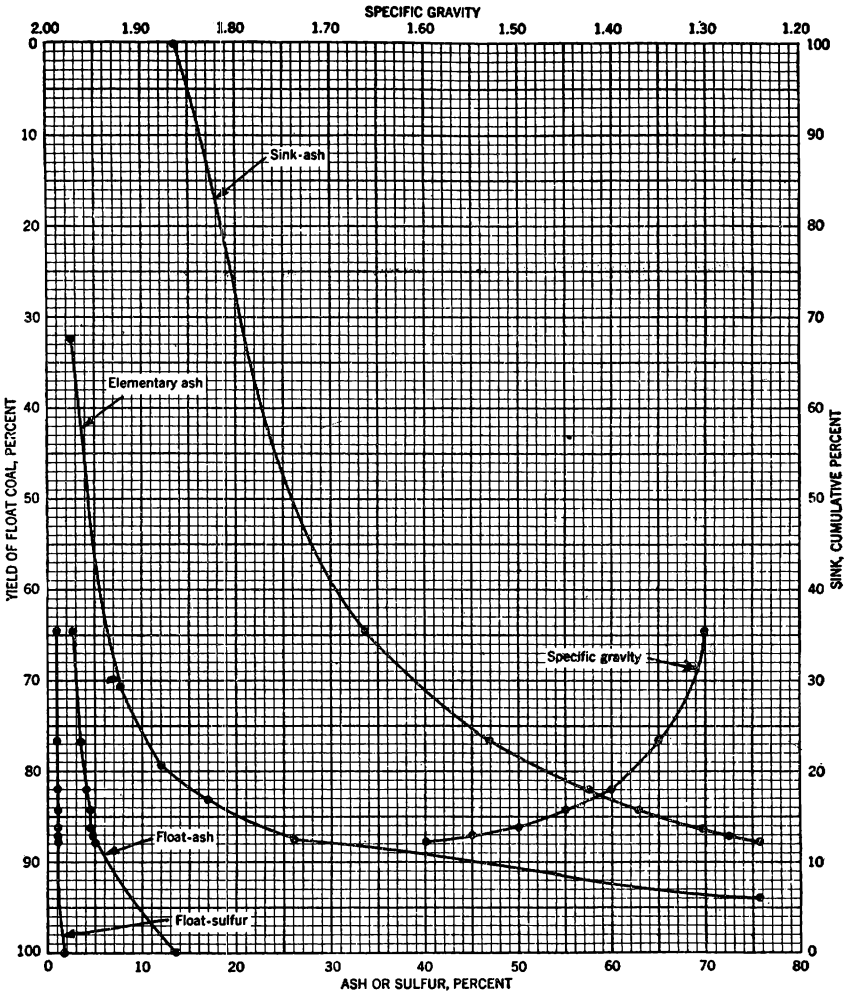
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	30, 982	46.00	3.77	1.05	46.00	3.77	1.05	100.00	8.96	1.36	
1.30–1.35	24, 229	35.98	6.90	1.09	81.98	5.14	1.07	54.00	13.38	1.62	46.26
1.35–1.40	6, 918	10.28	13.45	1.41	92.26	6.07	1.11	18.02	26.31	2.67	11.70
1.40–1.45	956	1.42	21.17	1.97	93.68	6.30	1.12	7.74	43.40	4.33	2.84
1.45–1.50	956	1.42	21.17	1.97	95.10	6.52	1.13	6.32	48.39	4.86	1.75
1.50–1.55	225	.33	30.73	2.36	95.43	6.60	1.14	4.90	56.28	5.70	.67
1.55–1.60	225	.34	30.73	2.36	95.77	6.69	1.14	4.57	58.13	5.94	
Sink-1.60	2, 849	4.23	60.33	6.23	100.00	8.96	1.36	4.23	60.33	6.23	
Total	67, 340	100.00									

FIGURE 31.—Washing characteristics of tipple sample of 1½-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, 1½-inch x ⅜-inch.)



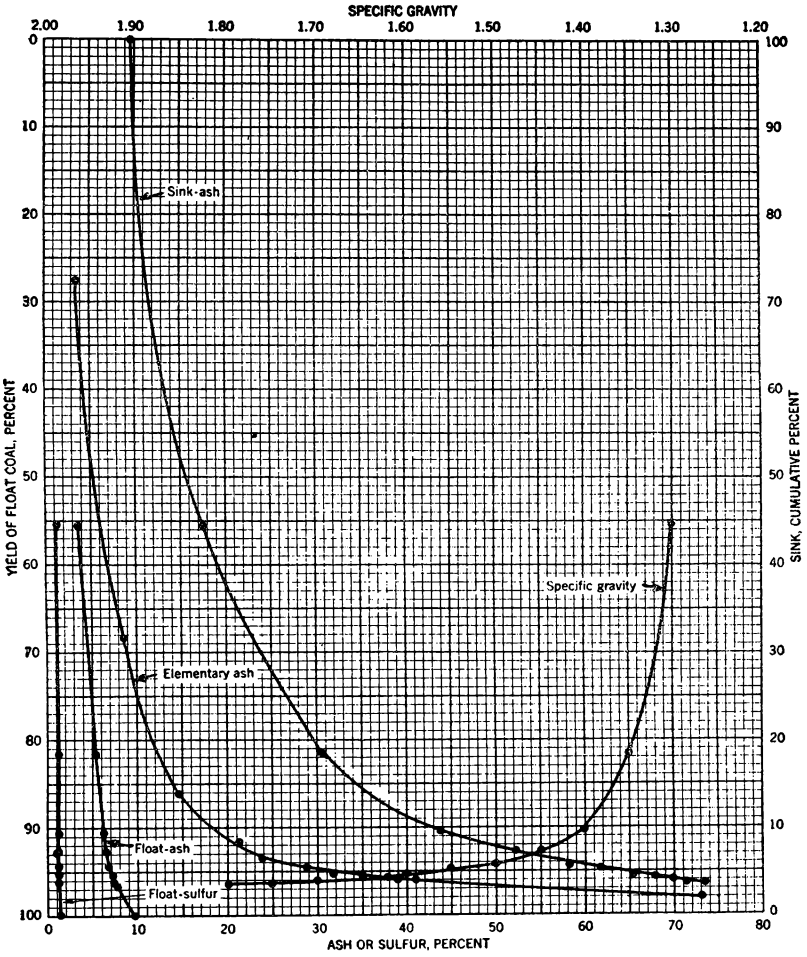
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	27,738	53.00	2.51	0.90	53.00	2.51	0.90	100.00	8.64	1.47	------
1.30-1.35	15,809	30.21	6.65	1.17	83.21	4.01	1.00	47.00	15.55	2.12	38.47
1.35-1.40	4,323	8.26	13.82	1.67	91.47	4.90	1.06	16.79	31.57	3.84	9.44
1.40-1.45	619	1.18	22.26	2.11	92.65	5.12	1.07	8.53	48.76	5.94	2.37
1.45-1.50	619	1.19	22.26	2.11	93.84	5.34	1.09	7.35	53.01	6.55	1.61
1.50-1.55	221	.42	26.92	2.49	94.26	5.43	1.09	6.16	58.95	7.41	.85
1.55-1.60	222	.43	26.92	2.49	94.69	5.53	1.10	5.74	61.30	7.77	------
Sink-1.60	2,779	5.31	64.08	8.20	100.00	8.64	1.47	5.31	64.08	8.20	------
Total	52,330	100.00	------	------	------	------	------	------	------	------	------

FIGURE 32.—Washing characteristics of tipple sample of 1½-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, ⅜-inch x 14-mesh.)



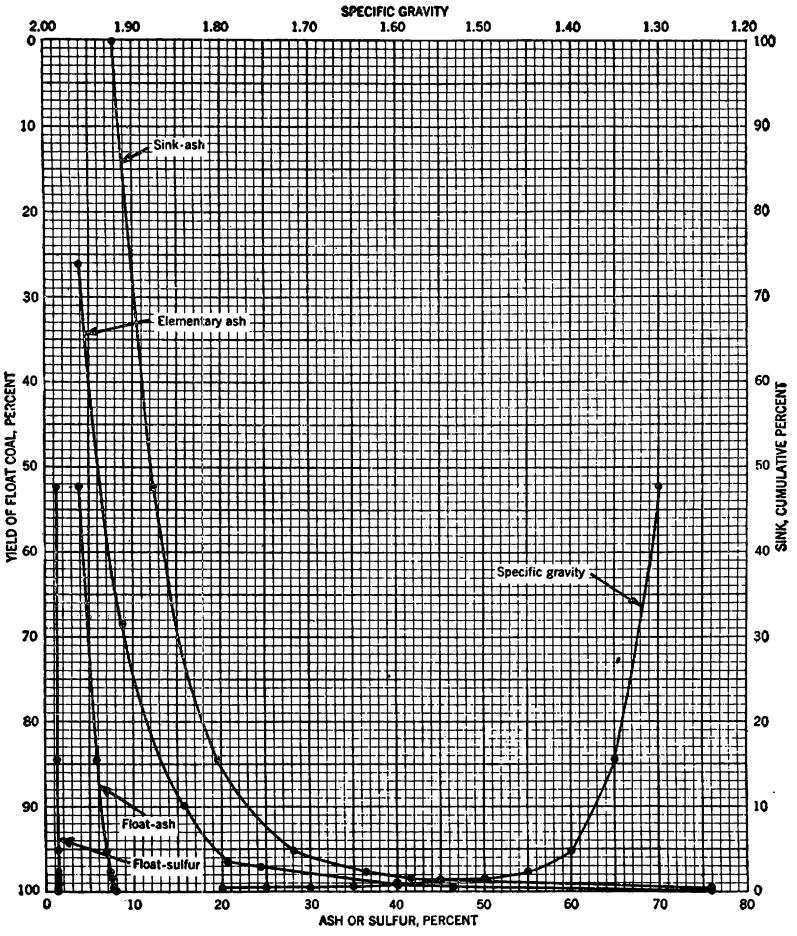
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	4,521	64.68	2.67	0.90	64.68	2.67	0.90	100.0	13.63	1.84	-------
1.30–1.35	832	11.90	7.84	1.32	76.58	3.47	.97	35.32	33.70	3.55	17.42
1.35–1.40	386	5.52	12.09	1.52	82.10	4.05	1.00	23.42	46.84	4.69	7.58
1.40–1.45	144	2.06	16.95	1.62	84.16	4.37	1.02	17.90	57.55	5.66	4.12
1.45–1.50	144	2.06	16.95	1.62	86.22	4.67	1.03	15.84	62.83	6.19	2.89
1.50–1.55	58	.83	26.10	2.21	87.05	4.87	1.04	13.78	69.69	6.87	1.66
1.55–1.60	58	.83	26.10	2.21	87.88	5.07	1.05	12.95	72.48	7.17	-------
Sink–1.60	847	12.12	75.66	7.51	100.00	13.63	1.84	12.12	75.66	7.51	-------
Total	6,990	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 33.—Washing characteristics of tippe sample of 1½-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, 14-mesh x 100-mesh.)



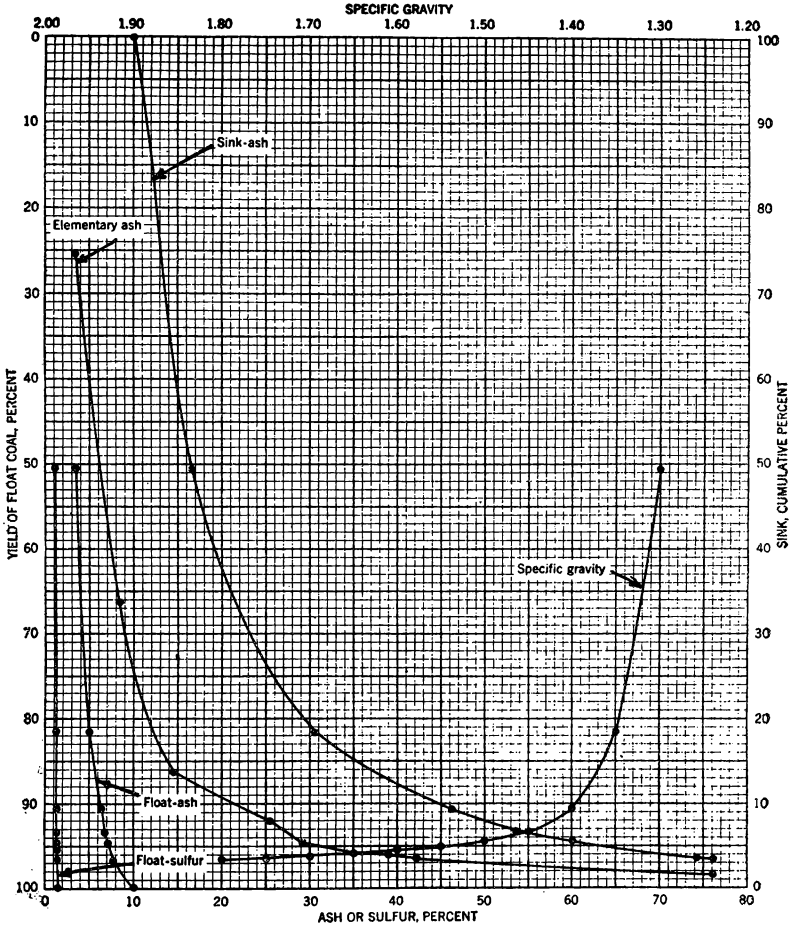
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30		55.36	3.54	1.14	55.36	3.54	1.14	100.00	9.77	1.43	
1.30–1.35		26.46	8.69	1.23	81.82	5.21	1.17	44.64	17.50	1.78	
1.35–1.40		8.52	14.86	1.28	90.34	6.12	1.18	18.18	30.32	2.59	
1.40–1.45		2.60	21.53	1.33	92.94	6.55	1.18	9.66	43.95	3.74	
1.45–1.50		1.20	23.77	1.75	94.14	6.77	1.19	7.06	52.20	4.62	
1.50–1.55		.67	28.46	1.38	94.81	6.92	1.19	5.86	58.03	5.21	
1.55–1.60		.54	31.30	2.58	95.35	7.06	1.20	5.19	61.84	5.71	
1.60–1.65		.34	34.94	2.75	95.69	7.16	1.21	4.65	65.39	6.07	
1.65–1.70		.24	37.64	2.51	95.93	7.23	1.21	4.31	67.79	6.33	
1.70–1.75		.22	38.76	6.04	96.15	7.31	1.22	4.07	69.57	6.56	
1.75–1.80		.23	40.98	2.58	96.38	7.39	1.22	3.85	71.33	6.59	
Sink–1.80		3.62	73.26	6.84	100.00	9.77	1.43	3.62	73.26	6.84	

FIGURE 34.—Composite of washing characteristics of tipple sample of 3-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, 3-inch x 100-mesh.)



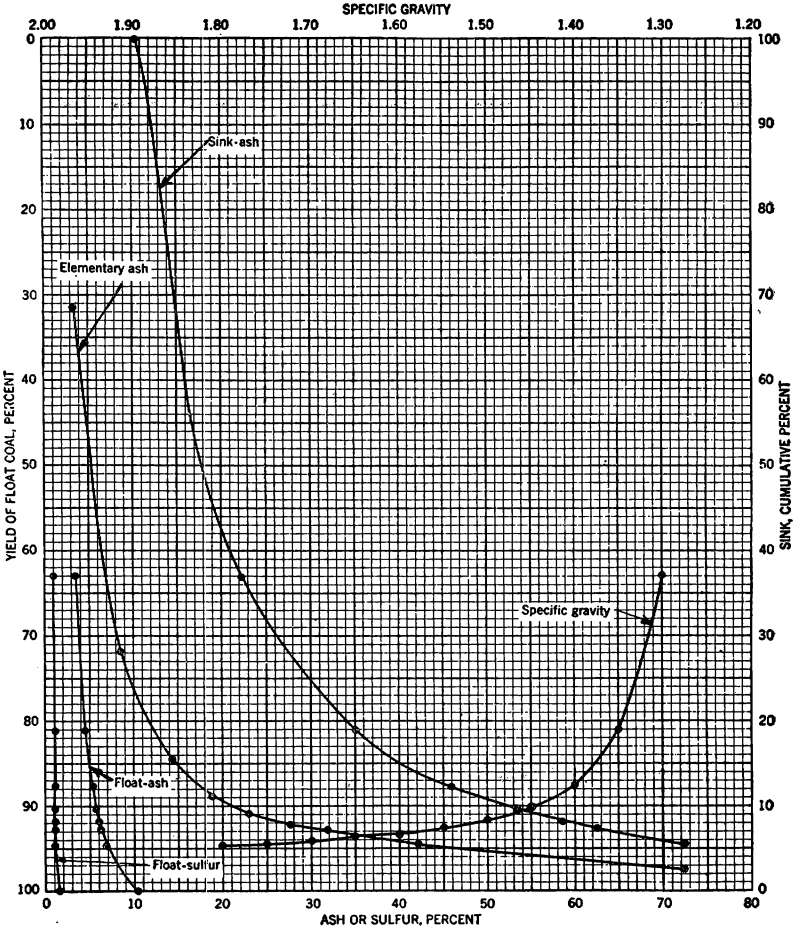
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	ash	Sulfur	
Float–1.30	41,957	52.26	3.93	1.23	52.26	3.93	1.23	100.00	7.96	1.28	
1.30–1.35	25,968	32.34	8.96	1.24	84.60	5.85	1.23	47.74	12.37	1.34	42.93
1.35–1.40	8,505	10.59	15.67	1.17	95.19	6.94	1.23	15.40	19.53	1.54	13.15
1.40–1.45	2,056	2.56	20.61	1.12	97.75	7.30	1.22	4.81	28.04	2.37	3.22
1.45–1.50	527	.66	24.34	2.90	98.41	7.42	1.24	2.25	36.50	3.79	1.02
1.50–1.55	290	.36	32.49	.64	98.77	7.51	1.23	1.59	41.54	4.16	.86
1.55–1.60	400	.50	30.99	4.14	99.27	7.63	1.25	1.23	44.19	5.18	.54
1.60–1.65	32	.04	41.59	.98	99.31	7.64	1.25	.73	53.23	5.90	.07
1.65–1.70	23	.03	46.27	.65	99.34	7.65	1.25	.69	53.91	6.18	.15
1.70–1.75	95	.12	27.75	20.17	99.46	7.68	1.27	.66	54.26	6.44	.30
1.75–1.80	146	.18	28.54	.81	99.64	7.71	1.27	.54	60.15	3.38	
Sink–1.80	289	.36	75.95	4.67	100.00	7.96	1.28	.36	75.95	4.67	
Total	80,288	100.00									

FIGURE 35.—Washing characteristics of tipple sample of 3-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, 3-inch x 1½-inch.)



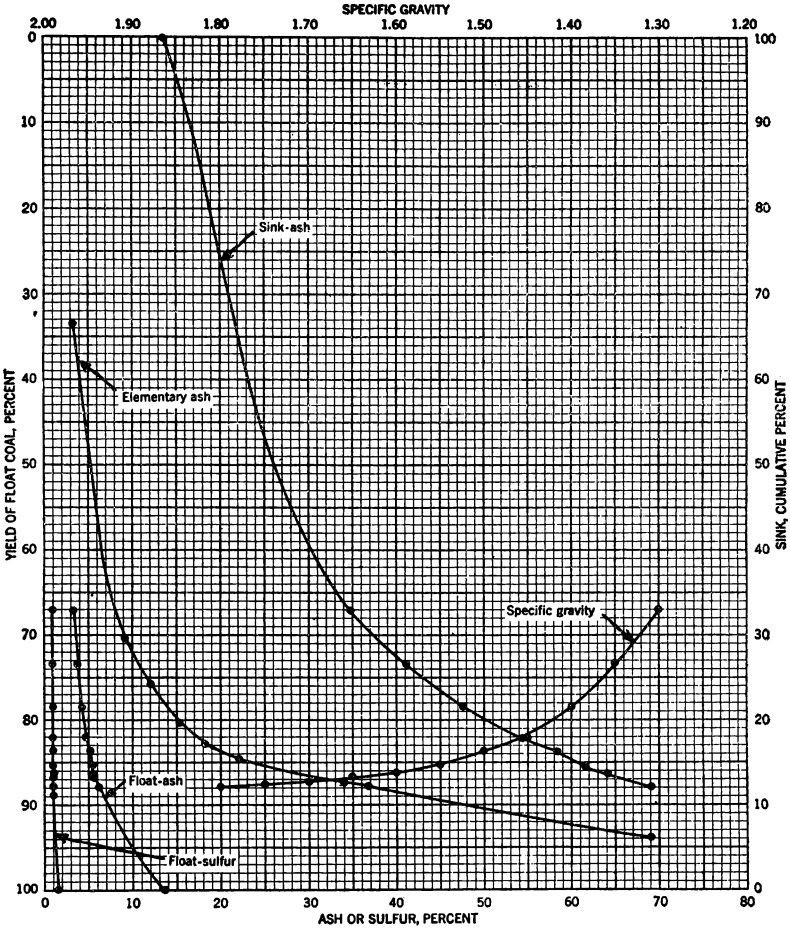
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulatvie percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	32.772	50.72	3.48	1.16	50.72	3.48	1.16	100.00	9.99	1.40	
1.30–1.35	20,071	31.06	8.48	1.23	81.78	5.01	1.19	49.28	16.70	1.65	40.01
1.35–1.40	5,783	8.95	14.70	1.34	90.73	6.30	1.20	18.22	30.71	2.36	11.39
1.40–1.45	1.578	2.44	25.35	1.40	93.17	6.80	1.20	9.27	46.17	3.35	3.71
1.45–1.50	824	1.27	25.26	1.66	94.44	7.05	1.21	6.83	53.61	4.05	1.90
1.50–1.55	408	.63	29.54	1.45	95.07	7.19	1.21	5.56	60.09	4.59	1.07
1.55–1.60	287	.44	32.93	2.45	95.51	7.31	1.22	4.93	63.39	4.99	.87
1.60–1.65	281	.43	35.48	3.47	95.94	7.44	1.23	4.49	67.03	5.24	.68
1.65–1.70	160	.25	39.02	2.94	96.19	7.52	1.23	4.06	70.38	5.43	.46
1.70–1.75	138	.21	42.12	4.90	96.40	7.60	1.24	3.81	72.43	5.59	.44
1.75–1.80	148	.23	47.26	3.51	96.63	7.69	1.25	3.60	74.20	5.63	
Sink–1.80	2,180	3.37	76.04	5.78	100.00	9.99	1.40	3.37	76.04	5.78	
Total	64,630	100.00									

FIGURE 36.—Washing characteristics of 3-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, 1½-inch x ⅜-inch.)



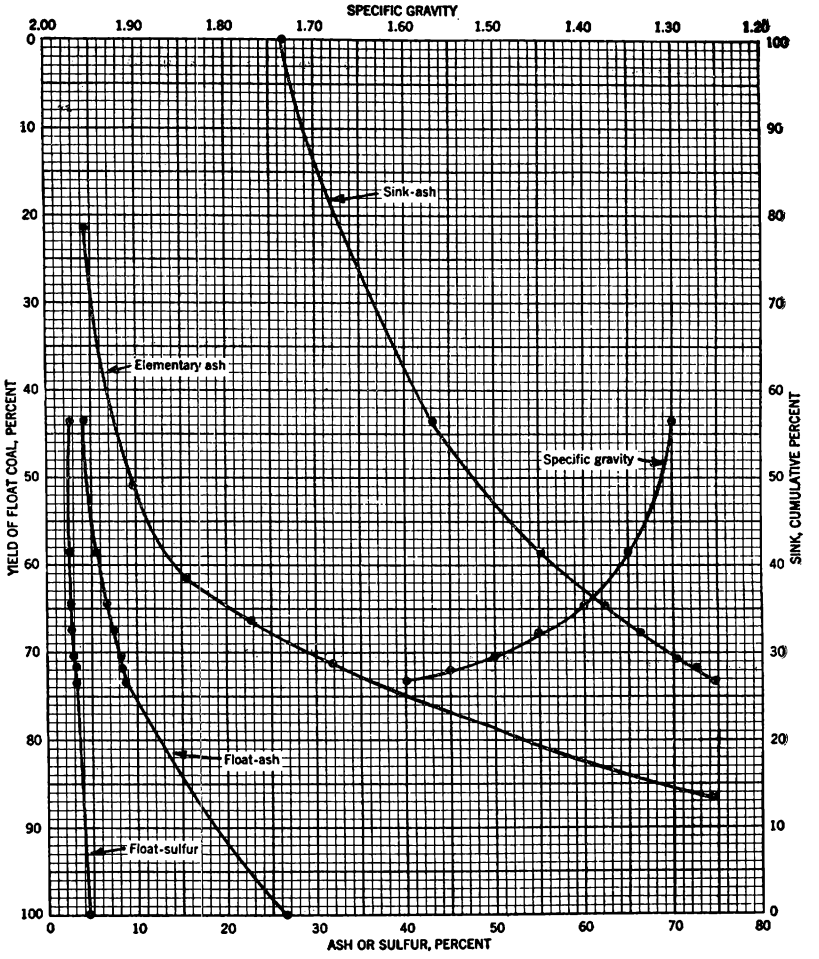
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	26,308	63.04	3.35	1.09	63.04	3.35	1.09	100.00	10.33	1.55	
1.30–1.35	7,484	17.93	8.72	1.22	80.97	4.54	1.12	36.96	22.25	2.34	24.53
1.35–1.40	2,755	6.60	14.35	1.35	87.57	5.28	1.14	19.03	35.01	3.40	9.24
1.40–1.45	1,100	2.64	18.86	1.45	90.21	5.68	1.15	12.43	45.97	4.49	4.14
1.45–1.50	625	1.50	22.99	1.49	91.71	5.96	1.15	9.79	53.29	5.31	2.41
1.50–1.55	379	.91	27.77	1.60	92.62	6.17	1.16	8.29	58.77	6.00	1.56
1.55–1.60	271	.65	31.77	1.90	93.27	6.35	1.16	7.38	62.59	6.54	1.08
1.60–1.65	179	.43	35.49	2.15	93.70	6.49	1.17	6.73	65.57	6.99	.81
1.65–1.70	160	.38	37.65	2.47	94.08	6.61	1.17	6.30	67.62	7.32	.67
1.70–1.75	122	.29	40.71	2.69	94.37	6.72	1.18	5.92	69.54	7.63	.55
1.75–1.80	108	.26	42.11	2.70	94.63	6.81	1.18	5.63	71.03	7.89	
Sink–1.80	2,239	5.37	72.43	8.14	100.00	10.33	1.55	5.37	72.43	8.14	
Total	41,730	100.00									

FIGURE 37.—Washing characteristics of tipple sample of 3-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, ⅜-inch x 14-mesh.)



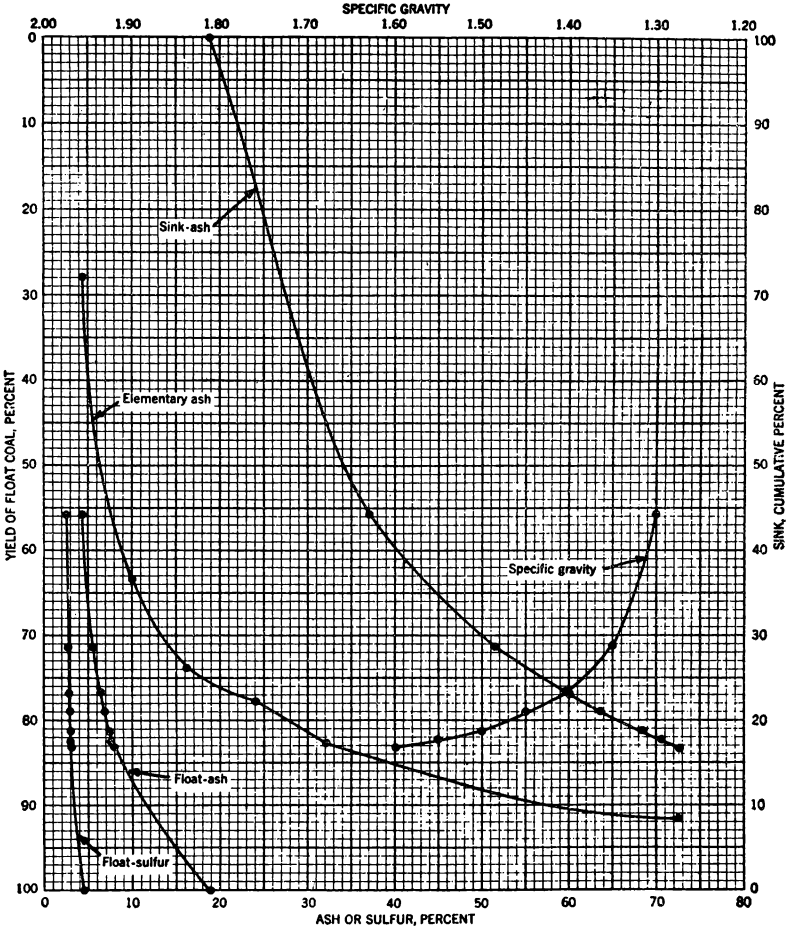
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	4,990	67.03	3.32	0.91	67.03	3.32	0.91	100.00	13.74	1.67	
1.30-1.35	478	6.42	9.14	1.18	73.45	3.83	.93	32.97	34.91	3.22	11.32
1.35-1.40	365	4.90	12.03	1.21	78.35	4.34	.95	26.55	41.14	3.71	8.59
1.40-1.45	275	3.69	15.28	1.23	82.04	4.83	.96	21.65	47.73	4.28	5.48
1.45-1.50	133	1.79	18.30	1.28	83.83	5.12	.97	17.96	54.40	4.90	3.11
1.50-1.55	98	1.32	22.03	1.40	85.15	5.38	.98	16.17	58.39	5.30	2.29
1.55-1.60	72	.97	25.30	1.43	86.12	5.61	.98	14.85	61.62	5.65	1.55
1.60-1.65	43	.58	28.17	1.54	86.70	5.76	.99	13.88	64.16	5.95	1.12
1.65-1.70	40	.54	30.89	1.69	87.24	5.91	.99	13.30	65.73	6.14	.89
1.70-1.75	26	.35	34.02	1.79	87.59	6.03	.99	12.76	67.21	6.33	.71
1.75-1.80	27	.36	36.77	1.95	87.95	6.15	1.00	12.41	68.14	6.46	
Sink-1.80	897	12.05	69.08	6.59	100.00	13.74	1.67	12.05	69.08	6.59	
Total	7,444	100.00									

FIGURE 38.—Washing characteristics of tipple sample of 3-inch x 0 coal from No. 6 bed, Franklin County, Ill. (Size, 14-mesh x 100-mesh.)



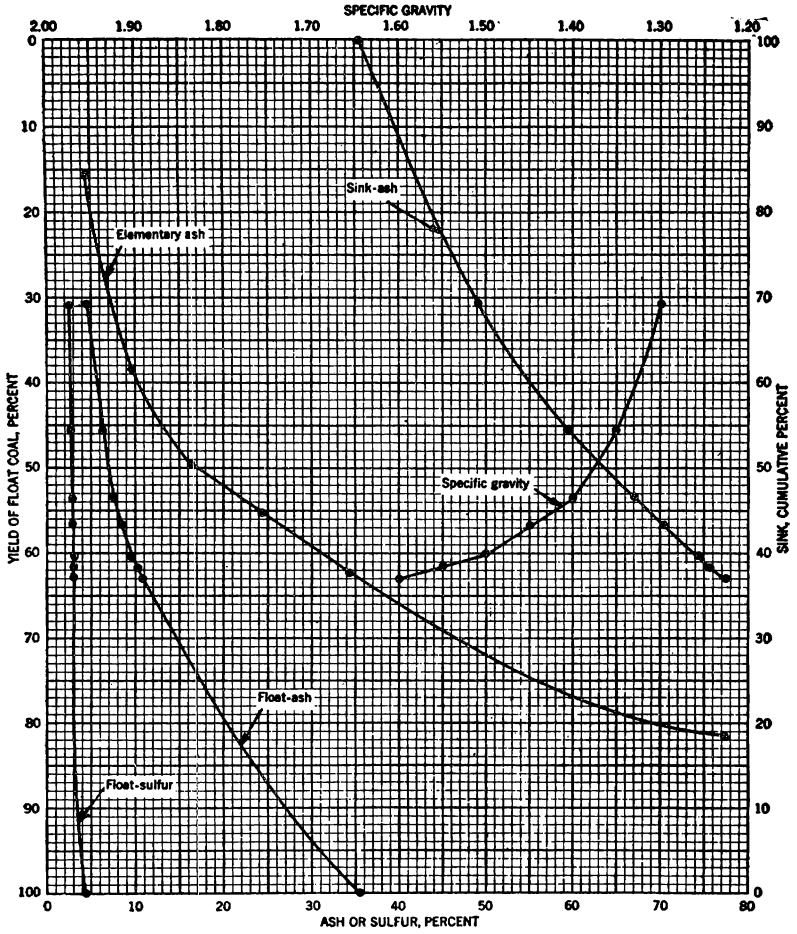
Specific-gravity fractions	Weight, grams	Elementary data: Percent			Computed cumulative data: Float, cumulative percent			Computed cumulative data: Sink, cumulative percent			Near-gravity ±0.05 percent
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float – 1.30		43.72	4.48	2.60	43.72	4.48	2.60	100.00	26.41	4.37	
1.30 – 1.35		14.59	9.69	3.30	58.31	5.78	2.78	56.28	43.44	5.75	
1.35 – 1.40		6.46	15.41	3.84	64.77	6.74	2.88	41.69	55.25	6.61	
1.40 – 1.45		2.95	22.72	4.18	67.72	7.44	2.94	35.23	62.56	7.12	
1.45 – 1.50		2.95	22.72	4.18	70.67	8.08	2.99	32.28	66.20	7.39	
1.50 – 1.55		1.32	31.50	5.08	71.99	8.51	3.03	29.33	70.57	7.71	
1.55 1.60		1.33	31.51	5.08	73.32	8.92	3.07	28.01	72.41	7.83	
Sink–1.60		26.68	74.45	7.97	100.00	26.41	4.37	26.68	74.45	7.97	

FIGURE 39.—Composite of washing characteristics of tipple sample of 1½-inch x 0 coal from No. 6 bed, Fulton County, Ill. (Size, 1½-inch x 100-mesh.)



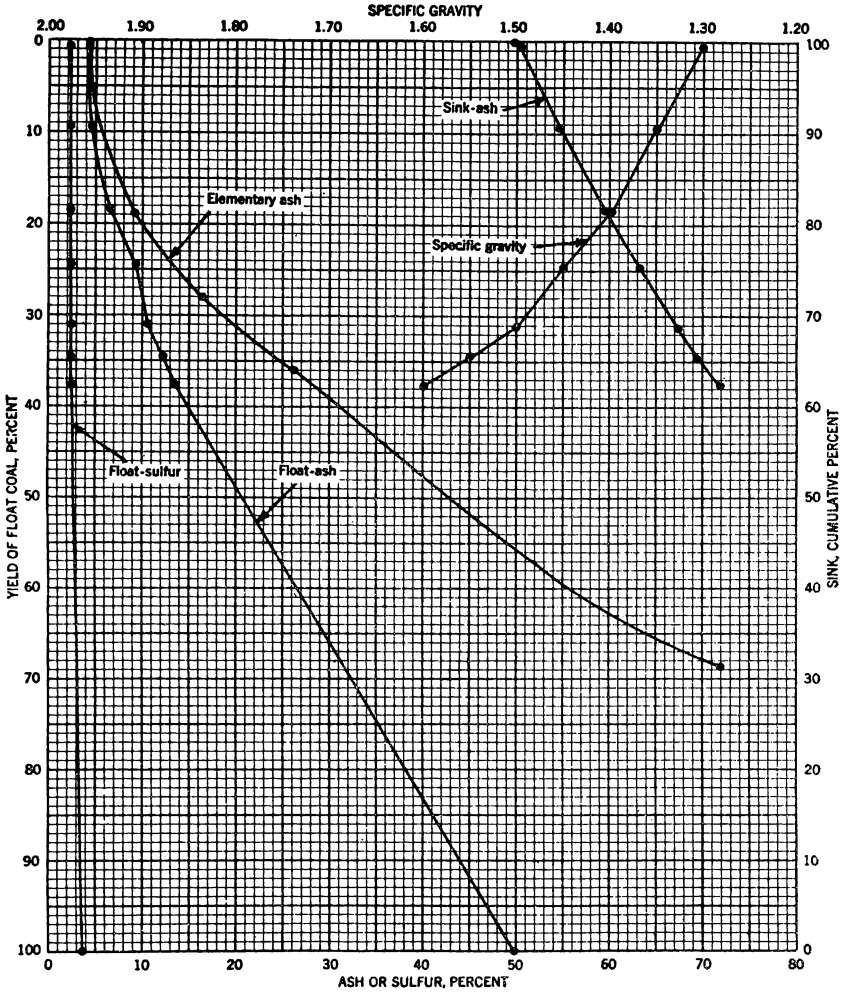
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	57,153	55.87	4.47	2.60	55.87	4.47	2.60	100.00	18.87	4.49	
1.30-1.35	15,748	15.39	10.04	3.49	71.26	5.67	2.79	44.13	37.09	6.89	20.85
1.35-1.40	5,585	5.46	16.28	4.36	76.72	6.43	2.90	28.74	51.57	8.71	7.73
1.40-1.45	2,324	2.27	24.18	4.93	78.99	6.94	2.96	23.28	59.85	9.73	4.54
1.45-1.50	2,325	2.27	24.18	4.93	81.26	7.42	3.02	21.01	63.71	10.25	3.26
1.50-1.55	1,016	.99	32.09	6.45	82.25	7.72	3.06	18.74	68.49	10.89	1.99
1.55-1.60	1,016	1.00	32.09	6.45	83.25	8.01	3.10	17.75	70.53	11.14	
Sink-1.60	17,123	16.75	72.82	11.42	100.00	18.87	4.49	16.75	72.82	11.42	
Total	102,290	100.00									

FIGURE 40.—Washing characteristics of tipple sample of 1½-inch x 0 coal from No. 6 bed, Fulton County, Ill. (Size, 1½-inch x ⅜-inch.)



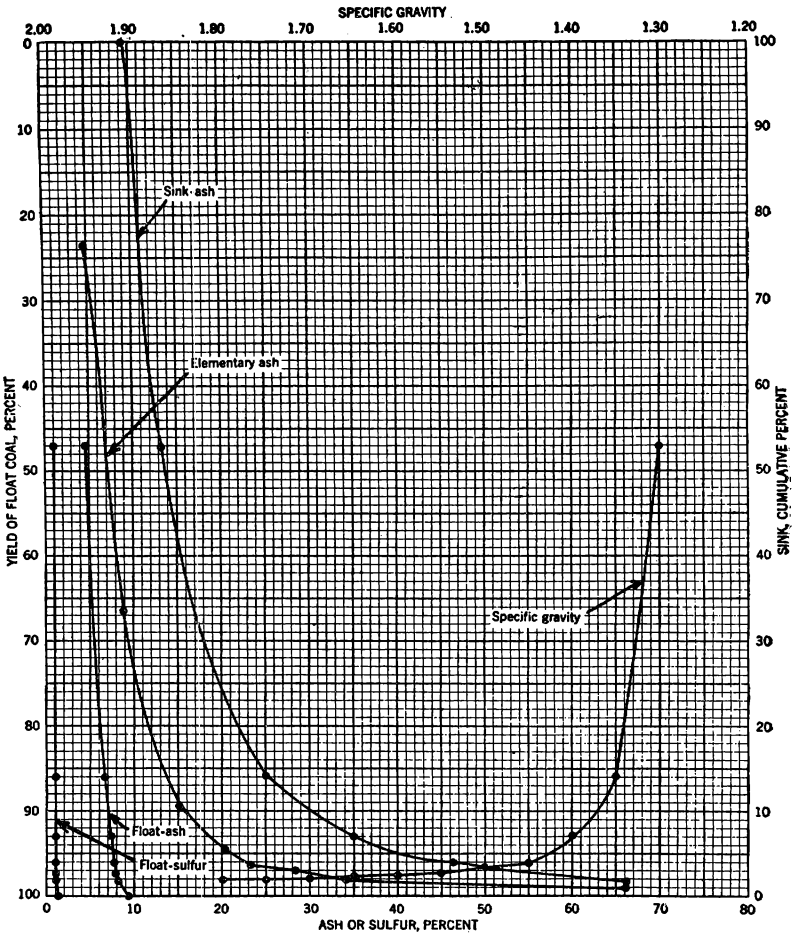
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	13,346	30.87	4.54	2.60	30.87	4.54	2.60	100.00	35.37	4.30	-------
1.30-1.35	6,341	14.67	9.80	3.07	45.54	6.23	2.75	69.13	49.13	5.05	22.54
1.35-1.40	3,400	7.87	16.31	3.54	53.41	7.72	2.87	54.46	59.73	5.59	11.23
1.40-1.45	1,452	3.36	24.29	3.96	56.77	8.70	2.93	46.59	67.06	5.93	6.72
1.45-1.50	1,452	3.36	24.29	3.96	60.13	9.57	2.99	43.23	70.39	6.09	4.79
1.50-1.55	620	1.43	34.35	4.52	61.56	10.15	3.03	39.87	74.27	6.26	2.87
1.55-1.60	621	1.44	34.35	4.52	63.00	10.70	3.06	38.44	75.76	6.33	-------
Sink-1.60	15,989	37.00	77.37	6.40	100.00	35.37	4.30	37.00	77.37	6.40	-------
Total	43,221	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 41.—Washing characteristics of tipple sample of 1½-inch x 0 coal from No. 6 bed, Fulton County, Ill. (Size, ⅜-inch x 14-mesh.)



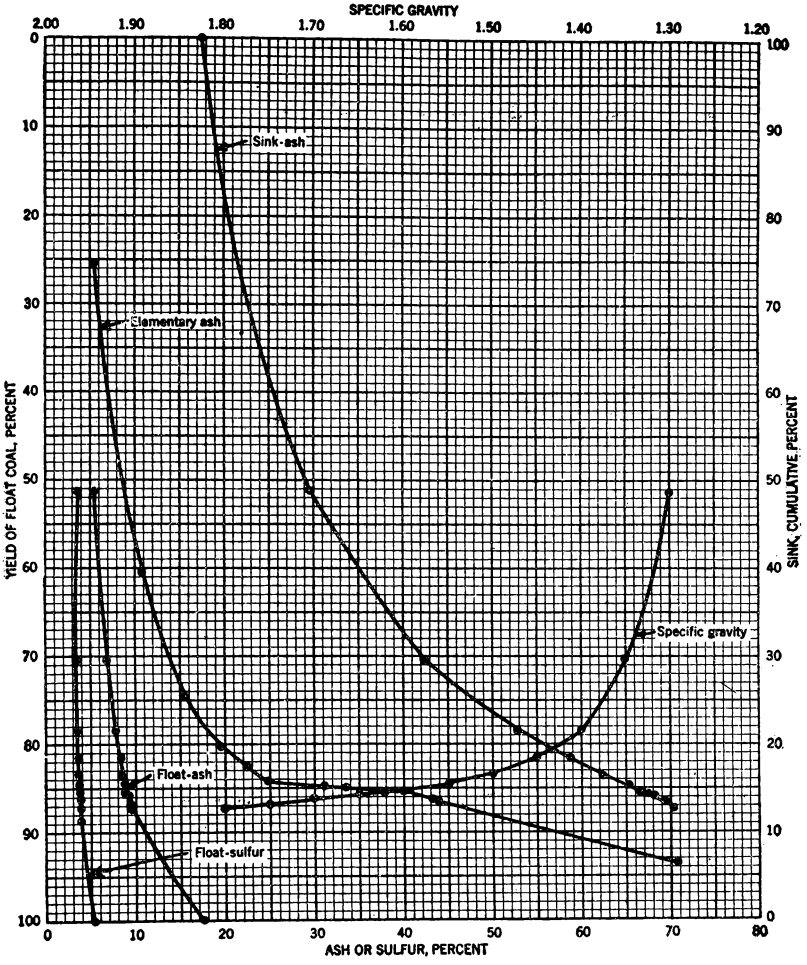
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	54	0.83	4.12	2.20	0.83	4.12	2.20	100.00	49.88	3.81	.....
1.30-1.35	576	8.71	4.74	2.24	9.54	4.69	2.24	99.17	50.26	3.83	17.49
1.35-1.40	581	8.78	9.03	2.50	18.32	6.77	2.36	90.46	54.65	3.98	15.16
1.40-1.45	422	6.38	16.42	2.72	24.70	9.26	2.46	81.68	59.55	4.14	12.76
1.45-1.50	422	6.38	16.42	2.72	31.08	10.73	2.51	75.30	63.20	4.26	9.66
1.50-1.55	217	3.28	26.22	2.99	34.36	12.21	2.56	68.92	67.53	4.40	6.56
1.55-1.60	217	3.28	26.22	2.99	37.64	13.43	2.59	65.64	69.60	4.47	.....
Sink-1.60	4,123	62.36	71.88	4.55	100.00	49.88	3.81	62.36	71.88	4.55	.....
Total	6,612	100.00	.....	.....	.....	.....	.....	.....	.....	.....	.....

FIGURE 42.—Washing characteristics of tipple sample of 1½-inch x 0 coal from No. 6 bed, Fulton County, Ill. (Size, 14-mesh x 100-mesh.)



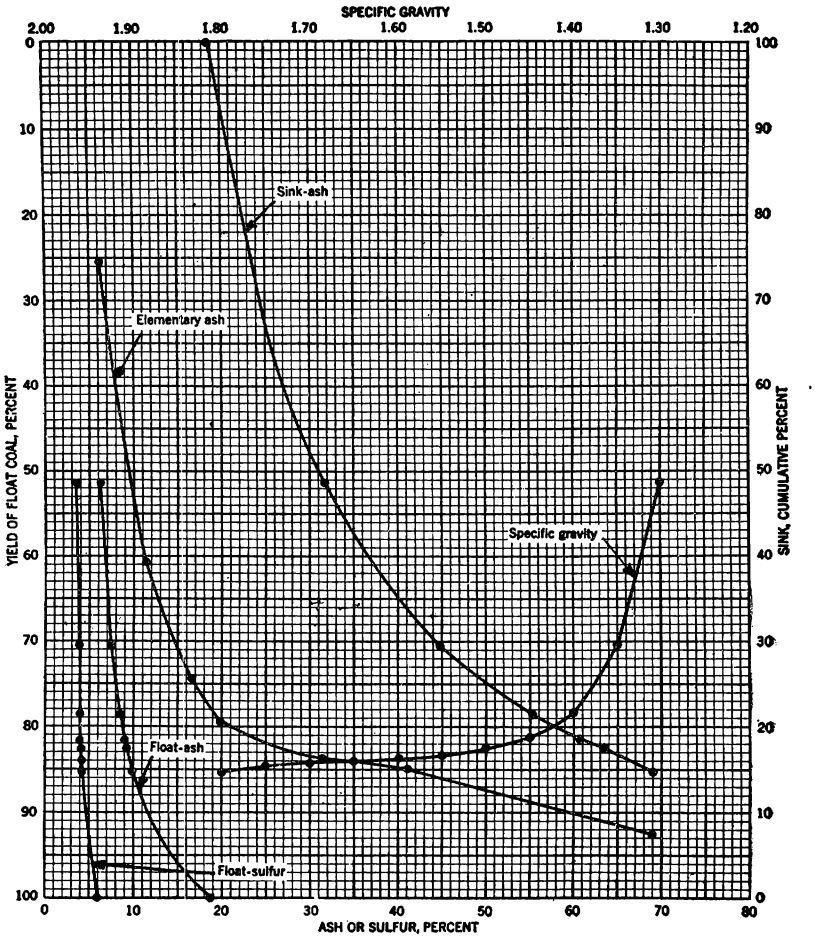
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	87,997	47.07	4.76	1.00	47.07	4.76	1.00	100.00	9.25	1.33	
1.30-1.35	72,688	38.88	8.96	1.06	85.95	6.66	1.03	52.93	13.24	1.63	45.85
1.35-1.40	13,041	6.97	15.04	1.20	92.92	7.29	1.04	14.05	25.10	3.21	10.06
1.40-1.45	5,783	3.09	20.43	1.34	96.01	7.71	1.05	7.08	34.99	5.19	3.75
1.45-1.50	1,230	.66	23.37	5.08	96.67	7.82	1.08	3.99	46.27	8.18	1.34
1.50-1.55	1,270	.68	28.56	4.22	97.35	7.96	1.10	3.33	50.81	8.79	.96
1.55-1.60	529	.28	27.77	6.30	97.63	8.02	1.11	2.65	56.52	9.96	.45
1.60-1.65	320	.17	30.34	10.78	97.80	8.06	1.13	2.37	59.92	10.40	.30
1.65-1.70	249	.13	35.55	6.33	97.93	8.10	1.14	2.20	62.21	10.37	.27
1.70-1.75	268	.14	34.13	15.43	98.07	8.13	1.16	2.07	63.88	10.62	.14
1.75-1.80	0				98.07	8.13	1.16	1.93	66.04	10.27	
Sink-1.80	3,606	1.93	66.04	10.27	100.00	9.25	1.33	1.93	66.04	10.27	
Total	186,981	100.00									

FIGURE 43.—Washing characteristics of tipple sample of 3½-inch x 1½-inch coal from No. 6 bed, Jefferson County, Ill. (Size, 3½-inch x 1½-inch.)



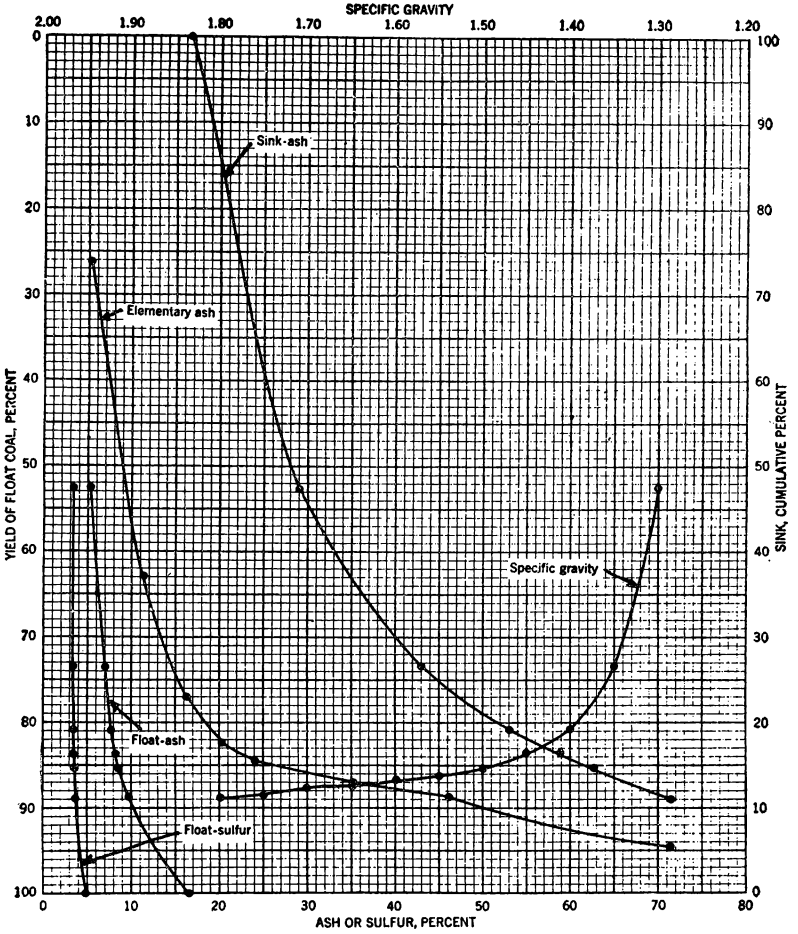
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30		51.27	5.43	3.45	51.27	5.43	3.45	100.00	17.40	5.20	
1.30 x 1.35		18.98	10.88	3.66	70.25	6.90	3.51	48.73	29.98	7.05	
1.35 x 1.40		8.33	15.26	4.30	78.58	7.79	3.59	29.75	42.17	9.21	
1.40 x 1.45		3.29	19.03	5.57	81.87	8.24	3.67	21.42	52.64	11.12	
1.45 x 1.50		1.65	22.34	6.50	83.52	8.52	3.73	18.13	58.74	12.12	
1.50 x 1.55		1.14	24.71	8.89	84.66	8.74	3.80	16.48	62.38	12.68	
1.55 x 1.60		.61	31.05	7.10	85.27	8.90	3.82	15.34	65.18	12.97	
1.60 x 1.65		.40	33.44	7.37	85.67	9.01	3.84	14.73	66.59	13.21	
1.65 x 1.70		.38	37.47	7.72	86.05	9.14	3.85	14.33	67.52	13.37	
1.70 x 1.75		.61	43.55	7.41	86.66	9.38	3.88	13.95	68.34	13.53	
1.75 x 1.80		.48	43.77	9.67	87.14	9.57	3.91	13.34	69.47	13.81	
Sink–1.80		12.86	70.43	13.96	100.00	17.40	5.20	12.86	70.43	13.96	

FIGURE 44.—Composite of washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Macoupin County, Ill. (Size, 4-inch x 100-mesh.)



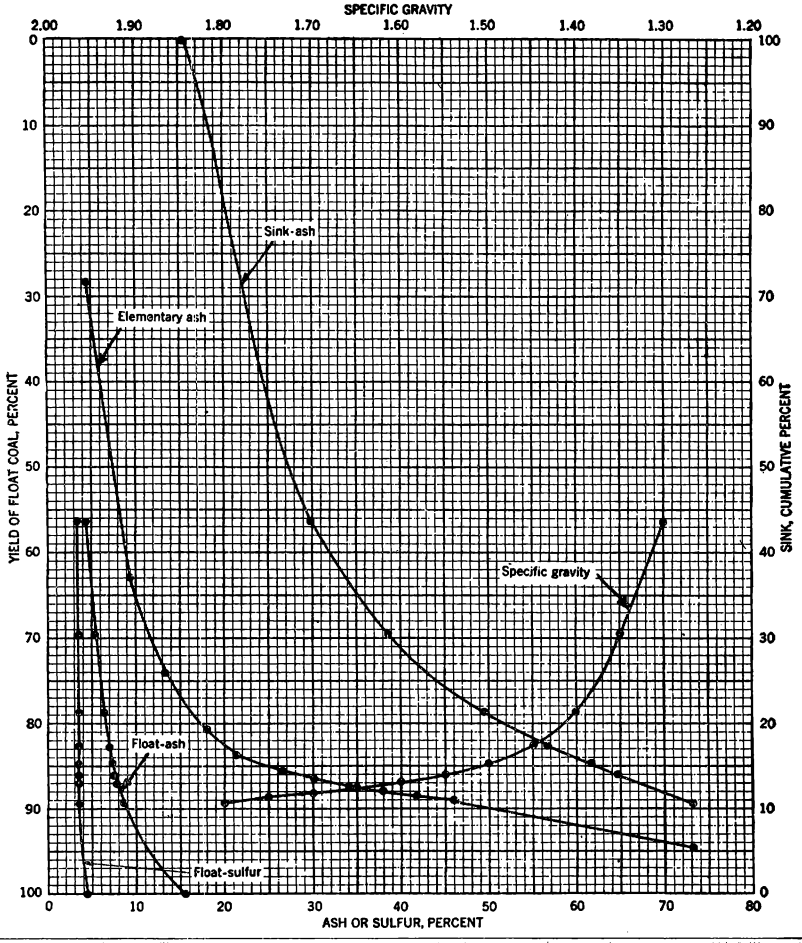
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	68, 152	51. 26	6. 23	3. 56	51. 26	6. 23	3. 56	100. 00	18. 70	5. 92	
1.30–1.35	25, 288	19. 02	11. 44	3. 81	70. 28	7. 64	3. 63	48. 74	31. 80	8. 39	27. 04
1.35–1.40	10, 659	8. 02	16. 68	4. 94	78. 30	8. 57	3. 76	29. 72	44. 84	11. 33	10. 93
1.40–1.45	3, 866	2. 91	19. 93	6. 95	81. 21	8. 97	3. 88	21. 70	55. 24	13. 69	4. 06
1.45–1.50	1, 525	1. 15	22. 47	8. 38	82. 36	9. 16	3. 94	18. 79	60. 71	14. 73	2. 29
1.50–1.55	1, 510	1. 14	23. 62	11. 70	83. 50	9. 36	4. 05	17. 64	63. 21	15. 14	1. 50
1.55–1.60	477	.36	31. 95	8. 92	83. 86	9. 46	4. 07	16. 50	65. 94	15. 38	. 51
1.60–1.65	202	.15	31. 50	10. 56	84. 01	9. 50	4. 08	16. 14	66. 70	15. 52	. 31
1.65–1.70	217	.16	35. 89	11. 68	84. 17	9. 55	4. 09	15. 99	67. 03	15. 57	. 69
1.70–1.75	706	.53	43. 76	8. 57	84. 70	9. 76	4. 12	15. 83	67. 34	15. 61	. 99
1.75–1.80	607	.46	41. 10	12. 43	85. 16	9. 93	4. 17	15. 30	68. 16	15. 85	
Sink–1.80	19, 731	14. 84	69. 00	15. 96	100. 00	18. 70	5. 92	14. 84	69. 00	15. 96	
Total	132, 940	100. 00									

FIGURE 45.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Macoupin County, Ill. (Size, 4-inch x 1¼-inch.)



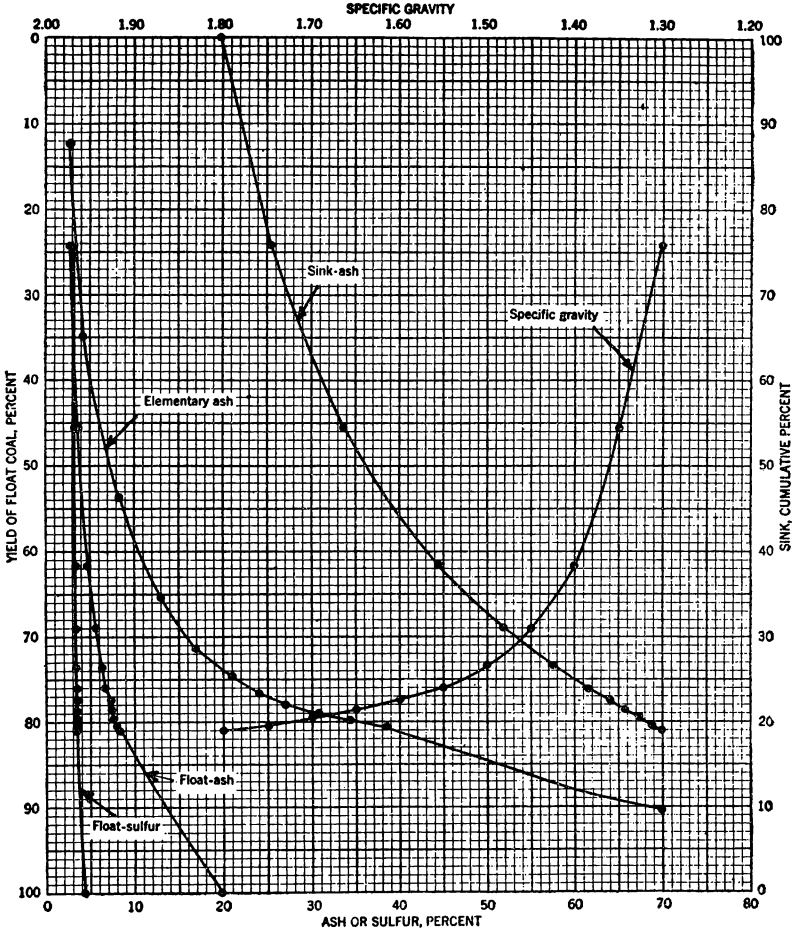
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	36,854	52.37	5.21	3.39	52.37	5.21	3.39	100.00	16.58	4.91	
1.30-1.35	14,742	20.95	11.50	3.57	73.32	7.01	3.44	47.63	29.09	6.58	28.36
1.35-1.40	5,216	7.41	16.37	4.02	80.73	7.87	3.49	26.68	42.90	8.94	10.32
1.40-1.45	2,044	2.91	20.45	5.49	83.64	8.30	3.56	19.27	53.10	10.84	4.52
1.45-1.50	1,130	1.61	24.27	6.96	85.25	8.61	3.63	16.36	58.91	11.79	2.57
1.50-1.55	672	.96	26.15	9.00	86.21	8.80	3.69	14.75	62.69	12.31	1.61
1.55-1.60	458	.65	32.84	7.54	86.86	8.98	3.72	13.79	65.23	12.54	1.11
1.60-1.65	327	.46	35.34	7.96	87.32	9.12	3.74	13.14	66.83	12.79	.89
1.65-1.70	302	.43	39.30	7.97	87.75	9.27	3.76	12.68	67.98	12.97	1.09
1.70-1.75	462	.66	45.33	7.63	88.41	9.54	3.79	12.25	68.98	13.14	1.13
1.75-1.80	328	.47	46.19	9.59	88.88	9.73	3.82	11.59	70.33	13.46	
Sink-1.80	7,824	11.12	71.35	13.62	100.00	16.58	4.91	11.12	71.35	13.62	
Total	70,359	100.00									

FIGURE 46.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Macoupin County, Ill. (Size, 1½-inch x ⅜-inch.)



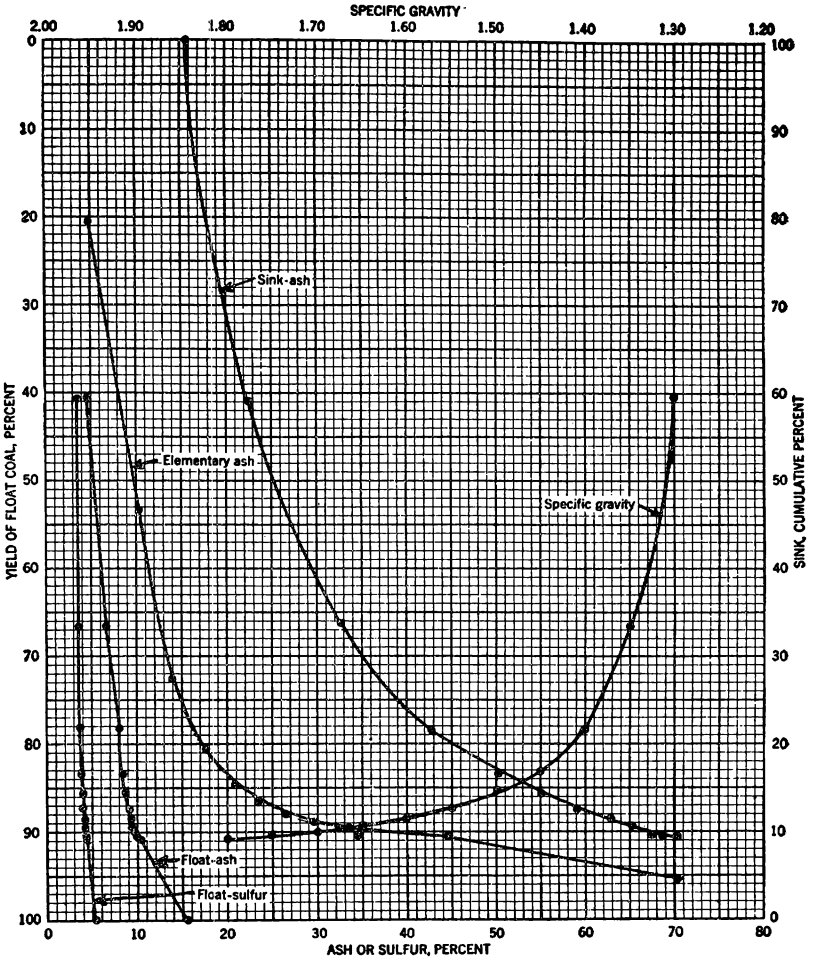
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	14,969	56.56	4.48	3.42	56.56	4.48	3.42	100.00	15.54	4.52	
1.30-1.35	3,402	12.86	9.41	3.69	69.42	5.39	3.47	43.44	29.94	5.95	22.12
1.35-1.40	2,450	9.26	13.44	3.87	78.68	6.34	3.52	30.58	38.57	6.90	13.24
1.40-1.45	1,052	3.98	17.98	4.32	82.66	6.90	3.56	21.32	49.48	8.22	6.18
1.45-1.50	581	2.20	21.68	4.84	84.86	7.28	3.59	17.34	56.71	9.11	3.37
1.50-1.55	309	1.17	26.63	5.27	86.03	7.55	3.61	15.14	61.81	9.74	2.05
1.55-1.60	233	.88	30.16	6.02	86.91	7.78	3.64	13.97	64.75	10.11	1.52
1.60-1.65	169	.64	34.13	6.14	87.55	7.97	3.65	13.09	67.08	10.38	1.30
1.65-1.70	175	.66	38.02	6.44	88.21	8.19	3.68	12.45	68.77	10.60	1.23
1.70-1.75	152	.57	41.80	5.53	88.78	8.41	3.69	11.79	70.49	10.84	1.05
1.75-1.80	126	.48	46.00	5.64	89.26	8.61	3.70	11.22	71.95	11.11	
Sink-1.80	2,842	10.74	73.11	11.35	100.00	15.54	4.52	10.74	73.11	11.35	
Total	26,460	100.00									

FIGURE 47.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Macoupin County, Ill. (Size, ⅜-inch x 14-mesh.)



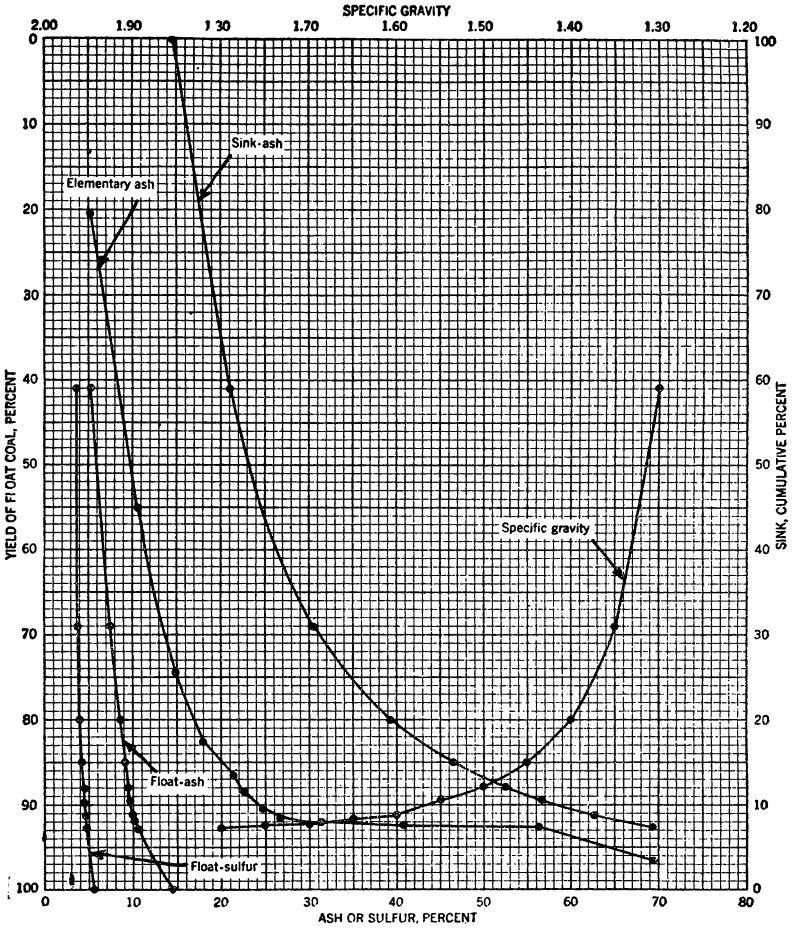
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	1,956	24.17	2.85	3.08	24.17	2.85	3.08	100.00	19.96	4.20	
1.30-1.35	1,737	21.47	4.25	3.28	45.64	3.51	3.17	75.83	25.41	4.56	37.43
1.35-1.40	1,291	15.96	8.27	3.58	61.60	4.74	3.28	54.36	33.76	5.07	23.38
1.40-1.45	600	7.42	13.00	3.56	69.02	5.63	3.31	38.40	44.36	5.68	11.80
1.45-1.50	354	4.38	16.89	3.69	73.40	6.30	3.33	30.98	51.87	6.19	6.94
1.50-1.55	207	2.56	20.99	3.73	75.96	6.80	3.35	26.60	57.63	6.60	4.04
1.55-1.60	120	1.48	24.01	3.83	77.44	7.13	3.35	24.04	61.53	6.91	2.54
1.60-1.65	86	1.06	26.97	3.85	78.50	7.39	3.36	22.56	64.00	7.11	1.97
1.65-1.70	74	.91	30.74	4.03	79.41	7.66	3.37	21.50	65.82	7.27	1.78
1.70-1.75	70	.87	34.30	4.16	80.28	7.95	3.38	20.59	67.37	7.42	1.55
1.75-1.80	55	.68	38.63	4.22	80.96	8.21	3.38	19.72	68.83	7.56	
Sink-1.80	1,540	19.04	69.91	7.68	100.00	19.96	4.20	19.04	69.91	7.68	
Total	8,090	100.00									

FIGURE 48.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Macoupin County, Ill. (Size, 14-mesh x 100-mesh.)



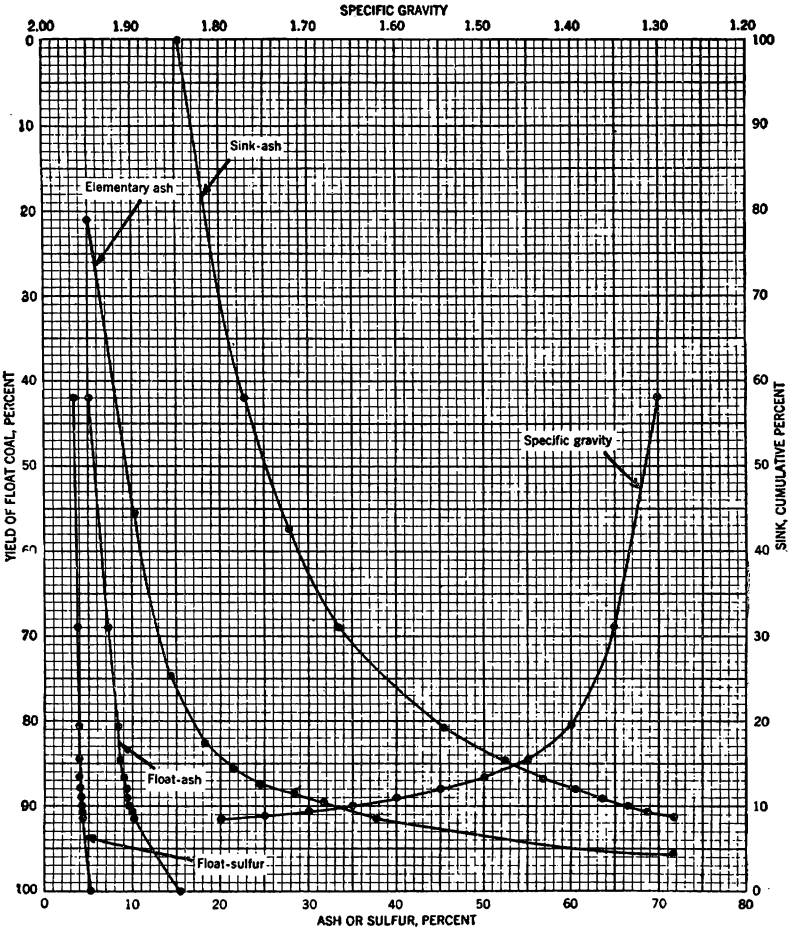
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30		40.75	4.97	3.58	40.75	4.97	3.58	100.00	15.53	5.12	
1.30–1.35		25.76	10.06	3.76	66.51	6.94	3.65	59.25	22.79	6.18	
1.35–1.40		11.87	13.99	4.53	78.38	8.01	3.78	33.49	32.58	8.04	
1.40–1.45		4.86	17.47	5.92	83.24	8.56	3.91	21.62	42.78	9.97	
1.45–1.50		2.50	20.91	7.01	85.74	8.92	4.00	16.76	50.12	11.14	
1.50–1.55		1.52	23.50	8.89	87.26	9.18	4.08	14.26	55.24	11.87	
1.55–1.60		1.34	26.49	10.22	88.60	9.44	4.18	12.74	59.03	12.22	
1.60–1.65		.80	29.88	10.47	89.40	9.62	4.23	11.40	62.85	12.46	
1.65–1.70		.66	33.15	10.64	90.06	9.79	4.28	10.60	65.34	12.61	
1.70–1.75		.42	34.64	10.84	90.48	9.91	4.31	9.94	67.48	12.74	
1.75–1.80		.44	44.45	6.71	90.92	10.08	4.32	9.52	68.92	12.82	
Sink–1.80		9.08	70.11	13.12	100.00	15.53	5.12	9.08	70.11	13.12	

FIGURE 49.—Composite of washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Madison County, Ill. (Size, 4-inch x 100-mesh.)



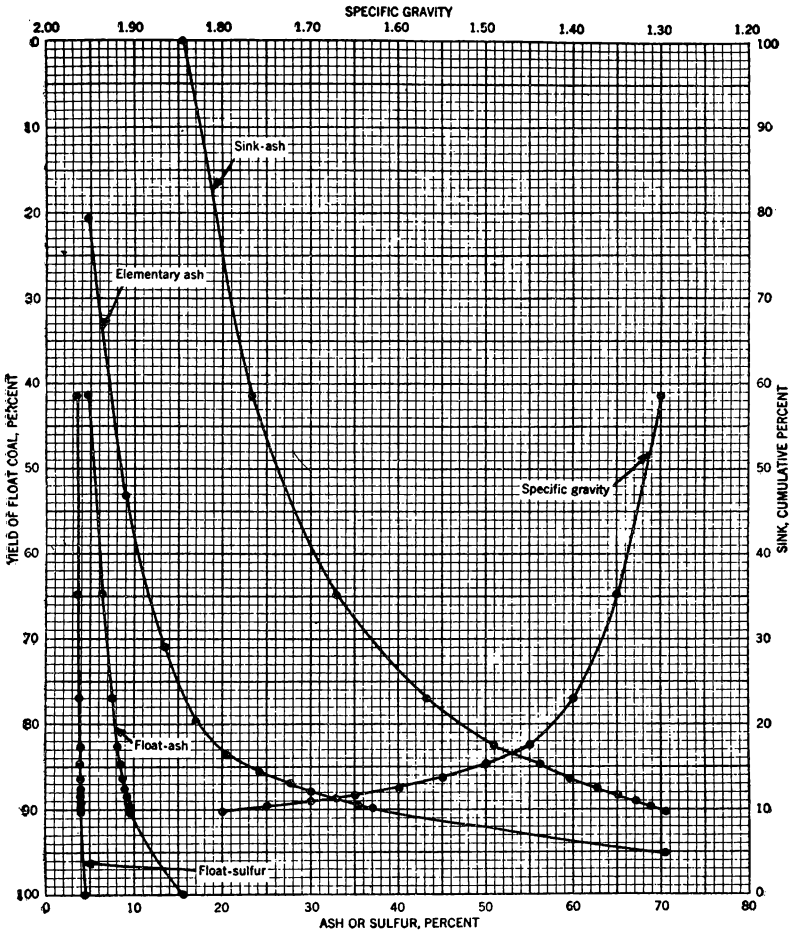
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	36,401	41.01	5.17	3.72	41.01	5.17	3.72	100.00	14.61	5.62	
1.30-1.35	24,834	27.99	10.71	3.85	69.00	7.42	3.77	58.99	21.17	6.94	38.98
1.35-1.40	9,752	10.99	14.92	5.28	79.99	8.45	3.98	31.00	30.62	9.73	16.10
1.40-1.45	4,536	5.11	18.04	7.21	85.10	9.02	4.17	20.01	39.25	12.17	7.96
1.45-1.50	2,528	2.85	21.36	7.73	87.95	9.42	4.29	14.90	46.52	13.87	4.31
1.50-1.55	1,293	1.46	22.43	11.39	89.41	9.64	4.40	12.05	52.47	15.33	3.19
1.55-1.60	1,534	1.73	24.77	13.36	91.14	9.92	4.57	10.59	56.61	15.87	2.31
1.60-1.65	512	.58	26.59	16.19	91.72	10.03	4.65	8.86	62.83	16.36	1.15
1.65-1.70	503	.57	31.45	16.12	92.29	10.16	4.72	8.28	65.37	16.37	.69
1.70-1.75	110	.12	40.73	11.18	92.41	10.20	4.73	7.71	67.88	16.39	.68
1.75-1.80	496	.56	56.36	2.81	92.97	10.48	4.72	7.59	68.31	16.47	
Sink-1.80	6,237	7.03	69.26	17.56	100.00	14.61	5.62	7.03	69.26	17.56	
Total	88,736	100.00									

FIGURE 50.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Madison County, Ill. (Size, 4-inch x 1½-inch.)



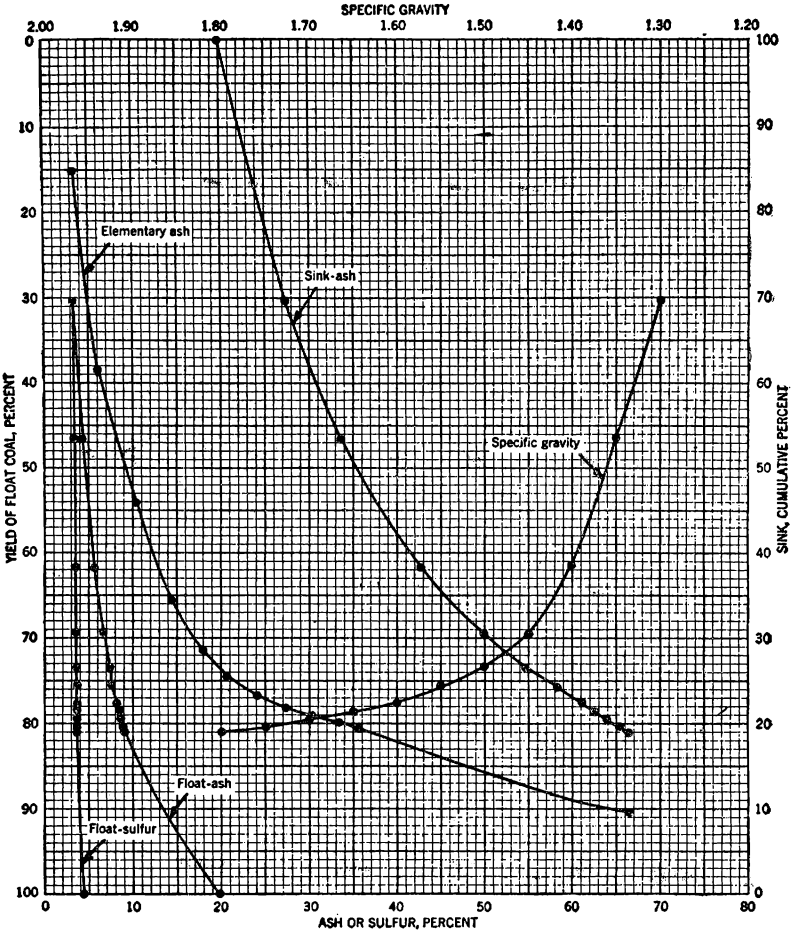
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	25,628	41.97	5.09	3.64	41.97	5.09	3.64	100.00	15.40	5.29	-------
1.30-1.35	16,443	26.93	10.53	3.77	68.90	7.22	3.69	58.03	22.86	6.48	38.81
1.35-1.40	7,257	11.88	14.43	4.47	80.78	8.28	3.81	31.10	33.54	8.83	15.79
1.40-1.45	2,385	3.91	18.23	6.08	84.69	8.74	3.91	19.22	45.35	11.53	5.86
1.45-1.50	1,190	1.95	21.73	7.92	86.64	9.03	4.00	15.31	52.27	12.92	3.36
1.50-1.55	864	1.41	24.70	9.37	88.05	9.28	4.09	13.36	56.73	13.65	2.44
1.55-1.60	627	1.03	28.57	9.73	89.08	9.50	4.15	11.95	60.51	14.16	1.97
1.60-1.65	576	.94	31.82	10.04	90.02	9.74	4.21	10.92	63.52	14.58	1.61
1.65-1.70	411	.67	34.90	9.70	90.69	9.92	4.25	9.98	66.50	15.00	1.14
1.70-1.75	286	.47	33.32	14.34	91.16	10.04	4.31	9.31	68.78	15.38	.77
1.75-1.80	183	.30	37.76	12.01	91.46	10.13	4.33	8.84	70.66	15.44	-------
Sink-1.80	5,216	8.54	71.82	15.56	100.00	15.40	5.29	8.54	71.82	15.56	-------
Total	61,066	100.00	-------	-------	-------	-------	-------	-------	-------	-------	-------

FIGURE 51.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Madison County Ill. (Size, 1½-inch x ⅜-inch.)



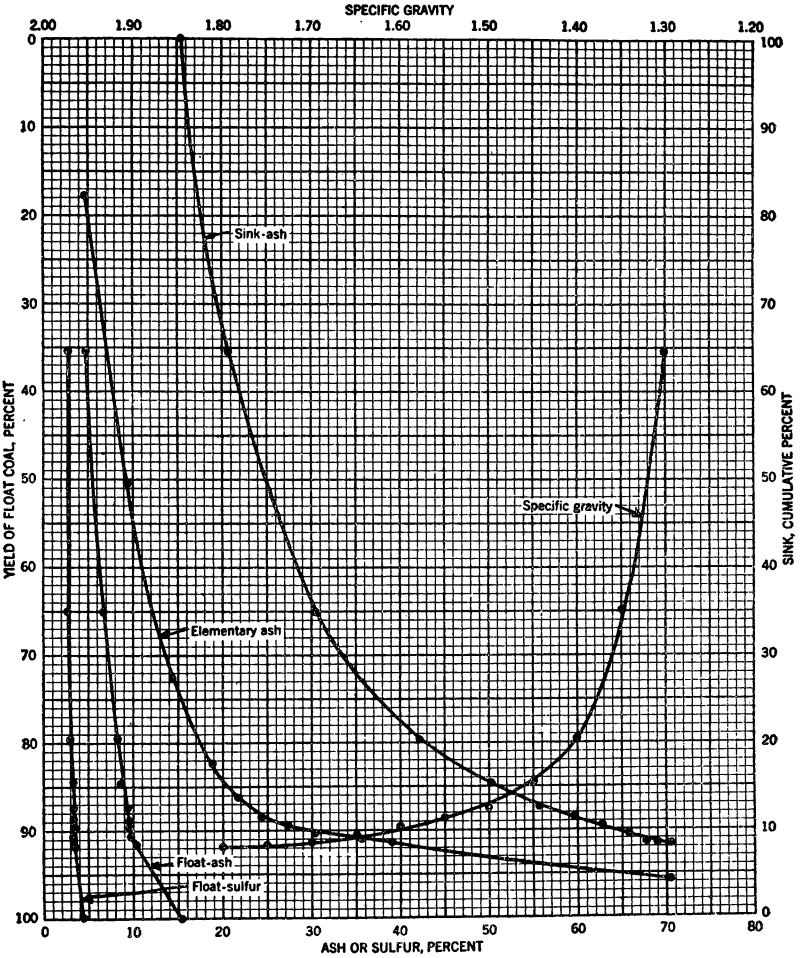
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	15,082	41.28	4.86	3.39	41.28	4.86	3.39	100.00	15.67	4.42	
1.30-1.35	8,618	23.59	8.95	3.66	64.87	6.35	3.49	58.72	23.27	5.15	35.70
1.35-1.40	4,423	12.11	13.42	4.07	76.98	7.46	3.58	35.13	32.89	6.15	17.43
1.40-1.45	1,943	5.32	17.12	4.95	82.30	8.08	3.67	23.02	43.13	7.25	7.88
1.45-1.50	937	2.56	20.56	5.99	84.86	8.46	3.74	17.70	50.95	7.94	4.10
1.50-1.55	563	1.54	24.21	6.95	86.40	8.74	3.80	15.14	56.09	8.27	2.75
1.55-1.60	441	1.21	27.65	7.41	87.61	9.00	3.85	13.60	59.70	8.42	1.98
1.60-1.65	281	.77	30.03	7.80	88.38	9.19	3.88	12.39	62.83	8.51	1.49
1.65-1.70	263	.72	33.07	8.11	89.10	9.38	3.91	11.62	65.01	8.56	1.29
1.70-1.75	207	.57	35.46	8.08	89.67	9.54	3.94	10.90	67.12	8.59	1.07
1.75-1.80	183	.50	37.05	7.24	90.17	9.70	3.96	10.33	68.86	8.62	
Sink-1.80	3,590	9.83	70.48	8.69	100.00	15.67	4.42	9.83	70.48	8.69	
Total	36,531	100.00									

FIGURE 52.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Madison County, Ill. (Size, ⅛-inch x 14-mesh.)



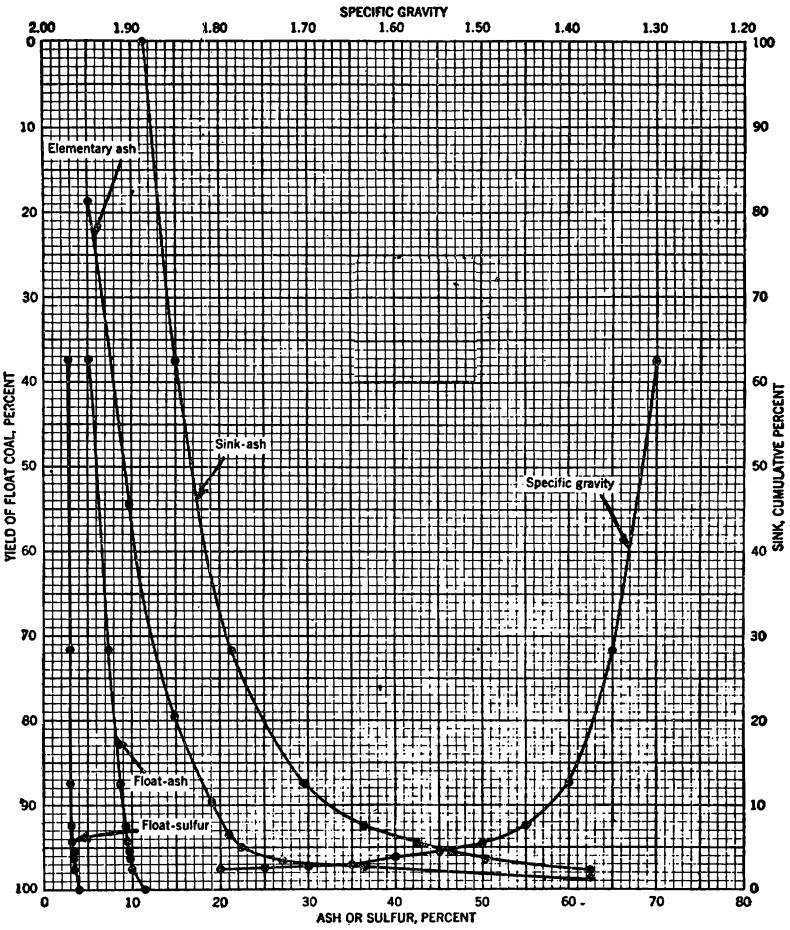
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	3,022	30.27	3.20	3.23	30.27	3.20	3.23	100.00	19.95	4.33	
1.30–1.35	1,622	16.24	6.10	3.41	46.51	4.21	3.29	69.73	27.22	4.81	31.18
1.35–1.40	1,492	14.94	10.34	3.68	61.45	5.70	3.39	53.49	33.63	5.24	22.78
1.40–1.45	783	7.84	14.30	3.93	69.29	6.68	3.45	38.55	42.65	5.84	11.88
1.45–1.50	403	4.04	17.88	4.32	73.33	7.29	3.50	30.71	49.89	6.33	6.48
1.50–1.55	244	2.44	20.65	4.73	75.77	7.72	3.54	26.67	54.74	6.63	4.29
1.55–1.60	185	1.85	24.13	5.05	77.62	8.11	3.57	24.23	58.18	6.82	2.90
1.60–1.65	105	1.05	27.30	5.38	78.67	8.37	3.60	22.38	60.99	6.97	1.86
1.65–1.70	81	.81	30.18	5.72	79.48	8.59	3.62	21.33	62.65	7.04	1.70
1.70–1.75	89	.89	33.19	5.81	80.37	8.86	3.64	20.52	63.93	7.10	1.48
1.75–1.80	59	.59	35.74	5.71	80.96	9.06	3.66	19.63	65.32	7.16	
Sink–1.80	1,901	19.04	66.24	7.20	100.00	19.95	4.33	19.04	66.24	7.20	
Total	9,986	100.00									

FIGURE 53.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Madison County, Ill. (Size, 14-mesh x 100-mesh).



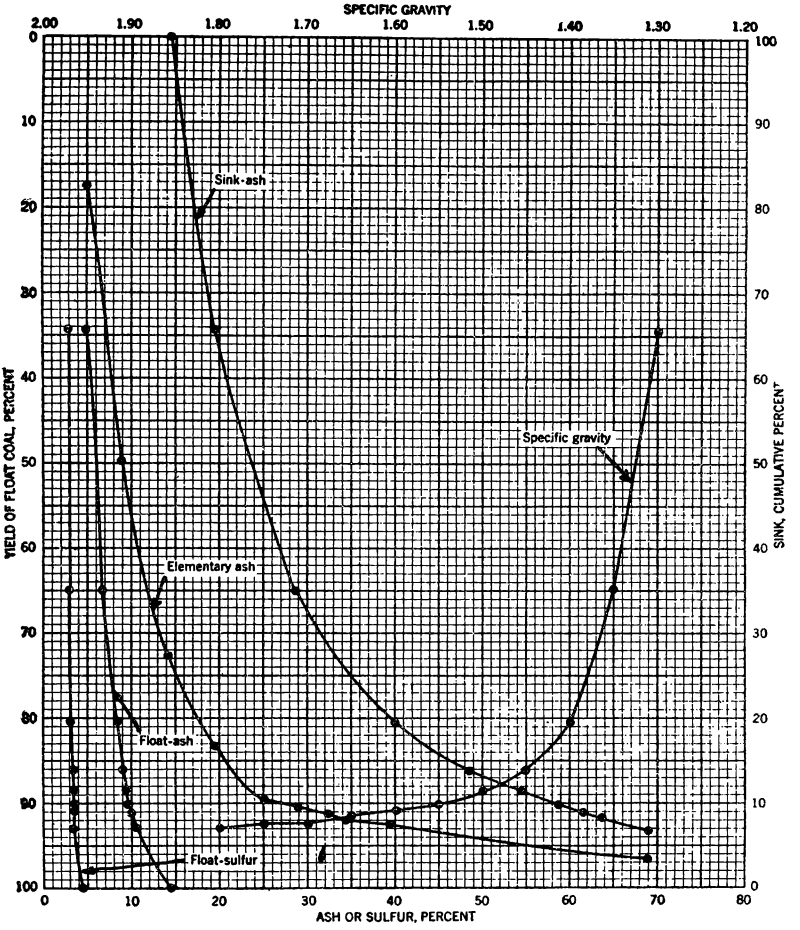
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30		35.34	4.93	2.87	35.34	4.93	2.87	100.00	15.16	4.30	
1.30 – 1.35		29.66	9.21	2.94	65.00	6.88	2.90	64.66	20.75	5.08	
1.35 – 1.40		14.56	14.31	3.44	79.56	8.24	3.00	35.00	30.54	6.89	
1.40 – 1.45		5.30	18.98	4.11	84.86	8.91	3.07	20.44	42.10	9.35	
1.45 – 1.50		2.52	21.84	5.40	87.38	9.29	3.14	15.14	50.19	11.18	
1.50 – 1.55		1.37	24.32	6.97	88.75	9.52	3.20	12.62	55.85	12.33	
1.55 – 1.60		.93	27.46	7.92	89.68	9.70	3.25	11.25	59.69	12.98	
1.60 – 1.65		.92	30.27	8.28	90.60	9.91	3.30	10.32	62.59	13.44	
1.65 – 1.70		.49	35.39	7.33	91.09	10.05	3.32	9.40	65.75	13.95	
1.70 – 1.75		.41	38.98	5.68	91.50	10.18	3.33	8.91	67.42	14.31	
1.75 – 1.80		.39	38.99	8.63	91.89	10.30	3.35	8.50	68.80	14.73	
Sink–1.80		8.11	70.23	15.02	100.00	15.16	4.30	8.11	70.23	15.02	

FIGURE 54.—Composite of washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Perry County, Ill. (Size, 4-inch x 100-mesh.)



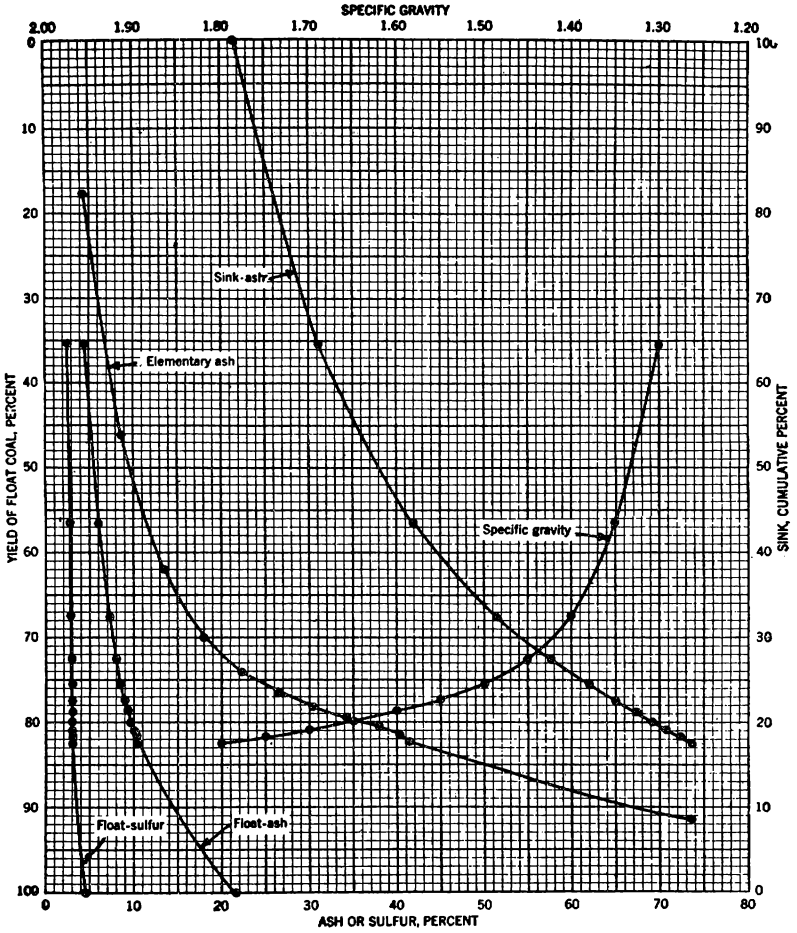
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	53,864	37.41	5.14	2.87	37.41	5.14	2.87	100.00	11.31	4.00	
1.30–1.35	49,328	34.26	9.68	2.91	71.67	7.31	2.89	62.59	15.00	4.68	50.02
1.35–1.40	22,680	15.76	14.89	3.40	87.43	8.68	2.98	28.33	21.44	6.83	20.64
1.40–1.45	7,031	4.88	19.13	4.45	92.31	9.23	3.06	12.57	29.64	11.12	7.09
1.45–1.50	3,175	2.21	21.08	7.04	94.52	9.51	3.15	7.69	36.31	15.36	3.11
1.50–1.55	1,289	.90	22.39	10.06	95.42	9.63	3.22	5.48	42.46	18.71	1.61
1.55–1.60	1,022	.71	24.29	12.36	96.13	9.74	3.28	4.58	46.40	20.41	1.66
1.60–1.65	1,363	.95	27.00	11.14	97.08	9.91	3.36	3.87	50.46	21.89	1.09
1.65–1.70	196	.14	34.57	11.42	97.22	9.94	3.37	2.92	58.09	25.38	.29
1.70–1.75	210	.15	36.37	7.09	97.37	9.98	3.38	2.78	59.27	26.08	.30
1.75–1.80	217	.15	32.82	19.53	97.52	10.02	3.40	2.63	60.58	27.17	
Sink–1.80	3,564	2.48	62.26	27.63	100.00	11.31	4.00	2.48	62.26	27.63	
Total	143,939	100.00									

FIGURE 55.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Perry County, Ill. (Size, 4-inch x 1½-inch.)



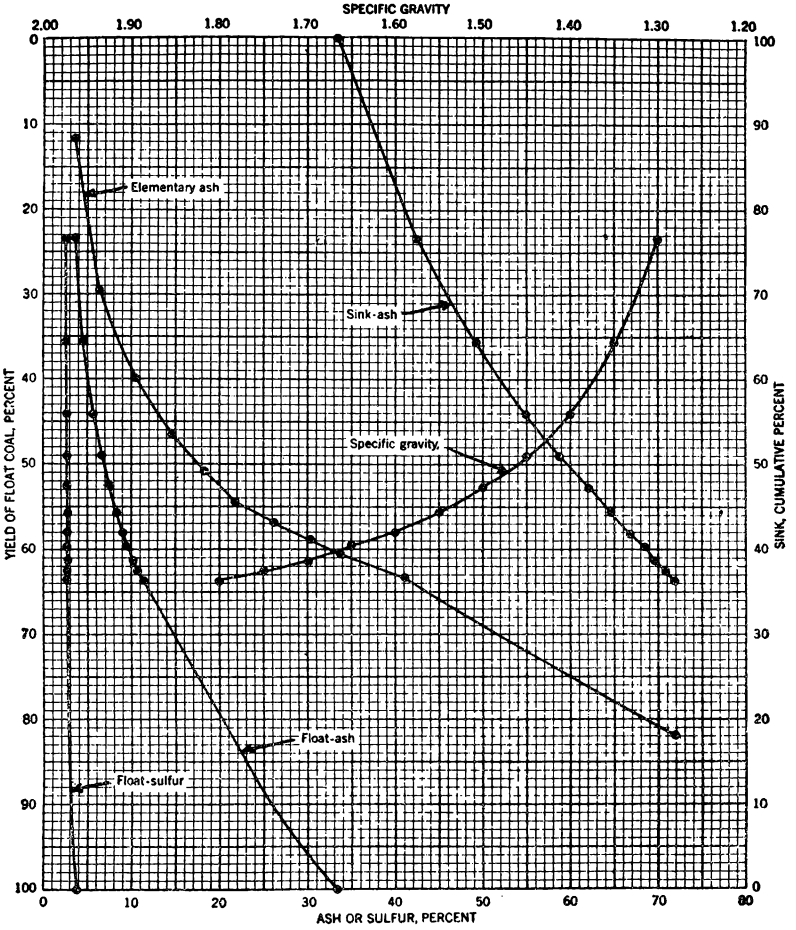
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	24,154	34.57	4.99	2.95	34.57	4.99	2.95	100.00	14.49	4.53	
1.30-1.35	21,205	30.35	8.94	2.96	64.92	6.84	2.95	65.43	19.50	5.37	45.77
1.35-1.40	10,773	15.42	14.17	3.57	80.34	8.24	3.07	35.08	28.64	7.45	21.26
1.40-1.45	4,082	5.84	19.62	4.08	86.18	9.02	3.14	19.66	39.99	10.49	8.41
1.45-1.50	1,798	2.57	23.05	4.98	88.75	9.42	3.19	13.82	48.60	13.20	4.01
1.50-1.55	1,005	1.44	25.15	7.37	90.19	9.67	3.26	11.25	54.43	15.08	2.26
1.55-1.60	572	.82	28.96	7.78	91.01	9.85	3.30	9.81	58.73	16.21	1.50
1.60-1.65	475	.68	32.43	8.21	91.69	10.01	3.34	8.99	61.45	16.98	1.22
1.65-1.70	379	.54	34.25	9.87	92.23	10.16	3.38	8.31	63.82	17.70	.94
1.70-1.75	277	.40	39.42	7.20	92.63	10.28	3.39	7.77	65.88	18.24	.79
1.75-1.80	271	.39	38.77	9.51	93.02	10.40	3.42	7.37	67.32	18.84	
Sink-1.80	4,876	6.98	68.91	19.36	100.00	14.49	4.53	6.98	68.91	19.36	
Total	69,867	100.00									

FIGURE 56.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Perry County, Ill. (Size, 1½-inch x ⅜-inch.)



Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	18,370	35.61	4.42	2.73	35.61	4.42	2.73	100.00	21.61	4.64	
1.30-1.35	10,773	20.89	8.68	3.02	56.50	6.00	2.84	64.39	31.12	5.70	31.88
1.35-1.40	5,670	10.99	13.45	3.28	67.49	7.21	2.91	43.50	41.89	6.98	16.14
1.40-1.45	2,657	5.15	17.99	3.63	72.64	7.97	2.96	32.51	51.51	8.24	8.01
1.45-1.50	1,475	2.86	22.23	3.94	75.50	8.51	3.00	27.36	57.82	9.10	4.77
1.50-1.55	986	1.91	26.50	4.23	77.41	8.96	3.03	24.50	61.97	9.71	3.29
1.55-1.60	713	1.38	30.32	4.54	78.79	9.33	3.05	22.59	64.97	10.17	2.57
1.60-1.65	614	1.19	34.25	4.58	79.98	9.70	3.08	21.21	67.23	10.53	2.20
1.65-1.70	519	1.01	38.14	4.31	80.99	10.06	3.09	20.02	69.19	10.89	1.85
1.70-1.75	433	.84	40.35	4.51	81.83	10.37	3.11	19.01	70.84	11.24	1.64
1.75-1.80	415	.80	41.36	4.79	82.63	10.67	3.12	18.17	72.25	11.55	
Sink-1.80	8,958	17.37	73.67	11.86	100.00	21.61	4.64	17.37	73.67	11.86	
Total	51,583	100.00									

FIGURE 57.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Perry County, Ill. (Size, ⅜-inch x 14-mesh.)



Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	1,881	23.53	3.65	2.55	23.53	3.65	2.55	100.00	33.25	3.85	
1.30-1.35	974	12.18	6.44	2.79	35.71	4.60	2.63	76.47	42.35	4.24	20.55
1.35-1.40	669	8.37	10.52	2.91	44.08	5.73	2.68	64.29	49.16	4.52	13.34
1.40-1.45	397	4.97	14.85	3.01	49.05	6.65	2.72	55.92	54.94	4.76	8.71
1.45-1.50	299	3.74	18.13	2.95	52.79	7.46	2.73	50.95	58.85	4.93	6.72
1.50-1.55	238	2.98	21.85	2.96	55.77	8.23	2.75	47.21	62.08	5.09	5.27
1.55-1.60	183	2.29	26.19	2.97	58.06	8.94	2.75	44.23	64.79	5.23	3.97
1.60-1.65	134	1.68	30.24	2.96	59.74	9.54	2.76	41.94	66.89	5.36	3.18
1.65-1.70	120	1.50	33.81	2.93	61.24	10.13	2.76	40.26	68.42	5.46	2.79
1.70-1.75	103	1.29	37.74	2.87	62.53	10.70	2.77	38.76	69.76	5.55	2.54
1.75-1.80	100	1.25	41.14	2.91	63.78	11.30	2.77	37.47	70.86	5.65	
Sink-1.80	2,896	36.22	71.89	5.74	100.00	33.25	3.85	36.22	71.89	5.74	
Total	7,994	100.00									

FIGURE 58.—Washing characteristics of tipple sample of 4-inch x 0 coal from No. 6 bed, Perry County, Ill. (Size, 14-mesh x 100-mesh.)

NO. 7 BED

The washing characteristics of a 5-inch by 0 tipple sample collected at a slope mine near Danville are shown in figures 59 to 63. These data reveal a coal very similar in preparation characteristics to the other coal beds in the State. A clean product of less than 10 percent ash can be obtained by washing at an ordinary specific gravity. This particular operator does not have a washing plant but hand-picks the coal either before or during the loading operation.

Although the total ash content of the raw coal increases with fineness, gravity separation of the various sizes shows that ash content of the same float fractions is lower in the smaller sizes. For example, the float-and-sink test shows that a 1.40-specific-gravity separation would yield coal with the following ash content: 5- by 1½-inch size, 8.93 percent; 1½- by ⅜-inch size, 7.45 percent; ⅜-inch by 14-mesh size, 6.11 percent; and 14- by 100-mesh size, 4.96 percent.

SCREEN ANALYSES OF TIPPLE SAMPLES

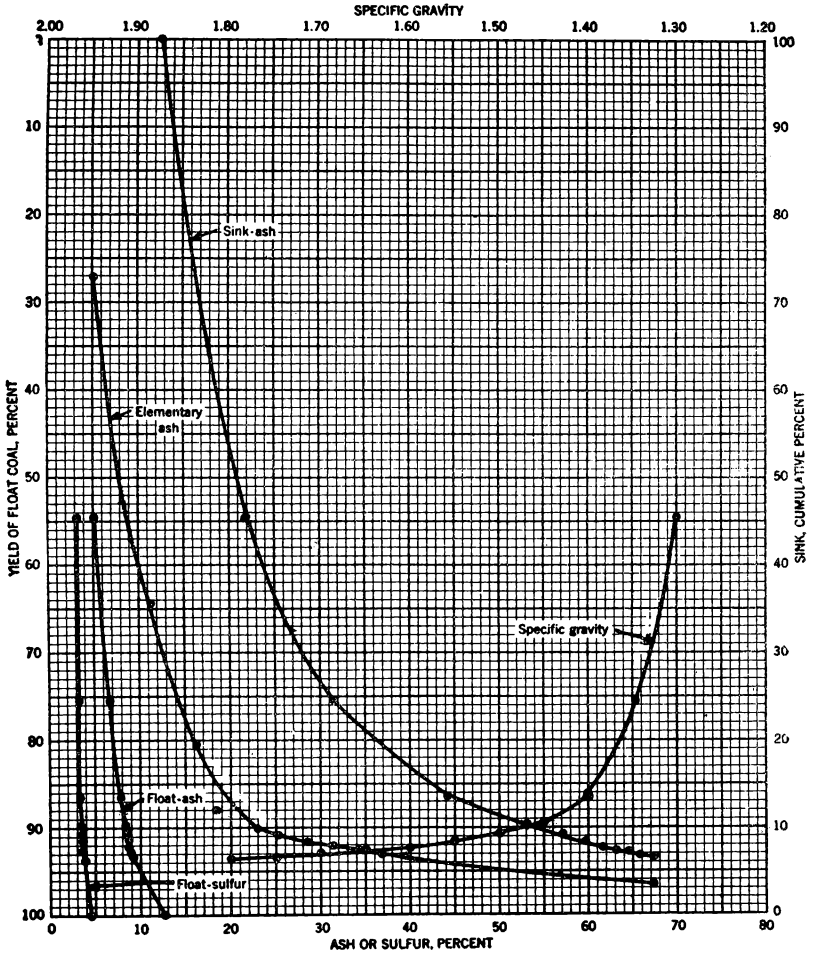
At selected mines throughout the State, tipple samples of slack were obtained and screen analyses made. The procedure followed is adequately described in the A.S.T.M. Standards on Coal and Coke.[17]

In case a washed product was collected, the gross sample was air-dried before screening. The only variation from the A. S. T. M. procedure was to screen out the minus ⅜-inch coal as the initial step. In this way, the original minus ⅜-inch coal in the sample is not contaminated by the minus ⅜-inch coal resulting from degradation while screening the larger sizes. The ⅜-inch by 0 degradation coal was weighed and prorated among the plus ⅜-inch sizes. This precaution did not prove to be of any great importance in these tests, as the amount of degradation was insignificant. In a more friable coal, degradation during the test could cause considerable error in the screen analysis.

While the actual screen testing of the plus ⅜-inch sizes was performed in the field, the ⅜-inch by 0 portion was riffled and sent to the laboratory, where more precise control of the test could be exercised.

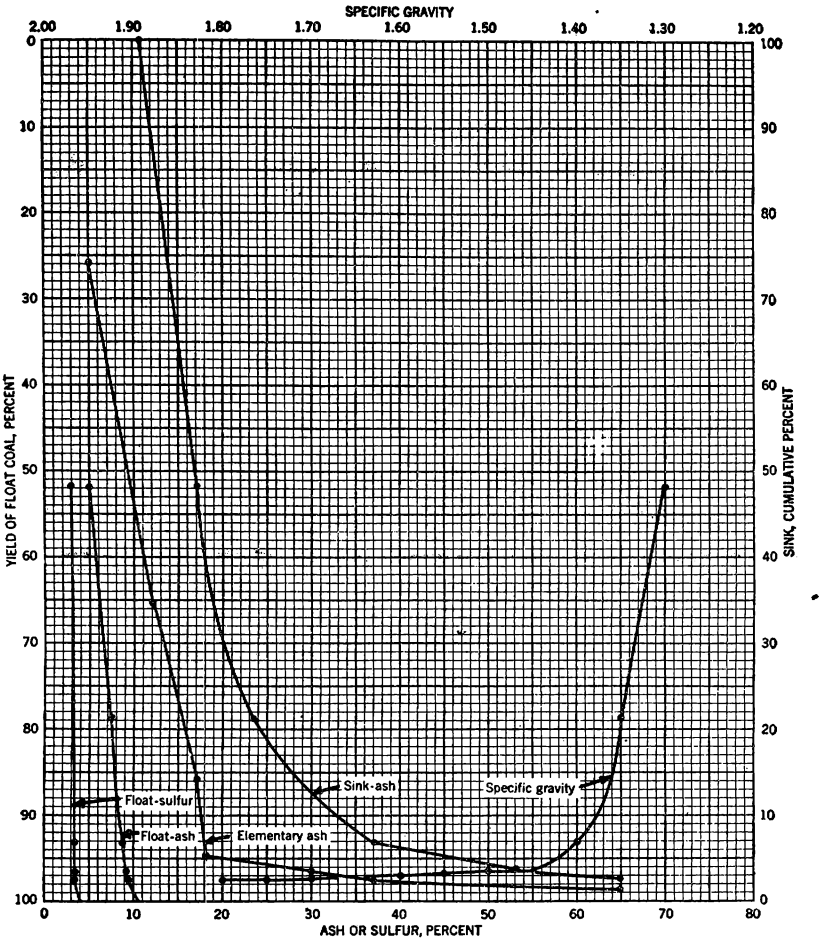
Three of the four washed samples were cleaned in preparation plants, using wet methods. After washing, the coal is moved over dewatering screens, and some of the fine size coal is lost. Therefore, the size-consist of raw slack from the same operator would show a higher percentage of minus 28-mesh coal.

[17] Standard Method of Test for Screen Analysis of Coal, A. S. T. M. Designation D–410–38.



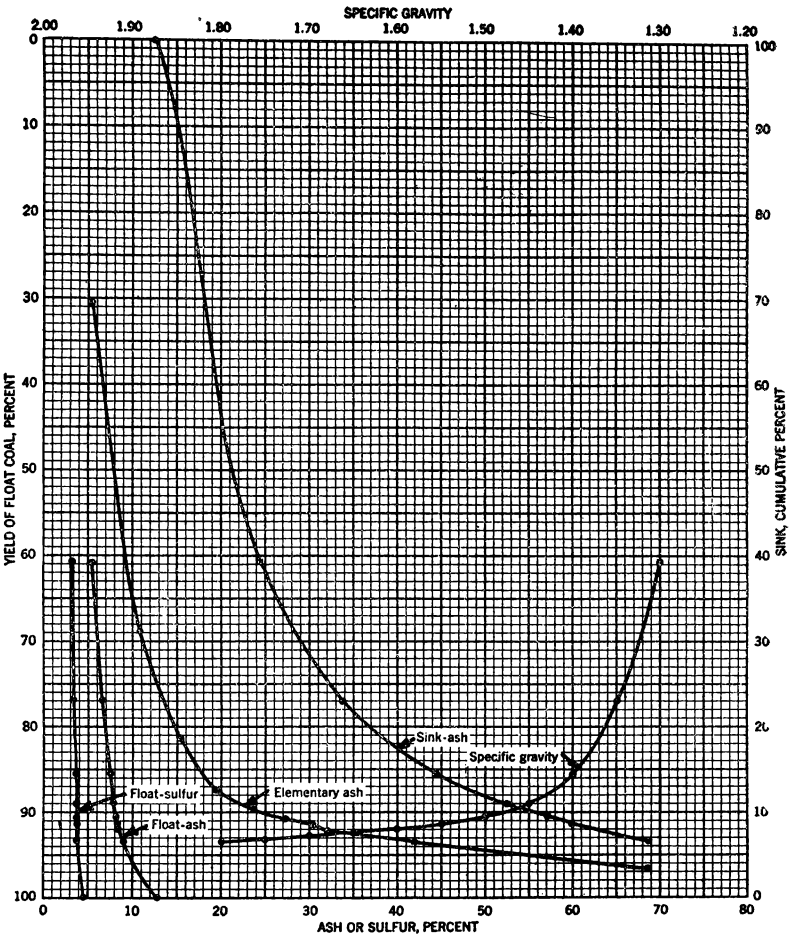
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30		54.47	5.03	3.06	54.47	5.03	3.06	100.00	12.89	4.49	
1.30-1.35		20.69	11.18	3.51	75.16	6.72	3.18	45.53	22.29	6.20	
1.35-1.40		11.19	16.01	4.27	86.35	7.93	3.32	24.84	31.55	8.43	
1.40-1.45		3.48	18.11	7.04	89.83	8.32	3.47	13.65	44.29	11.85	
1.45-1.50		1.14	22.81	6.26	90.97	8.50	3.50	10.17	53.25	13.49	
1.50-1.55		.68	25.39	8.15	91.65	8.63	3.54	9.03	57.09	14.40	
1.55-1.60		.51	28.49	8.53	92.16	8.74	3.57	8.35	59.67	14.91	
1.60-1.65		.40	31.56	10.15	92.56	8.84	3.59	7.84	61.70	15.33	
1.65-1.70		.35	34.45	10.23	92.91	8.93	3.62	7.44	63.32	15.61	
1.70-1.75		.30	36.63	10.30	93.21	9.02	3.64	7.09	64.75	15.87	
1.75-1.80		.32	39.25	10.05	93.53	9.13	3.66	6.79	65.99	16.12	
Sink-180		6.47	67.31	16.42	100.00	12.89	4.49	6.47	67.31	16.42	

FIGURE 59.—Composite of washing characteristics of tipple sample of 5-inch x 0 coal from No. 7 bed, Vermilion County, Ill. (Size, 5-inch x 100-mesh.)



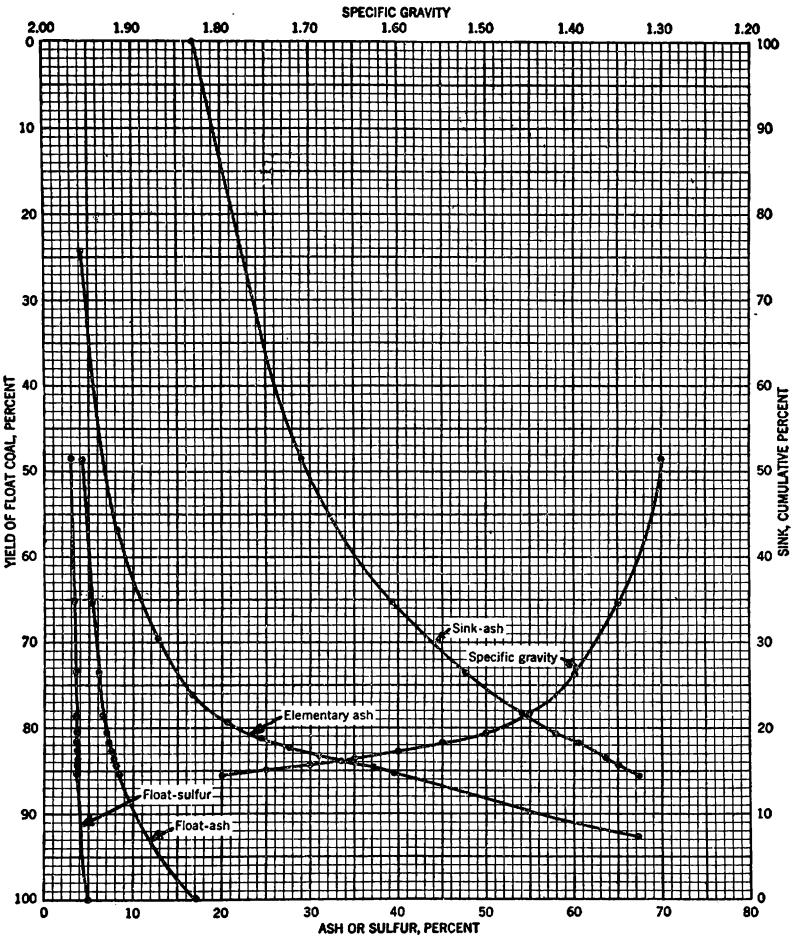
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	37,648	51.87	5.00	2.97	51.87	5.00	2.97	100.00	10.87	4.09	
1.30-1.35	19,391	26.72	12.09	3.23	78.59	7.41	3.06	48.13	17.19	5.31	41.25
1.35-1.40	10,546	14.53	17.12	4.02	93.12	8.93	3.21	21.41	23.56	7.90	17.66
1.40-1.45	2,275	3.13	18.06	8.89	96.25	9.22	3.39	6.88	37.15	16.09	3.41
1.45-1.50	200	.28	29.95	3.67	96.53	9.28	3.39	3.75	53.09	22.10	.56
1.50-1.55	200	.28	24.85	11.11	96.81	9.33	3.42	3.47	54.95	23.59	.47
1.55-1.60	141	.19	27.73	10.39	97.00	9.36	3.43	3.19	57.59	24.68	.31
1.60-1.65	86	.12	36.98	11.85	97.12	9.40	3.44	3.00	59.49	25.59	.30
1.65-1.70	134	.18	36.98	11.85	97.30	9.45	3.46	2.88	60.42	26.16	.24
1.70-1.75	45	.06	36.98	11.85	97.36	9.47	3.46	2.70	61.99	27.11	.28
1.75-1.80	162	.22	36.98	11.85	97.58	9.53	3.48	2.64	62.56	27.46	
Sink-1.80	1,755	2.42	64.88	28.88	100.00	10.87	4.09	2.42	64.88	28.88	
Total	72,583	100.00									

FIGURE 60.—Washing characteristics of tipple sample of 5-inch x 0 coal from No. 7 bed, Vermilion County, Ill. (Size, 5-inch x 1½-inch.)



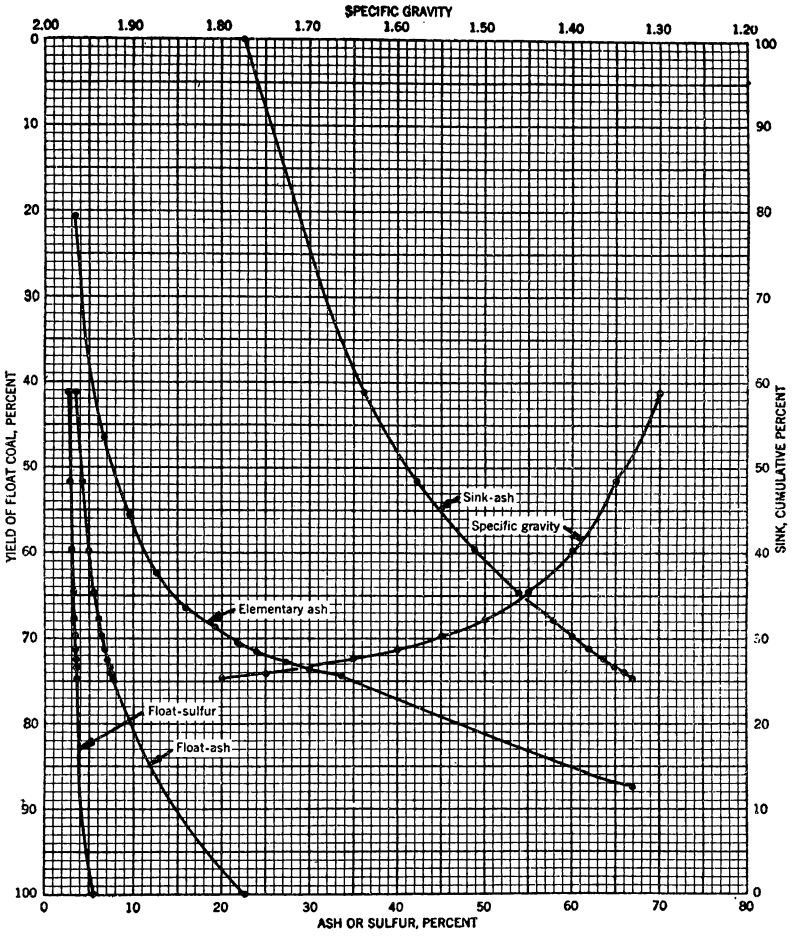
Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	38,442	60.84	5.40	3.20	60.84	5.40	3.20	100.00	12.81	4.69	
1.30-1.35	10,206	16.15	10.86	3.84	76.99	6.55	3.33	39.16	24.33	6.99	24.77
1.35-1.40	5,443	8.62	15.55	4.60	85.61	7.45	3.46	23.01	33.79	9.21	12.00
1.40-1.45	2,137	3.38	19.53	6.19	88.99	7.91	3.57	14.39	44.72	11.96	4.93
1.45-1.50	980	1.55	23.72	6.99	90.54	8.18	3.62	11.01	52.45	13.74	2.35
1.50-1.55	503	.80	27.31	8.44	91.34	8.35	3.67	9.46	57.16	14.84	1.43
1.55-1.60	398	.63	30.53	8.96	91.97	8.50	3.70	8.66	59.92	15.43	1.14
1.60-1.65	325	.51	32.02	11.80	92.48	8.63	3.75	8.03	62.22	15.94	.86
1.65-1.70	220	.35	35.08	11.79	92.83	8.73	3.78	7.52	64.27	16.22	.75
1.70-1.75	250	.40	37.47	11.94	93.23	8.85	3.81	7.17	65.69	16.44	.71
1.75-1.80	193	.31	41.96	10.58	93.54	8.96	3.83	6.77	67.36	16.71	
Sink-1.80	4,082	6.46	68.58	17.00	100.00	12.81	4.69	6.46	68.58	17.00	
Total	63,179	100.00									

FIGURE 61.—Washing characteristics of tipple sample of 5-inch x 0 coal from No. 7 bed, Vermilion County, Ill. (Size, 1½-inch x ⅜-inch)



Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float–1.30	11,453	48.49	4.20	2.98	48.49	4.20	2.98	100.00	17.01	4.98	
1.30–1.35	3,969	16.81	8.18	3.98	65.30	5.22	3.24	51.51	29.08	6.86	25.33
1.35–1.40	2,013	8.52	12.89	4.64	73.82	6.11	3.40	34.70	39.20	8.25	13.00
1.40–1.45	1,058	4.48	16.75	5.41	78.30	6.72	3.51	26.18	47.76	9.43	6.67
1.45–1.50	518	2.19	20.70	6.31	80.49	7.10	3.59	21.70	54.16	10.26	3.53
1.50–1.55	316	1.34	24.42	6.91	81.83	7.38	3.64	19.51	57.92	10.70	2.32
1.55–1.60	231	.98	27.80	7.73	82.81	7.62	3.69	18.17	60.39	10.98	1.73
1.60–1.65	177	.75	31.07	8.01	83.56	7.83	3.73	17.19	62.25	11.17	1.47
1.65–1.70	170	.72	33.77	8.18	84.28	8.06	3.77	16.44	63.67	11.31	1.35
1.70–1.75	149	.63	37.21	8.36	84.91	8.27	3.80	15.72	65.04	11.46	1.17
1.75–1.80	127	.54	39.55	8.00	85.45	8.47	3.83	15.09	66.20	11.59	
Sink–1.80	3,435	14.55	67.19	11.72	100.00	17.01	4.98	14.55	67.19	11.72	
Total	23,616	100.00									

FIGURE 62.—Washing characteristics of tipple sample of 5-inch x 0 coal from No. 7 bed, Vermilion County, Ill. (Size, ⅜-inch x 14-mesh.)



Specific-gravity fractions	Elementary data				Computed cumulative data						Near-gravity ±0.05 percent
	Weight, grams	Percent			Float, cumulative percent			Sink, cumulative percent			
		Weight	Ash	Sulfur	Weight	Ash	Sulfur	Weight	Ash	Sulfur	
Float-1.30	2,347	41.19	3.57	2.74	41.19	3.57	2.74	100.00	22.70	5.34	
1.30-1.35	587	10.31	6.81	3.75	51.50	4.22	2.94	58.81	36.10	7.17	18.51
1.35-1.40	467	8.20	9.63	4.41	59.70	4.96	3.14	48.50	42.32	7.89	13.12
1.40-1.45	280	4.92	12.77	4.67	64.62	5.56	3.26	40.30	48.97	8.60	8.19
1.45-1.50	186	3.27	15.92	5.05	67.89	6.06	3.35	35.38	54.01	9.15	4.94
1.50-1.55	95	1.67	19.35	4.37	69.56	6.37	3.37	32.11	57.89	9.57	3.16
1.55-1.60	85	1.49	21.88	5.63	71.05	6.70	3.42	30.44	60.00	9.85	2.74
1.60-1.65	71	1.25	23.92	5.77	72.30	7.00	3.46	28.95	61.96	10.07	2.15
1.65-1.70	51	.90	27.38	6.03	73.20	7.25	3.49	27.70	63.68	10.26	1.76
1.70-1.75	49	.86	30.07	6.27	74.06	7.51	3.52	26.80	64.90	10.41	1.53
1.75-1.80	38	.67	33.73	6.49	74.73	7.75	3.55	25.94	66.05	10.54	
Sink-1.80	1,440	25.27	66.91	10.65	100.00	22.70	5.34	25.27	66.91	10.65	
Total	5,696	100.00									

FIGURE 63.—Washing characteristics of tipple sample of 5-inch x 0 coal from No. 7 bed, Vermilion County, Ill. (Size, 14-mesh x 100-mesh.)

Examination of table 18 shows that, where the coal is washed, the ash content of the various size fractions is fairly constant as the size decreases to 14-mesh. Below 14-mesh, the ash content increases rapidly with fineness, indicating that the cleaning unit has but slight beneficial effect on the very fine coal. On the other hand, the ash content of the size fractions from raw screenings increases with fineness down to 100-mesh and then decreases. This shows that the high ash impurities in the Illinois coal beds easily break in size down to approximately 100-mesh but below that size are not as friable as the coal substance itself.

TABLE 18.—*Size-consist test data of screenings produced in Illinois*

Mining district	Southwestern Illinois		Franklin-Williamson		Eagle Valley		Southwestern Illinois		Fulton-Peoria		Fulton-Peoria	
Bed	No. 6		No. 6		No. 5		No. 6		No. 6		No. 5	
Sample No.	2		3		4		5		6		7	
Size	1¼ x 0 raw		1½ x 0 raw		1½ x 0 raw		1½ x 0 raw		1 x 0 washed		1¼ x 0 washed	
	Weight percent	Ash percent	Weight percent	Ash percent	Weight percent	Ash percent	Weight percent	Ash percent	Weight percent	Ash percent	Weight percent	Ash percent
On 1½			0.22	8.07	13.51	10.71	0.43	17.00				
On 1¼	0.09	25.22	2.81	11.46	15.76	10.49	1.53	15.66			0.87	13.36
On 1	5.54	15.66	8.40	13.17	18.63	10.79	7.88	15.07	1.30	7.78	12.17	12.81
On ¾	15.23	15.95	13.16	11.77	14.22	11.80	14.01	14.47	20.21	7.30	25.09	12.62
On ½	19.80	16.86	19.22	11.41	13.03	12.72	19.33	13.98	25.85	7.56	23.02	12.19
On ⅜	9.59	15.54	10.60	10.72	5.38	13.18	9.85	13.66	12.30	7.85	8.57	12.01
On 4-mesh	13.58	15.23	12.95	10.66	6.04	13.29	11.41	13.80	16.14	7.96	12.87	11.48
On 8-mesh	12.89	16.72	11.35	10.51	5.00	15.37	12.40	14.02	13.23	7.92	9.38	11.42
On 14-mesh	8.11	16.97	7.57	10.33	2.96	16.08	8.74	14.42	6.70	8.21	4.03	11.90
On 28-mesh	5.92	19.58	5.29	11.93	2.02	17.76	5.73	16.15	2.50	9.95	1.79	14.28
On 48-mesh	3.48	22.01	3.15	13.94	1.21	19.43	3.38	18.23	.97	14.67	.88	17.72
On 100-mesh	2.29	24.03	1.96	15.11	.82	20.77	2.16	19.41	.40	17.21	.54	20.65
On 200-mesh	1.14	23.75	.96	15.46	.45	20.15	1.08	18.69	.20	19.36	.27	21.66
Through 200-mesh	2.34	17.06	2.36	14.08	.97	16.94	2.07	16.03	.20	34.61	.52	28.99
Total	100.00	16.89	100.00	11.53	100.00	12.22	100.00	14.64	100.00	7.95	100.00	12.44

Mining district	Wilmington		Franklin-Williamson		Springfield		Saline-Gallatin		Danville		LaSalle	
Bed	No. 2		No. 6		No. 5		No. 5		No. 7		No. 2	
Sample No.	8		9		11		14		15		16	
Size	1½ x 0 washed		1½ x 0 raw		1¼ x 0 raw		2 x 0 raw		1½ x 0 raw		1¼ x 0 washed	
	Weight percent	Ash percent	Weight percent	Ash percent	Weight percent	Ash percent	Weight percent	Ash percent	Weight percent	Ash percent	Weight percent	Ash percent
On 1½	1.32	9.08	0.78	11.43			5.50	8.09	10.05	12.96		
On 1¼	8.42	7.47	4.99	9.73	2.26	17.70	6.97	7.96	10.29	11.24	0.68	10.87
On 1	11.90	6.84	9.74	10.41	13.60	14.53	11.23	8.32	13.84	11.83	5.62	9.40
On ¾	13.27	7.25	12.04	11.28	20.73	13.61	11.92	8.71	11.95	11.95	12.89	10.75
On ½	21.22	6.53	15.94	12.02	16.02	13.82	15.34	9.04	13.53	12.42	24.13	11.13
On ⅜	10.66	6.74	8.07	12.99	6.99	13.40	7.63	9.82	6.46	13.61	10.97	13.73
On 4-mesh	15.32	6.85	11.63	11.84	11.68	13.87	10.93	10.09	8.03	15.82	18.60	12.48
On 8-mesh	7.58	5.97	12.11	12.80	11.23	13.86	10.19	11.28	7.79	16.73	14.40	12.27
On 14-mesh	4.65	5.30	8.82	13.19	7.23	16.01	7.33	12.54	5.69	18.97	6.49	12.47
On 28-mesh	2.62	6.39	6.01	15.18	4.52	17.39	4.89	15.33	4.30	19.77	3.02	13.88
On 48-mesh	1.26	9.61	3.68	17.83	2.71	19.65	2.90	17.39	2.74	20.54	1.51	17.15
On 100-mesh	.76	18.77	2.37	19.73	1.66	21.42	1.86	18.34	1.83	21.33	.91	19.50
On 200-mesh	.46	23.40	1.07	19.96	.81	22.64	.99	18.13	1.12	20.89	.50	24.38
Through 200-mesh	.56	30.76	2.75	17.91	.56	23.41	2.32	14.93	2.38	15.96	.28	27.56
Total	100.00	7.09	100.00	12.74	100.00	14.67	100.00	10.40	100.00	14.15	100.00	12.13

Table 18 also reveals the resistance of the various beds to breakage. The No. 2 bed in the La Salle mining district had more than 87 percent plus 8-mesh size in the sample of 1¼-inch by 0 slack, and the No. 5 bed in the Eagle Valley mining district had but about 8 percent minus 8-mesh materials in a sample of 1½-inch by 0 slack. In contrast, an operation in the No. 5 bed in the Saline-Gallatin mining district removing the coal with heavily mechanized equipment shows more 20 percent minus 8-mesh size in its 2-inch by 0 screenings. The sample of 1¼-inch by 0 slack from the No. 2 bed in the La Salle mining district cited above is a washed coal, but as the product is air-cleaned the finer sizes are not lost as is the case when a wet-cleaned coal is passed over dewatering screens.

WASHABILITY DATA ON SAMPLES COLLECTED IN MINES

NO. 2 BED

NORTHERN ILLINOIS COAL CO.—NO. 10 MINE

No. 10 mine is a stripping operation in Grundy County, 3½ miles west of Wilmington. The mine sample was taken at the foot of the main entrance ramp to the No. 6 pit.

Section of coal bed

	Feet	Inches
Bony coal [1]		2
Coal		10½
Fusain and pyrite lens		1
Coal		5
Pyrite lens		1
Coal	1	1
Floor, soft fire clay		
Thickness of bed	2	8½
Thickness of sample	2	6½

[1] Not included in sample.

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	87.96	87.96	3.31	3.31	1.63	1.63
	1.30 to 1.35	2.22	90.18	9.47	3.46	5.11	1.72
	1.35 to 1.40	.96	91.14	13.34	3.57	7.52	1.78
	1.40 to 1.45	.49	91.63	17.34	3.64	10.24	1.82
	1.45 to 1.50	.29	91.92	20.01	3.69	12.32	1.86
1½- x ⅜-in	1.50 to 1.55	.25	92.17	22.89	3.74	12.82	1.88
	1.55 to 1.60	.12	92.29	26.94	3.77	14.04	1.90
59.44 percent of sample	1.60 to 1.65	.10	92.39	29.16	3.80	17.18	1.92
	1.65 to 1.70	.17	92.56	35.39	3.86	18.90	1.95
	1.70 to 1.75	.20	92.76	36.85	3.93	14.00	1.97
	1.75 to 1.80	.14	92.90	39.99	3.98	17.28	2.00
	Over 1.80	7.10	100.00	60.43	7.99	25.43	3.66
⅜-in. x 14-mesh	Under 1.30	86.24	86.24	2.99	2.99	1.39	1.39
	1.30 to 1.35	2.93	89.17	9.38	3.20	4.41	1.49
	1.35 to 1.40	1.60	90.77	13.47	3.38	5.66	1.56
	1.40 to 1.45	.82	91.59	16.30	3.50	7.73	1.62
	1.45 to 1.50	.58	92.17	20.68	3.61	9.35	1.67
	1.50 to 1.55	.39	92.56	23.63	3.69	10.97	1.71
32.07 percent of sample	1.55 to 1.60	.39	92.95	26.46	3.79	11.44	1.75
	1.60 to 1.65	.24	93.19	29.92	3.86	12.36	1.77
	1.65 to 1.70	.25	93.44	33.57	3.94	13.18	1.80
	1.70 to 1.75	.22	93.66	36.89	4.01	13.31	1.83
	1.75 to 1.80	.19	93.85	40.78	4.09	13.25	1.85
	Over 1.80	6.15	100.00	61.26	7.60	21.21	3.05
14- x 100-mesh	Under 1.30	57.58	57.58	2.04	2.04	1.03	1.03
	1.30 to 1.35	14.74	72.32	3.45	2.33	1.43	1.11
	1.35 to 1.40	4.02	76.34	7.15	2.58	2.55	1.19
	1.40 to 1.45	2.02	78.36	9.59	2.76	3.28	1.24
	1.45 to 1.50	1.21	79.57	13.70	2.93	4.56	1.29
	1.50 to 1.55	.91	80.48	14.87	3.06	4.77	1.33
7.19 percent of sample	1.55 to 1.60	.39	80.87	21.76	3.15	6.86	1.36
	1.60 to 1.65	.36	81.23	24.01	3.25	7.10	1.38
	1.65 to 1.70	.39	81.62	27.31	3.36	7.71	1.41
	1.70 to 1.75	.32	81.94	30.58	3.47	8.27	1.44
	1.75 to 1.80	.30	82.24	33.76	3.58	8.89	1.47
	Over 1.80	17.76	100.00	61.17	13.81	12.12	3.36
100-mesh x 0 1.30 percent of sample				17.57		5.06	

The mine sample was taken in 8–A pit, ½ mile parallel to main haulage road about 400 yards beyond last ramp.

Section of coal bed

	Feet	Inches
Bone coal [1]		2
Coal	1	10¾
Clay		¼
Coal		7
Pyrite		½
Coal		4
Floor, soft fire clay.		
Thickness of bed	3	½
Thickness of sample	2	10½

[1] Not included in sample.

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	64.43	64.43	4.24	4.24	2.46	2.46
	1.30 to 1.35	13.38	77.81	8.26	4.93	4.54	2.82
	1.35 to 1.40	6.03	83.84	11.53	5.41	6.50	3.08
	1.40 to 1.45	2.90	86.74	16.65	5.78	7.97	3.25
	1.45 to 1.50	1.77	88.51	18.59	6.04	9.34	3.37
1½- x ⅜-in.	1.50 to 1.55	1.27	89.78	21.12	6.25	10.91	3.47
	1.55 to 1.60	.84	90.62	24.46	6.42	11.68	3.55
	1.60 to 1.65	.41	91.03	27.13	6.51	14.12	3.60
59.50 percent of sample	1.65 to 1.70	.32	91.35	29.31	6.59	16.12	3.64
	1.70 to 1.75	.24	91.59	31.53	6.66	16.68	3.68
	1.75 to 1.80	.20	91.79	33.57	6.72	20.06	3.71
	Over 1.80	8.21	100.00	59.65	11.06	38.18	6.54
⅜-in. x 14-mesh	Under 1.30	73.48	73.48	3.35	3.35	2.03	2.03
	1.30 to 1.35	6.25	79.73	7.85	3.70	3.80	2.17
	1.35 to 1.40	3.66	83.39	11.20	4.03	5.21	2.30
	1.40 to 1.45	1.72	85.11	14.70	4.25	6.99	2.40
	1.45 to 1.50	1.21	86.32	17.93	4.44	8.25	2.48
	1.50 to 1.55	.86	87.18	20.85	4.60	9.19	2.55
31.93 percent of sample	1.55 to 1.60	.75	87.93	23.60	4.76	10.81	2.62
	1.60 to 1.65	.59	88.52	26.70	4.91	12.33	2.68
	1.65 to 1.70	.44	88.96	29.15	5.03	12.60	2.73
	1.70 to 1.75	.38	89.34	31.06	5.14	13.57	2.78
	1.75 to 1.80	.42	89.76	33.14	5.27	13.93	2.83
	Over 1.80	10.24	100.00	57.11	10.58	24.03	5.00
14- x 100-mesh	Under 1.30	57.59	57.59	3.17	3.17	1.94	1.94
	1.30 to 1.35	4.49	62.08	4.49	3.27	2.14	1.95
	1.35 to 1.40	3.47	65.55	8.14	3.52	3.54	2.04
	1.40 to 1.45	2.22	67.77	10.34	3.75	3.96	2.10
	1.45 to 1.50	1.41	69.18	12.52	3.93	5.00	2.16
	1.50 to 1.55	1.06	70.24	14.33	4.08	5.51	2.21
	1.55 to 1.60	.79	71.03	16.99	4.22	5.75	2.25
6.87 percent of sample	1.60 to 1.65	.69	71.72	21.16	4.39	6.59	2.29
	1.65 to 1.70	.62	72.34	23.29	4.55	6.59	2.33
	1.70 to 1.75	.37	72.71	26.68	4.66	7.43	2.35
	1.75 to 1.80	.42	73.13	31.12	4.82	8.13	2.39
	Over 1.80	26.87	100.00	60.43	19.76	11.09	4.73
100- mesh x 0 1.70 percent of sample				24.34		8.63	

UNION COAL CO.—UNION MINE

The Union mine is in La Salle County, between La Salle and Peru. The mine sample was taken at 2d north, 1st left, 2d room.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal	1	2½
Pyrite		½
Coal		½
Bone and coal	1	3¾
Coal		10½
Floor, soft fire clay.		
Thickness of bed	3	5¾
Thickness of sample	3	5¾

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	84.83	84.83	5.09	5.09	2.77	2.77
	1.30 to 1.35	7.29	92.12	10.94	5.55	3.95	2.86
	1.35 to 1.40	2.65	94.77	14.79	5.81	5.20	2.93
	1.40 to 1.45	1.43	96.20	17.94	5.99	6.90	2.99
	1.45 to 1.50	.91	97.11	21.18	6.13	8.51	3.04
1½- x ⅜-in.	1.50 to 1.55	.58	97.69	22.57	6.23	9.61	3.08
	1.55 to 1.60	.38	98.07	26.72	6.31	10.63	3.11
60.50 percent of sample	1.60 to 1.65	.33	98.40	28.83	6.39	12.86	3.14
	1.65 to 1.70	.26	98.66	30.71	6.45	10.68	3.16
	1.70 to 1.75	.29	98.95	31.46	6.52	16.59	3.20
	1.75 to 1.80	.11	99.06	33.80	6.55	12.85	3.21
	Over 1.80	.94	100.00	53.23	6.99	22.07	3.39
⅜-in. x 14-mesh	Under 1.30	82.72	82.72	4.02	4.02	2.46	2.46
	1.30 to 1.35	6.05	88.77	10.59	4.47	3.67	2.54
	1.35 to 1.40	3.03	91.80	14.33	4.79	4.28	2.60
	1.40 to 1.45	1.48	93.28	18.13	5.00	5.46	2.65
	1.45 to 1.50	.77	94.05	21.00	5.14	5.59	2.67
	1.50 to 1.55	.53	94.58	25.43	5.25	6.80	2.69
30.91 percent of sample	1.55 to 1.60	.39	94.97	28.12	5.34	7.46	2.71
	1.60 to 1.65	.26	95.23	31.73	5.42	7.67	2.73
	1.65 to 1.70	.33	95.56	32.26	5.51	8.75	2.75
	1.70 to 1.75	.26	95.82	34.39	5.59	9.26	2.76
	1.75 to 1.80	.26	96.08	34.92	5.67	9.88	2.78
	Over 1.80	3.92	100.00	57.29	7.69	18.68	3.41
14- x 100-mesh	Under 1.30	65.83	65.83	2.71	2.71	2.37	2.37
	1.30 to 1.35	14.28	80.11	6.75	3.43	3.17	2.51
	1.35 to 1.40	5.01	85.12	10.70	3.86	3.60	2.58
	1.40 to 1.45	2.90	88.02	14.28	4.20	4.06	2.63
	1.45 to 1.50	1.19	89.21	18.19	4.39	4.56	2.65
	1.50 to 1.55	.68	89.89	21.65	4.52	4.85	2.67
7.46 percent of sample	1.55 to 1.60	.48	90.37	24.35	4.62	5.82	2.68
	1.60 to 1.65	.32	90.69	27.55	4.70	6.71	2.70
	1.65 to 1.70	.24	90.93	27.55	4.77	6.71	2.71
	1.70 to 1.75	.20	91.13	31.79	4.82	7.36	2.72
	1.75 to 1.80	.16	91.29	31.79	4.87	7.36	2.73
	Over 1.80	8.71	100.00	61.95	9.84	12.79	3.60
100-mesh x 0, 1.13 percent of sample.				13.63		4.14	

Sample taken at 1st north, 1st left, 2d room.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal and shale		¾
Coal (vertical pyrite and calcite)	2	¾
Bone and coal		2¾
Coal		6½
Pyrite		¼
Coal		10¼
Pyrite		¼
Coal		1
Floor, soft fire clay.		
Thickness of bed	3	10½
Thickness of sample	3	10½

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	81.15	81.15	5.84	5.84	3.44	3.44
	1.30 to 1.35	8.70	89.85	12.35	6.47	4.10	3.50
	1.35 to 1.40	2.51	92.36	15.91	6.73	5.66	3.56
	1.40 to 1.45	1.71	94.07	17.10	6.92	8.23	3.65
	1.45 to 1.50	.97	95.04	21.26	7.06	11.14	3.72
1½- x ⅜ in.	1.50 to 1.55	.49	95.53	24.03	7.15	12.24	3.77
	1.55 to 1.60	.52	96.05	27.80	7.26	14.55	3.83
	1.60 to 1.65	.42	96.47	29.55	7.36	17.53	3.89
54.26 percent of sample	1.65 to 1.70	.27	96.74	32.71	7.43	16.92	3.92
	1.70 to 1.75	.23	96.97	34.86	7.49	18.41	3.96
	1.75 to 1.80	.17	97.14	35.13	7.54	19.69	3.98
	Over 1.80	2.86	100.00	57.66	8.98	34.38	4.85
⅜-in. x 14-mesh	Under 1.30	81.01	81.01	4.58	4.58	3.05	3.05
	1.30 to 1.35	7.68	88.69	11.05	5.14	4.63	3.19
	1.35 to 1.40	3.04	91.73	15.56	5.49	5.06	3.25
	1.40 to 1.45	1.48	93.21	19.72	5.71	6.02	3.29
	1.45 to 1.50	.78	93.99	22.31	5.85	8.05	3.33
	1.50 to 1.55	.44	94.43	24.57	5.94	10.64	3.37
34.94 percent of sample	1.55 to 1.60	.36	94.79	27.21	6.02	11.67	3.40
	1.60 to 1.65	.22	95.01	29.87	6.07	13.13	3.42
	1.65 to 1.70	.21	95.22	30.47	6.13	14.22	3.44
	1.70 to 1.75	.18	95.40	32.79	6.18	15.29	3.47
	1.75 to 1.80	.15	95.55	34.64	6.22	15.77	3.49
	Over 1.80	4.45	100.00	59.10	8.57	21.67	4.30
14- x 100-mesh	Under 1.30	66.58	66.58	3.49	3.49	2.60	2.60
	1.30 to 1.35	11.76	78.34	7.04	4.02	3.53	2.74
	1.35 to 1.40	6.96	85.30	9.60	4.48	4.33	2.87
	1.40 to 1.45	2.60	87.90	14.22	4.77	4.84	2.93
	1.45 to 1.50	1.19	89.09	18.80	4.95	5.20	2.96
	1.50 to 1.55	.77	89.86	21.17	5.09	6.22	2.99
9.37 percent of sample	1.55 to 1.60	.50	90.36	23.53	5.19	7.51	3.01
	1.60 to 1.65	.24	90.60	25.57	5.25	8.86	3.03
	1.65 to 1.70	.27	90.87	26.72	5.31	9.69	3.05
	1.70 to 1.75	.21	91.08	28.93	5.37	10.58	3.06
	1.75 to 1.80	.16	91.24	30.80	5.41	11.59	3.08
	Over 1.80	8.76	100.00	62.08	10.38	14.51	4.08
100-mesh x 0, 1.43 percent of sample				15.62		5.50	

NO. 5 BED

GALLATIN COUNTY COAL CO.—GALLATIN MINE

Gallatin mine is in Gallatin County 1¼ miles west of Junction. The mine sample was taken in 15 room off 1st and 2nd entries near face on right rib.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal		10½
Pyrite		1
Coal		10¼
Bone coal		¼
Coal	2	3
Pyrite		¼
Coal		8¼
Floor, soft fire clay.		
Thickness of bed	4	9½
Thickness of sample	4	9½

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	32.90	32.90	4.58	4.58	2.27	2.27
	1.30 to 1.35	34.19	67.09	8.95	6.81	2.66	2.47
	1.35 to 1.40	14.01	81.10	13.50	7.96	3.07	2.57
	1.40 to 1.45	1.71	82.81	16.77	8.15	6.19	2.65
	1.45 to 1.50	1.33	84.14	19.38	8.32	8.97	2.75
1½- x ⅜-in.	1.50 to 1.55	1.19	85.33	21.55	8.51	11.29	2.87
	1.55 to 1.60	2.19	87.52	23.69	8.89	13.48	3.13
50.41 percent of sample	1.60 to 1.65	1.93	89.45	25.64	9.25	15.28	3.39
	1.65 to 1.70	1.19	90.64	27.42	9.49	17.06	3.57
	1.70 to 1.75	.86	91.50	29.89	9.68	19.08	3.72
	1.75 to 1.80	.70	92.20	31.49	9.84	19.13	3.84
	Over 1.80	7.80	100.00	51.98	13.13	27.61	5.69
⅜-in. x 14-mesh	Under 1.30	37.04	37.04	4.16	4.16	2.32	2.32
	1.30 to 1.35	32.74	69.78	8.84	6.36	2.79	2.54
	1.35 to 1.40	14.28	84.06	12.82	7.45	3.39	2.68
	1.40 to 1.45	4.06	88.12	16.89	7.89	5.06	2.79
	1.45 to 1.50	2.27	90.39	19.44	8.18	7.11	2.90
	1.50 to 1.55	1.28	91.67	21.43	8.36	9.64	3.00
37.56 percent of sample	1.55 to 1.60	1.15	92.82	23.80	8.56	11.77	3.11
	1.60 to 1.65	.77	93.59	25.69	8.70	13.45	3.19
	1.65 to 1.70	.72	94.31	27.85	8.84	15.74	3.29
	1.70 to 1.75	.49	94.80	30.34	8.95	17.37	3.36
	1.75 to 1.80	.43	95.23	31.61	9.06	18.42	3.43
	Over 1.80	4.77	100.00	52.15	11.11	23.07	4.36
14- x 100-mesh	Under 1.30	57.86	57.86	4.50	4.50	2.74	2.74
	1.30 to 1.35	12.28	70.14	9.76	5.42	2.92	2.77
	1.35 to 1.40	7.46	77.60	13.95	6.24	3.74	2.86
	1.40 to 1.45	3.64	81.24	16.68	6.71	4.58	2.94
	1.45 to 1.50	2.32	83.56	19.16	7.05	5.24	3.01
	1.50 to 1.55	1.41	84.97	21.15	7.29	5.05	3.04
9.42 percent of sample	1.55 to 1.60	1.05	86.02	22.86	7.48	7.21	3.09
	1.60 to 1.65	.57	86.59	25.27	7.60	8.78	3.13
	1.65 to 1.70	.51	87.10	27.85	7.71	10.13	3.17
	1.70 to 1.75	.48	87.58	29.78	7.83	9.85	3.21
	1.75 to 1.80	.30	87.88	31.96	7.92	10.27	3.23
	Over 1.80	12.12	100.00	60.08	14.24	15.78	4.75
100-mesh x 0, 2.61 percent of sample				14.87		15.78	

The mine sample was taken in 15 room off 1st and 2d east entries, near first breakthrough to left on left rib.

Section of coal bed

	Feet	Inches
Roof, shale:		
Coal	1	3½
Fusain		¼
Coal		7½
Fusain		¼
Coal and small fusain bands under ¼-in	1	6¾
Pyrite		¼
Coal and small fusain bands under ¼-in	1	2½
Floor, soft fire clay.		
Thickness of bed	4	9
Thickness of sample	4	9

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size..	Under 1.30	35.05	35.05	4.66	4.66	2.31	2.31
	1.30 to 1.35	32.05	67.10	8.73	6.60	2.64	2.47
	1.35 to 1.40	14.87	81.97	12.78	7.72	3.55	2.66
	1.40 to 1.45	4.88	86.85	16.86	8.24	6.13	2.86
	1.45 to 1.50	4.17	91.02	19.46	8.75	7.87	3.09
1½. x ⅜-in	1.50 to 1.55	1.62	92.64	22.55	8.99	9.79	3.21
	1.55 to 1.60	1.21	93.85	23.24	9.18	13.27	3.34
59.65 percent of sample	1.60 to 1.65	.59	94.44	25.55	9.28	14.87	3.41
	1.65 to 1.70	.44	94.88	27.50	9.36	17.61	3.47
	1.70 to 1.75	.26	95.14	28.81	9.42	19.59	3.52
	1.75 to 1.80	.24	95.38	30.47	9.47	20.63	3.56
	Over 1.80	4.62	100.00	42.12	10.98	29.10	4.74
⅜-in. x 14-mesh	Under 1.30	42.83	42.83	3.76	3.76	2.29	2.29
	1.30 to 1.35	27.54	70.37	8.87	5.76	2.68	2.44
	1.35 to 1.40	11.49	81.86	13.27	6.81	3.70	2.62
	1.40 to 1.45	5.33	87.19	16.93	7.43	5.62	2.80
	1.45 to 1.50	3.33	90.52	20.16	7.90	6.93	2.95
	1.50 to 1.55	1.71	92.23	23.84	8.20	7.91	3.05
29.82 percent of sample	1.55 to 1.60	1.06	93.29	26.67	8.41	8.97	3.11
	1.60 to 1.65	.66	93.95	28.29	8.55	10.39	3.16
	1.65 to 1.70	.48	94.43	30.44	8.66	11.96	3.21
	1.70 to 1.75	.40	94.83	30.91	8.75	13.02	3.25
	1.75 to 1.80	.30	95.13	29.98	8.82	13.12	3.28
	Over 1.80	4.87	100.00	55.44	11.09	24.15	4.30
14- x 100-mesh	Under 1.30	49.70	49.70	3.33	3.33	2.41	2.41
	1.30 to 1.35	18.45	68.15	7.18	4.37	2.77	2.51
	1.35 to 1.40	6.72	74.87	12.95	5.14	3.54	2.60
	1.40 to 1.45	3.74	78.61	16.02	5.66	4.52	2.69
	1.45 to 1.50	2.65	81.26	18.51	6.08	5.22	2.77
	1.50 to 1.55	1.18	82.44	21.15	6.29	6.20	2.82
8.32 percent of sample	1.55 to 1.60	1.50	83.94	22.11	6.58	6.01	2.88
	1.60 to 1.65	.83	84.77	25.35	6.76	6.72	2.92
	1.65 to 1.70	.58	85.35	28.48	6.91	7.27	2.95
	1.70 to 1.75	.51	85.86	30.80	7.05	7.33	2.97
	1.75 to 1.80	.42	86.28	32.68	7.18	7.41	2.99
	Over 1.80	13.72	100.00	61.11	14.58	13.42	4.43
100-mesh x 0 2.21 percent of sample				14.88		4.87	

MIDLAND ELECTRIC COAL CORP.—VULCAN MINE

The Vulcan mine is a stripping operation in Fulton County 2 miles northwest of Rapatee. The mine sample was taken 175 feet from north end of pit No. 5.

Section of coal bed

	Ft.	Inches
Coal with small bony streaks	1	9½
Bone coal		¼
Coal		9½
Bone coal		¼
Coal		1¾
Bone coal		½
Coal		9¼
Floor, soft fire clay.		
Thickness of bed	3	7
Thickness of sample	3	7

Washington characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	25.63	25.63	8.82	8.82	2.62	2.62
	1.30 to 1.35	32.42	58.05	13.25	11.29	2.74	2.69
	1.35 to 1.40	13.93	71.98	16.67	12.33	2.69	2.69
	1.40 to 1.45	5.29	77.27	20.20	12.87	3.61	2.75
	1.45 to 1.50	4.21	81.48	24.58	13.48	3.73	2.80
1½- x ⅜-in.	1.50 to 1.55	3.20	84.68	26.34	13.96	4.64	2.87
	1.55 to 1.60	2.03	86.71	29.62	14.33	5.56	2.93
	1.60 to 1.65	1.19	87.90	32.04	14.57	5.77	2.97
57.51 percent of sample	1.65 to 1.70	1.67	89.57	36.05	14.97	6.43	3.04
	1.70 to 1.75	1.55	91.12	36.77	15.34	7.22	3.11
	1.75 to 1.80	.98	92.10	37.03	15.57	6.84	3.15
	Over 1.80	7.90	100.00	52.55	18.49	16.86	4.23
⅜-in. x 14-mesh	Under 1.30	37.35	37.35	6.90	6.90	2.41	2.41
	1.30 to 1.35	26.92	64.27	11.90	8.99	2.58	2.48
	1.35 to 1.40	14.46	78.73	15.23	10.14	2.74	2.53
	1.40 to 1.45	4.47	83.20	18.84	10.61	3.34	2.57
	1.45 to 1.50	2.31	85.51	22.24	10.92	3.67	2.60
	1.50 to 1.55	1.31	86.82	25.35	11.14	3.90	2.62
32.56 percent of sample	1.55 to 1.60	.95	87.77	28.00	11.32	4.21	2.64
	1.60 to 1.65	.92	88.69	30.50	11.52	4.34	2.66
	1.65 to 1.70	.74	89.43	32.08	11.69	4.49	2.67
	1.70 to 1.75	.75	90.18	33.30	11.92	4.10	2.68
	1.75 to 1.80	.71	90.89	34.74	12.05	3.88	2.69
	Over 1.80	9.11	100.00	55.18	15.98	8.78	3.25
14- x 100-mesh	Under 1.30	19.80	19.80	3.35	3.35	2.26	2.26
	1.30 to 1.35	24.67	44.47	6.60	5.15	2.45	2.37
	1.35 to 1.40	21.76	66.23	10.83	7.02	2.63	2.45
	1.40 to 1.45	8.08	74.31	14.98	7.88	2.86	2.50
	1.45 to 1.50	3.85	78.16	17.88	8.38	3.07	2.52
	1.50 to 1.55	2.07	80.23	20.17	8.68	3.40	2.55
8.27 percent of sample	1.55 to 1.60	1.02	81.25	23.48	8.87	3.59	2.56
	1.60 to 1.65	.87	82.12	25.26	9.04	3.93	2.58
	1.65 to 1.70	.70	82.82	27.33	9.19	3.88	2.59
	1.70 to 1.75	.64	83.46	28.96	9.35	3.82	2.60
	1.75 to 1.80	.50	83.96	30.86	9.47	3.49	2.60
	Over 1.80	16.04	100.00	56.50	17.02	5.82	3.12
100-mesh x 0; 1.66 percent of sample				21.02		3.38	

PANTHER CREEK MINES, INC.—PANTHER CREEK NO. 5 MINE

Panther Creek No. 5 mine is in Sangamon County in the town of Springfield. The mine sample was taken at 22 west at 15 north.

Section of coal bed

	Feet	Inches
Roof, shale:		
Coal	1	5¼
Pyrite		1½
Coal	3	3½
Pyrite		⅛
Coal—laminated		10
Floor, soft fire clay:		
Thickness of bed	5	8⅜
Thickness of sample	5	8⅜

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	40.20	40.20	7.59	7.59	2.76	2.76
	1.30 to 1.35	29.31	69.51	11.01	9.03	3.18	2.94
	1.35 to 1.40	13.47	82.98	14.84	9.97	4.62	3.21
	1.40 to 1.45	6.74	89.72	19.27	10.67	6.01	3.42
	1.45 to 1.50	4.18	93.90	22.59	11.20	7.19	3.59
1½- x ⅜-in	1.50 to 1.55	1.55	95.45	25.40	11.43	8.34	3.67
	1.55 to 1.60	.95	96.40	26.67	11.58	7.52	3.70
	1.60 to 1.65	.54	96.94	28.43	11.68	10.56	3.74
49.45 percent of sample	1.65 to 1.70	.35	97.29	28.30	11.74	12.86	3.77
	1.70 to 1.75	.42	97.71	31.20	11.82	13.59	3.82
	1.75 to 1.80	.18	97.89	31.65	11.86	6.74	3.82
	Over 1.80	2.11	100.00	42.44	12.50	24.27	4.25
⅜-in. x 14-mesh	Under 1.30	43.65	43.65	5.26	5.26	2.80	2.80
	1.30 to 1.35	26.66	70.31	10.11	7.10	3.32	3.00
	1.35 to 1.40	13.42	83.73	14.04	8.21	4.49	3.24
	1.40 to 1.45	5.16	88.89	18.65	8.82	5.27	3.35
	1.45 to 1.50	2.90	91.79	23.28	9.27	5.92	3.44
	1.50 to 1.55	1.59	93.38	26.49	9.57	6.70	3.49
	1.55 to 1.60	1.06	94.44	29.72	9.79	7.32	3.53
37.62 percent of sample	1.60 to 1.65	.57	95.01	31.84	9.93	7.81	3.56
	1.65 to 1.70	.54	95.55	32.78	10.06	8.62	3.59
	1.70 to 1.75	.43	95.98	34.25	10.16	7.96	3.61
	1.75 to 1.80	.40	96.38	34.80	10.27	7.40	3.62
	Over 1.80	3.62	100.00	45.99	11.56	10.60	3.88
14- x 100-mesh	Under 1.30	32.92	32.92	3.50	3.50	2.65	2.65
	1.30 to 1.35	24.26	57.18	6.52	4.78	2.92	2.76
	1.35 to 1.40	16.89	74.07	10.82	6.16	3.49	2.93
	1.40 to 1.45	7.52	81.59	14.64	6.94	4.13	3.04
	1.45 to 1.50	3.72	85.31	18.87	7.46	4.93	3.12
	1.50 to 1.55	1.95	87.26	22.83	7.80	5.52	3.18
	1.55 to 1.60	1.22	88.48	26.23	8.06	5.77	3.21
10.82 percent of sample	1.60 to 1.65	.95	89.43	28.48	8.27	6.33	3.25
	1.65 to 1.70	.63	90.06	30.87	8.43	6.63	3.27
	1.70 to 1.75	.57	90.63	32.48	8.58	6.19	3.29
	1.75 to 1.80	.53	91.16	34.35	8.73	5.99	3.30
	Over 1.80	8.84	100.00	55.28	12.85	12.99	4.16
100-mesh x 0, 2.11 percent of sample				16.43		4.58	

The sample was taken at 21 west inby 14 south.

Section of coal bed

	Feet	Inches
Roof, shale:		
Coal	1	2¾
Bone coal		¾
Coal (pyrite streaks)	3	9½
Coal, laminated with bone		9
Floor, soft fire clay:		
Thickness of bed	5	10
Thickness of sample	5	10

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½ in. top size	Under 1.30	42.52	42.52	7.20	7.20	2.86	2.86
	1.30 to 1.35	27.24	69.76	10.97	8.67	3.76	3.21
	1.35 to 1.40	12.97	82.73	15.53	9.75	4.61	3.43
	1.40 to 1.45	7.06	89.79	20.49	10.59	5.24	3.57
	1.45 to 1.50	3.70	93.49	24.68	11.15	6.40	3.68
1½- x ⅜-in	1.50 to 1.55	2.75	96.24	27.19	11.61	7.43	3.79
	1.55 to 1.60	.93	97.17	28.31	11.77	9.92	3.85
	1.60 to 1.65	.55	97.72	27.78	11.86	8.26	3.88
41.90 percent of sample	1.65 to 1.70	.52	98.24	31.50	11.96	11.82	3.92
	1.70 to 1.75	.30	98.54	34.92	12.03	10.72	3.94
	1.75 to 1.80	.19	98.73	32.44	12.07	9.64	3.95
	Over 1.80	1.27	100.00	49.23	12.54	21.36	4.17
⅜-in. x 14-mesh	Under 1.30	50.38	50.38	5.94	5.94	2.76	2.76
	1.30 to 1.35	22.04	72.42	10.51	7.33	3.69	3.04
	1.35 to 1.40	10.91	83.33	14.56	8.28	4.53	3.24
	1.40 to 1.45	4.49	87.82	19.25	8.84	5.00	3.33
	1.45 to 1.50	2.71	90.53	24.54	9.31	5.36	3.39
	1.50 to 1.55	1.99	92.52	28.37	9.72	5.31	3.43
43.03 percent of sample	1.55 to 1.60	1.25	93.77	32.42	10.02	6.11	3.47
	1.60 to 1.65	.74	94.51	33.54	10.21	6.79	3.49
	1.65 to 1.70	.54	95.05	35.08	10.35	8.24	3.52
	1.70 to 1.75	.40	95.45	37.05	10.46	8.37	3.54
	1.75 to 1.80	.45	95.90	37.40	10.58	8.81	3.56
	Over 1.80	4.10	100.00	51.88	12.28	20.36	4.25
14- x 100-mesh	Under 1.30	33.61	33.61	4.17	4.17	2.56	2.56
	1.30 to 1.35	25.45	59.06	7.14	5.45	3.01	2.75
	1.35 to 1.40	14.85	73.91	10.19	6.40	3.38	2.88
	1.40 to 1.45	6.94	80.85	13.96	7.05	4.12	2.99
	1.45 to 1.50	3.84	84.69	17.73	7.54	4.56	3.06
	1.50 to 1.55	1.99	86.68	22.36	7.88	5.03	3.10
12.95 percent of sample	1.55 to 1.60	1.38	88.06	26.10	8.16	5.23	3.14
	1.60 to 1.65	.77	88.83	30.06	8.35	5.44	3.16
	1.65 to 1.70	.83	89.66	31.28	8.56	5.12	3.17
	1.70 to 1.75	.58	90.24	34.50	8.73	5.61	3.19
	1.75 to 1.80	.44	90.68	36.94	8.87	6.14	3.20
	Over 1.80	9.32	100.00	57.29	13.38	12.56	4.08
100-mesh x 0, 2.12 percent of sample				17.83		4.46	

SAHARA COAL CO.—SAHARA NO. 5 MINE

Sahara No. 5 is in Saline County about 10 miles west of Harrisburg. The mine sample was taken about 15,000 feet from shaft bottom on rib of No. 2 main east entry.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal		8¾
Fusain		⅛
Coal		7⅛
Fusain		¼
Coal		6⅜
Pyrite		½
Coal		8
Fusain		¼
Coal		4½
Fusain		⅛
Coal		1
Fusain		⅛
Coal		3⅜
Pyrite		½
Coal	2	8
Floor, hard fire clay.		
Thickness of bed	6	1
Thickness of sample	6	1

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½ in. top size	Under 1.30	29.19	29.19	4.02	4.02	1.42	1.42
	1.30 to 1.35	52.96	82.15	7.44	6.22	1.77	1.65
	1.35 to 1.40	7.70	89.85	11.80	6.70	3.07	1.77
1½- x ⅜ in.	1.40 to 1.45	1.00	90.85	16.62	6.81	7.15	1.83
	1.45 to 1.50	1.00	91.85	16.62	6.92	7.15	1.88
61.94 percent of sample	1.50 to 1.55	.48	92.33	22.48	7.00	11.41	1.93
	1.55 to 1.60	.48	92.81	22.48	7.08	11.41	1.98
	Over 1.60	7.19	100.00	54.38	10.48	38.96	4.64
⅜ in. x 14-mesh	Under 1.30	36.02	36.02	3.29	3.29	1.46	1.46
	1.30 to 1.35	46.85	82.87	7.22	5.51	1.77	1.64
	1.35 to 1.40	8.68	91.55	12.35	6.16	2.73	1.74
	1.40 to 1.45	1.40	92.95	17.27	6.33	5.53	1.80
28.75 percent of sample	1.45 to 1.50	1.41	94.36	17.27	6.49	5.53	1.85
	1.50 to 1.55	.35	94.71	24.10	6.56	10.09	1.88
	1.55 to 1.60	.35	95.06	24.10	6.62	10.09	1.91
	Over 1.60	4.94	100.00	53.54	8.94	28.90	3.25
14- x 100-mesh	Under 1.30	57.88	57.88	3.12	3.12	1.40	1.40
	1.30 to 1.35	17.46	75.34	8.20	4.30	1.87	1.51
	1.35 to 1.40	6.83	82.17	12.52	4.98	2.30	1.57
	1.40 to 1.45	1.97	84.14	16.64	5.25	2.97	1.61
7.10 percent of sample	1.45 to 1.50	1.97	86.11	16.64	5.51	2.97	1.64
	1.50 to 1.55	.84	86.95	28.62	5.74	6.19	1.68
	1.55 to 1.60	.85	87.80	28.62	5.96	6.19	1.73
	Over 1.60	12.20	100.00	61.28	12.71	20.15	3.97
100-mesh x 0, 2.21 percent of sample				12.27		3.52	

SAHARA COAL CO.—SAHARA NO. 16 MINE

Sahara No. 16 mine is in Saline County, 5 miles west of Harrisburg. The mine sample was taken in 8 south entry, off 3d main east on left side of last breakthrough between entries at No. 52 room.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal		2
Pyrite		¼
Coal	1	¼
Fusain		¼
Coal		2½
Fusain		¼
Coal		1
Fusain		¼
Coal, containing small bands	5	4
Floor, hard fire clay.		
Thickness of bed	6	10¾
Thickness of sample	6	10¾

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½in. top size	Under 1.30	51.85	51.85	3.83	3.83	0.72	0.72
	1.30 to 1.35	38.64	90.49	7.35	5.33	1.04	.86
	1.35 to 1.40	4.78	95.27	11.58	5.65	1.79	.90
	1.40 to 1.45	1.26	96.53	15.80	5.78	1.84	.92
	1.45 to 1.50	.37	96.90	20.18	5.83	2.06	.92
1½- x ⅜in.	1.50 to 1.55	.42	97.32	22.70	5.91	2.00	.92
	1.55 to 1.60	.21	97.53	24.93	5.95	2.93	.93
46.81 percent of sample	1.60 to 1.65	.34	97.87	27.73	6.02	6.80	.95
	1.65 to 1.70	.20	98.07	29.12	6.07	.36	.95
	1.70 to 1.75	.15	98.22	31.23	6.11	.29	.95
	1.75 to 1.80	.22	98.44	30.31	6.16	.22	.95
	Over 1.80	1.56	100.00	45.78	6.78	4.89	1.01
⅜- in. x 14-mesh	Under 1.30	50.41	50.41	3.38	3.38	0.76	0.76
	1.30 to 1.35	35.17	85.58	6.83	4.80	.91	.82
	1.35 to 1.40	6.90	92.48	11.56	5.30	1.30	.86
	1.40 to 1.45	1.49	93.97	15.02	5.46	1.52	.87
	1.45 to 1.50	.65	94.62	19.38	5.55	1.62	.87
	1.50 to 1.55	.49	95.11	23.81	5.65	1.84	.88
40.25 percent of sample	1.55 to 1.60	.31	95.42	26.23	5.71	2.10	.88
	1.60 to 1.65	.30	95.72	28.84	5.77	2.15	.89
	1.65 to 1.70	.28	96.00	31.40	5.86	1.69	.89
	1.70 to 1.75	.24	96.24	32.22	5.93	2.11	.89
	1.75 to 1.80	.27	96.51	33.38	6.00	1.67	.89
	Over 1.80	3.49	100.00	51.93	7.61	7.13	1.11
14- x 100-mesh	Under 1.30	68.98	68.98	4.90	4.90	1.36	1.36
	1.30 to 1.35	12.25	81.23	8.28	5.41	1.13	1.33
	1.35 to 1.40	4.68	85.91	12.10	5.77	1.28	1.32
	1.40 to 1.45	2.00	87.91	13.94	5.96	1.28	1.32
	1.45 to 1.50	1.12	89.03	17.60	6.11	1.38	1.32
	1.50 to 1.55	.64	89.67	21.29	6.21	1.57	1.32
10.61 percent of sample	1.55 to 1.60	.40	90.07	24.94	6.30	1.70	1.33
	1.60 to 1.65	.52	90.59	26.74	6.42	1.78	1.33
	1.65 to 1.70	.28	90.87	32.64	6.50	1.68	1.33
	1.70 to 1.75	.24	91.11	32.64	6.56	1.68	1.33
	1.75 to 1.80	.24	91.35	32.64	6.63	1.68	1.33
	Over 1.80	8.65	100.00	62.80	11.49	5.87	1.72
100 mesh x 0, 2.33 percent of sample.				14.94		2.46	

The mine sample was taken at 8 south entry off 3 main east on right side of last breakthrough between entries at No. 52 room.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal		¾
Shale		¼
Coal		2½
Shale		½
Coal		5
Pyrite		¾
Coal (containing small pyrite bands)	6	3½
Floor, hard fire clay.		
Thickness of bed	7	1¼
Thickness of sample	7	1¼

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	63.60	63.60	4.54	4.54	0.71	0.71
	1.30 to 1.35	30.24	93.84	8.75	5.90	.98	.80
	1.35 to 1.40	3.61	97.45	13.70	6.19	1.69	.83
	1.40 to 1.45	1.04	98.49	19.05	6.32	2.36	.85
	1.45 to 1.50	.30	98.79	22.68	6.37	3.76	.86
1½- x ⅜-in	1.50 to 1.55	.20	98.99	24.47	6.41	6.54	.87
	1.55 to 1.60	.16	99.15	27.23	6.44	9.02	.88
	1.60 to 1.65	.05	99.20	27.23	6.45	9.02	.88
43.71 percent of sample	1.65 to 1.70	.18	99.38	28.32	6.49	17.58	.91
	1.70 to 1.75	.02	99.40	28.32	6.50	17.58	.92
	1.75 to 1.80	.04	99.44	28.32	6.50	17.58	.92
	Over 1.80	.56	100.00	53.95	6.77	18.51	1.02
⅜-in. x 14-mesh	Under 1.30	61.89	61.89	3.52	3.52	0.74	0.74
	1.30 to 1.35	25.52	87.41	7.84	4.78	1.11	.85
	1.35 to 1.40	5.49	92.90	12.86	5.26	1.52	.89
	1.40 to 1.45	2.30	95.20	17.68	5.59	1.77	.91
	1.45 to 1.50	.76	95.96	20.73	5.68	2.87	.92
	1.50 to 1.55	.47	96.43	24.95	5.77	3.31	.94
44.69 percent of sample	1.55 to 1.60	.26	96.69	27.22	5.83	4.38	.95
	1.60 to 1.65	.19	96.88	28.44	5.87	4.78	.95
	1.65 to 1.70	.13	97.01	29.59	5.91	6.06	.96
	1.70 to 1.75	.09	97.10	32.46	5.93	7.54	.97
	1.75 to 1.80	.09	97.19	32.46	5.96	7.54	.97
	Over 1.80	2.81	100.00	61.84	7.53	11.72	1.27
14- x 100-mesh	Under 1.30	73.28	73.28	3.52	3.52	0.84	0.84
	1.30 to 1.35	5.78	79.06	10.24	4.01	1.41	.88
	1.35 to 1.40	3.66	82.72	13.54	4.43	1.37	.90
	1.40 to 1.45	1.69	84.41	16.55	4.68	1.37	.91
	1.45 to 1.50	1.41	85.82	18.06	4.90	1.40	.92
	1.50 to 1.55	1.03	86.85	19.99	5.07	1.42	.92
9.33 percent of sample	1.55 to 1.60	.33	87.18	23.91	5.15	1.77	.93
	1.60 to 1.65	.47	87.65	23.91	5.25	1.77	.93
	1.65 to 1.70	.33	87.98	29.90	5.34	2.19	.94
	1.70 to 1.75	.28	88.26	29.90	5.42	2.19	.94
	1.75 to 1.80	.23	88.49	29.90	5.48	2.19	.95
	Over 1.80	11.51	100.00	63.05	12.11	3.82	1.28
100-mesh x 0, 2.27 percent of sample				12.91		1.28	

NO. 6 BED

CONSOLIDATED COAL CO.—CONSOLIDATED NO. 7 MINE

The No. 7 mine is in Macoupin County 2 miles northeast of Staunton. The mine sample was taken 30 feet in on right rib of 9 stub entry, off 8 left, off main east.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal	1	1¾
Pyrite		¼
Coal		11¾
Pyrite		¼
Coal		¾
Pyrite		¼
Coal		7
Fusain (mother coal)		1
Coal		4½
Pyrite		¼
Coal	2	7¼
Pyrite		½
Coal		2½
Shale (blue band)		1
Coal	1	1¾
Floor, hard fire clay.		
Thickness of bed	7	4¾
Thickness of sample	7	4¾

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	61.10	61.10	6.06	6.06	3.50	3.50
	1.30 to 1.35	16.81	77.91	11.28	7.19	3.59	3.52
	1.35 to 1.40	7.94	85.85	15.62	7.97	4.57	3.62
	1.40 to 1.45	3.32	89.17	20.83	8.45	5.15	3.67
	1.45 to 1.50	1.84	91.01	26.21	8.80	4.97	3.70
1½- x ⅜-in	1.50 to 1.55	.93	91.94	29.67	9.02	6.42	3.73
	1.55 to 1.60	.89	92.83	32.79	9.24	7.83	3.77
55.80 percent of sample	1.60 to 1.65	.36	93.19	37.44	9.35	7.67	3.78
	1.65 to 1.70	.46	93.65	38.06	9.49	10.22	3.81
	1.70 to 1.75	.29	93.94	33.76	9.57	16.86	3.85
	1.75 to 1.80	.24	94.18	36.33	9.64	17.64	3.89
	Over 1.80	5.82	100.00	62.37	12.71	23.54	5.03
⅜-in. x 14-mesh	Under 1.30	63.47	63.47	4.58	4.58	3.27	3.27
	1.30 to 1.35	15.70	79.17	10.52	5.76	3.71	3.36
	1.35 to 1.40	7.47	86.64	14.57	6.52	4.37	3.44
	1.40 to 1.45	3.71	90.35	19.13	7.04	4.87	3.50
	1.45 to 1.50	1.81	92.16	23.92	7.37	5.34	3.54
	1.50 to 1.55	1.02	93.18	28.24	7.60	5.83	3.56
34.81 percent of sample	1.55 to 1.60	.65	93.83	32.32	7.77	6.43	3.58
	1.60 to 1.65	.40	94.23	34.21	7.88	7.44	3.60
	1.65 to 1.70	.35	94.58	38.09	7.99	7.63	3.62
	1.70 to 1.75	.27	94.85	41.20	8.09	8.04	3.63
	1.75 to 1.80	.19	95.04	44.74	8.16	8.02	3.64
	Over 1.80	4.96	100.00	62.46	10.85	22.95	4.59
14- x 100-mesh	Under 1.30	24.54	24.54	2.50	2.50	3.27	3.27
	1.30 to 1.35	31.92	56.46	3.62	3.13	3.33	3.30
	1.35 to 1.40	16.95	73.41	8.52	4.38	3.35	3.31
	1.40 to 1.45	6.84	80.25	12.83	5.10	3.68	3.35
	1.45 to 1.50	4.62	84.87	16.97	5.74	3.90	3.38
	1.50 to 1.55	1.93	86.80	20.47	6.07	4.25	3.40
7.56 percent of sample	1.55 to 1.60	1.38	88.18	24.05	6.35	4.57	3.41
	1.60 to 1.65	.86	89.04	27.51	6.56	4.96	3.43
	1.65 to 1.70	.65	89.69	30.57	6.73	5.47	3.44
	1.70 to 1.75	.47	90.16	33.04	6.87	5.82	3.46
	1.75 to 1.80	.39	90.55	35.65	6.99	6.04	3.47
	Over 1.80	9.45	100.00	62.34	12.22	15.72	4.62
100-mesh x 0, 1.83 percent of sample				12.78		3.96	

Sample was taken at 4 right, 600 feet off 9 left, off main 8 left entry.

Section of coal bed

	Foot	Inches
Roof, shale.		
Coal		7
Pyrite		¼
Coal		6¾
Pyrite		¼
Coal		7½
Pyrite		½
Coal banded with pyrite	1	9
Pyrite		¼
Coal		7
Pyrite		¼
Coal	1	6
Pyrite		¾
Coal		4
Shale (blue band)		1
Coal	1	2
Floor, hard fire clay.		
Thickness of bed	7	4½
Thickness of sample	7	4½

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	54.69	54.69	5.58	5.58	3.69	3.69
	1.30 to 1.35	23.73	78.42	10.39	7.04	4.16	3.83
	1.35 to 1.40	8.21	86.63	15.75	7.86	4.29	3.88
	1.40 to 1.45	2.70	89.33	22.15	8.29	4.05	3.88
1½- x ⅜-in.	1.45 to 1.50	1.53	90.86	25.94	8.59	5.35	3.91
	1.50 to 1.55	.84	91.70	29.21	8.79	6.57	3.93
50.00 percent of sample	1.55 to 1.60	.46	92.16	32.43	8.90	8.08	3.95
	1.60 to 1.65	.23	92.39	35.73	8.96	8.31	3.96
	1.65 to 1.70	.34	92.73	39.63	9.08	9.48	3.98
	1.70 to 1.75	.13	92.86	37.67	9.12	10.25	3.99
	1.75 to 1.80	.23	93.09	51.94	9.22	4.48	3.99
	Over 1.80	6.91	100.00	59.78	12.72	26.04	5.52
⅜-in. x 14-mesh	Under 1.30	59.48	59.48	4.00	4.00	3.53	3.53
	1.30 to 1.35	20.95	80.43	9.78	5.51	3.92	3.63
	1.35 to 1.40	7.91	88.34	14.78	6.34	4.21	3.68
	1.40 to 1.45	2.66	91.00	20.33	6.75	4.36	3.70
	1.45 to 1.50	1.51	92.51	24.97	7.04	4.76	3.72
	1.50 to 1.55	.88	93.39	29.55	7.25	5.10	3.73
38.45 percent of sample	1.55 to 1.60	.57	93.96	33.98	7.42	5.37	3.74
	1.60 to 1.65	.40	94.36	37.45	7.54	6.28	3.75
	1.65 to 1.70	.32	94.68	41.54	7.66	6.16	3.76
	1.70 to 1.75	.25	94.93	44.28	7.76	6.64	3.77
	1.75 to 1.80	.17	95.10	49.25	7.83	6.07	3.77
	Over 1.80	4.90	100.00	66.43	10.70	18.44	4.49
14- x 100-mesh	Under 1.30	31.85	31.85	2.45	2.45	3.24	3.24
	1.30 to 1.35	28.45	60.30	4.24	3.29	3.79	3.50
	1.35 to 1.40	15.39	75.69	8.58	4.37	3.92	3.58
	1.40 to 1.45	7.12	82.81	13.11	5.12	3.99	3.62
	1.45 to 1.50	3.18	85.99	17.66	5.58	4.18	3.64
	1.50 to 1.55	1.90	87.89	21.81	5.94	3.98	3.65
9.34 percent of sample	1.55 to 1.60	1.26	89.15	25.84	6.22	3.96	3.65
	1.60 to 1.65	.64	89.79	30.79	6.39	4.10	3.66
	1.65 to 1.70	.52	90.31	33.80	6.55	4.24	3.66
	1.70 to 1.75	.38	90.69	37.28	6.68	4.45	3.66
	1.75 to 1.80	.43	91.12	38.62	6.83	4.45	3.67
	Over 1.80	8.88	100.00	64.50	11.95	13.06	4.50
100-mesh x 0, 2.21 percent of sample				13.30		3.99	

CONSOLIDATED COAL CO.—JEFFERSON NO. 20 MINE

The Jefferson No. 20 mine is in Jefferson County, ½ mile west of Nason. The mine sample was taken on left rib of reservoir, off bottom about 150 feet in from main haulage.

Section of coal bed

	Foot	Inches
Roof, coal.		
Coal	1	1½
Shale		½
Coal		6
Shale		½
Coal	1	6½
Shale (blue band)		1
Coal		11½
Pyrite		1
Coal		7
Floor, hard shale.		
Thickness of bed	Unknown.	Unknown.
Thickness of sample	4	11

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	42.30	42.30	4.65	4.65	0.93	0.93
	1.30 to 1.35	34.36	76.66	8.56	6.40	1.07	.99
	1.35 to 1.40	10.96	87.62	13.75	7.32	1.31	1.03
	1.40 to 1.45	4.32	91.94	20.04	7.92	1.07	1.03
	1.45 to 1.50	1.53	93.47	26.00	8.22	0.76	1.03
1½- x ⅜-in.	1.50 to 1.55	.57	94.04	30.33	8.35	10.04	1.08
	1.55 to 1.60	.24	94.28	32.38	8.41	1.91	1.09
64.14 percent of sample	1.60 to 1.65	.13	94.41	34.91	8.45	3.89	1.09
	1.65 to 1.70	.24	94.65	33.83	8.51	9.70	1.11
	1.70 to 1.75	.15	94.80	29.70	8.54	18.47	1.14
	1.75 to 1.80	.04	94.84	41.03	8.56	4.49	1.14
	Over 1.80	5.16	100.00	68.05	11.63	12.49	1.73
⅜-in. x 14-mesh	Under 1.30	57.70	57.70	3.77	3.77	0.90	0.90
	1.30 to 1.35	23.43	81.13	8.30	5.08	1.19	.98
	1.35 to 1.40	7.09	88.22	13.43	5.75	1.28	1.01
	1.40 to 1.45	2.96	91.18	17.78	6.14	1.24	1.02
	1.45 to 1.50	1.72	92.90	21.57	6.43	1.39	1.02
	1.50 to 1.55	.99	93.89	26.89	6.64	1.36	1.03
28.40 percent of sample	1.55 to 1.60	.68	94.57	30.35	6.81	1.38	1.03
	1.60 to 1.65	.49	95.06	34.44	6.95	1.61	1.03
	1.65 to 1.70	.35	95.41	35.27	7.06	1.62	1.03
	1.70 to 1.75	.27	95.68	36.78	7.14	2.02	1.04
	1.75 to 1.80	.22	95.90	37.81	7.21	2.93	1.04
	Over 1.80	4.10	100.00	71.14	9.83	7.64	1.31
14- x 100-mesh	Under 1.30	68.25	68.25	4.65	4.65	0.92	0.92
	1.30 to 1.35	7.30	75.55	10.47	5.21	1.57	.98
	1.35 to 1.40	4.74	80.29	13.07	5.68	1.39	1.01
	1.40 to 1.45	3.52	83.81	15.19	6.08	1.26	1.02
	1.45 to 1.50	2.22	86.03	17.67	6.38	1.21	1.02
	1.50 to 1.55	1.52	87.55	20.78	6.63	1.26	1.03
5.82 percent of sample	1.55 to 1.60	.93	88.48	25.40	6.82	1.22	1.03
	1.60 to 1.65	.56	89.04	30.00	6.97	1.29	1.03
	1.65 to 1.70	.67	89.71	32.01	7.16	1.26	1.03
	1.70 to 1.75	.37	90.08	35.37	7.27	1.27	1.03
	1.75 to 1.80	.41	90.49	36.90	7.41	1.33	1.03
	Over 1.80	9.51	100.00	70.22	13.38	4.00	1.32
100-mesh x 0, 1.64 percent of sample				10.70		1.24	

The mine sample was taken on left rib of reservoir off bottom about 200 feet in from main haulage.

Section of coal bed

	Feet	Inches
Roof, coal.		
Coal		6
Shale		½
Coal		4
Shale		½
Coal		8
Pyrite		¼
Coal		9
Shale		½
Coal	1	10½
Shale (blue band)		1½
Coal	1	8
Floor, hard shale.		
Thickness of bed	Unknown	Unknown.
Thickness of sample	6	¾

Washing characteristics, data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	39.08	39.08	4.71	4.71	0.90	0.90
	1.30 to 1.35	37.29	76.37	8.88	6.75	1.11	1.00
	1.35 to 1.40	10.90	87.27	14.51	7.72	1.05	1.01
	1.40 to 1.45	4.76	92.03	21.26	8.42	.96	1.01
1½- x ⅜-inch	1.45 to 1.50	1.94	93.97	25.30	8.76	.95	1.00
	1.50 to 1.55	.51	94.48	29.29	8.88	1.79	1.01
68.52 percent of sample	1.55 to 1.60	.35	94.83	33.67	8.97	1.72	1.01
	1.60 to 1.65	.13	94.96	35.12	9.00	4.49	1.02
	1.65 to 1.70	.06	95.02	40.04	9.02	.38	1.02
	1.70 to 1.75	.04	95.06	43.56	9.04	5.18	1.02
	1.75 to 1.80	.04	95.10	47.97	9.05	3.64	1.02
	Over 1.80	4.90	100.00	81.38	12.60	4.70	1.20
⅜-in. x 14-mesh	Under 1.30	66.24	66.24	4.41	4.41	0.94	.94
	1.30 to 1.35	14.11	80.35	9.91	5.38	1.12	.97
	1.35 to 1.40	7.19	87.54	14.37	6.11	1.23	.99
	1.40 to 1.45	3.22	90.76	18.59	6.56	1.26	1.00
	1.45 to 1.50	1.80	92.56	23.23	6.88	1.40	1.00
	1.50 to 1.55	1.03	93.59	27.99	7.11	1.55	1.02
24.75 percent of sample	1.55 to 1.60	.66	94.25	32.12	7.29	1.41	1.02
	1.60 to 1.65	.39	94.64	36.00	7.41	1.35	1.02
	1.65 to 1.70	.28	94.92	36.14	7.49	1.64	1.02
	1.70 to 1.75	.25	95.17	35.49	7.57	2.01	1.02
	1.75 to 1.80	.18	95.35	37.19	7.62	2.01	1.03
	Over 1.80	4.65	100.00	77.53	10.87	5.25	1.22
14- x 100-mesh	Under 1.30	68.05	68.05	3.88	3.88	0.92	.92
	1.30 to 1.35	5.27	73.32	9.89	4.31	1.28	.95
	1.35 to 1.40	5.80	79.12	13.05	4.95	1.24	.97
	1.40 to 1.45	3.73	82.85	15.97	5.45	1.14	.98
	1.45 to 1.50	1.97	84.82	18.59	5.75	1.18	.98
	1.50 to 1.55	1.70	86.52	21.58	6.06	1.17	.98
5.03 percent of sample	1.55 to 1.60	.91	87.43	26.40	6.28	1.34	.99
	1.60 to 1.65	.91	88.34	28.38	6.50	1.33	.99
	1.65 to 1.70	.53	88.87	32.80	6.66	1.32	.99
	1.70 to 1.75	.48	89.35	35.22	6.81	1.37	.99
	1.75 to 1.80	.48	89.83	36.00	6.97	1.37	1.00
	Over 1.80	10.17	100.00	71.37	13.52	4.28	1.33
100-mesh x 0				10.98		1.15	
1.70 percent of sample.							

LUMAGHI COAL CO.—CANTINE NO. 2 MINE

The Cantine No. 2 mine is in Madison County about 2 miles east of Collinsville. The mine sample was taken at 4th west, 7th north, 1st right, room No. 1.

Section of coal bed

	Feet	Inches
Roof, sandrock.		
Coal	2	0
Shale		½
Coal		1
Pyrite		¼
Coal		6
Shale		¾
Coal	1	3
Pyrite		½
Coal	1	3¼
Shale		½
Coal		4½
Shale (blue band)		1¾
Coal (containing numerous small bands)	2	0
Floor, hard fire clay.		
Thickness of bed	7	10
Thickness of sample	7	10

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in, top size	Under 1.30	37.24	37.24	5.12	5.12	3.56	3.56
	1.30 to 1.35	29.99	67.23	10.17	7.37	3.80	3.67
	1.35 to 1.40	9.66	76.89	13.97	8.20	4.81	3.81
	1.40 to 1.45	5.82	82.71	17.46	8.85	6.30	3.99
1½- x ⅜-in	1.45 to 1.50	2.42	85.13	21.32	9.21	7.63	4.09
	1.50 to 1.55	1.39	86.52	23.95	9.44	8.52	4.16
52.36 percent of sample	1.55 to 1.60	1.33	87.85	27.82	9.72	9.66	4.24
	1.60 to 1.65	1.23	89.08	31.09	10.02	8.64	4.30
	1.65 to 1.70	.65	89.73	36.85	10.21	7.01	4.32
	1.70 to 1.75	.58	90.31	38.18	10.39	8.34	4.35
	1.75 to 1.80	.93	91.24	39.30	10.69	9.01	4.40
	Over 1.80	8.76	100.00	58.16	14.84	28.35	6.50
⅜-in. x 14-mesh	Under 1.30	42.83	42.83	3.91	3.91	3.46	3.46
	1.30 to 1.35	29.26	72.09	7.88	5.52	3.67	3.55
	1.35 to 1.40	9.77	81.86	13.04	6.42	4.21	3.62
	1.40 to 1.45	4.63	86.49	17.41	7.01	5.14	3.71
	1.45 to 1.50	2.27	88.76	21.25	7.37	5.90	3.76
	1.50 to 1.55	1.33	90.09	24.71	7.63	6.71	3.81
35.76 percent of sample	1.55 to 1.60	1.10	91.19	29.01	7.89	6.60	3.84
	1.60 to 1.65	.85	92.04	32.23	8.11	7.32	3.87
	1.65 to 1.70	.74	92.78	34.97	8.32	7.19	3.90
	1.70 to 1.75	.60	93.38	36.84	8.51	7.59	3.93
	1.75 to 1.80	.49	93.87	38.37	8.66	8.47	3.95
	Over 1.80	6.13	100.00	59.50	11.78	18.79	4.86
14- x 100-mesh	Under 1.30	46.55	46.55	2.81	2.81	3.40	3.40
	1.30 to 1.35	17.07	63.62	6.63	3.83	3.55	3.44
	1.35 to 1.40	10.38	74.00	10.75	4.80	3.83	3.49
	1.40 to 1.45	5.69	79.69	14.66	5.51	4.27	3.55
	1.45 to 1.50	2.42	82.11	18.43	5.89	4.86	3.59
	1.50 to 1.55	1.66	83.77	20.94	6.19	4.92	3.62
9.80 percent of sample	1.55 to 1.60	1.30	85.07	23.99	6.46	5.22	3.64
	1.60 to 1.65	1.14	86.21	27.43	6.74	5.39	3.66
	1.65 to 1.70	.69	86.90	31.87	6.94	5.60	3.68
	1.70 to 1.75	.66	87.56	34.20	7.14	5.73	3.69
	1.75 to 1.80	.47	88.03	36.40	7.30	5.89	3.71
	Over 1.80	11.97	100.00	61.43	13.78	10.06	4.47
100-mesh x 0, 2.08 percent of sample				16.93		4.64	

The mine sample was removed about 50 feet inby right rib of No. 16 Room, off 17 stub, off 12 south main entry.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal (containing numerous small shale binders)	1	11
Pyrite		1
Coal		6½
Pyrite		¾
Coal		5½
Pyrite		½
Coal		
Pyrite		½
Coal		10½
Pyrite		½
Coal	1	2
Pyrite		½
Coal		4
Shale (blue band)		4½
Coal	1	3½
Floor, hard fire clay.		
Thickness of bed	7	6¼
Thickness of sample	7	6¼

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	36.87	36.87	4.77	4.77	3.82	3.82
	1.30 to 1.35	29.49	66.36	10.83	7.46	3.50	3.68
	1.35 to 1.40	8.86	75.22	15.44	8.40	4.12	3.73
	1.40 to 1.45	3.85	79.07	18.92	8.91	6.10	3.85
1½- x ⅜-in.	1.45 to 1.50	3.11	82.18	21.02	9.37	8.19	4.01
	1.50 to 1.55	1.49	83.67	24.07	9.63	9.76	4.11
47.08 percent of sample	1.55 to 1.60	0.74	84.41	26.73	9.78	9.90	4.16
	1.60 to 1.65	1.27	85.68	33.59	10.14	6.98	4.20
	1.65 to 1.70	0.85	86.53	33.74	10.37	9.96	4.26
	1.70 to 1.75	1.38	87.91	37.54	10.80	9.24	4.34
	1.75 to 1.80	1.23	89.14	36.08	11.14	13.78	4.47
	Over 1.80	10.86	100.00	50.89	15.46	22.29	6.40
⅜-in. x 14-mesh	Under 1.30	46.53	46.53	3.95	3.95	3.65	3.65
	1.30 to 1.35	23.59	70.12	9.72	5.89	3.69	3.66
	1.35 to 1.40	8.98	79.10	14.52	6.87	4.03	3.71
	1.40 to 1.45	3.74	82.84	18.90	7.41	4.71	3.75
	1.45 to 1.50	2.25	85.09	22.60	7.82	5.54	3.80
	1.50 to 1.55	1.45	86.54	25.59	8.11	6.05	3.84
39.03 per cent of sample	1.55 to 1.60	1.24	87.78	29.27	8.41	6.73	3.88
	1.60 to 1.65	1.10	88.88	32.56	8.71	6.68	3.91
	1.65 to 1.70	.93	89.81	34.79	8.98	7.32	3.95
	1.70 to 1.75	.74	90.55	37.24	9.21	7.04	3.97
	1.75 to 1.80	.78	91.33	39.38	9.47	7.86	4.00
	Over 1.80	8.67	100.00	53.03	13.25	14.49	4.91
14- x 100-mesh	Under 1.30	40.22	40.22	2.69	2.69	3.43	3.43
	1.30 to 1.35	18.74	58.96	6.47	3.89	3.67	3.51
	1.35 to 1.40	11.50	70.46	11.20	5.08	3.80	3.55
	1.40 to 1.45	5.45	75.91	14.80	5.78	4.09	3.59
	1.45 to 1.50	3.02	78.93	18.27	6.26	4.26	3.62
	1.50 to 1.55	2.21	81.14	20.96	6.66	4.47	3.64
11.07 percent of sample	1.55 to 1.60	1.29	82.43	24.84	6.94	5.00	3.66
	1.60 to 1.65	1.21	83.64	27.54	7.24	5.21	3.69
	1.65 to 1.70	1.11	84.75	31.11	7.56	5.52	3.71
	1.70 to 1.75	.74	85.49	33.96	7.78	5.78	3.73
	1.75 to 1.80	.56	86.05	36.61	7.97	5.86	3.74
	Over 1.80	13.95	100.00	56.19	14.70	10.17	4.64
100-mesh x 0, 2.82 percent of sample.				16.93		4.47	

MIDLAND ELECTRIC COAL CORP.—MIDDLE GROVE MINE

The Middle Grove mine is a stripping operation in Fulton County about 7 miles west of Farmington. The mine sample was taken at north end of pit 300 feet from main haulage road.

Section of coal bed

	Feet	Inches
Coal		7
Shale		1
Coal	1	1
Shale (blue band)		2
Coal		2
Shale and pyrite lens		½
Coal		6½
Shale		½
Coal		4¾
Pyrite		¼
Coal		10
Bone, coal, and shale [1]		1
Floor, soft fire clay.		
Thickness of bed	4	½
Thickness of sample	3	11½

[1] Not included in sample.

Washing characteristics: data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	65.78	65.78	4.90	4.90	2.43	2.43
	1.30 to 1.35	4.55	70.33	11.82	5.35	2.75	2.45
	1.35 to 1.40	4.88	75.21	18.52	6.20	2.20	2.43
	1.40 to 1.45	2.96	78.17	23.28	6.85	2.26	2.43
	1.45 to 1.50	1.51	79.68	27.20	7.23	3.50	2.45
1½- x ⅜-in.	1.50 to 1.55	.91	80.59	34.62	7.54	2.97	2.45
	1.55 to 1.60	.56	81.15	37.05	7.75	3.70	2.46
57.05 percent of sample	1.60 to 1.65	.69	81.84	40.89	8.03	4.57	2.48
	1.65 to 1.70	.48	82.32	45.32	8.24	4.96	2.49
	1.70 to 1.75	.28	82.60	45.70	8.37	7.04	2.51
	1.75 to 1.80	.45	83.05	50.02	8.60	6.24	2.53
	Over 1.80	16.95	100.00	69.63	18.94	22.97	5.99
⅜-in. x 14-mesh	Under 1.30	52.22	52.22	4.64	4.64	2.58	2.58
	1.30 to 1.35	12.06	64.28	9.64	5.58	3.22	2.70
	1.35 to 1.40	5.13	69.41	16.30	6.37	2.96	2.72
	1.40 to 1.45	3.43	72.84	22.21	7.12	2.75	2.72
	1.45 to 1.50	2.45	75.29	26.90	7.76	2.36	2.71
	1.50 to 1.55	1.49	76.78	32.35	8.24	2.52	2.71
34.23 percent of sample	1.55 to 1.60	1.03	77.81	36.08	8.61	2.58	2.70
	1.60 to 1.65	.92	78.73	40.14	8.97	2.93	2.71
	1.65 to 1.70	.74	79.47	44.12	9.30	3.22	2.71
	1.70 to 1.75	.63	80.10	47.96	9.61	3.34	2.72
	1.75 to 1.80	.58	80.68	51.13	9.90	3.19	2.72
	Over 1.80	19.32	100.00	72.50	22.00	12.86	4.68
14- x 100-mesh	Under 1.30	14.76	14.76	3.39	3.39	2.40	2.40
	1.30 to 1.35	22.54	37.30	4.20	3.88	2.56	2.50
	1.35 to 1.40	13.71	51.01	8.33	5.08	2.99	2.63
	1.40 to 1.45	5.23	56.24	12.35	5.75	3.11	2.67
	1.45 to 1.50	3.44	59.68	17.89	6.45	2.79	2.68
	1.50 to 1.55	2.91	62.59	22.79	7.21	2.72	2.68
7.08 percent of sample	1.55 to 1.60	1.76	64.35	26.40	7.74	2.65	2.68
	1.60 to 1.65	1.64	65.99	30.12	8.29	2.59	2.68
	1.65 to 1.70	1.12	67.11	34.04	8.72	2.61	2.68
	1.70 to 1.75	1.16	68.27	37.54	9.21	2.71	2.68
	1.75 to 1.80	.82	69.09	40.92	9.59	2.80	2.68
	Over 1.80	30.91	100.00	72.95	29.17	7.60	4.20
100-mesh x 0, 1.64 percent of sample				33.28		5.20	

The mine sample was taken at north end of pit, 1,300 feet in a southerly direction.

Section of coal bed

	Feet	Inches
Coal		2
Pyrite		¾
Coal	1	1
Shale (blue band)		2
Coal		8
Shale		¾
Coal		3½
Shale		½
Coal		7½
Shale and bone coal[1]		4
Floor, soft fire clay.		
Thickness of bed	3	6
Thickness of sample	3	2

[1] Not included in sample.

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	73.18	73.18	5.19	5.19	2.41	2.41
	1.30 to 1.35	5.10	78.28	10.72	5.55	2.82	2.44
	1.35 to 1.40	2.17	80.45	17.32	5.87	2.87	2.45
	1.40 to 1.45	1.90	82.35	23.13	6.27	3.14	2.46
1½- x ⅜-in	1.45 to 1.50	1.71	84.06	27.90	6.71	2.96	2.47
	1.50 to 1.55	1.14	85.20	34.06	7.07	2.85	2.48
	1.55 to 1.60	.65	85.85	37.66	7.30	2.48	2.48
56.20 percent of sample	1.60 to 1.65	.65	86.50	41.33	7.56	2.23	2.48
	1.65 to 1.70	.51	87.01	43.53	7.77	4.01	2.49
	1.70 to 1.75	.22	87.23	49.47	7.88	3.13	2.49
	1.75 to 1.80	.19	87.42	51.09	7.97	4.12	2.49
	Over 1.80	12.58	100.00	82.91	17.40	5.82	2.91
⅜-in. x 14-mesh	Under 1.30	67.19	67.19	3.44	3.44	2.56	2.56
	1.30 to 1.35	5.89	73.08	9.82	3.95	3.17	2.61
	1.35 to 1.40	3.11	76.19	15.25	4.42	3.22	2.63
	1.40 to 1.45	1.58	77.77	21.04	4.75	3.07	2.64
	1.45 to 1.50	1.41	79.18	26.13	5.13	2.94	2.65
	1.50 to 1.55	1.08	80.26	30.79	5.48	2.69	2.65
34.99 percent sample	1.55 to 1.60	.86	81.12	35.47	5.80	2.43	2.65
	1.60 to 1.65	.95	82.07	39.11	6.18	2.50	2.64
	1.65 to 1.70	.90	82.97	43.12	6.58	2.11	2.64
	1.70 to 1.75	.44	83.41	46.68	6.79	2.77	2.64
	1.75 to 1.80	.43	83.84	49.92	7.02	2.66	2.64
	Over 1.80	16.16	100.00	81.63	19.07	4.50	2.94
14- x 100-mesh	Under 1.30	31.44	31.44	2.96	2.96	2.48	2.48
	1.30 to 1.35	16.26	47.70	3.38	3.10	2.50	2.49
	1.35 to 1.40	13.59	61.29	6.19	3.79	2.64	2.52
	1.40 to 1.45	4.57	65.86	11.45	4.32	2.98	2.55
	1.45 to 1.50	1.94	67.80	16.73	4.67	3.02	2.57
	1.50 to 1.55	2.01	69.81	20.71	5.14	3.05	2.58
7.36 percent of sample	1.55 to 1.60	1.28	71.09	24.97	5.49	2.87	2.59
	1.60 to 1.65	.93	72.02	29.14	5.80	2.81	2.59
	1.65 to 1.70	1.07	73.09	33.18	6.20	2.77	2.59
	1.70 to 1.75	1.04	74.13	37.06	6.63	2.74	2.59
	1.75 to 1.80	.52	74.65	41.28	6.87	2.80	2.59
	Over 1.80	25.35	100.00	77.98	24.90	3.90	2.93
100-mesh x 0, 1.45 percent of sample				28.61		3.54	

OLD BEN COAL CORP.—NO. 9 MINE

The No. 9 mine is in Franklin County at West Frankfort. The mine sample was taken in main south No. 1 entry on left rib, 7,621 feet in from old mine.

Section of coal bed

	Feet	Inches
Roof, coal.		
Coal		3
Shale		½
Coal		½
Shale		1
Coal		11¼
Shale		1½
Coal		8½
Shale		¾
Coal	1	5
Shale		½
Coal		11
Shale		¾
Coal		8½
Shale (blue band)		1
Coal	1	5
Floor, soft fire clay.		
Thickness of bed	Unknown.	Unknown.
Thickness of sample	6	11

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	41.70	41.70	3.42	3.42	1.14	1.14
	1.30 to 1.35	37.99	79.69	7.61	5.42	1.17	1.15
	1.35 to 1.40	12.16	91.85	14.50	6.62	1.27	1.17
	1.40 to 1.45	4.02	95.87	20.73	7.21	1.18	1.17
	1.45 to 1.50	1.46	97.33	25.90	7.49	1.40	1.17
1½- x ⅜-in.	1.50 to 1.55	.51	97.84	29.07	7.60	2.20	1.18
	1.55 to 1.60	.27	98.11	32.63	7.67	3.55	1.19
57.40 percent of sample	1.60 to 1.65	.13	98.24	31.80	7.71	11.61	1.20
	1.65 to 1.70	.22	98.46	36.78	7.77	1.47	1.20
	1.70 to 1.75	.12	98.58	38.91	7.81	6.01	1.21
	1.75 to 1.80	.05	98.63	47.37	7.83	1.90	1.21
	Over 1.80	1.37	100.00	72.52	8.71	9.33	1.32
⅜-in. x 14-mesh	Under 1.30	81.91	81.91	4.11	4.11	1.10	1.10
	1.30 to 1.35	5.59	87.50	11.86	4.61	1.31	1.11
	1.35 to 1.40	4.10	91.60	16.47	5.14	1.40	1.13
	1.40 to 1.45	1.88	93.48	21.03	5.46	1.39	1.13
	1.45 to 1.50	1.28	94.76	25.17	5.72	1.35	1.13
	1.50 to 1.55	.70	95.46	28.95	5.89	1.57	1.14
32.31 percent of sample	1.55 to 1.60	.47	95.93	32.89	6.02	1.76	1.14
	1.60 to 1.65	.26	96.19	35.73	6.11	1.94	1.14
	1.65 to 1.70	.24	96.43	38.29	6.19	2.32	1.15
	1.70 to 1.75	.17	96.60	39.70	6.24	2.15	1.15
	1.75 to 1.80	.15	96.75	41.60	6.30	3.54	1.15
	Over 1.80	3.25	100.00	72.52	8.45	10.07	1.44
14- x 100-mesh	Under 1.30	74.99	74.99	3.03	3.03	1.01	1.01
	1.30 to 1.35	4.46	79.45	10.04	3.42	1.24	1.02
	1.35 to 1.40	4.09	83.54	13.15	3.90	1.23	1.03
	1.40 to 1.45	2.20	85.74	16.61	4.23	1.26	1.04
	1.45 to 1.50	1.62	87.36	20.13	4.52	1.26	1.04
	1.50 to 1.55	1.09	88.45	22.98	4.75	1.35	1.05
7.77 percent of sample	1.55 to 1.60	.80	89.25	26.47	4.94	1.34	1.05
	1.60 to 1.65	.66	89.91	28.43	5.12	1.42	1.05
	1.65 to 1.70	.48	90.39	31.19	5.25	1.53	1.05
	1.70 to 1.75	.32	90.71	36.05	5.36	1.71	1.06
	1.75 to 1.80	.19	90.90	36.05	5.43	1.71	1.06
	Over 1.80	9.10	100.00	72.72	11.55	7.29	1.63
100-mesh x 0, 2.52 percent of sample.				10.65		1.49	

The mine sample was taken in main south No. 1 entry, 1st crosscut, 7,000 feet in from old mine.

Section of coal bed

	Feet	Inches
Roof, coal:		
Coal		1½
Shale		½
Coal		2
Shale		½
Coal		11
Shale		½
Coal	1	5
Shale		½
Coal		3
Shale		½
Coal		5
Shale		½
Coal		7½
Shale		1
Coal	1	3½
Shale (blue band)		1
Coal, containing many small binders	1	9½
Floor, soft fire clay:		
Thickness of bed	Unknown	Unknown.
Thickness of sample	7	4½

Washing characteristics: data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size, 1½- x ⅜-in, 56.16 percent of sample	Under 1.30	37.84	37.84	3.48	3.48	1.11	1.11
	1.30 to 1.35	37.83	75.67	7.89	5.68	1.08	1.10
	1.35 to 1.40	15.13	90.80	14.69	7.19	1.14	1.10
	1.40 to 1.45	3.94	94.74	19.16	7.68	1.32	1.11
	1.45 to 1.50	1.49	96.23	24.63	7.95	1.30	1.11
	1.50 to 1.55	.56	96.79	30.24	8.07	1.41	1.11
	1.55 to 1.60	.50	97.29	34.60	8.21	1.26	1.12
	1.60 to 1.65	.20	97.49	40.03	8.28	2.13	1.12
	1.65 to 1.70	.32	97.81	44.23	8.39	1.06	1.12
	1.70 to 1.75	.29	98.10	48.54	8.51	1.84	1.12
	1.75 to 1.80	.41	98.51	52.34	8.69	1.05	1.12
	Over 1.80	1.49	100.00	68.10	9.58	5.96	1.19
⅜-in. x 14-mesh, 33.92 percent of sample	Under 1.30	70.91	70.91	3.88	3.88	1.15	1.15
	1.30 to 1.35	12.74	83.65	9.53	4.74	1.19	1.16
	1.35 to 1.40	7.25	90.90	14.84	5.55	1.26	1.16
	1.40 to 1.45	2.43	93.33	20.24	5.93	1.37	1.17
	1.45 to 1.50	1.54	94.87	24.73	6.23	1.56	1.18
	1.50 to 1.55	.86	95.73	28.89	6.44	1.49	1.18
	1.55 to 1.60	.64	96.37	33.28	6.62	1.75	1.19
	1.60 to 1.65	.37	96.74	37.88	6.74	1.85	1.19
	1.65 to 1.70	.30	97.04	41.01	6.84	2.38	1.19
	1.70 to 1.75	.20	97.24	44.54	6.92	2.55	1.19
	1.75 to 1.80	.15	97.39	46.90	6.98	3.22	1.19
	Over 1.80	2.61	100.00	73.09	8.71	6.84	1.34
14- x 100-mesh, 8.04 percent of sample	Under 1.30	71.39	71.39	3.03	3.03	1.00	1.00
	1.30 to 1.35	5.94	77.33	9.34	3.51	1.31	1.02
	1.35 to 1.40	4.87	82.20	13.58	4.11	1.35	1.04
	1.40 to 1.45	2.66	84.86	17.18	4.52	1.41	1.05
	1.45 to 1.50	1.89	86.75	20.53	4.87	1.35	1.06
	1.50 to 1.55	1.33	88.08	24.18	5.16	1.35	1.07
	1.55 to 1.60	1.06	89.14	26.84	5.42	1.39	1.07
	1.60 to 1.65	.72	89.86	29.90	5.62	1.48	1.07
	1.65 to 1.70	.58	90.44	34.25	5.80	1.66	1.08
	1.70 to 1.75	.43	90.87	36.34	5.94	1.81	1.08
	1.75 to 1.80	.34	91.21	41.59	6.08	2.13	1.08
	Over 1.80	8.79	100.00	72.32	11.90	4.57	1.39
100-mesh 0, x 1.88 percent of sample				11.29		1.32	

SAHARA COAL CO.—NO. 6 MINE

The No. 6 mine is a stripping operation in Saline County about 10 miles west of Harrisburg. The exact location in the pit where this sample was taken is unknown.

Section of coal bed

	Ft.	Inches
Coal		4
Shale		3/8
Coal	1	1/8
Fusain		1/2
Coal		7 1/2
Pyrite		1/2
Coal		6 3/4
Fusain		3/8
Coal		2 1/2
Shale		1/2
Coal		4 5/8
Shale		1/2
Coal		5 3/4
Shale (blue band)		3/8
Coal		5 1/8
Floor, soft fire clay.		
Thickness of bed	4	5
Thickness of sample	4	5

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	28.77	28.77	3.27	3.27	2.18	2.18
	1.30 to 1.35	34.89	63.66	7.20	5.42	2.39	2.30
1½- x ⅜-in	1.35 to 1.40	12.08	75.74	14.18	6.82	2.55	2.34
	1.40 to 1.45	4.58	80.32	22.55	7.72	3.20	2.39
65.67 percent of sample	1.45 to 1.50	4.59	84.91	22.55	8.52	3.20	2.43
	1.50 to 1.55	1.68	86.59	31.05	8.96	4.09	2.46
	1.55 to 1.60	1.69	88.28	31.05	9.38	4.09	2.49
	Over 1.60	11.72	100.00	61.43	15.48	13.94	3.83
⅜-in. x 14-mesh	Under 1.30	33.52	33.52	2.79	2.79	2.07	2.07
	1.30 to 1.35	26.51	60.03	6.87	4.59	2.39	2.21
	1.35 to 1.40	12.48	72.51	14.58	6.31	2.69	2.29
	1.40 to 1.45	3.43	75.94	23.72	7.10	2.89	2.32
27.68 percent of sample	1.45 to 1.50	3.43	79.37	23.72	7.82	2.89	2.35
	1.50 to 1.55	1.53	80.90	31.34	8.26	3.63	2.37
	1.55 to 1.60	1.54	82.44	31.34	8.69	3.63	2.39
	Over 1.60	17.56	100.00	65.61	18.69	10.46	3.81
14- x 100-mesh	Under 1.30	46.84	46.84	3.65	3.65	2.08	2.08
	1.30 to 1.35	9.65	56.49	9.34	4.62	2.41	2.14
	1.35 to 1.40	6.39	62.88	14.12	5.59	2.46	2.17
	1.40 to 1.45	3.17	66.05	20.27	6.29	2.46	2.18
5.14 percent of sample	1.45 to 1.50	3.18	69.23	20.27	6.93	2.46	2.20
	1.50 to 1.55	2.04	71.27	27.30	7.52	2.55	2.21
	1.55 to 1.60	2.04	73.31	27.30	8.07	2.55	2.22
	Over 1.60	26.69	100.00	65.98	23.52	9.58	4.18
100-mesh x 0 1.51 percent of sample				17.05		2.94	

The mine sample was taken 3 miles west of No. 13 ramp.

Section of coal bed

	Ft.	Inches
Coal		4
Bone coal		½
Coal		5
Shale		2
Coal	1	3
Pyrite		½
Coal		6
Shale		½
Coal		8½
Bone coal		1½
Coal		4½
Shale		¾
Coal		5
Shale (blue band)		½
Coal		6
Floor, soft fire clay.		
Thickness of bed	5	¼
Thickness of sample	5	¼

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	42.33	42.33	4.30	4.30	2.00	2.00
	1.30 to 1.35	25.55	67.88	7.49	5.50	2.49	2.18
	1.35 to 1.40	11.13	79.01	13.40	6.61	2.95	2.29
	1.40 to 1.45	4.55	83.56	17.94	7.23	3.54	2.36
1½- x ⅜-in.	1.45 to 1.50	1.63	85.19	22.02	7.51	4.74	2.41
	1.50 to 1.55	1.03	86.22	27.72	7.75	4.82	2.43
66.58 percent of sample	1.55 to 1.60	.88	87.10	32.79	8.01	3.96	2.45
	1.60 to 1.65	.63	87.73	38.19	8.22	3.72	2.46
	1.65 to 1.70	.48	88.21	41.42	8.40	3.83	2.47
	1.70 to 1.75	.40	88.61	43.88	8.57	5.01	2.48
	1.75 to 1.80	.26	88.87	44.32	8.67	6.96	2.49
	Over 1.80	11.13	100.00	65.07	14.95	29.81	5.53
⅜-in. x 14-mesh	Under 1.30	40.22	40.22	3.22	3.22	2.04	2.04
	1.30 to 1.35	25.24	65.46	7.44	4.85	2.47	2.21
	1.35 to 1.40	11.42	76.88	12.56	5.99	2.81	2.30
	1.40 to 1.45	4.20	81.08	17.14	6.57	3.39	2.35
	1.45 to 1.50	2.42	83.50	21.73	7.00	3.76	2.39
	1.50 to 1.55	1.68	85.18	26.71	7.40	3.88	2.42
26.80 percent of sample	1.55 to 1.60	1.23	86.41	31.95	7.75	3.91	2.44
	1.60 to 1.65	.95	87.36	35.53	8.05	4.07	2.46
	1.65 to 1.70	.81	88.17	39.46	8.34	4.45	2.48
	1.70 to 1.75	.71	88.88	43.06	8.62	4.52	2.50
	1.75 to 1.80	.57	89.45	46.24	8.86	4.93	2.51
	Over 1.80	10.55	100.00	69.43	15.25	16.30	3.97
14- x 100-mesh	Under 1.30	56.66	56.66	3.51	3.51	2.07	2.07
	1.30 to 1.35	9.27	65.93	9.18	4.31	2.57	2.14
	1.35 to 1.40	6.02	71.95	13.16	5.05	2.76	2.19
	1.40 to 1.45	3.50	75.45	16.51	5.58	2.85	2.22
	1.45 to 1.50	2.43	77.88	20.09	6.03	3.06	2.25
	1.50 to 1.55	1.69	79.57	24.84	6.43	3.04	2.27
5.14 percent of sample	1.55 to 1.60	1.62	81.19	26.40	6.83	3.15	2.28
	1.60 to 1.65	1.11	82.30	31.03	7.16	3.26	2.30
	1.65 to 1.70	.95	83.25	34.53	7.47	3.36	2.31
	1.70 to 1.75	.72	83.97	38.90	7.74	3.60	2.32
	1.75 to 1.80	.72	84.69	42.59	8.03	3.71	2.33
	Over 1.80	15.31	100.00	69.75	17.48	13.24	4.00
100-mesh x 0, 1.48 percent of sample				18.39		3.70	

UNITED ELECTRIC COAL CO.—FIDELITY MINE

The Fidelity Mine is a stripping operation in Perry County about 7 miles west of Du Quoin. The mine sample was taken ½ mile south of north end of pit No. 2.

Section of coal bed

	Feet	Inches
Coal		9½
Pyrite		¼
Coal		5½
Pyrite		¼
Coal	2	8
Bone Coal		½
Coal	1	4
Mud		¼
Coal		2
Shale (blue band)		1
Coal		10
Floor, soft fire clay:		
Thickness of bed	6	5¼
Thickness of sample	6	5¼

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	37.01	37.01	4.77	4.77	2.69	2.69
	1.30 to 1.35	29.22	66.23	8.82	6.56	2.79	2.73
	1.35 to 1.40	15.79	82.02	13.74	7.94	3.25	2.83
	1.40 to 1.45	6.32	88.34	18.75	8.71	3.87	2.91
1½- x ⅜-in	1.45 to 1.50	5.34	93.68	22.91	9.52	5.15	3.04
	1.50 to 1.55	1.56	95.24	26.34	9.80	5.82	3.08
	1.55 to 1.60	.64	95.88	28.56	9.92	7.18	3.11
56.71 percent of sample	1.60 to 1.65	.47	96.35	28.53	10.01	8.96	3.14
	1.65 to 1.70	.24	96.59	33.14	10.07	6.22	3.14
	1.70 to 1.75	.24	96.83	38.83	10.14	3.93	3.15
	1.75 to 1.80	.41	97.24	38.85	10.26	8.25	3.17
	Over 1.80	2.76	100.00	58.02	11.58	11.87	3.41
⅜-in. x 14-mesh	Under 1.30	59.10	59.10	5.31	5.31	2.59	2.59
	1.30 to 1.35	12.51	71.61	12.10	6.50	2.83	2.63
	1.35 to 1.40	5.63	77.24	15.46	7.15	3.02	2.66
	1.40 to 1.45	4.15	81.39	19.68	7.79	3.28	2.69
	1.45 to 1.50	2.89	84.28	23.57	8.33	3.55	2.72
	1.50 to 1.55	1.61	85.89	27.73	8.69	3.89	2.74
34.46 percent of sample	1.55 to 1.60	1.14	87.03	31.34	8.99	4.14	2.76
	1.60 to 1.65	1.10	88.13	34.40	9.31	4.14	2.78
	1.65 to 1.70	.88	89.01	36.69	9.58	4.38	2.79
	1.70 to 1.75	.86	89.87	39.99	9.87	4.43	2.81
	1.75 to 1.80	.79	90.66	42.49	10.15	3.17	2.81
	Over 1.80	9.34	100.00	61.71	14.97	11.43	3.62
14- x 100-mesh	Under 1.30	47.54	47.54	4.15	4.15	2.62	2.62
	1.30 to 1.35	9.12	56.66	7.89	4.75	2.77	2.64
	1.35 to 1.40	5.79	62.45	13.93	5.60	2.87	2.67
	1.40 to 1.45	4.48	66.93	17.36	6.39	2.80	2.67
	1.45 to 1.50	3.03	69.96	21.21	7.03	2.70	2.68
	1.50 to 1.55	2.36	72.32	25.15	7.62	2.73	2.68
7.11 percent of sample	1.55 to 1.60	1.48	73.80	28.66	8.04	2.87	2.68
	1.60 to 1.65	1.72	75.52	31.92	8.59	2.76	2.68
	1.65 to 1.70	1.01	76.53	34.96	8.94	2.66	2.68
	1.70 to 1.75	1.28	77.81	37.70	9.41	2.99	2.69
	1.75 to 1.80	1.08	78.89	40.17	9.83	2.60	2.69
	Over 1.80	21.11	100.00	62.28	20.90	7.42	3.69
100-mesh x 0, 1.72 percent of sample				22.47		3.08	

The mine sample was taken 5/8 mile south of north end of pit No. 2.

Section of coal bed

	Feet	Inches
Dirty coal		4
Coal		8
Shale		¼
Coal		7½
Pyrite		¼
Coal		3½
Pyrite		¼
Coal	2	5¾
Pyrite		½
Coal		5
Shale (blue band)		1¾
Coal	1	0
Floor, soft fire clay.		
Thickness of bed	6	¾
Thickness of sample	6	¾

Washing characteristics, data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	40.66	40.66	5.06	5.06	2.66	2.66
	1.30 to 1.35	23.15	63.81	9.56	6.69	2.86	2.73
	1.35 to 1.40	12.84	76.65	14.55	8.01	3.29	2.83
	1.40 to 1.45	5.37	82.02	19.48	8.76	4.26	2.92
1½- x ⅜-in.	1.45 to 1.50	3.94	85.96	21.84	9.36	5.77	3.05
	1.50 to 1.55	1.40	87.36	27.00	9.64	5.95	3.10
57.82 percent of sample	1.55 to 1.60	1.21	88.57	31.87	9.95	5.77	3.13
	1.60 to 1.65	1.10	89.67	37.72	10.29	5.18	3.16
	1.65 to 1.70	.59	90.26	40.29	10.48	4.78	3.17
	1.70 to 1.75	.41	90.67	44.10	10.63	4.89	3.18
	1.75 to 1.80	.51	91.18	42.41	10.81	7.66	3.20
	Over 1.80	8.82	100.00	68.34	15.89	14.75	4.22
⅜-in. x 14-mesh	Under 1.30	46.54	46.54	4.14	4.14	2.51	2.51
	1.30 to 1.35	16.70	63.24	9.80	5.63	2.96	2.63
	1.35 to 1.40	10.82	74.06	13.92	6.85	3.29	2.73
	1.40 to 1.45	4.63	78.69	18.87	7.55	3.73	2.78
	1.45 to 1.50	3.01	81.70	22.75	8.11	4.26	2.84
	1.50 to 1.55	1.68	83.38	26.90	8.49	4.78	2.88
34.56 percent of sample	1.55 to 1.60	1.16	84.54	30.04	8.79	5.37	2.91
	1.60 to 1.65	.85	85.39	34.11	9.04	5.33	2.94
	1.65 to 1.70	.70	86.09	36.36	9.26	5.48	2.96
	1.70 to 1.75	.59	86.68	38.49	9.46	4.56	2.97
	1.75 to 1.80	.60	87.28	41.11	9.68	4.43	2.98
	Over 1.80	12.72	100.00	68.89	17.21	12.64	4.21
14- x 100-mesh	Under 1.30	44.57	44.57	3.90	3.90	2.46	2.46
	1.30 to 1.35	9.17	53.74	9.18	4.80	2.95	2.54
	1.35 to 1.40	6.58	60.32	13.31	5.73	3.17	2.61
	1.40 to 1.45	4.34	64.66	16.76	6.47	3.20	2.65
	1.45 to 1.50	3.34	68.00	20.44	7.16	3.22	2.68
	1.50 to 1.55	2.74	70.74	23.83	7.80	3.38	2.71
5.87 percent of sample	1.55 to 1.60	1.74	72.48	28.15	8.29	3.62	2.73
	1.60 to 1.65	1.45	73.93	31.22	8.74	3.75	2.75
	1.65 to 1.70	1.25	75.18	33.98	9.16	3.69	2.76
	1.70 to 1.75	1.40	76.58	37.09	9.67	3.46	2.78
	1.75 to 1.80	.90	77.48	40.15	10.02	3.46	2.78
	Over 1.80	22.52	100.00	67.13	22.88	7.40	3.82
100-mesh x 0, 1.75 percent of sample				34.32		3.95	

NO. 7 BED

TILTON MINING CO.—TILTON MINE

The Tilton mine is in Vermilion County about 1½ miles north of Catlin. The mine sample was taken in No. 10 room at 5th east.

Section of coal bed

	Foot	Inches
Roof, shale.		
Bone coal		3
Coal	2	7
Pyrite		¼
Coal		7
Bone coal		½
Coal	1	0
Bone coal		½
Coal		9
Shale		1
Coal		6
Floor, hard fireclay.		
Thickness of bed	5	10¼
Thickness of sample	5	10¼

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	66.84	66.84	5.71	5.71	3.10	3.10
	1.30 to 1.35	16.60	83.44	12.40	7.04	3.59	3.20
	1.35 to 1.40	9.14	92.58	18.39	8.16	3.17	3.19
	1.40 to 1.45	2.18	94.76	22.28	8.49	3.65	3.20
1½- x ⅜-in.	1.45 to 1.50	.84	95.60	27.40	8.65	4.58	3.22
	1.50 to 1.55	.54	96.14	30.89	8.78	5.27	3.23
	1.55 to 1.60	.64	96.78	36.29	8.96	4.73	3.24
54.13 percent of sample	1.60 to 1.65	.29	97.07	37.96	9.05	6.81	3.25
	1.65 to 1.70	.59	97.66	46.11	9.27	3.46	3.25
	1.70 to 1.75	.30	97.96	48.02	9.39	5.42	3.26
	1.75 to 1.80	.43	98.39	52.59	9.58	4.35	3.26
	Over 1.80	1.61	100.00	62.14	10.42	11.08	3.39
⅜-in. x 14-mesh	Under 1.30	63.23	63.23	3.96	3.96	2.77	2.77
	1.30 to 1.35	15.18	78.41	9.91	5.11	3.82	2.97
	1.35 to 1.40	10.45	88.86	15.38	6.32	3.74	3.06
	1.40 to 1.45	3.33	92.19	19.96	6.81	4.29	3.11
	1.45 to 1.50	1.48	93.67	22.95	7.07	5.26	3.14
	1.50 to 1.55	.81	94.48	27.22	7.24	6.05	3.17
34.86 percent of sample	1.55 to 1.60	.58	95.06	30.50	7.38	6.78	3.19
	1.60 to 1.65	.46	95.52	34.32	7.51	7.10	3.21
	1.65 to 1.70	.43	95.95	38.37	7.65	7.02	3.22
	1.70 to 1.75	.35	96.30	41.63	7.77	6.83	3.24
	1.75 to 1.80	.34	96.64	44.95	7.90	6.67	3.25
	Over 1.80	3.36	100.00	59.83	9.65	14.58	3.63
14- x 100-mesh	Under 1.30	38.70	38.70	2.37	2.37	2.35	2.35
	1.30 to 1.35	20.93	59.63	4.98	3.29	2.91	2.55
	1.35 to 1.40	15.52	75.15	9.03	4.47	3.63	2.77
	1.40 to 1.45	7.29	82.44	14.22	5.33	3.94	2.87
	1.45 to 1.50	3.87	86.31	18.45	5.92	3.96	2.92
	1.50 to 1.55	1.87	88.18	21.65	6.26	4.35	2.95
8.76 percent of sample	1.55 to 1.60	1.32	89.50	24.82	6.53	4.75	2.98
	1.60 to 1.65	.60	90.10	27.79	6.67	5.23	2.99
	1.65 to 1.70	1.00	91.10	29.80	6.93	5.27	3.02
	1.70 to 1.75	.60	91.70	32.59	7.09	5.38	3.03
	1.75 to 1.80	.43	92.13	36.44	7.23	5.72	3.05
	Over 1.80	7.87	100.00	58.01	11.23	12.74	3.81
100-mesh x 0, 2.25 percent of sample				13.94		4.64	

The mine sample was taken in No. 21 room at 5th east.

Section of coal bed

	Feet	Inches
Roof, shale.		
Coal		4
Fusain		¼
Coal		7
Fusain		¼
Coal		5¾
Fusain		¼
Coal	2	7½
Pyrite		½
Coal		11
Shale		1½
Coal		6½
Floor, hard fire clay.		
Thickness of bed	5	8½
Thickness of sample	5	8½

Washing characteristics; data in percent

Size	Specific-gravity fraction	Weight		Ash		Sulfur	
		Direct	Cumulative	Direct	Cumulative	Direct	Cumulative
Crushed to 1½-in. top size	Under 1.30	60.63	60.63	5.09	5.09	2.97	2.97
	1.30 to 1.35	17.49	78.12	11.59	6.55	3.52	3.09
	1.35 to 1.40	7.73	85.85	16.40	7.43	3.62	3.14
	1.40 to 1.45	2.07	87.92	19.61	7.72	5.56	3.20
	1.45 to 1.50	.98	88.90	21.39	7.87	8.70	3.26
1½- x ⅜-in	1.50 to 1.55	.63	89.53	23.27	7.98	9.93	3.31
	1.55 to 1.60	.52	90.05	27.41	8.09	11.84	3.35
57.67 percent of sample	1.60 to 1.65	.46	90.51	29.68	8.20	10.47	3.39
	1.65 to 1.70	.14	90.65	37.53	8.25	9.68	3.40
	1.70 to 1.75	.39	91.04	32.73	8.35	18.23	3.46
	1.75 to 1.80	.43	91.47	38.44	8.49	15.80	3.52
	Over 1.80	8.53	100.00	64.26	13.25	26.18	5.45
⅜-in. x 14-mesh	Under 1.30	60.22	60.22	3.59	3.59	2.73	2.73
	1.30 to 1.35	15.05	75.27	10.10	4.89	3.81	2.95
	1.35 to 1.40	9.29	84.56	15.54	6.06	3.75	3.03
	1.40 to 1.45	3.02	87.58	19.77	6.53	4.62	3.09
	1.45 to 1.50	1.26	88.84	23.30	6.77	5.68	3.13
	1.50 to 1.55	.82	89.66	26.12	6.95	6.37	3.16
31.72 percent of sample	1.55 to 1.60	.66	90.32	28.58	7.11	7.10	3.18
	1.60 to 1.65	.48	90.80	31.84	7.24	7.73	3.21
	1.65 to 1.70	.39	91.19	33.08	7.35	8.93	3.23
	1.70 to 1.75	.27	91.46	35.27	7.43	9.79	3.25
	1.75 to 1.80	.28	91.74	36.96	7.52	10.21	3.27
	Over 1.80	8.26	100.00	66.16	12.36	17.09	4.41
14- x 100-mesh	Under 1.30	40.12	40.12	2.36	2.36	2.35	2.35
	1.30 to 1.35	20.39	60.51	5.13	3.29	3.12	2.61
	1.35 to 1.40	10.58	71.09	9.36	4.20	3.54	2.75
	1.40 to 1.45	5.70	76.79	14.17	4.94	3.74	2.82
	1.45 to 1.50	3.37	80.16	17.75	5.48	3.96	2.87
	1.50 to 1.55	1.61	81.77	21.34	5.79	4.32	2.90
8.23 percent of sample	1.55 to 1.60	1.24	83.01	23.18	6.05	4.61	2.92
	1.60 to 1.65	1.02	84.03	24.93	6.28	4.95	2.95
	1.65 to 1.70	.64	84.67	28.28	6.44	5.38	2.97
	1.70 to 1.75	.47	85.14	31.49	6.58	5.95	2.98
	1.75 to 1.80	.42	85.56	33.84	6.72	6.29	3.00
	Over 1.80	14.44	100.00	61.39	14.61	13.65	4.54
100-mesh x 0, 2.38 percent of sample				16.32		5.25	