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URBANA

REPORT OF INVESTIGATIONS—NO. 48

WASHABILITY CHARACTERISTICS OF ILLINOIS COAL SCREENINGS

BY

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IN COOPERATION WITH THE ENGINEERING EXPERIMENT STATION,
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WASHABILITY CHARACTERISTICS OF ILLINOIS COAL SCREENINGS

D. R. MITCHELL[1] AND L. C. MCCABE[2]

INTRODUCTION

Foreword.—The washability characteristics, size-range, and chemical analyses of screenings from Illinois mines are matters of growing interest. Screenings that are mechanically cleaned, carefully sized, mixed, dedusted, or made dustless by treatment with oil or chemicals have an advantage over screenings receiving no special preparation. The producers of raw screenings are accordingly interested in the possibilities of improvement revealed by analytical data and the results of experimental tests on coals from the districts in which they operate.

A number of reports have been published on the general subject of the washability of Illinois coal,[3] none of which has treated screenings as a specific problem. In order to obtain the technical information necessary to answer the many requests received, an investigation of the screenings problem was started in 1934.

This investigation was conducted as a cooperative project between the Coal Division of the Illinois State Geological Survey and the Department of Mining and Metallurgical Engineering of the University of Illinois. Ten mines distributed among the different mining districts, were sampled so that each of the commercially important coal beds as well as the different districts would be represented (table 1 and figure 1). They were all underground mines, and the data presented should be representative of screenings similarly produced from other underground mines for the particular district in which each of the samples was taken.

---

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[2] Associate Geologist, Coal Division, Illinois State Geological Survey, Urbana.

[3] Lincoln, F. C., Coal washing in Illinois: U. of I. Eng. Expt. Sta. Bull. 69, 1913.
Holbrook, E. A., Dry preparation of bituminous coal at Illinois Mines: U. of I. Eng. Expt. Sta. Bull. 88, 1916.
Fraser, T., and Yancey, H. F., Cleaning tests of Illinois coals: U. S. Bur. of Mines, T. P. 361, 1925.
Callen, A. C., and Mitchell, D. R., Washability tests of Illinois coals: U. of I. Eng. Expt. Sta. Bull. 217, 1930.
Mitchell, D. R., The possible production of low ash and sulphur coal in Illinois as shown by float-and-sink tests: U. of I. Eng. Expt. Sta. Bull. 258, 1933.
McCabe, L. C., Mitchell, D. R., and Cady, G. H., Banded ingredients of No. 6 coal and their heating values as related to washability characteristics: Ill. Geol. Survey, Rept. of Inv. No. 34, 1934.

FIGURE 1.—MAP OF ILLINOIS SHOWING LOCATION OF MINES WHERE SCREENINGS WERE SAMPLED.

A preliminary report, "Proximate analyses and screen tests of coal mine screenings," was published by the Illinois State Geological Survey in 1935 as Report of Investigations No. 38. Other reports to be issued in the series will be concerned with the effect of washing and sizing on the ash fusion temperatures and the effect of sizing and washing on the distribution of the coal components.

Purpose of the investigation.—This report is concerned with: (1) Float-and-sink tests made in the laboratory; (2) chemical analyses of the float-and-sink fractions; and (3) their significance in the preparation of screenings for the market.

The methods used in sampling, sizing, and chemical analysis of the screenings from the ten mines are described in Report of Investigations No. 38 and are not repeated herein. Details of float-and-sink procedure are given.

Acknowledgments.—The writers gratefully acknowledge the cooperation and assistance of the management of the mines in collecting the samples.

Float-and-sink tests of sizes above 3/8 inch were made in the laboratory of the Department of Mining and Metallurgical Engineering.

TABLE 1.—LOCATION, COAL BEDS WORKED, THICKNESS OF BEDS, MINING METHODS AND TONNAGES OF MINES SAMPLED

Mine	County	Coal bed number	Average thickness (Feet)	(Inches)	Mining methods	Daily average (Tons)
A.....	Henry.....	1	4	1	Room-and-pillar, coal shot from solid, hand loading.	450
B.....	Woodford...	2	2	9	Longwall, hand mining, hand loading.....	425
C.....	Peoria.....	5	4	2	Room-and-pillar, machine mining, hand loading...	3,000
D.....	Vermilion....	(Grape Creek)	5	0	Room-and-pillar, machine mining, hand loading...	3,000
E.....	Sangamon...	5 (Springfield)	5	9	Room-and-pillar, coal shot from solid, hand loading.	1,500
F.....	Christian....	6	7	6	Room-and-pillar, coal shot from solid, hand loading.	700
G.....	St. Clair.....	6	7	0	Room-and-pillar, machine mining, machine loading	1,300
H.....	Marion.....	6	6	4	Room-and-pillar, machine mining, hand loading...	1,700
I.....	Williamson..	6	10	0	Room-and-pillar, machine mining, mechanical loading.....	4,000
J.....	Saline.....	5 (Harrisburg)	5	3	Room-and-pillar, machine mining, hand loading...	2,000

The project was carried on under the general supervision of Dr. G. H. Cady, Head of the Coal Division of the Survey. L. G. Hazen and C. C. Boley, Technical Assistants in the Coal Division, assisted in the laboratory preparation of samples and in assembling the data. Ash and sulfur determinations were made in the analytical laboratory of the Survey, under the supervision of Dr. F. H. Reed, Head of the Geochemical Section, under the direction of Dr. O. W. Rees, and with the assistance of J. W. Robinson and C. S. Westerberg.

LABORATORY PROCEDURE

One-quarter of the gross sample of screenings of 1000 to 1500 pounds from each mine was sized as follows:

2 to 1¼-inch (one instance)
1¼ to ¾-inch (all mines)
¾ to ⅜-inch (all mines)
⅜ inch to 10-mesh (all mines)
10 to 48-mesh (all mines)
Minus 48-mesh (all mines)
(Round-hole screens were used in sizing at ⅜-inch and above and Tyler standard sieves for sizing below ⅜-inch).

Each size was separated by heavy liquids of 1.30, 1.35, 1.40, 1.50, and 1.70 specific gravity into the following fractions:

	1.30	Specific gravity	float
1.30 to	1.35	"	"
1.35 to	1.40	"	"
1.40 to	1.50	"	"
1.50 to	1.70	"	"
	1.70	"	sink

Zinc chloride solutions.—Water solutions of zinc chloride were used in making float-and-sink tests of ¾ to ⅜-inch and larger coal.

Galvanized iron cans for holding the solutions, a wire basket for holding the coal, dippers for removing the float, and a drainage and washing table were used as shown in figure 2.

Fifty per cent zinc chloride solution (sp. gr., 1.568) is available from chemical manufacturers. From this solution the 1.70 specific gravity solution was prepared by adding granular zinc chloride; the solutions of 1.50 specific gravity and lower were made by diluting the commercial solution with water.

Dry coal is not easily wet by zinc chloride solutions and pieces of slightly greater specific gravity than the solutions tend to float. Soaking the coal over night prior to float-and-sink testing restores the moisture to the "as mined" condition and makes wetting by zinc chloride less difficult. However, this procedure causes disintegration and loss of refuse in samples containing clay. To reduce this loss, all samples to be soaked in water were first quickly passed through the solution of 1.70 specific gravity and separated into a

float and a sink fraction. The float was then soaked in water overnight, drained, and then tested in the 1.30, 1.35, 1.40, 1.50 and 1.70 specific gravity zinc chloride solutions. The sink material from the 1.70 specific gravity separation of the dry coal was composed largely of shale and pyrite or mixtures of the two. The sink from the separation of the soaked coal at the same specific gravity was largely "bony" coal and slate which do not readily disintegrate in water or heavy solutions. The two sink fractions were combined to make the complete sample of 1.70 sink.

All other fractions separated in zinc chloride solution were washed in a water spray to remove the solution adhering to the coal, drained, and then surface dried. A small grab sample was taken of all fractions for moisture determinations and the remaining coal was ground to 3/8 inch and reduced to two pounds by riffling. This sample was sent to the laboratory for moisture, ash, and sulfur determinations.

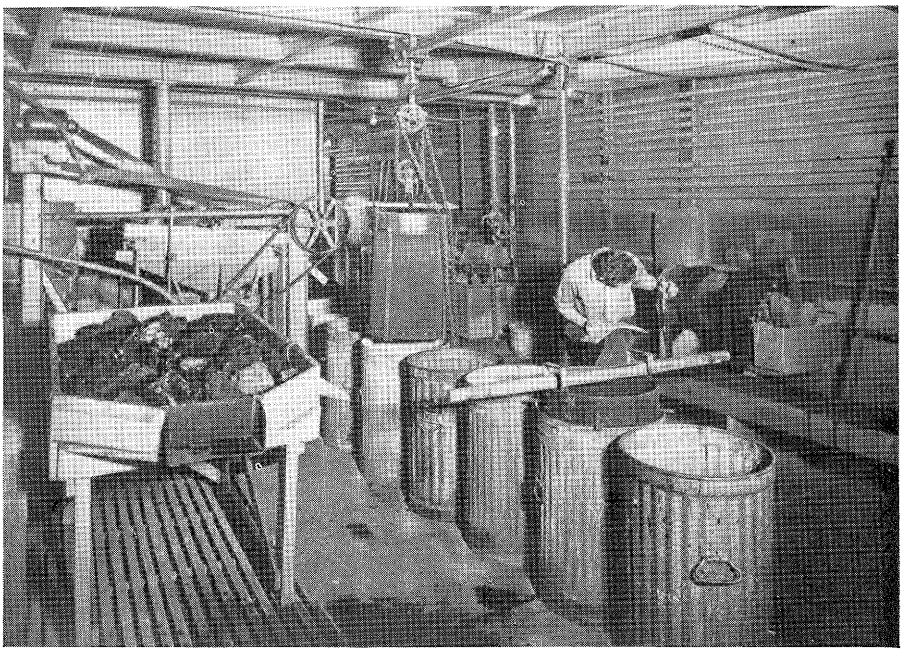

FIGURE 2.—FLOAT-AND-SINK APPARATUS FOR LARGE SIZES

Organic solutions.—Carbontetrachloride, benzene, and bromoform mixtures were used in preparing the solutions for the specific gravity separation of sizes smaller than 3/8 inch.

Bromoform (sp. gr. 2.890) was used with carbontetrachloride (sp. gr. 1.595) in preparing the solution of 1.70 specific gravity. Carbontetrachloride and benzene (sp. gr. 0.878) mixtures were used in preparing solutions of 1.30, 1.35, 1.40, and 1.50 specific gravity.

Organic solutions will wet dry coal readily and do not cause disintegration of shale and clay. All samples were air-dried to remove surface moisture before making float-and-sink separations in organic solutions.

Battery jars were convenient containers for the solutions (fig. 3). A metal can with a 60-mesh screen bottom and having a slightly smaller diameter than the battery jars, was used to hold the coal larger than 48-mesh while it was in the solutions. The float-coal was skimmed off with a wire-bottom dipper and the can containing the sink-coal was lifted and drained. The contents of the can were then surface dried with an electric fan before the procedure was repeated in the solution of next higher specific gravity.

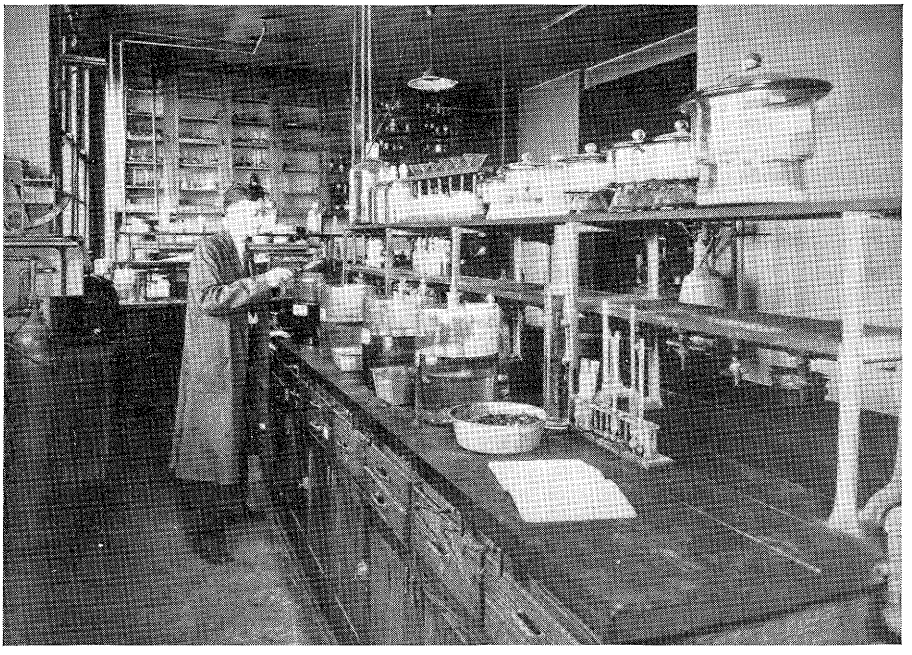

FIGURE 3.—FLOAT-AND-SINK APPARATUS FOR SMALL SIZES

As the minus 48-mesh dust may stay in suspension for several hours the apparatus and procedure for float-and-sink testing differed from that described above. The sample was placed in the separating medium in a battery jar and allowed to stand until the solution was clear between the float and the sink fractions. The float particles were then collected by means of an aspirating apparatus (fig. 4), filtered from the heavy liquid and dried. The sink was collected on filter paper, dried, and the procedure was repeated in the next higher gravity solution.

Organic solutions must be kept covered to prevent a change in specific gravity because of differential evaporation. Frequent checking of the specific gravity of solutions with a good hydrometer or Westphal balance is necessary.

SIZING AND CHEMICAL ANALYSES

A brief summary of the size characteristics and chemical properties of the samples follows. Those interested in the detailed chemical analyses of the various sizes in the screenings are referred to Report of Investigations No. 38.

The distribution of the various sizes in the samples is given in table 2. At all mines except *I* and *J* the impurity content of the dust, or minus 48-mesh size, is so high that the dust has little value. Such dust removed by dedusting methods would be very difficult to market.

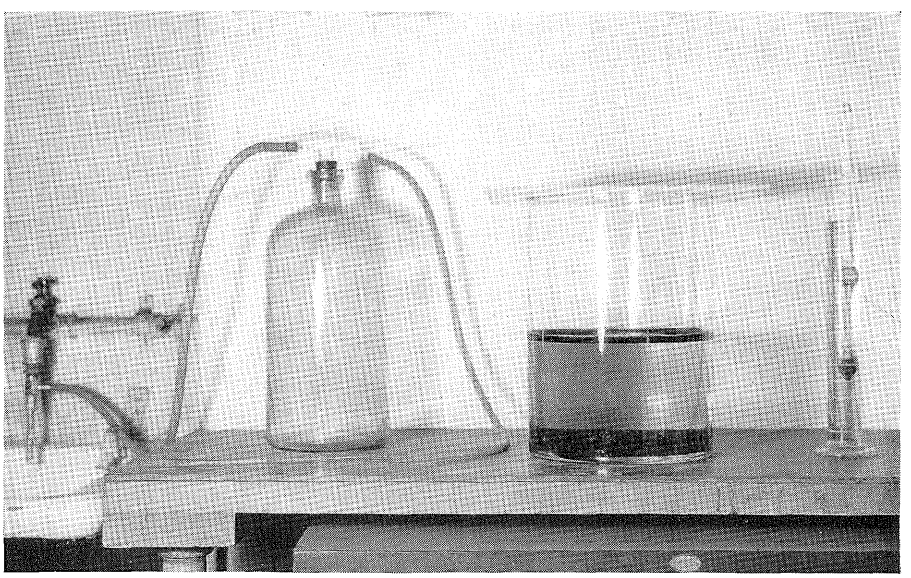

FIGURE 4.—ASPIRATING ARRANGEMENT FOR FLOAT-AND-SINK TESTING

Most of the samples showed an increase in ash content from the coarse to the smallest sizes. Five samples show the same trend for sulphur distribution. Four samples (*C, F, G, H*) showed an opposite trend in that the amount of sulphur actually decreased in the small sizes. Screenings from mine *E* contained about the same amount of sulphur in all sizes.

The *as received* and *moisture free* proximate analysis of the screenings produced at the ten mines are given in table 3.

INTERPRETATION OF WASHABILITY CURVES

Because of variation in moisture from one float-and-sink fraction to another, the *as received* ash and sulfur percentages of the different sizes are not directly comparable with each other or with the *as received* data of the screenings in table 3. For this reason all washability data are calculated

to the moisture-free basis and the curves constructed therefrom. Yields and chemical analyses can easily be changed from the dry basis upon which they are given to the *as received* or *as mined* condition by making the necessary correction for the total moisture in the coal. The normal coal bed moisture as determined by averaging total moisture from several face samples is usually used for this calculation. If the coal is to be cleaned by a wet washery, it may be necessary to make further adjustments for moisture added during washing. The tables of float-and-sink data (tables 9 to 18) contain the calculations necessary for the construction of washability curves.

Methods of calculating washability data from chemical analyses and of constructing and interpreting washability curves are given by Callen and Mitchell[4] so that it is not necessary to present a general discussion of them here. However, to illustrate the washability characteristics of the screenings studied in this investigation, the curves constructed from the data obtained from the mine *B* screenings are discussed in some detail. Only the most significant washability characteristics of the screenings from the other mines sampled are discussed.

SPECIFIC GRAVITY DISTRIBUTION CURVE[5]

The ±0.10 specific gravity distribution curve shows the weight per cent of material present within the range of 0.10 of a unit of specific gravity above and 0.10 of a unit of specific gravity below a stated specific gravity. Thus at 1.5 specific gravity the specific gravity distribution curve, reading on the coal recovery ordinate coal, per cent, gives the weight per cent of material present between 1.40 and 1.60 specific gravity.

[4] Callen, A. C., and Mitchell, D. R., Washability tests of Illinois coals: Univ. Illinois Eng. Expt. Sta., Bull. 217, 1930.

[5] Bird, B. M., Interpretation of float-and-sink data, Proceedings Second International Conference on Bituminous Coal, Vol. 2, p. 82, 1928. Proceedings of the Third International Conference on Bituminous Coal, vol. 2, p. 722, 1931.

TABLE 2.—SIZING

(Comparison of weight per cent, and per

Mine	1¼ to ¾ in.	Ash	S.	¾ to ⅜ in.	Ash	S.	⅜ in. to 10 mesh
A.....	25.0	17.2	6.1	25.5	17.7	6.2	31.8
B.....	20.3	11.0	1.7	29.4	14.3	1.8	31.0
C.....	34.7	14.3	3.5	28.8	14.6	3.3	23.5
D.....	18.8	12.6	1.9	24.1	13.6	2.0	32.2
E.....	29.5	12.8	5.2	28.6	14.1	5.5	26.6
F.....	28.3	14.2	4.7	28.7	17.0	4.8	27.3
G.....	29.0	15.5	4.7	26.5	16.9	4.7	26.0
H.....	33.0	15.4	4.7	23.5	15.5	4.9	26.7
I[1].....	28.6	9.8	1.7	25.6	9.9	1.9	27.0
J.....	30.7	9.7	2.8	26.0	10.2	2.7	25.4

[1] At this mine 2-inch screenings were sampled. The 2 to 1¼-inch size was 22.6 per

The curve was developed to show the relative difficulty of separating coal from refuse at any selected specific gravity and is constructed to show the proportion of coal present within a narrow range both sides of any selected specific gravity. The point to be made is that separation is relatively difficult at those gravities at which relatively large percentages of material are present and relatively easy at other places. The authority cited above writes as follows in explanation:

> "Suppose that a raw coal could be found, three-fourths of which was composed of particles between 1.45 and 1.55 specific gravities. Obviously a very sharp separation at 1.50 specific gravity would be more difficult to obtain with such a coal than in a coal of which three-fourths was less than 1.30 and more than 1.70 specific gravities."

The difficulty or ease of separation is determined by the extent of concentration of the coal material at any one narrow range of specific gravity. Table 4[6] indicates the nature of the washing problem as determined by this concentration as revealed by the specific gravity distribution curve.

The use of specific gravity distribution curves makes it possible to select a gravity at which washing can be done most efficiently. Furthermore, they clearly show that the possibility of efficient separation at one gravity does not assure similar efficiency at another.

Elaborate discussion of the fundamentals involved in the specific gravity distribution curves and their methods of construction may be found in the publications cited to which the reader who is in search of a complete discussion of this item of the washability diagram should refer.

[6] Bird, B. M., Proc. 3rd International Conference on Bituminous Coal, Vol. 2, p. 722, 1931.

TESTS OF SCREENINGS

cent of ash and sulfur on a dry basis)

Ash	S.	10 to 48 mesh	Ash	S.	48 mesh	Ash	S.
19.5	6.2	12.5	25.5	6.2	5.2	29.9	7.1
19.7	2.0	13.6	30.5	2.9	5.7	36.5	4.0
16.3	3.2	9.3	18.9	2.9	3.7	22.9	2.7
14.7	2.1	16.1	17.5	2.5	8.8	21.4	3.8
13.8	5.3	10.7	17.3	5.4	4.6	20.2	5.0
18.7	4.7	10.2	25.3	4.7	5.5	21.1	3.5
19.3	4.5	12.5	25.8	4.2	6.0	25.2	3.4
15.0	4.7	11.8	17.3	4.2	5.0	20.4	3.7
10.8	2.2	12.9	14.4	2.3	5.9	14.6	2.2
11.7	2.9	12.3	18.5	3.3	5.6	16.8	3.7

cent of the sample and analyzed 9.2 per cent ash and 1.5 per cent sulfur on the dry basis.

TABLE 3.—PROXIMATE ANALYSES OF SCREENINGS[1]

Mine	Condition[2]	Moisture	Ash	Volatile matter	Fixed carbon	Sulfur	B. t. u. per pound
A.....	1	14.1	16.8	35.0	34.1	5.21	9,811
	2	.....	19.6	40.7	39.7	6.06	11,422
B.....	1	11.8	17.1	30.1	41.0	1.98	10,195
	2	.....	19.4	34.2	46.4	2.24	11,557
C.....	1	13.5	14.2	34.3	38.0	2.81	10,322
	2	.....	16.5	39.7	43.8	3.25	11,939
D.....	1	13.6	12.7	32.0	41.7	1.97	10,506
	2	.....	14.6	37.0	48.4	2.28	12,157
E.....	1	13.1	12.0	35.1	39.8	4.58	10,608
	2	.....	13.8	40.4	45.8	5.27	12,202
F.....	1	12.5	15.5	33.6	38.4	4.15	10,441
	2	.....	17.8	38.4	43.8	4.74	11,585
G.....	1	9.5	16.3	35.7	38.1	4.14	10,402
	2	.....	18.1	39.6	42.3	4.59	11,544
H.....	1	9.7	14.7	35.0	40.6	4.12	10,707
	2	.....	16.3	38.7	45.0	4.56	11,856
I.....	1	8.4	9.5	32.1	50.0	1.73	11,847
	2	.....	10.4	35.0	54.6	1.89	12,928
J.....	1	5.7	11.2	32.7	50.4	2.79	12,116
	2	.....	11.8	34.7	53.5	2.96	12,852

[1] All analyses are of 1¼- to 0-inch coal except that of Mine I which is of 2- to 0-inch coal.
[2] The form of analysis is denoted by number, as follows: 1, sample as received at laboratory; 2, moisture-free or dry coal.

Before leaving the explanation, however, it is desirable to indicate the reason for and the method of making adjustments of percentages of recovery as shown in table 8 and as used in the construction of the specific gravity distribution curves. In any series of float-and-sink tests a certain amount of high gravity material is likely to be present lying considerably beyond the range of specific gravity agents employed. This material consists mainly of rock and shale from the roof and floor which would be eliminated in the most crude separation processes. The cleaning problems obviously concerns that part of the product of the mines that is not so obviously non-coal material. If this rock material is not eliminated from consideration, inter-

TABLE 4.—DIFFICULTY OF WASHING AS AFFECTED BY CONCENTRATION OF MATERIAL

Per cent of coal present (±0.10 curve)	Degree of difficulty
0 — 7	Simple
7 — 10	Moderately difficult
10 — 15	Difficult
15 — 20	Very difficult
Above 25	Formidable

pretation of the float-and-sink data becomes unreliable, as Bird[7] has pointed out. The selection of a specific gravity of 2.00 as the point of separation of the mineral and rock materials is more or less arbitrary but is determined mainly "because it is as high as existing specific gravity curves can be extrapolated with any degree of accuracy."[8]

Calculations for the specific gravity distribution curves of coal *B* are given in table 8.

MINE B WASHABILITY CURVES

The washability curves for the mine *B* screenings (fig. 6) may be used, with some additional discussion of characteristics peculiar to individual mines, to illustrate the washability of the screenings selected for this investigation.

In the study of the washability characteristics of screenings, the minus 48-mesh dust was excluded from consideration because in practice it is recognized that removal of dust before washing facilitates water clarification and permits more rapid dewatering of the larger coal. The dusts are little improved by washing and they may interfere with the effective washing of larger sizes. When the dust is not removed by screening or dedusting before washing, it is commonly lost in the sludge.

1¼-INCH TO 48-MESH COAL

Coal Recovery and Specific Gravity Curves.—The ash content (moisture-free basis) of mine *B* 1¼-inch to 48-mesh screenings is 16.26 per cent (table 10). It is to the advantage of both producer and consumer to reduce the ash content of this coal before it reaches the market if it is economically feasible to do so. Assuming that it is desired to reduce the ash in the screenings to 5 per cent (moisture-free basis) the use of washability curves in determining the practicability of such an improvement in the coal may be examined. On the first set of curves (1¼-inch to 48-mesh) of figure 6 a vertical line extending from 5 per cent ash would intersect the coal recovery-ash (*A*) curve at 81.6 per cent coal recovery as read on the left ordinate. A horizontal line at this level would intersect the specific gravity (*S.G.*) curve at 1.50 specific gravity. A third line extending vertically at this point would intersect the specific gravity distribution (±0.10 sp. gr.) curve at 4.4 per cent, this being the amount of material in the coal being tested having a specific gravity between 1.40 and 1.60. Table 4 shows this to be a simple washing problem.

The intersections of two of the remaining washability curves with a horizontal line at 81.6 per cent recovery are also significant.

[7] Op. cit., Vol. 2, 1928, p. 95.
[8] Op. cit.

Sulfur curve.—The sulfur (S) curve would cross such a horizontal line at 1.2 per cent, indicating a sulfur content of that percentage when the coal is washed to 5 per cent ash. The termination of the sulfur curve on the 100 per cent recovery line shows that the unwashed coal contained 2.0 per cent sulfur.

Refuse Reject-Ash Curve.—The horizontal line would cross the refuse reject-ash (R) curve at 73.8 indicating this percentage of ash in the refuse from the washed coal. Refuse having this much ash contains little or no coal.

Ash Distribution Curve.—The ash distribution (D) curve shows the percentage of ash in each float-and-sink fraction involved in the calculation. Its primary function is to indicate the degree or admixture of refuse and coal, hence a sharp change in direction to the right in this curve is indicative of a rapid increase of high ash material.

SIZED COAL

Close sizing of screenings before cleaning is rarely practicable but the washability characteristics of the individual sizes are important in an evaluation of the cleaning problem for the whole coal. A study of the individual sizes may indicate the desirability of diverting one or more sizes of the feed to be pneumatically cleaned while other sizes are cleaned by a wet process; or it may be found advisable to by-pass certain of the smaller sizes without cleaning and to remix them with the larger sizes after the latter have been cleaned. Each coal and every size making up the screenings has its own characteristics and an understanding of these is imperative to the successful selection and operation of the units to be used in preparing the coal for the market.

Use of Curves in Evaluating Washability.—The basis for the construction of the ± 0.10 specific gravity distribution curves for the various sizes of coal B above minus 48-mesh is presented in table 8. The method of adjustment of the percentages has already been explained. The amount of material having a specific gravity of 2.00 and above was not determined experimentally but by extrapolation of the specific gravity curve to the 2.00 specific gravity point using an appropriately shaped curve.

Examination of the adjusted percentages of mine B sized coal as given in table 8 or as obtained from inspection of the specific gravity distribution curves, shows, when taken in connection with the data given in table 4, that for any size coal the washing problem is more difficult at 1.45 or 1.4 than at 1.50, 1.60, or 1.70 specific gravity. On the other hand washing at 1.50 where but relatively small percentages of the coal are present would accomplish good separation. It may be noted that a similar conclusion was reached in regard to the effectiveness of washing at 1.50 specific gravity in the preceding consideration of the 1¼-inch to 48-mesh coal. At this specific gravity

the washing problem could be classified as a simple one (table 4) for each of the sizes since in no case do the adjusted percentages (table 8) exceed 6.7 per cent.

Although it would be still easier to wash at 1.60 and 1.70 specific gravity the washed coal would undoubtedly have a higher ash content.

Coal Recovery and Ash.—Table 5 shows ash percentages for the sized unwashed coal and the corresponding recovery and ash percentages of the washed coal floating at 1.50 specific gravity. This information is also shown by the *A* curves, figure 6.

TABLE 5.—ASH AND RECOVERIES IN SIZED COAL FROM MINE B

Size	Raw coal ash (dry) (Per cent)	Washed coal	
		Recovery 1.50 sp. gr. (Per cent)	Ash (dry) 1.50 sp. gr. (Per cent)
1¼ to ¾ inch	11.0	91.8	5.5
¾ to ⅜ inch	14.3	86.1	5.3
⅜ inch to 10 mesh	19.7	77.8	4.6
10 to 48 mesh	30.5	65.0	4.2
Minus 48 mesh	36.5	48.0	7.0

The low recoveries in the small sizes at 1.50 specific gravity are accounted for by the high ash content of these sizes. This is due to the association with the screenings of relatively friable mineral matter consisting of soft clay from the roof and floor of the mine which concentrates in these small sizes.

Ash Distribution Curves.—As stated in the discussion of the 1¼-inch to 48-mesh coal, the ash distribution curve indicates the ash content of the coal of each float-and-sink fraction. Where this curve shows a sharp change in direction, as is true of all *D* curves for coal *B* except that of the minus 48-mesh, sharp changes in ash content are indicated, pointing to good differentiation of coal and mineral matter.

Comparison of Dust and Larger Coal.—Generally when two different sizes of coal from the same mine are separated into several specific gravity fractions by heavy liquids, as previously described, the increments of the smaller coal have lower ash than the corresponding increments of the larger coal. The 10- to 48-mesh and minus 48-mesh sizes invite comparisons bearing on this generalization. Comparison of the ash content of the float-and-sink fractions of the two sizes (table 10, col. 4) shows uniformly, lower ash in the minus 48-mesh size. Examination of the amounts of coal at each specific gravity (col. 3) shows that 46.9 per cent of the 10- to 48-mesh coal floats at 1.30 specific gravity while only 4 per cent of the minus 48-mesh size floats at the same specific gravity. The fractions of intermediate specific gravity

(1.35 to 1.50) are large in the minus 48-mesh dust and small in the 10- to 48-mesh size. As a result at 1.50 specific gravity, the cumulative ash (col. 8) shows 4.2 per cent in the 10- to 48-mesh size and 7.0 per cent ash in the minus 48-mesh dust.

GENERAL INTERPRETATION OF DATA FROM ALL MINES

Most cleaning plants in Illinois are so operated that the cleaned coal compares closely with that obtained by float-and-sink tests made at or near to 1.50 specific gravity. Table 6 shows the character of the cleaned coal and refuse of all ten mines at this specific gravity. The highest recoveries were from coals *C, E, I,* and *J.*

The ash content of the float from coals *A, C* and *E* is high; the ash content of the sink is low. This relationship indicates the necessity of cleaning at a lower specific gravity in order to secure an acceptable low ash product. However, cleaning at a lower specific gravity would result in a still lower ash in the refuse which is undesirable since considerable fuel would be lost in the refuse.

TABLE 6.—COMPARISON OF RECOVERY, ASH AND SULFUR PERCENTAGES
(1.50 Specific Gravity in 1¼-inch to 48-mesh coal, dry basis)

Mine	Recovery	Float ash (Cumulative)	Float sulfur (Cumulative)	Sink ash (Cumulative)	Sink sulfur (Cumulative)
A.....	80.6	9.5	4.4	53.5	11.4
B.....	81.6	5.0	1.2	73.8	5.4
C.....	89.1	11.8	2.9	54.7	6.7
D.....	86.0	7.9	1.6	56.5	5.4
E.....	90.0	10.0	4.2	46.1	14.6
F.....	82.2	8.5	3.9	60.6	9.1
G.....	83.5	9.1	3.6	61.1	9.0
H.....	85.1	8.8	3.2	55.1	13.2
I.....	92.6	6.5	1.4	58.8	6.4
J.....	91.4	7.1	1.9	59.2	12.2

The lowest ash and sulfur were obtained from coal *B* at this specific gravity. The refuse, containing 73.8 per cent ash, was free of coal but the recovery is only 81.6 per cent. However, the greater part of the refuse was introduced in mining and can hardly be considered coal recovery. Considering recovery, ash and sulfur percentages, coals *I* and *J* shows the best response to cleaning at 1.50 specific gravity.

Coal *A* is very difficult to clean at 1.50 specific gravity as 15 per cent of the coal is within ±0.10 per cent of this specific gravity. Cleaning at 1.55 specific gravity would increase recovery and place the cleaning problem in the difficult classification with a 0.5 per cent increase in ash in the washed coal.

Table 7 gives a concise picture of the relative difficulty of cleaning the coals at 1.50 specific gravity. At this specific gravity the coals present the following order of increasing difficulty in cleaning: *B* easiest; *J, I, D, G, C, F, H, E, and A,* most difficult.

TABLE 7.—COMPARISON OF DIFFICULTY OF CLEANING
(1¼-inch to 48-mesh coal at 1.50 Specific Gravity)

Mine	Per cent of ±0.10 material	Degree of difficulty of cleaning
A	15.0	Very difficult
B	4.3	Simple
C	11.2	Difficult
D	9.5	Difficult
E	13.5	Difficult
F	11.5	Difficult
G	10.5	Difficult
H	11.5	Difficult
I	5.6	Simple
J	4.5	Simple

SUMMARY AND CONCLUSIONS

Screenings were sampled at ten mines in the State representing five different producing horizons and a considerable variety of operating conditions. The ash and sulfur would be lowered in all these coals by a washing procedure based on specific gravity differences of coal and refuse.

The specific gravity best suited for separating most of the coals, considering ash and sulfur reduction, recoveries, and ease of washing is 1.50, although for coal A washing at a slightly higher specific gravity might be desirable.

The ash content (dry basis) of 1¼-inch screenings as they came from the mines varied between 10.8 and 19.7 per cent; the extremes of sulfur were 1.98 and 6.2 per cent. The range of ash in the 1¼-inch to 48-mesh screenings floating at 1.50 specific gravity was 5.0 to 11.8 per cent. Ash in the refuse ranged between 53.5 and 73.8 per cent. The lowest recovery of coal at this specific gravity was 80.6 per cent, the highest 92.6 per cent.

At 1.50 specific gravity the washing problem varies from simple to very difficult but in no instance is the problem too difficult for available cleaning equipment operated with competent supervision. The data are applicable only to the coals sampled but no doubt have characteristics in common with screenings similarly produced from other mines in the respective districts.

TABLE 8.—CALCULATIONS FOR ±0.10 SPECIFIC GRAVITY DISTRIBUTION CURVES, MINE B

Specific gravity	1.7	1.6	1.5	1.45	1.4
Size 1¼ inch to 48 mesh 11.5 per cent at 2.0 specific gravity					
		100 — 11.5 = 88.5			
Recovery at +0.10 specific gravity	85.2	83.7	83.1	82.4	81.6
Recovery at —0.10 specific gravity	83.1	81.6	79.2	76.4	68.8
	2.1 × 100/88.5 =	2.1 × 100/88.5 =	3.9 × 100/88.5 =	6.0 × 100/88.5 =	12.8 × 100/88.5 =
Adjusted ±0.10 specific gravity percentage	2.4	2.4	4.4	6.8	14.5
Size 1¼ to ¾ inch 4.8 per cent at 2.0 specific gravity					
		100 — 4.8 = 95.2			
Recovery at +0.10 specific gravity	94.0	93.4	93.0	92.5	91.8
Recovery at —0.10 specific gravity	93.0	91.8	89.4	86.7	75.6
	1.0	1.6	3.6	5.8	16.2
Adjusted ±0.10 specific gravity percentage	1.1	1.7	3.8	6.1	17.0
Size ¾ to ⅜ inch 8.0 per cent sink at 2.0 specific gravity					
		100 — 8 = 92			
Recovery at +0.10 specific gravity	89.7	88.3	87.7	87.1	86.1
Recovery at —0.10 specific gravity	87.7	86.1	84.0	81.7	74.1
	2.0	2.2	3.7	5.4	12.0
Adjusted ±0.10 specific gravity percentage	2.2	2.4	4.0	5.9	13.0

Size ⅜ inch to 10 mesh
15.2 per cent sink at 2.0 specific gravity

100 — 25.5 = 74.5

Recovery at +0.10 specific gravity.....	81.6	80.0	79.5	78.6	77.8
Recovery at —0.10 specific gravity.....	79.5	77.8	75.3	72.8	68.9
	2.1	2.2	4.2	5.8	8.9
Adjusted ±0.10 specific gravity percentage	2.5	2.6	5.0	6.8	10.5

Size 10 to 48 mesh
25.5 per cent sink at 2.0 specific gravity

100 — 25.5 = 74.5

Recovery at +0.10 specific gravity.....	69.4	68.0	67.2	66.2	65.0
Recovery at —0.10 specific gravity.....	67.2	65.0	62.2	58.0	47.0
	2.2	3.0	5.0	8.2	18.0
Adjusted ±0.10 specific gravity percentage	3.0	4.0	6.7	11.0	24.2

TABLE 9.—WASHABILITY DATA AND

Size	1 Specific gravity	2 Weight (Grams)	3 Weight (Per cent)	4 Ash or sulfur (Per cent)	5 Products (3 × 4)
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	31.65	5.5	174.08
	1.30–1.35	.....	27.56	8.3	228.75
	1.35–1.40	.....	11.84	13.8	163.39
	1.40–1.50	.....	9.59	20.6	197.55
	1.50–1.70	.....	5.90	32.6	192.34
	1.70 sink	.....	13.46	62.7	843.94
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	3.39	107.29
	1.30–1.35	.....		4.24	116.85
	1.35–1.40	.....	as	5.47	64.76
	1.40–1.50	.....		6.87	65.88
	1.50–1.70	.....	above	8.56	50.50
	1.70 sink	.....		12.57	169.19
			Ash		
1¼ to ¾ inch.....	1.30 float	8,742	39.90	6.8	271.32
	1.30–1.35	5,872	26.80	11.0	294.80
	1.35–1.40	2,764	12.62	15.7	198.13
	1.40–1.50	1,773	8.09	24.3	196.59
	1.50–1.70	1,043	4.76	38.2	181.83
	1.70 sink	1,715	7.83	66.6	521.48
			Sulfur		
1¼ to ¾ inch.....	1.30 float	Same	Same	3.60	143.64
	1.30–1.35			4.74	127.03
	1.35–1.40	as	as	5.91	74.58
	1.40–1.50			7.28	58.90
	1.50–1.70	above	above	8.19	38.98
	1.70 sink			12.77	99.99
			Ash		
¾ to ⅜ inch.....	1.30 float	8,080	40.68	5.7	231.88
	1.30–1.35	5,029	25.32	10.8	273.46
	1.35–1.40	2,313	11.64	16.4	190.90
	1.40–1.50	1,639	8.25	26.1	215.33
	1.50–1.70	843	4.24	37.3	158.15
	1.70 sink	1,961	9.87	65.0	641.55
			Sulfur		
¾ to ⅜ inch.....	1.30 float	Same	Same	3.40	138.31
	1.30–1.35			4.89	123.81
	1.35–1.40	as	as	5.90	68.68
	1.40–1.50			7.75	63.94
	1.50–1.70	above	above	8.86	37.57
	1.70 sink			13.69	135.12

CALCULATIONS FOR SCREENINGS, MINE A

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
31.65	174.08	5.5	100.00	1,800.05	18.0	15.82
59.21	402.83	6.8	68.35	1,625.97	23.8	45.43
71.05	566.22	8.0	40.79	1,397.22	34.3	65.13
80.64	763.77	9.5	28.95	1,233.83	42.6	75.84
86.54	956.11	11.0	19.36	1,036.28	53.5	83.59
100.00	1,800.05	18.0	13.46	843.94	62.7	93.27
			Sulfur			
Same	107.29	3.39	Same	574.47	5.74	Same
	224.14	3.79		467.18	6.84	
as	288.90	4.07	as	350.33	8.59	as
	354.78	4.40		285.57	9.86	
above	405.28	4.68	above	219.69	11.35	above
	574.47	5.74		169.19	12.57	
			Ash			
39.90	271.32	6.8	100.00	1,664.15	16.6	19.95
66.70	566.12	8.5	60.10	1,392.83	23.2	53.30
79.32	764.25	9.6	33.30	1,098.03	33.0	73.01
87.41	960.84	11.0	20.68	899.90	43.5	83.36
92.17	1,142.67	12.4	12.59	703.31	55.9	89.79
100.00	1,664.15	16.6	7.83	521.48	66.6	96.08
			Sulfur			
Same	143.64	3.60	Same	543.12	5.43	Same
	270.67	4.06		399.48	6.65	
as	345.25	4.35	as	272.45	8.18	as
	404.15	4.62		197.87	9.57	
above	443.13	4.81	above	138.97	11.04	above
	543.12	5.43		99.99	12.77	
			Ash			
40.68	231.88	5.7	100.00	1,711.27	17.1	20.34
66.00	505.34	7.7	59.32	1,479.39	24.9	53.34
77.64	696.24	9.0	34.00	1,205.93	35.5	71.82
85.89	911.57	10.6	22.36	1,015.03	45.4	81.76
90.13	1,069.72	11.9	14.11	799.70	56.7	88.01
100.00	1,711.27	17.1	9.87	641.55	65.0	95.06
			Sulfur			
Same	138.31	3.40	Same	567.43	5.67	Same
	262.12	3.97		429.12	7.23	
as	330.80	4.26	as	305.31	8.98	as
	394.74	4.60		236.63	10.58	
above	432.31	4.80	above	172.69	12.24	above
	567.43	5.67		135.12	13.69	

TABLE 9—

Size	1 Specific gravity	2 Weight (Grams)	3 Weight (Per cent)	4 Ash or sulfur (Per cent)	5 Products (3 × 4)
		Ash			
⅜ inch to 10 mesh.....	1.30 float	1,960	26.51	4.1	108.69
	1.30–1.35	2,075	28.06	6.4	179.58
	1.35–1.40	877	11.86	12.0	142.32
	1.40–1.50	819	11.08	17.8	197.22
	1.50–1.70	541	7.32	30.6	223.99
	1.70 sink	1,122	15.17	65.0	986.05
		Sulfur			
⅜ inch to 10 mesh.....	1.30 float	Same	Same	3.21	85.10
	1.30–1.35			3.84	107.75
	1.35–1.40	as	as	5.17	61.32
	1.40–1.50			6.69	74.13
	1.50–1.70	above	above	8.98	65.73
	1.70 sink			12.94	196.30
		Ash			
10 to 48 mesh.....	1.30 float	320.0	10.21	2.6	26.55
	1.30–1.35	1,011.5	32.25	3.9	125.78
	1.35–1.40	336.0	10.71	9.1	97.46
	1.40–1.50	361.5	11.53	14.4	166.03
	1.50–1.70	248.5	7.92	25.6	202.75
	1.70 sink	858.5	27.38	65.0	1,779.70
		Sulfur			
10 to 48 mesh.....	1.30 float	Same	Same	3.04	31.04
	1.30–1.35			3.30	106.43
	1.35–1.40	as	as	4.34	46.48
	1.40–1.50			5.46	62.95
	1.50–1.70	above	above	7.70	60.98
	1.70 sink			11.14	305.01
		Ash			
Minus 48 mesh.....	1.30 float	1.6	0.25	3.6	0.90
	1.30–1.35	57.2	8.61	2.8	24.11
	1.35–1.40	68.4	10.28	5.1	52.43
	1.40–1.50	84.6	12.80	10.0	128.00
	1.50–1.70	250.7	36.62	22.5	823.95
	1.70 sink	206.6	31.44	56.9	1,788.94
		Sulfur			
Minus 48 mesh.....	1.30 float	Same	Same	3.11	0.78
	1.30–1.35			3.04	26.17
	1.35–1.40	as	as	3.35	34.44
	1.40–1.50			3.81	48.77
	1.50–1.70	above	above	5.63	206.17
	1.70 sink			12.38	389.23

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
26.51	108.69	4.1	100.00	1,837.85	18.4	13.25
54.57	288.27	5.3	73.49	1,729.16	23.5	40.54
66.43	430.59	6.5	45.43	1,549.58	34.1	60.50
77.51	627.81	8.1	33.57	1,407.26	41.9	71.97
84.83	851.80	10.0	22.49	1,210.04	53.8	81.17
100.00	1,837.85	18.4	15.17	986.05	65.0	92.41
			Sulfur			
Same	85.10	3.21	Same	590.33	5.90	Same
	192.85	3.53		505.23	6.87	
as	254.17	3.83	as	397.48	8.75	as
	328.30	4.24		336.16	10.01	
above	394.03	4.64	above	262.03	11.65	above
	590.33	5.90		196.30	12.94	
			Ash			
10.21	26.55	2.6	100.00	2,398.27	24.0	5.10
42.46	152.33	3.6	89.79	2,371.72	26.4	26.33
53.17	249.79	4.7	57.54	2,245.94	39.0	47.81
64.70	415.82	6.4	46.83	2,148.48	45.9	58.93
72.62	618.57	8.5	35.30	1,982.45	56.2	68.66
100.00	2,398.27	24.0	27.38	1,779.70	65.0	86.31
			Sulfur			
Same	31.04	3.04	Same	612.89	6.13	Same
	137.47	3.24		581.85	6.48	
as	183.95	3.46	as	475.42	8.26	as
	246.90	3.82		428.94	9.16	
above	307.88	4.24	above	365.99	10.37	above
	612.89	6.13		305.01	11.14	
			Ash			
0.25	0.90	3.6	100.00	2,818.33	28.2	0.12
8.86	25.01	2.8	99.75	2,817.43	28.2	4.55
19.14	77.44	4.0	91.14	2,793.32	30.6	14.00
31.94	205.44	6.4	80.86	2,740.89	33.9	25.54
68.56	1,029.39	15.0	68.06	2,612.89	38.4	50.25
100.00	2,818.33	28.2	31.44	1,788.94	56.9	84.28
			Sulfur			
Same	0.78	3.11	Same	705.56	7.06	Same
	26.95	3.04		704.78	7.07	
as	61.39	3.21	as	678.61	7.45	as
	110.16	3.45		644.17	7.97	
above	316.33	4.61	above	595.40	8.75	above
	705.56	7.06		389.23	12.38	

TABLE 10.—WASHABILITY DATA AND

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	68.81	3.5	240.84
	1.30–1.35	.....	7.61	8.8	66.97
	1.35–1.40	.....	2.73	15.1	41.22
	1.40–1.50	.....	2.44	23.2	56.61
	1.50–1.70	.....	2.15	34.4	73.96
	1.70 sink	.....	16.26	79.0	1,284.54
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	1.02	70.19
	1.30–1.35	.....		1.77	13.47
	1.35–1.40	.....	as	2.58	7.04
	1.40–1.50	.....		3.46	8.44
	1.50–1.70	.....	above	5.54	11.91
	1.70 sink	.....		5.39	87.64
			Ash		
1¼ to ¾ inch.....	1.30 float	15,813	75.57	3.8	287.16
	1.30–1.35	2,327	11.12	10.0	111.20
	1.35–1.40	566	2.71	18.3	49.59
	1.40–1.50	504	2.41	25.4	61.21
	1.50–1.70	324	1.55	36.1	55.95
	1.70 sink	1,390	6.64	81.0	537.84
			Sulfur		
1¼ to ¾ inch.....	1.30 float	Same	Same	1.04	78.59
	1.30–1.35			1.87	20.79
	1.35–1.40	as	as	2.63	7.13
	1.40–1.50			3.37	8.12
	1.50–1.70	above	above	5.50	8.52
	1.70 sink			4.95	32.87
			Ash		
¾ to ⅜ inch.....	1.30 float	10,996	74.10	3.9	288.99
	1.30–1.35	1,124	7.57	10.3	77.97
	1.35–1.40	341	2.30	16.5	37.95
	1.40–1.50	319	2.15	24.5	52.67
	1.50–1.70	319	2.15	36.7	78.91
	1.70 sink	1,740	11.73	81.4	954.82
			Sulfur		
¾ to ⅜ inch.....	1.30 float	Same	Same	1.03	76.32
	1.30–1.35			2.03	15.36
	1.35–1.40	as	as	2.96	6.81
	1.40–1.50			3.49	7.50
	1.50–1.70	above	above	6.07	13.05
	1.70 sink			5.14	60.29

CALCULATIONS FOR SCREENINGS, MINE B

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
68.81	240.84	3.5	100.00	1,764.14	17.6	34.40
76.42	307.81	4.0	31.19	1,523.30	48.8	72.61
79.15	349.03	4.4	23.58	1,456.33	61.8	77.78
81.59	405.64	5.0	20.85	1,415.11	67.9	80.37
83.74	479.60	5.7	18.41	1,358.50	73.8	82.66
100.00	1,764.14	17.6	16.26	1,284.54	79.0	91.87
			Sulfur			
Same	70.19	1.02	Same	198.69	1.99	Same
	83.66	1.09		128.50	4.12	
as	90.70	1.15	as	115.03	4.88	as
	99.14	1.22		107.99	5.18	
above	111.05	1.33	above	99.55	5.41	above
	198.69	1.99		87.64	5.39	
			Ash			
75.57	287.16	3.8	100.00	1,102.95	11.0	37.78
86.69	398.36	4.6	24.43	815.79	33.4	81.13
89.40	447.95	5.0	13.31	704.59	52.9	88.04
91.81	509.16	5.5	10.60	655.00	61.8	90.60
93.36	565.11	6.1	8.19	593.79	72.5	92.58
100.00	1,102.95	11.0	6.54	537.84	81.0	96.68
			Sulfur			
Same	78.59	1.04	Same	156.02	1.56	Same
	99.38	1.15		77.43	3.17	
as	106.51	1.19	as	56.64	4.25	as
	114.63	1.25		49.51	4.67	
above	123.15	1.32	above	41.39	5.05	above
	156.02	1.56		32.87	4.95	
			Ash			
74.10	288.99	3.9	100.00	1,491.31	14.9	37.05
81.67	366.96	4.5	25.90	1,202.32	46.4	77.88
83.97	404.91	4.8	18.33	1,124.35	61.3	82.82
86.12	457.58	5.3	16.03	1,086.40	67.8	85.04
88.27	536.49	6.1	13.88	1,033.73	74.5	87.19
100.00	1 491.31	14.9	11.73	954.82	81.4	94.13
			Sulfur			
Same	76.32	1.03	Same	179.33	1.79	Same
	91.68	1.12		103.01	3.98	
as	98.49	1.17	as	87.65	4.78	as
	105.99	1.23		80.84	5.04	
above	119.04	1.35	above	73.34	5.28	above
	179.33	1.79		60.29	5.14	

TABLE 10—

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
⅜ inch to 10 mesh.....	1.30 float	2,149.5	68.92	3.3	227.43
	1.30–1.35	121.0	3.88	8.8	34.14
	1.35–1.40	77.7	2.49	14.1	35.11
	1.40–1.50	79.4	2.55	22.8	58.14
	1.50–1.70	68.8	2.21	33.0	72.93
	1.70 sink	622.1	19.95	79.3	1,582.03
			Sulfur		
⅜ inch to 10 mesh.....	1.30 float	Same	Same	1.02	70.29
	1.30–1.35			1.84	7.14
	1.35–1.40	as	as	2.66	6.62
	1.40–1.50			3.74	9.53
	1.50–1.70	above	above	5.57	12.31
	1.70 sink			5.11	101.94
			Ash		
10 to 48 mesh.....	1.30 float	553.2	46.97	2.5	117.42
	1.30–1.35	129.4	10.99	4.9	53.85
	1.35–1.40	49.4	4.19	11.5	48.18
	1.40–1.50	33.8	2.87	19.1	54.82
	1.50–1.70	34.7	2.95	31.9	94.11
	1.70 sink	377.2	32.03	76.0	2,434.28
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	0.90	42.27
	1.30–1.35			1.15	12.64
	1.35–1.40	as	as	1.97	8.25
	1.40–1.50			2.96	8.49
	1.50–1.70	above	above	4.71	13.89
	1.70 sink			6.11	195.70
			Ash		
Minus 48 mesh.....	1.30 float		4	2.1	8.4
	1.30–1.35		8	2.8	22.4
	1.35–1.40		16	5.3	84.8
	1.40–1.50	.....	20	11.0	220.0
	1.50–1.70	.....	6	14.8	88.8
	1.70 sink	.....	46	68.5	3,151.0
			Sulfur		
Minus 48 mesh.....	1.30 float	.....	Same	0.96	3.84
	1.30–1.35	.....		0.86	6.88
	1.35–1.40	.....	as	0.94	15.04
	1.40–1.50	.....		1.24	24.80
	1.50–1.70	.....	above	1.17	7.02
	1.70 sink	.....		7.88	362.48

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
68.92	227.43	3.3	100.00	2,009.78	20.1	34.46
72.80	261.57	3.6	31.08	1,782.35	57.3	70.86
75.29	296.68	3.9	27.20	1,748.21	64.3	74.04
77.84	354.82	4.6	24.71	1,713.10	69.3	76.56
80.05	427.75	5.3	22.16	1,654.96	74.7	78.94
100.00	2,009.78	20.1	19.95	1,582.03	79.3	90.02
			Sulfur			
Same	70.29	1.02	Same	207.83	2.08	Same
	77.43	1.06		137.54	4.42	
as	84.05	1.12	as	130.40	4.79	as
	93.58	1.20		123.78	5.00	
above	105.89	1.32	above	114.25	5.16	above
	207.83	2.08		101.94	5.11	
			Ash			
46.97	117.42	2.5	100.00	2,802.66	28.0	23.48
57.96	171.27	2.9	53.03	2,685.24	50.6	52.46
62.15	219.45	3.5	42.04	2,631.39	62.6	60.05
65.02	274.27	4.2	37.85	2,583.21	68.3	63.58
67.97	368.38	5.4	34.98	2,528.39	72.3	66.49
100.00	2,802.66	28.0	32.03	2,434.28	76.0	83.98
			Sulfur			
Same	42.27	0.90	Same	281.24	2.81	Same
	54.91	0.95		238.97	4.51	
as	63.16	1.02	as	226.33	5.38	as
	71.65	1.10		218.08	5.76	
above	85.54	1.26	above	209.59	5.99	above
	281.24	2.81		195.70	6.11	
			Ash			
4	8.4	2.1	100	3,575.4	35.8	2
12	30.8	2.6	96	3,567.0	37.2	8
28	115.6	4.1	88	3,544.6	40.3	20
48	335.6	7.0	72	3,459.8	48.1	38
54	424.4	7.9	52	3,239.8	62.3	51
100	3,575.4	35.8	46	3,151.0	68.5	77
			Sulfur			
Same	3.84	0.96	Same	420.06	4.20	Same
	10.72	0.89		416.22	4.34	
as	25.76	0.92	as	409.34	4.65	as
	50.56	1.05		394.30	5.48	
above	57.58	1.07	above	369.50	7.11	above
	420.06	4.20		362.48	7.88	

TABLE 11.—WASHABILITY DATA AND

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	21.20	7.1	150.79
	1.30–1.35	.....	43.79	10.8	474.74
	1.35–1.40	.....	16.38	15.7	257.21
	1.40–1.50	.....	7.74	22.0	170.48
	1.50–1.70	.....	3.81	32.5	123.66
	1.70 sink	.....	7.08	66.6	471.77
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	2.49	52.74
	1.30–1.35	.....		2.63	115.25
	1.35–1.40	.....	as	3.43	56.17
	1.40–1.50	.....		4.61	35.67
	1.50–1.70	.....	above	5.39	20.53
	1.70 sink	.....		7.39	52.31
			Ash		
1¼ to ¾ inch.....	1.30 float	4,829	20.41	7.9	161.24
	1.30–1.35	11,480	48.52	12.1	587.09
	1.35–1.40	3,933	16.62	17.8	295.84
	1.40–1.50	1,706	7.21	24.5	176.65
	1.50–1.70	741	3.13	35.7	111.74
	1.70 sink	971	4.11	68.5	281.54
			Sulfur		
1¼ to ¾ inch.....	1.30 float	Same	Same	2.67	54.49
	1.30–1.35			2.68	130.03
	1.35–1.40	as	as	3.90	64.82
	1.40–1.50			5.51	39.73
	1.50–1.70	above	above	6.72	21.03
	1.70 sink			11.93	49.03
			Ash		
¾ to ⅜ inch.....	1.30 float	5,843	26.66	7.6	202.62
	1.30–1.35	10,163	46.38	12.5	579.76
	1.35–1.40	2,676	12.21	19.0	231.99
	1.40–1.50	1,277	5.83	26.2	152.75
	1.50–1.70	714	3.26	36.9	120.29
	1.70 sink	1,241	5.66	66.9	378.65
			Sulfur		
¾ to ⅜ inch.....	1.30 float	Same	Same	2.40	63.98
	1.30–1.35			2.73	126.62
	1.35–1.40	as	as	3.89	47.49
	1.40–1.50			5.04	29.38
	1.50–1.70	above	above	5.23	17.05
	1.70 sink			8.27	46.81

CALCULATIONS FOR SCREENINGS, MINE C

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
21.20	150.79	7.1	100.00	1,648.65	16.5	10.60
64.99	625.53	9.6	78.80	1,497.86	19.0	43.09
81.37	882.74	10.8	35.01	1,023.12	29.2	73.18
89.11	1,053.22	11.8	18.63	765.91	41.1	85.24
92.92	1,176.88	12.7	10.89	595.43	54.7	91.01
100.00	1,648.65	16.5	7.08	471.77	66.6	96.46
			Sulfur			
Same	52.74	2.49	Same	332.67	3.33	Same
	167.99	2.58		279.93	3.55	
as	224.16	2.75	as	164.68	4.70	as
	259.83	2.92		108.51	5.82	
above	280.36	3.02	above	72.84	6.69	above
	332.67	3.33		52.31	7.39	
			Ash			
20.41	161.24	7.9	100.00	1,614.10	16.1	10.20
68.93	748.33	10.9	79.59	1,452.86	18.3	44.67
85.55	1,044.17	12.2	31.07	865.77	27.9	77.24
92.76	1,220.82	13.2	14.45	569.93	39.4	89.15
95.89	1,332.56	13.9	7.24	393.28	54.3	94.32
100.00	1,614.10	16.1	4.11	281.54	68.5	97.94
			Sulfur			
Same	54.49	2.67	Same	359.13	3.59	Same
	184.52	2.68		304.64	3.83	
as	249.34	2.91	as	174.61	5.62	as
	289.07	3.12		109.79	7.60	
above	310.10	3.23	above	70.06	9.68	above
	359.13	3.59		49.03	11.93	
			Ash			
26.66	202.62	7.6	100.00	1,666.06	16.7	13.33
73.04	782.38	10.7	73.34	1,463.44	20.0	49.85
85.25	1,014.37	11.9	26.96	883.68	32.8	79.14
91.08	1,167.12	12.8	14.75	651.69	44.2	88.16
94.34	1,287.41	13.6	8.92	498.94	55.9	92.71
100.00	1,666.06	16.7	5.66	378.65	66.9	97.17
			Sulfur			
Same	63.98	2.40	Same	331.33	3.31	Same
	190.60	2.61		267.35	3.64	
as	238.09	2.79	as	140.73	5.22	as
	267.47	2.94		93.24	6.32	
above	284.52	3.01	above	63.86	7.16	above
	331.33	3.31		46.81	8.27	

TABLE 11—

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
⅜ inch to 10 mesh.....	1.30 float	1,381	21.60	5.7	123.12
	1.30–1.35	2,267	35.47	8.0	283.76
	1.35–1.40	1,237	19.35	12.7	245.75
	1.40–1.50	608	9.51	18.2	173.08
	1.50–1.70	303	4.75	28.3	134.43
	1.70 sink	596	9.32	67.0	624.44
			Sulfur		
⅜ inch to 10 mesh.....	1.30 float	Same	Same	2.37	51.19
	1.30–1.35			2.46	87.26
	1.35–1.40	as	as	2.81	54.37
	1.40–1.50			3.98	37.85
	1.50–1.70	above	above	5.04	23.94
	1.70 sink			6.01	56.01
			Ash		
10 to 48 mesh.....	1.30 float	162	6.29	3.4	21.39
	1.30–1.35	1,008	39.11	5.4	211.19
	1.35–1.40	540	20.95	10.5	219.98
	1.40–1.50	288	11.18	17.5	195.65
	1.50–1.70	145	5.63	26.7	150.32
	1.70 sink	434	16.84	64.3	1,082.81
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	2.44	15.35
	1.30–1.35			2.44	95.43
	1.35–1.40	as	as	2.64	55.31
	1.40–1.50			3.09	34.55
	1.50–1.70	above	above	3.68	20.72
	1.70 sink			4.28	72.08
			Ash		
Minus 48 mesh.....	1.30 float	1.4	0.24	2.7	0.65
	1.30–1.35	112.1	18.90	2.9	54.81
	1.35–1.40	120.0	20.23	7.0	141.61
	1.40–1.50	112.2	18.92	12.4	234.61
	1.50–1.70	91.3	15.40	20.3	312.62
	1.70 sink	156.0	26.31	60.4	1,589.12
			Sulfur		
Minus 48 mesh.....	1.30 float	Same	Same	2.52	0.60
	1.30–1.35			2.46	46.49
	1.35–1.40	as	as	2.55	51.59
	1.40–1.50			2.45	46.35
	1.50–1.70	above	above	2.39	36.81
	1.70 sink			3.65	96.03

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
21.60	123.12	5.7	100.00	1,584.58	15.8	10.80
57.07	406.88	7.1	78.40	1,461.46	18.6	39.33
76.42	652.63	8.5	42.93	1,177.70	27.4	66.74
85.93	825.71	9.6	23.58	931.95	39.5	81.17
90.68	960.14	10.6	14.07	758.87	53.9	88.30
100.00	1,584.58	15.8	9.32	624.44	67.0	95.34
			Sulfur			
Same	51.19	2.37	Same	310.62	3.11	Same
	138.45	2.43		259.43	3.31	
as	192.82	2.52	as	172.17	4.01	as
	230.67	2.68		117.80	5.00	
above	254.61	2.81	above	79.95	5.68	above
	310.62	3.11		56.01	6.01	
			Ash			
6.29	21.39	3.4	100.00	1,881.34	18.8	3.14
45.40	232.58	5.1	93.71	1,859.95	19.8	25.84
66.35	452.56	6.8	54.60	1,648.76	30.2	55.87
77.53	648.21	8.4	33.65	1,428.78	42.5	71.94
83.16	798.53	9.6	22.47	1,233.13	54.9	80.34
100.00	1,881.34	18.8	16.84	1,082.81	64.3	91.58
			Sulfur			
Same	15.35	2.44	Same	293.44	2.93	Same
	110.78	2.44		278.09	2.97	
as	166.09	2.50	as	182.66	3.35	as
	200.64	2.59		127.35	3.78	
above	221.36	2.66	above	92.80	4.13	above
	293.44	2.93		72.08	4.28	
			Ash			
0.24	0.65	2.7	100.00	2,333.42	23.3	0.12
19.14	55.46	2.9	99.76	2,332.77	23.4	9.69
39.37	197.07	5.0	80.86	2,277.96	28.2	29.25
58.29	431.68	7.4	60.63	2,136.35	35.2	48.83
73.69	744.30	10.1	41.71	1,901.74	45.6	65.99
100.00	2,333.42	23.3	26.31	1,589.12	60.4	86.84
			Sulfur			
Same	0.60	2.52	Same	277.87	2.78	Same
	47.09	2.46		277.27	2.78	
as	98.68	2.51	as	230.78	2.85	as
	145.03	2.49		179.19	2.96	
above	181.84	2.47	above	132.84	3.18	above
	277.87	2.78		96.03	3.65	

TABLE 12.—WASHABILITY DATA AND

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	55.97	4.7	263.80
	1.30–1.35	.....	18.77	10.9	204.55
	1.35–1.40	.....	5.43	15.5	84.41
	1.40–1.50	.....	5.83	21.8	127.17
	1.50–1.70	.....	4.92	36.0	177.33
	1.70 sink	.....	9.08	67.6	613.67
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	1.24	69.32
	1.30–1.35	.....		1.87	35.07
	1.35–1.40	.....	as	2.37	12.86
	1.40–1.50	.....		2.78	16.20
	1.50–1.70	.....	above	3.36	16.53
	1.70 sink	.....		6.47	58.78
			Ash		
1¼ to ¾ inch.....	1.30 float	11,152	51.74	5.8	300.09
	1.30–1.35	6,645	30.83	11.1	342.21
	1.35–1.40	789	3.66	18.8	68.81
	1.40–1.50	767	3.56	24.8	88.29
	1.50–1.70	915	4.24	38.7	164.09
	1.70 sink	1,288	5.97	70.3	419.69
			Sulfur		
1¼ to ¾ inch.....	1.30 float	Same	Same	1.18	61.05
	1.30–1.35			1.60	49.33
	1.35–1.40	as	as	2.15	7.87
	1.40–1.50			2.73	6.99
	1.50–1.70	above	above	2.95	12.51
	1.70 sink			4.80	28.66
			Ash		
¾ to ⅜ inch.....	1.30 float	12,497	46.92	5.2	243.98
	1.30–1.35	6,609	24.81	10.5	260.50
	1.35–1.40	2,138	8.02	14.7	118.04
	1.40–1.50	2,027	7.61	20.7	157.52
	1.50–1.70	1,594	5.99	36.2	216.84
	1.70 sink	1,768	6.64	70.4	467.45
			Sulfur		
¾ to ⅜ inch.....	1.30 float	Same	Same	1.11	52.08
	1.30–1.35			1.74	43.17
	1.35–1.40	as	as	2.07	16.62
	1.40–1.50			2.43	18.49
	1.50–1.70	above	above	3.10	18.57
	1.70 sink			6.34	42.10

CALCULATIONS FOR SCREENINGS, MINE D

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
55.97	263.80	4.7	100.00	1,407.93	14.7	27.98
74.74	468.35	6.3	44.03	1,207.13	27.4	65.35
80.17	552.76	6.9	25.26	1,002.58	39.7	77.45
86.00	679.93	7.9	19.83	918.17	46.3	83.08
90.92	857.26	9.4	14.00	791.00	56.5	88.46
100.00	1,470.93	14.7	9.08	613.67	67.6	95.46
			Sulfur			
Same	69.32	1.24	Same	208.76	2.09	Same
	104.39	1.40		139.44	3.17	
as	117.25	1.46	as	104.37	4.13	as
	133.45	1.55		91.51	4.61	
above	149.98	1.65	above	75.31	5.38	above
	208.76	2.09		58.78	6.47	
			Ash			
51.74	300.09	5.8	100.00	1,383.18	13.8	25.87
82.57	642.30	7.8	48.26	1,083.09	22.4	67.15
86.23	711.11	8.2	17.43	740.88	42.5	84.40
89.79	799.40	8.9	13.77	672.07	48.8	88.01
94.03	963.49	10.2	10.21	583.78	57.1	91.91
100.00	1,383.18	13.8	5.97	419.69	70.3	97.01
			Sulfur			
Same	61.05	1.18	Same	166.41	1.66	Same
	110.38	1.34		105.36	2.18	
as	118.25	1.37	as	56.03	3.21	as
	125.24	1.39		48.16	3.50	
above	137.75	1.46	above	41.17	4.03	above
	166.41	1.66		28.66	4.80	
			Ash			
46.92	243.98	5.2	100.00	1,464.33	14.6	23.46
71.73	504.48	7.0	53.08	1,220.35	23.0	59.32
79.76	622.52	7.8	28.27	958.85	33.9	75.74
87.37	780.04	8.9	20.24	841.81	41.6	83.56
93.36	996.88	10.7	12.63	684.29	54.2	90.36
100.00	1,464.33	14.6	6.64	467.45	70.4	96.68
			Sulfur			
Same	52.08	1.11	Same	191.03	1.91	Same
	95.25	1.33		138.95	2.62	
as	111.87	1.40	as	95.78	3.39	as
	130.36	1.49		79.16	3.91	
above	148.93	1.60	above	60.67	4.80	above
	191.03	1.91		42.10	6.34	

TABLE 12—

Size	1 Specific gravity	2 Weight (Grams)	3 Weight (Per cent)	4 Ash or sulfur (Per cent)	5 Products (3 × 4)
			Ash		
⅜ inch to 10 mesh.....	1.30 float	5,470	63.86	4.4	280.98
	1.30–1.35	1,041	12.15	11.6	140.94
	1.35–1.40	397	4.63	16.5	76.40
	1.40–1.50	477	5.57	23.8	132.57
	1.50–1.70	351	4.10	36.8	150.88
	1.70 sink	830	9.69	66.8	647.58
			Sulfur		
⅜ inch to 10 mesh.....	1.30 float	Same	Same	1.31	83.66
	1.30–1.35			2.34	28.43
	1.35–1.40	as	as	2.73	12.64
	1.40–1.50			3.13	17.43
	1.50–1.70	above	above	3.85	15.78
	1.70 sink			6.70	64.92
			Ash		
10 to 48 mesh.....	1.30 float	1,242	58.64	3.7	216.97
	1.30–1.35	190	8.97	9.8	87.91
	1.35–1.40	111	5.24	13.1	68.64
	1.40–1.50	134	6.33	18.4	116.47
	1.50–1.70	122	5.76	32.5	187.20
	1.70 sink	319	15.06	65.5	986.43
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	1.32	77.40
	1.30–1.35			2.19	19.64
	1.35–1.40	as	as	2.58	13.52
	1.40–1.50			2.82	17.85
	1.50–1.70	above	above	3.43	19.75
	1.70 sink			7.04	106.02
			Ash		
Minus 48 mesh.....	1.30 float	37.9	5.70	2.0	11.40
	1.30–1.35	136.9	20.57	2.9	59.65
	1.35–1.40	93.6	14.07	6.5	91.46
	1.40–1.50	118.0	17.73	10.3	182.62
	1.50–1.70	125.7	18.89	15.5	292.80
	1.70 sink	153.3	23.04	64.5	1,486.08
			Sulfur		
Minus 48 mesh.....	1.30 float	Same	Same	1.13	6.44
	1.30–1.35			1.15	23.66
	1.35–1.40	as	as	1.59	22.37
	1.40–1.50			1.62	28.72
	1.50–1.70	above	above	2.05	38.72
	1.70 sink			11.04	254.36

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
63.86	280.98	4.4	100.00	1,429.35	14.3	31.93
76.01	421.92	5.6	36.14	1,148.37	31.8	69.93
80.64	498.32	6.2	23.99	1,007.43	42.0	78.32
86.21	630.98	7.3	19.36	931.03	48.1	83.42
90.31	781.77	8.7	13.79	798.37	57.9	88.25
100.00	1,429.35	14.3	9.69	647.58	66.8	95.16
			Sulfur			
Same	83.66	1.31	Same	222.86	2.23	Same
	112.09	1.47		139.20	3.85	
as	124.73	1.55	as	110.77	4.62	as
	142.16	1.65		98.13	5.07	
above	157.94	1.75	above	80.70	5.85	above
	222.86	2.23		64.92	6.70	
			Ash			
58.64	216.97	3.7	100.00	1,663.62	16.6	29.32
67.61	304.88	4.5	41.36	1,446.65	35.0	63.12
72.85	373.52	5.1	32.39	1,358.74	41.9	70.23
79.18	489.99	6.2	27.15	1,290.10	47.5	76.01
84.94	677.19	8.0	20.82	1,173.63	56.4	82.06
100.00	1,663.62	16.6	15.06	986.43	65.5	92.47
			Sulfur			
Same	77.40	1.32	Same	254.18	2.54	Same
	97.04	1.43		176.78	4.27	
as	110.56	1.52	as	157.14	4.85	as
	128.41	1.62		143.62	5.29	
above	148.16	1.74	above	125.77	6.04	above
	254.18	2.54		106.02	7.04	
			Ash			
5.70	11.40	2.0	100.00	2,124.01	21.2	2.85
26.27	71.05	2.7	94.30	2,112.61	22.4	15.98
40.34	162.51	4.0	73.73	2,052.96	27.8	33.30
58.07	345.13	5.9	59.66	1,961.50	32.9	49.20
76.96	637.93	8.3	41.93	1,778.88	42.4	67.51
100.00	2,124.01	21.2	23.04	1,486.08	64.5	88.48
			Sulfur			
Same	6.44	1.13	Same	374.27	3.74	Same
	30.10	1.15		367.83	3.90	
as	52.47	1.30	as	344.17	4.67	as
	81.19	1.40		321.80	5.39	
above	119.91	1.56	above	293.08	6.99	above
	374.27	3.74		254.36	11.04	

TABLE 13.—WASHABILITY DATA AND

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	45.98	6.3	290.49
	1.30–1.35	.....	22.16	10.7	237.60
	1.35–1.40	.....	12.01	15.0	179.92
	1.40–1.50	.....	9.81	19.7	193.21
	1.50–1.70	.....	4.39	30.2	132.82
	1.70 sink	.....	5.65	58.4	330.10
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	3.44	158.05
	1.30–1.35	.....		4.03	89.24
	1.35–1.40	.....	as	5.38	64.60
	1.40–1.50	.....		6.55	64.18
	1.50–1.70	.....	above	9.52	41.81
	1.70 sink	.....		17.90	101.12
			Ash		
1¼ to ¾ inch.....	1.30 float	12,752	42.78	7.0	299.46
	1.30–1.35	8,685	29.14	12.0	349.68
	1.35–1.40	4,220	14.16	16.3	230.81
	1.40–1.50	2,326	7.80	22.1	172.38
	1.50–1.70	1,139	3.82	31.0	118.73
	1.70 sink	687	2.30	51.2	117.76
			Sulfur		
1¼ to ¾ inch.....	1.30 float	Same	Same	3.49	149.29
	1.30–1.35			4.23	123.26
	1.35–1.40	as	as	5.83	82.55
	1.40–1.50			7.12	55.54
	1.50–1.70	above	above	11.58	44.24
	1.70 sink			25.00	57.50
			Ash		
¾ to ⅜ inch.....	1.30 float	8,191	38.72	6.2	240.06
	1.30–1.35	6,358	30.05	11.0	330.55
	1.35–1.40	3,078	14.55	16.0	232.80
	1.40–1.50	1,898	8.97	21.6	193.75
	1.50–1.70	839	3.97	31.9	126.56
	1.70 sink	791	3.74	54.4	203.27
			Sulfur		
¾ to ⅜ inch.....	1.30 float	Same	Same	3.36	130.10
	1.30–1.35			4.04	121.40
	1.35–1.40	as	as	5.73	83.37
	1.40–1.50			7.45	66.83
	1.50–1.70	above	above	9.96	37.55
	1.70 sink			25.63	95.86

CALCULATIONS FOR SCREENINGS, MINE E

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
45.98	290.49	6.3	100.00	1,364.14	13.6	22.99
68.14	528.09	7.8	54.02	1,073.65	19.9	57.06
80.15	708.01	8.8	31.86	836.05	26.2	74.14
89.96	901.22	10.0	19.85	656.13	33.1	85.05
94.35	1,034.04	11.0	10.04	462.92	46.1	92.15
100.00	1,364.14	13.6	5.65	330.10	58.4	97.17
			Sulfur			
Same	158.05	3.44	Same	519.00	5.19	Same
	247.29	3.63		360.95	6.68	
as	311.89	3.89	as	271.71	8.53	as
	376.07	4.18		207.11	10.43	
above	417.88	4.43	above	142.93	14.63	above
	519.00	5.19		101.12	17.90	
			Ash			
42.78	299.46	7.0	100.00	1,288.82	12.9	21.39
71.92	649.14	9.0	57.22	989.36	17.3	57.35
86.08	879.95	10.2	28.08	639.68	22.8	79.00
93.88	1,052.33	11.2	13.92	408.87	29.4	89.98
97.70	1,171.06	12.0	6.12	236.49	38.6	95.79
100.00	1,288.82	12.9	2.30	117.76	51.2	98.85
			Sulfur			
Same	149.29	3.49	Same	512.38	5.12	Same
	272.52	3.79		363.09	6.34	
as	355.10	4.13	as	239.83	8.54	as
	410.64	4.37		157.28	11.30	
above	454.88	4.66	above	101.74	16.62	above
	512.38	5.12		57.50	25.00	
			Ash			
38.72	240.06	6.2	100.00	1,326.99	13.3	19.36
68.77	570.61	8.3	61.28	1,086.93	17.7	53.74
83.32	803.41	9.6	31.23	756.38	24.2	76.04
92.29	997.16	10.8	16.68	523.58	31.4	87.80
96.26	1,123.72	11.7	7.71	329.83	42.8	94.27
100.00	1,326.99	13.3	3.74	203.27	54.4	98.13
			Sulfur			
Same	130.10	3.36	Same	535.11	5.35	Same
	251.50	3.66		405.01	6.61	
as	334.87	4.02	as	283.61	9.08	as
	401.70	4.35		200.24	12.00	
above	439.25	4.56	above	133.41	17.30	above
	535.11	5.35		95.86	25.63	

TABLE 13—

Size	1 Specific gravity	2 Weight (Grams)	3 Weight (Per cent)	4 Ash or sulfur (Per cent)	5 Products (3 × 4)
			Ash		
⅜ inch to 10 mesh.....	1.30 float	3,556	61.90	6.5	402.35
	1.30–1.35	392	6.82	9.2	62.74
	1.35–1.40	408	7.10	12.8	90.88
	1.40–1.50	672	11.70	18.1	211.77
	1.50–1.70	278	4.84	29.4	142.29
	1.70 sink	439	7.64	60.3	460.69
			Sulfur		
⅜ inch to 10 mesh.....	1.30 float	Same	Same	3.51	217.27
	1.30–1.35			3.90	26.59
	1.35–1.40	as	as	4.60	32.66
	1.40–1.50			6.09	71.25
	1.50–1.70	above	above	8.52	41.24
	1.70 sink			15.52	118.57
			Ash		
10 to 48 mesh.....	1.30 float	547	34.42	3.5	120.47
	1.30–1.35	317	19.95	5.7	113.71
	1.35–1.40	183	11.52	10.4	119.81
	1.40–1.50	205	12.90	15.8	203.82
	1.50–1.70	95	5.98	27.5	164.45
	1.70 sink	242	15.23	61.7	939.69
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	3.17	109.11
	1.30–1.35			3.26	65.04
	1.35–1.40	as	as	3.85	44.35
	1.40–1.50			4.93	63.59
	1.50–1.70	above	above	7.05	42.16
	1.70 sink			12.73	193.88
			Ash		
Minus 48 mesh.....	1.30 float	10.1	1.53	2.2	3.37
	1.30–1.35	104.0	15.75	2.5	39.38
	1.35–1.40	156.4	23.69	5.2	123.19
	1.40–1.50	147.7	22.37	10.7	239.36
	1.50–1.70	97.3	14.74	18.8	277.11
	1.70 sink	144.7	21.92	58.6	1,284.51
			Sulfur		
Minus 48 mesh.....	1.30 float	Same	Same	3.10	4.74
	1.30–1.35			3.03	47.72
	1.35–1.40	as	as	3.06	72.49
	1.40–1.50			2.91	65.10
	1.50–1.70	above	above	3.24	47.76
	1.70 sink			11.63	254.93

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
61.90	402.35	6.5	100.00	1,370.72	13.7	30.95
68.72	465.09	6.8	38.10	968.37	25.4	65.31
75.82	555.97	7.3	31.28	905.63	28.9	72.27
87.52	767.74	8.8	24.18	814.75	33.7	81.67
92.36	910.03	9.9	12.48	602.98	48.3	89.94
100.00	1,370.72	13.7	7.64	460.69	60.3	96.18
			Sulfur			
Same	217.27	3.51	Same	507.58	5.08	Same
	243.86	3.55		290.31	7.62	
as	276.52	3.65	as	263.72	8.43	as
	347.77	3.97		231.06	9.55	
above	389.01	4.21	above	159.81	12.80	above
	507.58	5.08		118.57	15.52	
			Ash			
34.42	120.47	3.5	100.00	1,661.95	16.6	17.21
54.37	234.18	4.3	65.58	1,541.48	23.5	44.39
65.89	353.99	5.4	45.63	1,427.77	31.3	60.13
78.79	557.81	7.1	34.11	1,307.96	38.3	72.34
84.77	722.26	8.5	21.21	1,104.14	52.1	81.78
100.00	1,661.95	16.6	15.23	939.69	61.7	92.38
			Sulfur			
Same	109.11	3.17	Same	518.13	5.18	Same
	174.15	3.20		409.02	6.24	
as	218.50	3.32	as	343.98	7.54	as
	282.09	3.58		299.63	8.78	
above	324.25	3.83	above	236.04	11.13	above
	518.13	5.18		193.88	12.73	
			Ash			
1.53	3.37	2.2	100.00	1,966.92	19.7	0.76
17.28	42.75	2.5	98.47	1,963.55	19.9	9.40
40.97	165.94	4.1	82.72	1,924.17	23.3	29.12
63.34	405.30	6.4	59.03	1,800.98	30.5	52.15
78.08	682.41	8.7	36.66	1,561.62	42.6	70.71
100.00	1,966.92	19.7	21.92	1,284.51	58.6	89.04
			Sulfur			
Same	4.74	3.10	Same	492.74	4.93	Same
	52.46	3.04		488.00	4.96	
as	124.95	3.05	as	440.28	5.32	as
	190.05	3.00		367.79	6.23	
above	237.81	3.05	above	302.69	8.26	above
	492.74	4.93		254.93	11.63	

TABLE 14.—WASHABILITY DATA AND

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	35.68	4.5	161.67
	1.30–1.35	.....	27.45	8.8	241.04
	1.35–1.40	.....	11.20	13.1	146.74
	1.40–1.50	.....	7.82	18.8	146.94
	1.50–1.70	.....	4.30	32.3	138.91
	1.70 sink	.....	13.55	69.6	943.33
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	3.44	122.86
	1.30–1.35	.....		3.75	102.83
	1.35–1.40	.....	as	4.33	48.52
	1.40–1.50	.....		5.39	42.17
	1.50–1.70	.....	above	6.36	27.34
	1.70 sink	.....		9.95	134.76
			Ash		
1¼ to ¾ inch.....	1.30 float	10,080	37.86	4.8	181.73
	1.30–1.35	8,004	30.06	9.5	285.57
	1.35–1.40	2,837	10.65	14.0	149.10
	1.40–1.50	1,827	6.86	19.8	135.83
	1.50–1.70	925	3.47	33.4	115.90
	1.70 sink	2,955	11.10	68.0	754.80
			Sulfur		
1¼ to ¾ inch.....	1.30 float	Same	Same	3.55	134.40
	1.30–1.35			3.76	113.02
	1.35–1.40	as	as	4.47	47.60
	1.40–1.50			6.06	41.57
	1.50–1.70	above	above	7.33	25.43
	1.70 sink			12.78	141.86
			Ash		
¾ to ⅜ inch.....	1.30 float	10,238	35.47	4.4	156.07
	1.30–1.35	8,588	29.75	9.5	282.62
	1.35–1.40	3,403	11.79	13.9	163.88
	1.40–1.50	2,252	7.80	20.0	156.00
	1.50–1.70	983	3.41	34.1	116.28
	1.70 sink	3,399	11.78	68.9	811.64
			Sulfur		
¾ to ⅜ inch.....	1.30 float	Same	Same	3.45	122.37
	1.30–1.35			3.84	114.24
	1.35–1.40	as	as	4.38	51.64
	1.40–1.50			5.91	46.10
	1.50–1.70	above	above	7.03	23.97
	1.70 sink			10.33	121.69

CALCULATIONS FOR SCREENINGS, MINE F

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
35.68	161.67	4.5	100.00	1,778.63	17.8	17.84
63.13	402.71	6.4	64.32	1,616.96	25.1	49.40
74.33	549.45	7.4	36.87	1,375.92	37.3	68.73
82.15	696.39	8.5	25.67	1,229.18	47.9	78.24
86.45	835.30	9.7	17.85	1,082.24	60.6	84.30
100.00	1,778.63	17.8	13.55	943.33	69.6	93.22
			Sulfur			
Same	122.86	3.44	Same	478.48	4.78	Same
	225.69	3.58		355.62	5.53	
as	274.21	3.69	as	252.79	6.86	as
	316.38	3.85		204.27	7.96	
above	343.72	3.98	above	162.10	9.08	above
	478.48	4.78		134.76	9.95	
			Ash			
37.86	181.73	4.8	100.00	1,622.93	16.2	18.93
67.92	467.30	6.9	62.14	1,441.20	23.2	52.89
78.57	616.40	7.8	32.08	1,155.63	36.0	73.24
85.43	752.23	8.8	21.43	1,006.53	47.0	82.00
88.90	868.13	9.8	14.57	870.70	59.7	87.16
100.00	1,622.93	16.2	11.10	754.80	68.0	94.45
			Sulfur			
Same	134.40	3.55	Same	503.88	5.04	Same
	247.42	3.64		369.48	5.94	
as	295.02	3.75	as	256.46	7.99	as
	336.59	3.94		208.86	9.75	
above	362.02	4.07	above	167.29	11.48	above
	503.88	5.04		141.86	12.78	
			Ash			
35.47	156.07	4.4	100.00	1,686.49	16.9	17.73
65.22	438.69	6.7	64.53	1,530.42	23.7	50.34
77.01	602.57	7.8	34.78	1,247.80	35.9	71.11
84.81	758.57	8.9	22.99	1,083.92	47.1	80.91
88.22	874.85	9.9	15.19	927.92	61.1	86.51
100.00	1,686.49	16.9	11.78	811.64	68.9	94.11
			Sulfur			
Same	122.37	3.45	Same	480.01	4.80	Same
	236.61	3.63		357.64	5.54	
as	288.25	3.74	as	243.40	7.00	as
	334.35	3.94		191.76	8.34	
above	358.32	4.06	above	145.66	9.59	above
	480.01	4.80		121.69	10.33	

TABLE 14—

Size	1 Specific gravity	2 Weight (Grams)	3 Weight (Per cent)	4 Ash or sulfur (Per cent)	5 Products (3 × 4)
			Ash		
⅜ inch to 10 mesh.....	1.30 float	1,231	35.89	4.5	161.51
	1.30–1.35	858	25.01	7.4	185.07
	1.35–1.40	386	11.25	12.0	135.00
	1.40–1.50	276	8.05	17.9	144.10
	1.50–1.70	171	4.99	31.7	158.18
	1.70 sink	508	14.81	70.8	1,048.55
			Sulfur		
⅜ inch to 10 mesh.....	1.30 float	Same	Same	3.38	121.31
	1.30–1.35			3.66	91.54
	1.35–1.40	as	as	4.30	48.38
	1.40–1.50			4.78	38.48
	1.50–1.70	above	above	6.11	30.49
	1.70 sink			8.92	132.11
			Ash		
10 to 48 mesh.....	1.30 float	424	29.82	4.1	122.26
	1.30–1.35	290	20.39	7.4	150.88
	1.35–1.40	154	10.83	11.3	122.38
	1.40–1.50	142	9.99	16.1	160.84
	1.50–1.70	102	7.17	29.7	212.95
	1.70 sink	310	21.80	70.9	1,545.62
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	3.25	96.91
	1.30–1.35			3.58	72.99
	1.35–1.40	as	as	3.91	42.34
	1.40–1.50			4.28	42.76
	1.50–1.70	above	above	4.66	33.41
	1.70 sink			7.26	158.27
			Ash		
Minus 48 mesh.....	1.30 float	5.2	0.86	2.1	1.81
	1.30–1.35	22.2	3.65	3.2	11.68
	1.35–1.40	60.0	9.87	5.7	56.26
	1.40–1.50	117.2	19.28	8.8	169.66
	1.50–1.70	295.3	48.56	13.0	631.28
	1.70 sink	108.1	17.78	62.1	1,104.14
			Sulfur		
Minus 48 mesh.....	1.30 float	Same	Same	3.10	2.67
	1.30–1.35			3.15	11.50
	1.35–1.40	as	as	3.05	30.10
	1.40–1.50			2.84	54.76
	1.50–1.70	above	above	2.29	111.20
	1.70 sink			8.09	143.84

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
35.89	161.51	4.5	100.00	1,832.41	18.3	17.94
60.90	346.58	5.7	64.11	1,670.90	26.1	48.39
72.15	481.58	6.7	39.10	1,485.83	38.0	66.52
80.20	625.68	7.8	27.85	1,350.83	48.5	76.17
85.19	783.86	9.2	19.80	1,206.73	60.9	82.69
100.00	1,832.41	18.3	14.81	1,048.55	70.8	92.59
			Sulfur			
Same	121.31	3.38	Same	462.31	4.62	Same
	212.85	3.50		341.00	5.32	
as	261.23	3.62	as	249.46	6.38	as
	299.71	3.74		201.08	7.22	
above	330.20	3.88	above	162.60	8.21	above
	462.31	4.62		132.11	8.92	
			Ash			
29.82	122.26	4.1	100.00	2,314.93	23.1	14.91
50.21	273.14	5.4	70.18	2,192.67	31.2	40.01
61.04	395.52	6.5	49.79	2,041.79	41.0	55.62
71.03	556.36	7.8	38.96	1,919.41	49.3	66.03
78.20	769.31	9.8	28.97	1,758.57	60.7	74.61
100.00	2,314.93	23.1	21.80	1,545.62	70.9	89.10
			Sulfur			
Same	96.91	3.25	Same	446.68	4.47	Same
	169.90	3.38		349.77	4.98	
as	212.24	3.48	as	276.78	5.56	as
	255.00	3.59		234.44	6.02	
above	288.41	3.69	above	191.68	6.62	above
	446.68	4.47		158.27	7.26	
			Ash			
0.86	1.81	2.1	100.00	1,974.83	19.7	0.43
4.51	13.49	3.0	99.14	1,973.02	19.9	2.68
14.38	69.75	4.9	95.49	1,961.34	20.5	9.44
33.66	239.41	7.1	85.62	1,905.08	22.3	24.02
82.22	870.69	10.6	66.34	1,735.42	26.2	57.94
100.00	1,974.83	19.7	17.78	1,104.14	62.1	91.11
			Sulfur			
Same	2.67	3.10	Same	354.07	3.54	Same
	14.17	3.14		351.40	3.54	
as	44.27	3.08	as	339.90	3.56	as
	99.03	2.94		309.80	3.62	
above	210.23	2.56	above	255.04	3.84	above
	354.07	3.54		143.84	8.09	

TABLE 15.—WASHABILITY DATA AND

Size	1 Specific gravity	2 Weight (Grams)	3 Weight (Per cent)	4 Ash or sulfur (Per cent)	5 Products (3 × 4)
		Ash			
1¼ inch to 48 mesh....	1.30 float	.....	37.35	4.9	183.79
	1.30–1.35	.....	28.88	9.7	280.15
	1.35–1.40	.....	10.25	14.9	152.91
	1.40–1.50	.....	7.05	20.4	144.01
	1.50–1.70	.....	3.93	30.4	119.65
	1.70 sink	.....	12.54	70.8	887.40
		Sulfur			
1¼ inch to 48 mesh....	1.30 float	.....	Same	3.24	120.86
	1.30–1.35	.....		3.37	97.43
	1.35–1.40	.....	as	4.08	41.84
	1.40–1.50	.....		5.21	36.75
	1.50–1.70	.....	above	6.62	26.02
	1.70 sink	.....		9.78	122.64
		Ash			
1¼ to ¾ inch.....	1.30 float	11,065	33.03	5.6	184.97
	1.30–1.35	12,070	36.03	10.1	363.90
	1.35–1.40	4,255	12.70	15.1	191.77
	1.40–1.50	2,368	7.07	20.9	147.76
	1.50–1.70	869	2.59	31.1	80.55
	1.70 sink	2,874	8.58	68.9	591.16
		Sulfur			
1¼ to ¾ inch.....	1.30 float	Same	Same	3.22	106.36
	1.30–1.35			3.29	118.54
	1.35–1.40	as	as	4.02	51.05
	1.40–1.50			5.68	40.16
	1.50–1.70	above	above	8.20	21.24
	1.70 sink			13.91	119.35
		Ash			
¾ to ⅜ inch.....	1.30 float	10,041	33.10	4.5	148.95
	1.30–1.35	11,018	36.33	9.8	356.03
	1.35–1.40	3,214	10.60	16.2	171.72
	1.40–1.50	2,050	6.76	21.5	145.34
	1.50–1.70	1,069	3.52	33.2	116.86
	1.70 sink	2,938	9.69	70.0	678.30
		Sulfur			
¾ to ⅜ inch.....	1.30 float	Same	Same	3.12	103.27
	1.30–1.35			3.26	118.43
	1.35–1.40	as	as	4.20	44.52
	1.40–1.50			5.50	37.18
	1.50–1.70	above	above	7.27	25.59
	1.70 sink			12.24	118.60

CALCULATIONS FOR SCREENINGS, MINE G

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
37.35	183.79	4.9	100.00	1,767.91	17.7	18.67
66.23	463.94	7.0	62.65	1,584.12	25.3	51.79
76.48	616.85	8.1	33.77	1,303.97	38.6	71.35
83.53	760.86	9.1	23.52	1,151.06	48.9	80.00
87.46	880.51	10.1	16.47	1,007.05	61.1	85.49
100.00	1,767.91	17.7	12.54	887.40	70.8	93.73
			Sulfur			
Same	120.86	3.24	Same	445.54	4.46	Same
	218.29	3.30		324.68	5.18	
as	260.13	3.40	as	227.25	6.72	as
	296.88	3.55		185.41	7.88	
above	322.90	3.69	above	148.66	9.03	above
	445.54	4.46		122.64	9.78	
			Ash			
33.03	184.97	5.6	100.00	1,560.11	15.6	16.51
69.06	548.87	7.9	66.97	1,375.14	20.5	51.04
81.76	740.64	9.0	30.94	1,011.24	32.7	75.41
88.83	888.40	10.0	18.24	819.47	44.9	85.29
91.42	968.95	10.6	11.17	671.71	60.1	90.12
100.00	1,560.11	15.6	8.58	591.16	68.9	95.71
			Sulfur			
Same	106.36	3.22	Same	456.70	4.57	Same
	224.90	3.26		350.34	5.23	
as	275.95	3.37	as	231.80	7.49	as
	316.11	3.56		180.75	9.91	
above	337.35	3.69	above	140.59	12.59	above
	456.70	4.57		119.35	13.91	
			Ash			
33.10	148.95	4.5	100.00	1,617.20	16.2	16.55
69.43	504.98	7.3	66.90	1,468.25	21.9	51.26
80.03	676.70	8.4	30.57	1,112.22	36.4	74.73
86.79	822.04	9.5	19.97	940.50	47.1	83.41
90.31	938.90	10.4	13.21	795.16	60.2	88.55
100.00	1,617.20	16.2	9.69	678.30	70.0	95.15
			Sulfur			
Same	103.27	3.12	Same	447.59	4.47	Same
	221.70	3.19		344.32	5.15	
as	266.22	3.33	as	225.89	7.39	as
	303.40	3.49		181.37	9.08	
above	328.99	3.64	above	144.19	10.91	above
	447.59	4.47		118.60	12.24	

TABLE 15—

Size	1 Specific gravity	2 Weight (Grams)	3 Weight (Per cent)	4 Ash or sulfur (Per cent)	5 Products (3 × 4)
			Ash		
⅜ inch to 10 mesh.....	1.30 float	3,023	50.01	5.2	260.05
	1.30–1.35	1,015	16.82	10.2	171.56
	1.35–1.40	458	7.59	14.4	109.29
	1.40–1.50	397	6.58	20.2	132.92
	1.50–1.70	276	4.58	29.8	136.48
	1.70 sink	870	14.42	72.4	1,044.01
			Sulfur		
⅜ inch to 10 mesh.....	1.30 float	Same	Same	3.33	166.53
	1.30–1.35			3.77	63.41
	1.35–1.40	as	as	4.17	31.65
	1.40–1.50			4.97	32.70
	1.50–1.70	above	above	6.34	29.04
	1.70 sink			8.68	125.16
			Ash		
10 to 48 mesh.....	1.30 float	868	29.97	3.2	95.90
	1.30–1.35	626	21.62	7.0	151.34
	1.35–1.40	271	9.36	12.1	113.26
	1.40–1.50	249	8.60	18.1	155.66
	1.50–1.70	190	6.56	27.7	181.71
	1.70 sink	692	23.89	70.9	1,693.80
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	3.22	96.50
	1.30–1.35			3.47	75.02
	1.35–1.40	as	as	3.84	35.94
	1.40–1.50			4.23	36.38
	1.50–1.70	above	above	4.87	31.95
	1.70 sink			5.60	133.78
			Ash		
Minus 48 mesh.....	1.30 float	10.2	2.34	1.4	3.28
	1.30–1.35	62.4	14.31	3.2	45.79
	1.35–1.40	43.8	10.05	6.4	64.32
	1.40–1.50	71.0	16.28	10.5	170.94
	1.50–1.70	114.6	26.28	15.5	407.34
	1.70 sink	134.0	30.74	62.6	1,924.32
			Sulfur		
Minus 48 mesh.....	1.30 float	Same	Same	3.05	7.14
	1.30–1.35			3.16	45.22
	1.35–1.40	as	as	3.14	31.56
	1.40–1.50			2.89	47.05
	1.50–1.70	above	above	2.22	58.34
	1.70 sink			5.20	159.85

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
50.01	260.05	5.2	100.00	1,854.31	18.5	25.00
66.83	431.61	6.5	49.99	1,594.26	31.9	58.42
74.42	540.90	7.3	33.17	1,422.70	42.9	70.62
81.00	673.82	8.3	25.58	1,313.41	51.3	77.71
85.58	810.30	9.5	19.00	1,180.49	62.1	83.29
100.00	1,854.31	18.5	14.42	1,044.01	72.4	92.79
			Sulfur			
Same	166.53	3.33	Same	448.49	4.48	Same
	229.94	3.44		281.96	5.64	
as	261.59	3.51	as	218.55	6.59	as
	294.29	3.63		186.90	7.31	
above	323.33	3.78	above	154.20	8.11	above
	448.49	4.48		125.16	8.68	
			Ash			
29.97	95.90	3.2	100.00	2,391.67	23.9	14.98
51.59	247.24	4.8	70.03	2,295.77	32.8	40.78
60.95	360.50	5.9	48.41	2,144.43	44.3	56.27
69.55	516.16	7.4	39.05	2,031.17	52.0	65.25
76.11	697.87	9.2	30.45	1,875.51	61.6	72.83
100.00	2,391.67	23.9	23.89	1,693.80	70.9	88.05
			Sulfur			
Same	96.50	3.22	Same	409.57	4.10	Same
	171.52	3.32		313.07	4.47	
as	207.46	3.41	as	238.05	4.92	as
	243.84	3.51		202.11	5.18	
above	275.79	3.62	above	165.73	5.44	above
	409.57	4.10		133.78	5.60	
			Ash			
2.34	3.28	1.4	100.00	2,615.99	26.2	1.17
16.65	49.07	2.9	97.66	2,612.71	26.8	9.49
26.70	113.39	4.2	83.35	2,566.92	30.8	21.67
42.98	284.33	6.6	73.30	2,502.60	34.1	34.84
69.26	691.67	10.0	57.02	2,331.66	40.9	56.12
100.00	2,615.99	26.2	30.74	1,924.32	62.6	84.63
			Sulfur			
Same	7.14	3.05	Same	349.16	3.49	Same
	52.36	3.14		342.02	3.50	
as	83.92	3.14	as	296.88	3.56	as
	130.97	3.05		265.24	3.62	
above	189.31	2.73	above	218.19	3.83	above
	349.16	3.49		159.85	5.20	

TABLE 16.—WASHABILITY DATA AND

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	46.95	5.1	238.54
	1.30–1.35	.....	20.71	10.0	206.71
	1.35–1.40	.....	10.14	14.9	150.75
	1.40–1.50	.....	7.28	20.8	151.28
	1.50–1.70	.....	4.26	32.5	138.40
	1.70 sink	.....	10.66	64.2	684.17
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	2.87	134.96
	1.30–1.35	.....		3.14	65.06
	1.35–1.40	.....	as	3.56	36.14
	1.40–1.50	.....		4.70	34.25
	1.50–1.70	.....	above	6.35	27.05
	1.70 sink	.....		15.89	169.36
			Ash		
1¼ to ¾ inch.....	1.30 float	15,813	36.35	5.1	185.38
	1.30–1.35	11,907	27.37	10.0	273.70
	1.35–1.40	6,110	14.04	15.1	212.00
	1.40–1.50	3,833	8.81	21.2	186.77
	1.50–1.70	1,442	3.31	32.9	108.90
	1.70 sink	4,401	10.12	65.3	660.84
			Sulfur		
1¼ to ¾ inch.....	1.30 float	Same	Same	2.89	105.05
	1.30–1.35			3.06	83.75
	1.35–1.40	as	as	3.48	48.86
	1.40–1.50			5.08	44.75
	1.50–1.70	above	above	7.62	25.22
	1.70 sink			17.69	179.02
			Ash		
¾ to ⅜ inch.....	1.30 float	13,820	42.78	5.1	218.18
	1.30–1.35	8,074	24.99	9.9	247.40
	1.35–1.40	3,387	10.48	15.2	159.29
	1.40–1.50	2,490	7.71	21.3	164.22
	1.50–1.70	1,364	4.22	34.2	144.32
	1.70 sink	3,173	9.82	63.8	626.51
			Sulfur		
¾ to ⅜ inch.....	1.30 float	Same	Same	2.84	121.49
	1.30–1.35			3.12	77.97
	1.35–1.40	as	as	3.58	37.51
	1.40–1.50			4.53	34.92
	1.50–1.70	above	above	6.79	28.65
	1.70 sink			17.47	171.55

CALCULATIONS FOR SCREENINGS, MINE H

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
46.95	238.54	5.1	100.00	1,569.85	15.7	23.47
67.66	445.25	6.6	53.05	1,331.31	25.1	57.35
77.80	596.00	7.7	32.34	1,124.60	34.8	72.73
85.08	747.28	8.8	22.20	973.85	43.9	81.44
89.34	885.68	9.9	14.92	822.57	55.1	87.21
100.00	1,569.85	15.7	10.66	684.17	64.2	94.67
			Sulfur			
Same	134.96	2.87	Same	466.82	4.67	Same
	200.02	2.96		331.86	6.26	
as	236.16	3.04	as	266.80	8.25	as
	270.41	3.18		230.66	10.39	
above	297.46	3.33	above	196.41	13.16	above
	466.82	4.67		169.36	15.89	
			Ash			
36.35	185.38	5.1	100.00	1,627.59	16.3	18.18
63.72	459.08	7.2	63.65	1,442.21	22.6	50.03
77.76	671.08	8.6	36.28	1,168.51	32.2	70.74
86.57	857.85	9.9	22.24	956.51	43.0	82.16
89.88	966.75	10.7	13.43	769.74	57.3	88.22
100.00	1,627.59	16.3	10.12	660.84	65.3	94.94
			Sulfur			
Same	105.05	2.89	Same	486.65	4.87	Same
	188.80	2.96		381.60	5.99	
as	237.66	3.06	as	297.85	8.21	as
	282.41	3.26		248.99	11.19	
above	307.63	3.42	above	204.24	15.21	above
	486.65	4.87		179.02	17.69	
			Ash			
42.78	218.18	5.1	100.00	1,559.92	15.6	21.39
67.77	465.58	6.9	57.22	1,341.74	23.4	55.27
78.25	624.87	8.0	32.23	1,094.34	33.9	73.01
85.96	789.09	9.2	21.75	935.05	43.0	82.10
90.18	933.41	10.3	14.04	770.83	54.9	88.07
100.00	1,559.92	15.6	9.82	626.51	63.8	95.09
			Sulfur			
Same	121.49	2.84	Same	472.09	4.72	Same
	199.46	2.94		350.60	6.13	
as	236.97	3.03	as	272.63	8.46	as
	271.89	3.16		235.12	10.81	
above	300.54	3.33	above	200.20	14.26	above
	472.09	4.72		171.55	17.47	

TABLE 16—

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
⅜ inch to 10 mesh.....	1.30 float	4,068	65.29	5.5	359.09
	1.30–1.35	621	9.97	12.4	123.63
	1.35–1.40	303	4.86	16.6	80.67
	1.40–1.50	313	5.02	21.4	107.43
	1.50–1.70	284	4.56	33.0	150.48
	1.70 sink	642	10.30	64.3	662.29
			Sulfur		
⅜ inch to 10 mesh.....	1.30 float	Same	Same	2.92	190.64
	1.30–1.35			3.54	35.29
	1.35–1.40	as	as	3.91	19.00
	1.40–1.50			4.67	23.44
	1.50–1.70	above	above	5.78	26.36
	1.70 sink			15.55	160.16
			Ash		
10 to 48 mesh.....	1.30 float	1,246	43.66	3.6	157.17
	1.30–1.35	504	17.66	7.1	125.38
	1.35–1.40	296	10.37	11.5	119.25
	1.40–1.50	207	7.25	17.4	126.15
	1.50–1.70	181	6.34	28.6	181.32
	1.70 sink	420	14.72	62.5	920.00
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	2.76	120.50
	1.30–1.35			3.06	54.04
	1.35–1.40	as	as	3.49	36.19
	1.40–1.50			3.89	28.20
	1.50–1.70	above	above	4.80	30.43
	1.70 sink			10.89	160.30
			Ash		
Minus 48 mesh.....	1.30 float	42.6	5.14	3.3	16.96
	1.30 float	232.1	28.00	3.6	100.80
	1.35–1.40	99.9	12.05	7.0	84.35
	1.40–1.50	12.6	14.66	10.3	151.00
	1.50–1.70	148.1	17.86	13.0	232.18
	1.70 sink	184.8	22.29	56.9	1,268.30
			Sulfur		
Minus 48 mesh.....	1.30 float	Same	Same	2.57	13.21
	1.30–1.35			2.50	70.00
	1.35–1.40	as	as	2.79	33.62
	1.40–1.50			2.67	39.14
	1.50–1.70	above	above	2.14	38.22
	1.70 sink			7.81	174.08

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
65.29	359.09	5.5	100.00	1,483.59	14.8	32.64
75.26	482.72	6.4	34.71	1,124.50	32.4	70.27
80.12	563.39	7.0	24.74	1,000.87	40.4	77.69
85.14	670.82	7.9	19.88	920.20	46.3	82.63
89.70	821.30	9.1	14.86	812.77	54.7	87.42
100.00	1,483.59	14.8	10.30	662.29	64.3	94.85
			Sulfur			
Same	190.64	2.92	Same	454.89	4.55	Same
	225.93	3.00		264.25	7.61	
as	244.93	3.06	as	228.96	9.25	as
	268.37	3.15		209.96	10.56	
above	294.73	3.28	above	186.52	12.55	above
	454.89	4.55		160.16	15.55	
			Ash			
43.66	157.17	3.6	100.00	1,629.27	16.3	21.83
61.32	282.55	4.6	56.34	1,472.10	26.1	52.49
71.69	401.80	5.6	38.68	1,346.72	34.8	66.50
78.94	527.95	6.7	28.31	1,227.47	43.3	75.31
85.28	709.27	8.3	21.06	1,101.32	52.3	82.11
100.00	1,629.27	16.3	14.72	920.00	62.5	92.64
			Sulfur			
Same	120.50	2.76	Same	429.66	4.29	Same
	174.54	2.85		309.16	5.49	
as	210.73	2.94	as	255.12	6.59	as
	238.93	3.03		218.93	7.73	
above	269.36	3.16	above	190.73	9.06	above
	429.66	4.29		160.30	10.89	
			Ash			
5.14	16.96	3.3	100.00	1,853.59	18.5	2.57
33.14	117.76	3.6	94.86	1,836.63	19.4	19.14
45.19	202.11	4.5	66.86	1,735.83	26.0	39.16
59.85	353.11	5.9	54.81	1,651.48	30.1	52.52
77.71	585.29	7.5	40.15	1,500.48	37.4	68.78
100.00	1,853.59	18.5	22.29	1,268.30	56.9	88.86
			Sulfur			
Same	13.21	2.57	Same	368.27	3.68	Same
	83.21	2.51		355.06	3.74	
as	116.83	2.59	as	285.06	4.26	as
	155.97	2.61		251.44	4.59	
above	194.19	2.50	above	212.30	5.29	above
	368.27	3.68		174.08	7.81	

TABLE 17.—WASHABILITY DATA AND

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
2 inch to 48 mesh.....	1.30 float	.....	60.17	4.1	248.98
	1.30–1.35	.....	24.02	9.0	215.82
	1.35–1.40	.....	5.69	14.8	84.41
	1.40–1.50	.....	3.50	20.9	73.20
	1.50–1.70	.....	2.04	34.0	69.30
	1.70 sink	.....	4.58	68.6	314.19
			Sulfur		
2 inch to 48 mesh.....	1.30 float	.....	Same	1.32	79.63
	1.30–1.35	.....		1.53	36.70
	1.35–1.40	.....	as	1.61	9.18
	1.40–1.50	.....		1.97	6.89
	1.50–1.70	.....	above	3.02	6.16
	1.70 sink	.....		10.39	47.59
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	62.82	4.2	262.13
	1.30–1.35	.....	21.49	9.2	196.90
	1.35–1.40	.....	4.64	15.0	69.49
	1.40–1.50	.....	3.68	20.7	76.23
	1.50–1.70	.....	2.13	34.0	72.39
	1.70 sink	.....	5.24	68.8	360.68
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	1.31	82.39
	1.30–1.35	.....		1.58	34.01
	1.35–1.40	.....	as	1.75	8.11
	1.40–1.50	.....		2.03	7.48
	1.50–1.70	.....	above	2.89	6.15
	1.70 sink	.....		10.96	57.45
			Ash		
2 to 1¼ inch.....	1.30 float	16,260	51.62	4.0	206.48
	1.30–1.35	10,143	32.20	8.6	276.92
	1.35–1.40	2,859	9.07	14.6	132.42
	1.40–1.50	916	2.91	21.7	63.14
	1.50–1.70	561	1.78	33.5	59.63
	1.70 sink	762	2.42	67.4	163.11
			Sulfur		
2 to 1¼ inch.....	1.30 float	Same	Same	1.37	70.72
	1.30–1.35			1.41	45.40
	1.35–1.40	as	as	1.39	12.61
	1.40–1.50			1.71	4.97
	1.50–1.70	above	above	3.49	6.21
	1.70 sink			6.47	15.65

CALCULATIONS FOR SCREENINGS, MINE I

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
60.17	248.98	4.1	100.00	1,005.90	10.1	30.08
84.19	464.80	5.5	39.83	756.92	19.0	72.18
89.88	549.21	6.1	15.81	541.10	34.2	87.03
93.38	622.41	6.7	10.12	456.69	45.1	91.63
95.42	691.71	7.2	6.62	383.49	57.9	94.40
100.00	1,005.90	10.1	4.58	314.19	68.6	97.71
			Sulfur			
Same	79.63	1.32	Same	186.15	1.86	Same
	116.33	1.38		106.52	2.67	
as	125.51	1.40	as	69.82	4.42	as
	132.40	1.42		60.64	5.99	
above	138.56	1.45	above	53.75	8.12	above
	186.15	1.86		47.59	10.39	
			Ash			
62.82	262.13	4.2	100.00	1,037.82	10.4	31.41
84.31	459.03	5.4	37.18	775.69	20.9	73.56
88.95	528.52	5.9	15.69	578.79	36.9	86.63
92.63	604.75	6.5	11.05	509.30	46.1	90.79
94.76	677.14	7.1	7.37	433.07	58.8	93.69
100.00	1,037.82	10.4	5.24	360.68	68.8	97.38
			Sulfur			
Same	82.39	1.31	Same	195.59	1.96	Same
	116.40	1.38		113.20	3.04	
as	124.51	1.40	as	79.19	5.05	as
	131.99	1.42		71.08	6.43	
above	138.14	1.46	above	63.60	8.63	above
	195.59	1.96		57.45	10.96	
			Ash			
51.62	206.48	4.0	100.00	901.70	9.0	25.81
83.82	483.40	5.8	48.38	695.22	14.4	67.72
92.89	615.82	6.6	16.18	418.30	25.8	88.35
95.80	678.96	7.1	7.11	285.88	40.2	94.34
97.58	738.59	7.6	4.20	222.74	53.0	96.69
100.00	901.70	9.0	2.42	163.11	67.4	98.79
			Sulfur			
Same	70.72	1.37	Same	155.56	1.56	Same
	116.12	1.38		84.84	1.75	
as	128.73	1.39	as	39.44	2.44	as
	133.70	1.39		26.83	3.77	
above	139.91	1.43	above	21.86	5.20	above
	155.56	1.56		15.65	6.47	

TABLE 17—

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
		Ash			
1¼ to ¾ inch.....	1.30 float	16,139	54.13	4.4	238.17
	1.30–1.35	9,605	32.22	8.7	280.31
	1.35–1.40	1,704	5.72	14.9	85.23
	1.40–1.50	1,191	3.99	21.1	84.19
	1.50–1.70	388	1.30	34.3	44.59
	1.70 sink	788	2.64	67.5	178.20
		Sulfur			
1¼ to ¾ inch.....	1.30 float	Same	Same	1.32	71.45
	1.30–1.35			1.56	50.26
	1.35–1.40	as	as	1.70	9.72
	1.40–1.50			2.10	8.38
	1.50–1.70	above	above	3.47	4.51
	1.70 sink			10.31	27.22
		Ash			
¾ to ⅜ inch.....	1.30 float	14,514	53.56	3.7	198.17
	1.30–1.35	8,203	30.27	8.8	266.37
	1.35–1.40	1,508	5.56	14.5	80.62
	1.40–1.50	1,070	3.95	20.7	81.76
	1.50–1.70	672	2.48	35.2	87.28
	1.70 sink	1,132	4.18	67.7	282.97
		Sulfur			
¾ to ⅜ inch.....	1.30 float	Same	Same	1.27	68.02
	1.30–1.35			1.56	47.22
	1.35–1.40	as	as	1.66	9.23
	1.40–1.50			2.17	8.57
	1.50–1.70	above	above	3.05	7.56
	1.70 sink			10.36	43.30
		Ash			
⅜ inch to 10 mesh.....	1.30 float	4,233	77.70	4.6	357.42
	1.30–1.35	473	8.68	11.8	102.42
	1.35–1.40	163	2.99	16.5	49.33
	1.40–1.50	147	2.70	22.3	60.21
	1.50–1.70	116	2.13	35.2	74.98
	1.70 sink	316	5.80	67.9	393.82
		Sulfur			
⅜ 1nch to 10 mesh.....	1.30 float	Same	Same	1.41	109.56
	1.30–1.35			1.77	15.36
	1.35–1.40	as	as	2.02	6.04
	1.40–1.50			2.00	5.40
	1.50–1.70	above	above	2.88	6.13
	1.70 sink			12.12	70.30

Continued

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
54.13	238.17	4.4	100.00	910.69	9.1	27.07
86.35	518.48	6.0	45.87	672.52	14.7	70.24
92.07	603.71	6.5	13.65	392.21	28.7	89.21
96.06	687.90	7.2	7.93	306.98	38.7	94.06
97.36	732.49	7.5	3.94	222.79	56.5	96.71
100.00	910.69	9.1	2.64	178.20	67.5	98.68
			Sulfur			
Same	71.45	1.32	Same	171.54	1.71	Same
	121.71	1.41		100.09	2.18	
as	131.43	1.43	as	49.83	3.65	as
	139.81	1.45		40.11	5.06	
above	144.32	1.48	above	31.73	8.05	above
	171.54	1.71		27.22	10.31	
			Ash			
53.56	198.17	3.7	100.00	997.17	10.0	26.78
83.83	464.54	5.5	46.44	799.00	17.2	68.69
89.39	545.16	6.1	16.17	532.63	32.9	86.61
93.34	626.92	6.7	10.61	452.01	42.6	91.36
95.82	714.20	7.4	6.66	370.25	55.6	94.58
100.00	997.17	10.0	4.18	282.97	67.7	97.91
			Sulfur			
Same	68.02	1.27	Same	183.90	1.84	Same
	115.24	1.37		115.88	2.49	
as	124.47	1.39	as	68.66	4.25	as
	133.04	1.42		59.43	5.60	
above	140.60	1.47	above	50.86	7.64	above
	183.90	1.84		43.30	10.36	
			Ash			
77.70	357.42	4.6	100.00	1,038.18	10.4	38.85
86.38	459.84	5.3	22.30	680.76	30.5	82.04
89.37	509.17	5.7	13.62	578.34	42.5	87.87
92.07	569.38	6.2	10.63	529.01	49.8	90.72
94.20	644.36	6.8	7.93	468.80	59.1	93.13
100.00	1,038.18	10.4	5.80	393.82	67.9	97.10
			Sulfur			
Same	109.56	1.41	Same	212.79	2.13	Same
	124.92	1.45		103.23	4.63	
as	130.96	1.47	as	87.87	6.45	as
	136.36	1.48		81.83	7.70	
above	142.49	1.51	above	76.43	9.64	above
	212.79	2.13		70.30	12.12	

TABLE 17.—

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
10 to 48 mesh.....	1.30 float	1,625	69.33	3.5	242.66
	1.30–1.35	169	7.21	10.1	72.82
	1.35–1.40	89	3.80	14.1	53.58
	1.40–1.50	108	4.60	18.1	83.26
	1.50–1.70	74	3.16	30.3	95.75
	1.70 sink	279	11.90	71.1	846.09
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	1.13	78.34
	1.30–1.35			1.53	11.03
	1.35–1.40	as	as	1.70	6.46
	1.40–1.50			1.72	7.91
	1.50–1.70	above	above	2.11	6.68
	1.70 sink			10.51	125.07
			Ash		
Minus 48 mesh.....	1.30 float	136.8	17.87	1.7	30.38
	1.30–1.35	104.6	13.66	3.8	51.91
	1.35–1.40	106.1	13.86	6.4	88.70
	1.40–1.50	93.5	12.21	8.6	105.00
	1.50–1.70	227.0	29.65	10.4	308.36
	1.70 sink	97.7	12.75	62.5	796.87
			Sulfur		
Minus 48 mesh.....	1.30 float	Same	Same	0.89	15.90
	1.30–1.35			1.08	14.75
	1.35–1.40	as	as	1.09	15.11
	1.40–1.50			0.90	10.99
	1.50–1.70	above	above	0.92	28.38
	1.70 sink			9.25	117.94

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
69.33	242.66	3.5	100.00	1,394.16	13.9	34.66
76.54	315.48	4.1	30.67	1,151.50	37.5	72.93
80.34	369.06	4.6	23.46	1,078.68	46.0	78.44
84.94	452.32	5.3	19.66	1,025.10	52.1	82.64
88.10	548.07	6.2	15.06	941.84	62.5	86.52
100.00	1,394.16	13.9	11.90	846.09	71.1	94.05
			Sulfur			
Same	78.34	1.13	Same	235.49	2.35	Same
	89.37	1.17		157.15	5.12	
as	95.83	1.19	as	146.12	6.23	as
	103.74	1.22		139.66	7.10	
above	110.42	1.25	above	131.75	8.75	above
	235.49	2.35		125.07	10.51	
			Ash			
17.87	30.38	1.7	100.00	1,381.22	13.8	8.93
31.53	82.29	2.6	82.13	1,350.84	16.4	24.70
45.39	170.99	3.8	68.47	1,298.93	19.0	38.46
57.60	275.99	4.8	54.61	1,210.23	22.2	51.49
87.25	584.35	6.7	42.40	1,105.23	26.1	72.42
100.00	1,381.22	13.8	12.75	796.87	62.5	93.62
			Sulfur			
Same	15.90	0.89	Same	203.07	2.03	Same
	30.65	0.97		187.17	2.28	
as	45.76	1.01	as	172.42	2.52	as
	56.75	0.99		157.31	2.88	
above	85.13	0.98	above	146.32	3.45	above
	203.07	2.03		117.94	9.25	

TABLE 18.—WASHABILITY DATA AND

Size	1	2	3	4	5
	Specific gravity	Weight (Grams)	Weight (Per cent)	Ash or sulfur (Per cent)	Products (3 × 4)
			Ash		
1¼ inch to 48 mesh....	1.30 float	.....	52.64	4.7	245.68
	1.30–1.35	.....	30.05	9.2	276.21
	1.35–1.40	.....	5.48	13.1	71.61
	1.40–1.50	.....	3.23	17.7	57.26
	1.50–1.70	.....	1.79	26.2	46.84
	1.70 sink	.....	6.81	67.9	462.22
			Sulfur		
1¼ inch to 48 mesh....	1.30 float	.....	Same	1.48	77.89
	1.30–1.35	.....		2.02	60.81
	1.35–1.40	.....	as	3.64	19.92
	1.40–1.50	.....		5.81	18.77
	1.50–1.70	.....	above	9.30	16.64
	1.70 sink	.....		12.92	87.96
			Ash		
1¼ to ¾ inch.....	1.30 float	16,413	50.54	5.3	267.86
	1.30–1.35	11,603	35.73	9.4	335.86
	1.35–1.40	1,887	5.81	13.4	77.85
	1.40–1.50	937	2.89	19.0	54.91
	1.50–1.70	508	1.56	28.1	43.83
	1.70 sink	1,126	3.47	67.8	235.27
			Sulfur		
1¼ to ¾ inch.....	1.30 float	Same	Same	1.51	76.31
	1.30–1.35			1.99	71.10
	1.35–1.40	as	as	4.12	23.94
	1.40–1.50			6.95	20.08
	1.50–1.70	above	above	10.32	16.10
	1.70 sink			16.65	57.77
			Ash		
¾ to ⅜ inch.....	1.30 float	13,608	50.13	4.8	240.62
	1.30–1.35	9,574	35.26	9.0	317.34
	1.35–1.40	1,533	5.65	13.3	75.14
	1.40–1.50	763	2.81	19.0	53.39
	1.50–1.70	362	1.33	26.7	35.51
	1.70 sink	1,308	4.82	68.0	327.76
			Sulfur		
¾ to ⅜ inch.....	1.30 float	Same	Same	1.47	73.69
	1.30–1.35			2.00	70.52
	1.35–1.40	as	as	3.77	21.30
	1.40–1.50			7.09	19.92
	1.50–1.70	above	above	11.37	15.12
	1.70 sink			15.25	73.50

CALCULATIONS FOR SCREENINGS, MINE J

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
52.64	245.68	4.7	100.00	1,159.82	11.6	26.32
82.69	521.89	6.3	47.36	914.14	19.3	67.66
88.17	593.50	6.7	17.31	637.93	36.9	85.43
91.40	650.76	7.1	11.83	566.32	47.9	89.78
93.19	697.60	7.5	8.60	509.06	59.2	92.29
100.00	1,159.82	11.6	6.81	462.22	67.9	96.59
			Sulfur			
Same	77.89	1.48	Same	281.99	2.82	Same
	138.70	1.68		204.10	4.31	
as	158.62	1.80	as	143.29	8.28	as
	177.39	1.94		123.37	10.43	
above	194.03	2.08	above	104.60	12.16	above
	281.99	2.82		87.96	12.92	
			Ash			
50.54	267.86	5.3	100.00	1,015.58	10.2	25.27
86.27	603.72	7.0	49.46	747.72	15.1	68.40
92.08	681.57	7.4	13.73	411.86	30.0	89.17
94.97	736.48	7.8	7.92	334.01	42.2	93.52
96.53	780.31	8.1	5.03	279.10	55.5	95.75
100.00	1,015.58	10.2	3.47	235.27	67.8	98.26
			Sulfur			
Same	76.31	1.51	Same	265.30	2.65	Same
	147.41	1.71		188.99	3.82	
as	171.35	1.86	as	117.89	8.59	as
	191.43	2.01		93.95	11.86	
above	207.53	2.15	above	73.87	14.68	above
	265.30	2.65		57.77	16.65	
			Ash			
50.13	240.62	4.8	100.00	1,049.76	10.5	25.06
85.39	557.96	6.5	49.87	809.14	16.2	67.76
91.04	633.10	6.9	14.61	491.80	33.7	88.21
93.85	686.49	7.3	8.96	416.66	46.5	92.44
95.18	722.00	7.6	6.15	363.27	59.1	94.51
100.00	1,049.76	10.5	4.82	327.26	68.0	97.59
			Sulfur			
Same	73.69	1.47	Same	274.05	2.74	Same
	144.21	1.69		200.36	4.02	
as	165.51	1.82	as	129.84	8.89	as
	185.43	1.97		108.54	12.11	
above	200.55	2.11	above	88.62	14.41	above
	274.05	2.74		73.50	15.25	

TABLE 18—

Size	1 Specific gravity	2 Weight (Grams)	3 Weight (Per cent)	4 Ash or sulfur (Per cent)	5 Products (3 × 4)
			Ash		
⅜ inch to 10 mesh.....	1.30 float	4,009	58.96	4.5	265.32
	1.30–1.35	1,606	23.62	9.4	222.03
	1.35–1.40	331	4.87	13.0	63.31
	1.40–1.50	199	2.93	16.8	49.22
	1.50–1.70	127	1.87	25.7	48.06
	1.70 sink	527	7.75	69.2	536.30
			Sulfur		
⅜ inch to 10 mesh.....	1.30 float	Same	Same	1.49	87.85
	1.30–1.35			2.16	51.02
	1.35–1.40	as	as	3.40	16.56
	1.40–1.50			5.50	16.11
	1.50–1.70	above	above	9.51	17.78
	1.70 sink			13.04	101.06
			Ash		
10 to 48 mesh.....	1.30 float	1,236	50.12	3.2	160.38
	1.30–1.35	449	18.21	8.4	152.96
	1.35–1.40	136	5.52	11.9	65.69
	1.40–1.50	137	5.55	15.7	87.13
	1.50–1.70	77	3.12	23.8	74.26
	1.70 sink	431	17.48	66.6	1,164.07
			Sulfur		
10 to 48 mesh.....	1.30 float	Same	Same	1.40	70.17
	1.30–1.35			1.92	34.96
	1.35–1.40	as	as	2.53	13.96
	1.40–1.50			3.26	18.09
	1.50–1.70	above	above	5.87	18.31
	1.70 sink			9.60	167.81
			Ash		
Minus 48 mesh.....	1.30 float	96.6	15.88	2.0	31.76
	1.30–1.35	90.8	14.93	4.4	65.69
	1.35–1.40	54.4	8.94	7.2	64.37
	1.40–1.50	68.1	11.20	9.0	100.80
	1.50–1.70	189.2	31.11	10.3	320.43
	1.70 sink	109.1	17.94	60.3	1,081.78
			Sulfur		
Minus 48 mesh.....	1.30 float	Same	Same	1.19	18.90
	1.30–1.35			1.44	21.50
	1.35–1.40	as	as	1.59	14.21
	1.40–1.50			1.59	17.81
	1.50–1.70	above	above	1.86	57.86
	1.70 sink			13.34	239.32

Concluded

6	7	8	9	10	11	12
Cumulative float			Cumulative sink			Ordinate for Curve D
Weight (Per cent)	Products	Ash or sulfur (Per cent)	Weight (Per cent)	Products	Ash or sulfur (Per cent)	
			Ash			
58.96	265.32	4.5	100.00	1,184.24	11.8	29.48
82.58	487.35	5.9	41.04	918.92	22.4	70.77
87.45	550.66	6.3	17.42	696.89	40.0	85.01
90.38	599.88	6.6	12.55	633.58	50.5	88.91
92.25	647.94	7.0	9.62	584.36	60.7	91.31
100.00	1,184.24	11.8	7.75	536.30	69.2	96.12
			Sulfur			
Same	87.85	1.49	Same	290.38	2.90	Same
	138.87	1.68		202.53	4.93	
as	155.43	1.78	as	151.51	8.70	as
	171.54	1.90		134.95	10.75	
above	189.32	2.05	above	118.84	12.35	above
	290.38	2.90		101.06	13.04	
			Ash			
50.12	160.38	3.2	100.00	1,704.49	17.0	25.06
68.33	313.34	4.6	49.88	1,544.11	30.9	59.22
73.85	379.03	5.1	31.67	1,391.15	43.9	71.09
79.40	466.16	5.9	26.15	1,325.46	50.7	76.62
82.52	540.42	6.5	20.60	1,238.33	60.1	80.96
100.00	1,704.49	17.0	17.48	1,164.07	66.6	91.26
			Sulfur			
Same	70.17	1.40	Same	323.30	3.23	Same
	105.13	1.54		253.13	5.07	
as	119.09	1.61	as	218.17	6.89	as
	137.18	1.73		204.21	7.81	
above	155.49	1.88	above	186.12	9.03	above
	323.30	3.23		167.81	9.60	
			Ash			
15.88	31.76	2.0	100.00	1,664.83	16.6	7.94
30.81	97.45	3.2	84.12	1,633.07	19.4	23.34
39.75	161.82	4.1	69.19	1,567.38	22.7	35.28
50.95	262.62	5.2	60.25	1,503.01	24.9	45.35
82.06	583.05	7.1	49.05	1,402.21	28.6	66.50
100.00	1,664.83	16.6	17.94	1,081.78	60.3	91.03
			Sulfur			
Same	18.90	1.19	Same	369.60	3.70	Same
	40.40	1.31		350.70	4.17	
as	54.61	1.37	as	329.20	4.76	as
	72.42	1.42		314.99	5.23	
above	130.28	1.59	above	297.18	6.06	above
	369.60	3.70		239.32	13.34	

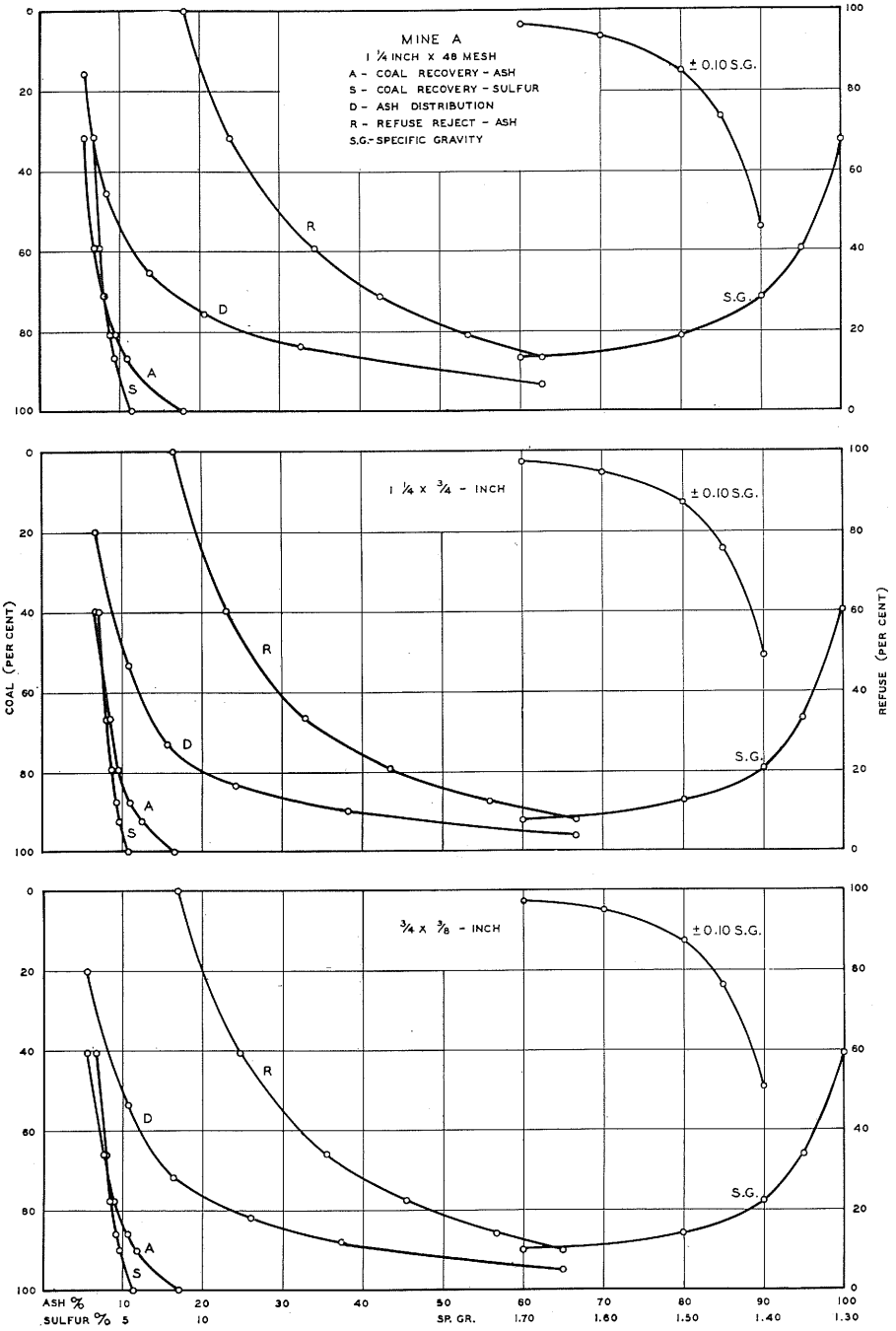

FIGURE 5.—WASHABILITY CURVES, MINE A

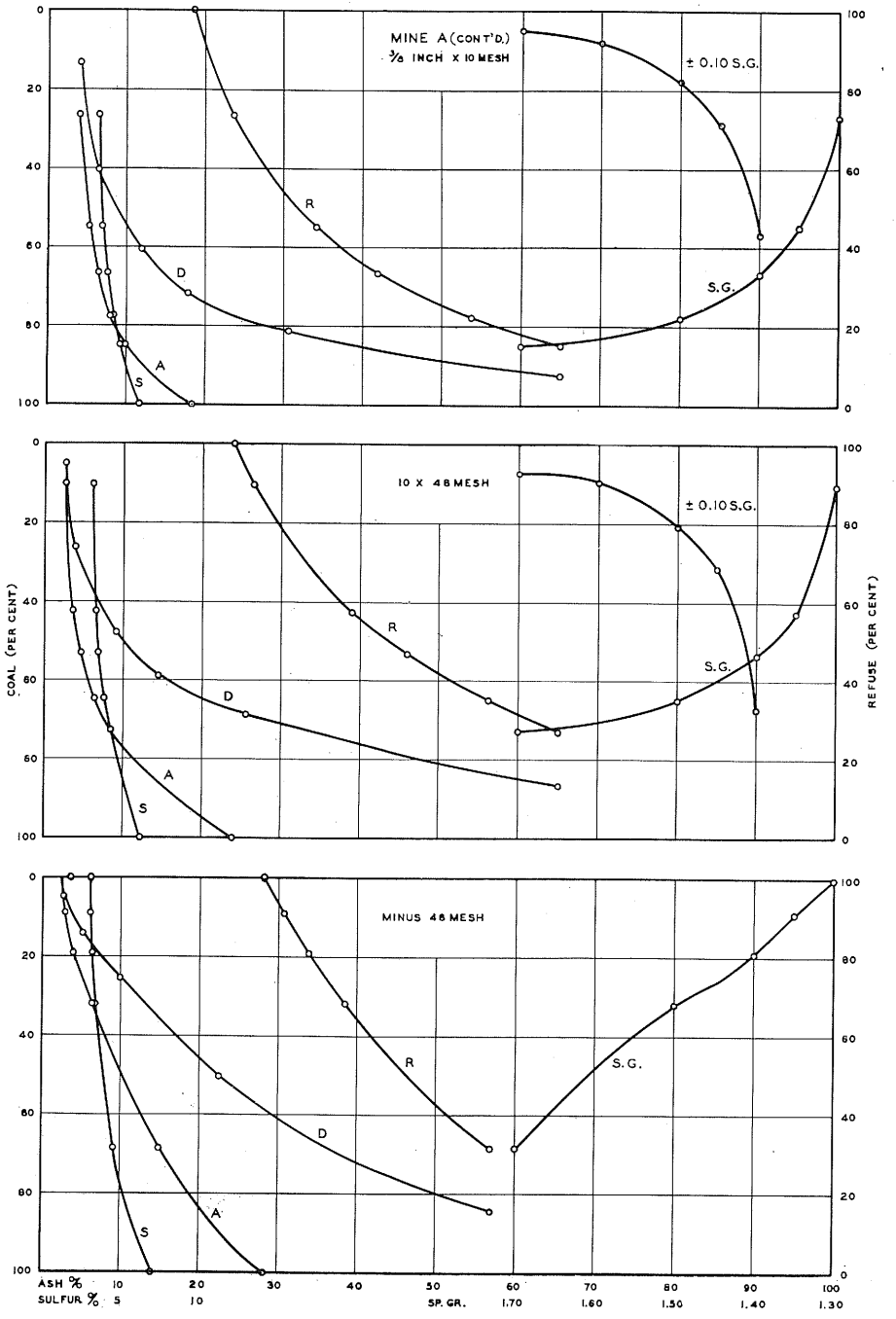

FIGURE 5.—CONTINUED

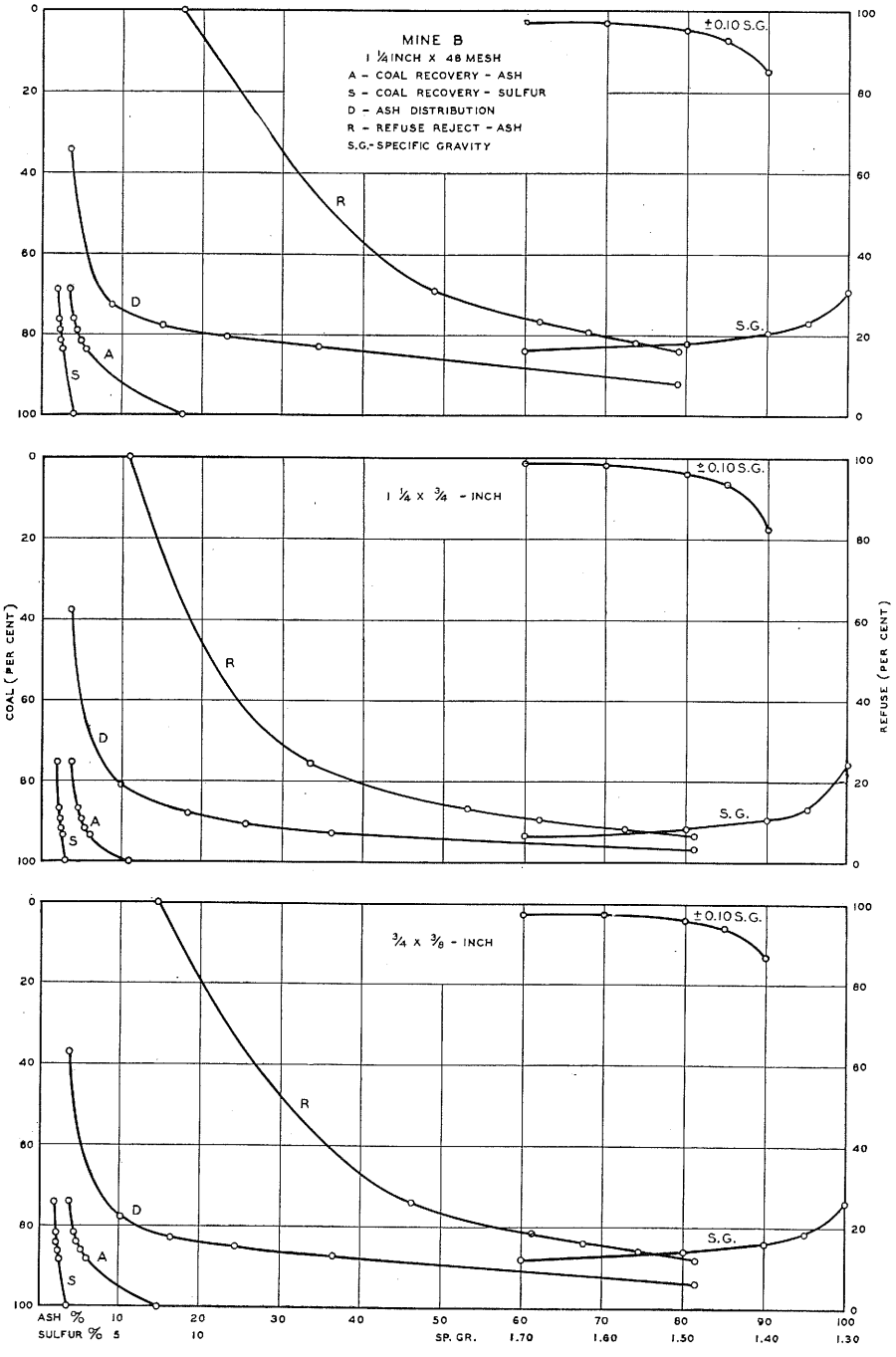

FIGURE 6.—WASHABILITY CURVES, MINE B

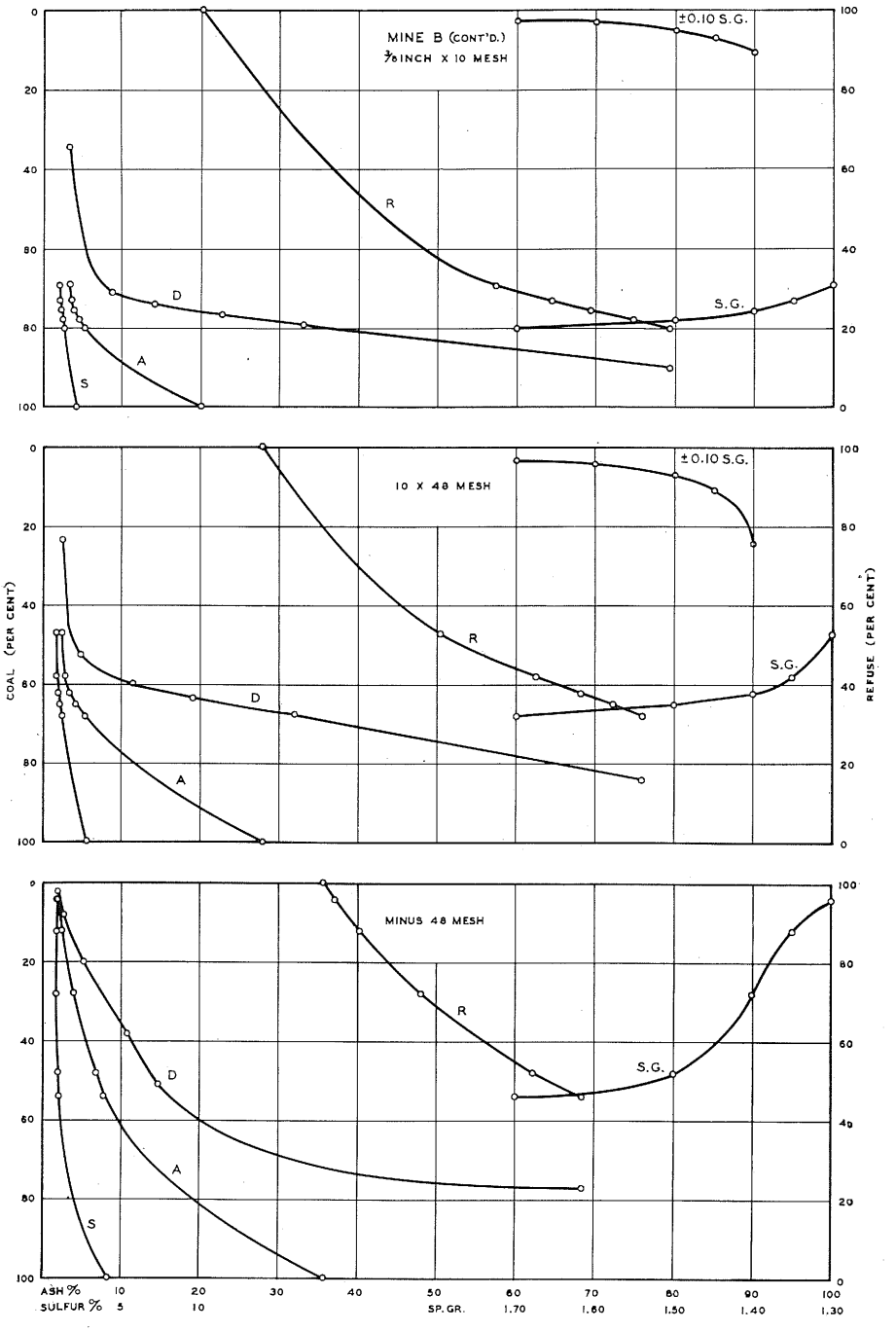

FIGURE 6.—CONTINUED

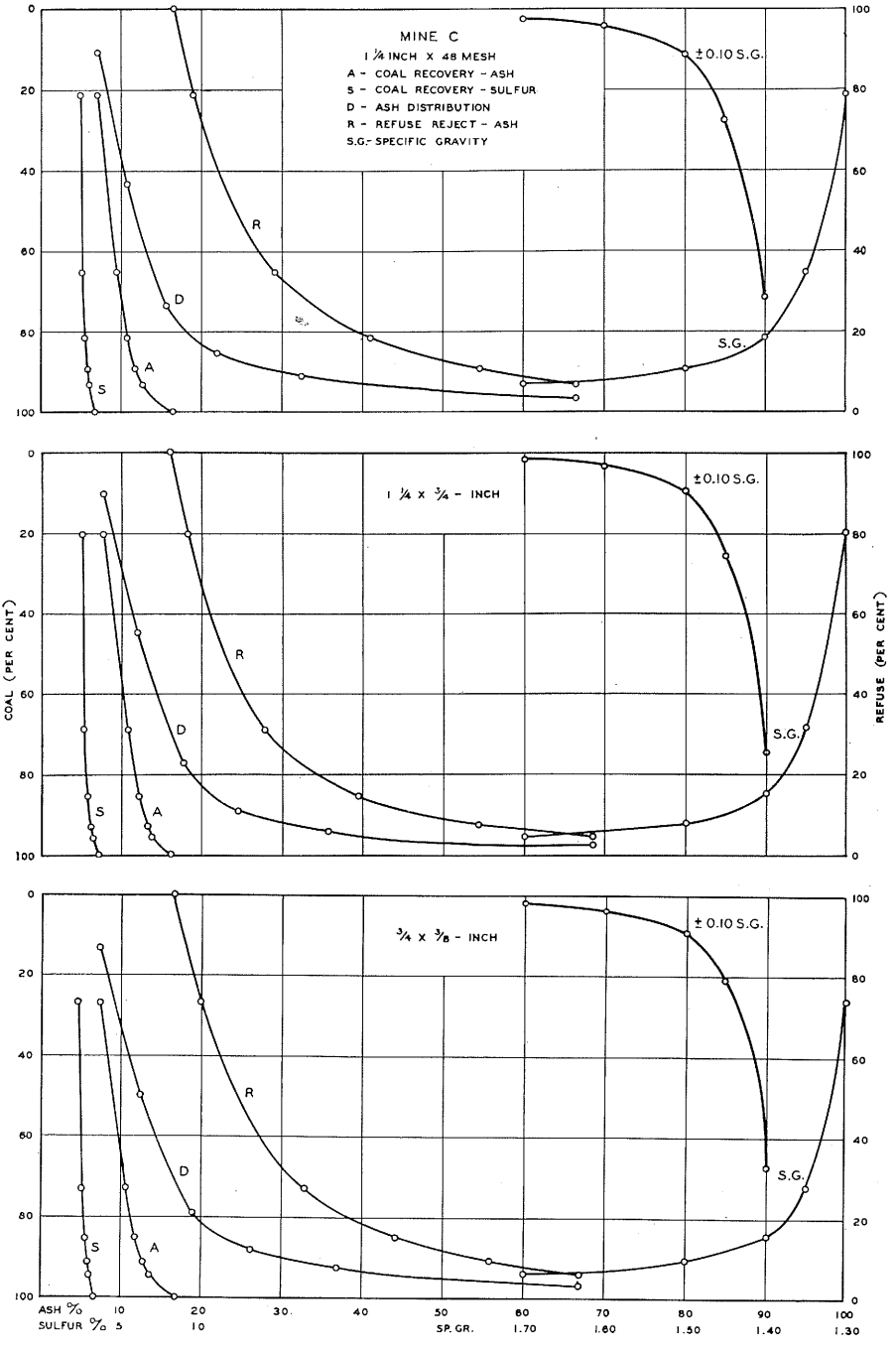

FIGURE 7.—WASHABILITY CURVES, MINE C

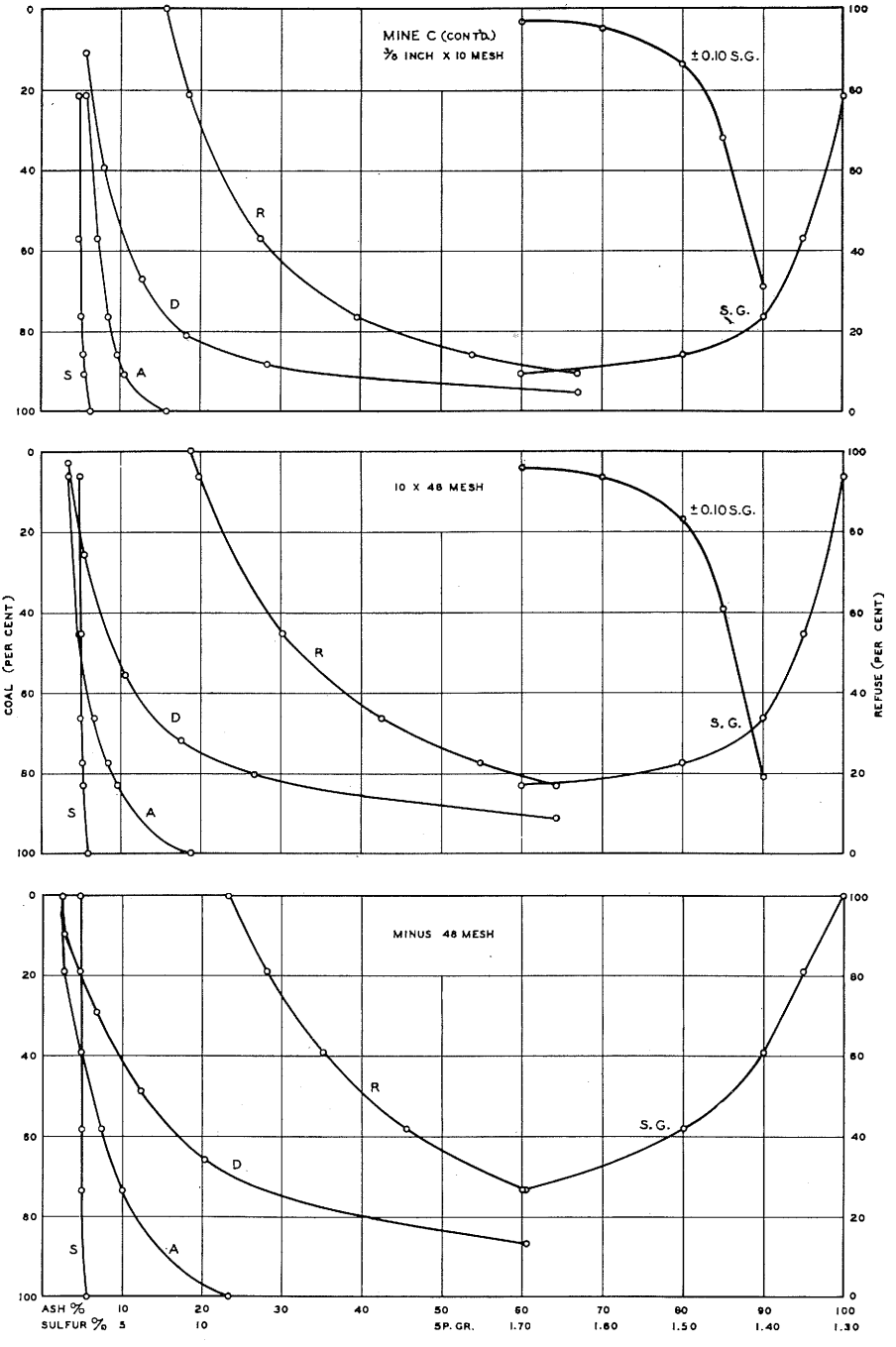

FIGURE 7.—CONTINUED

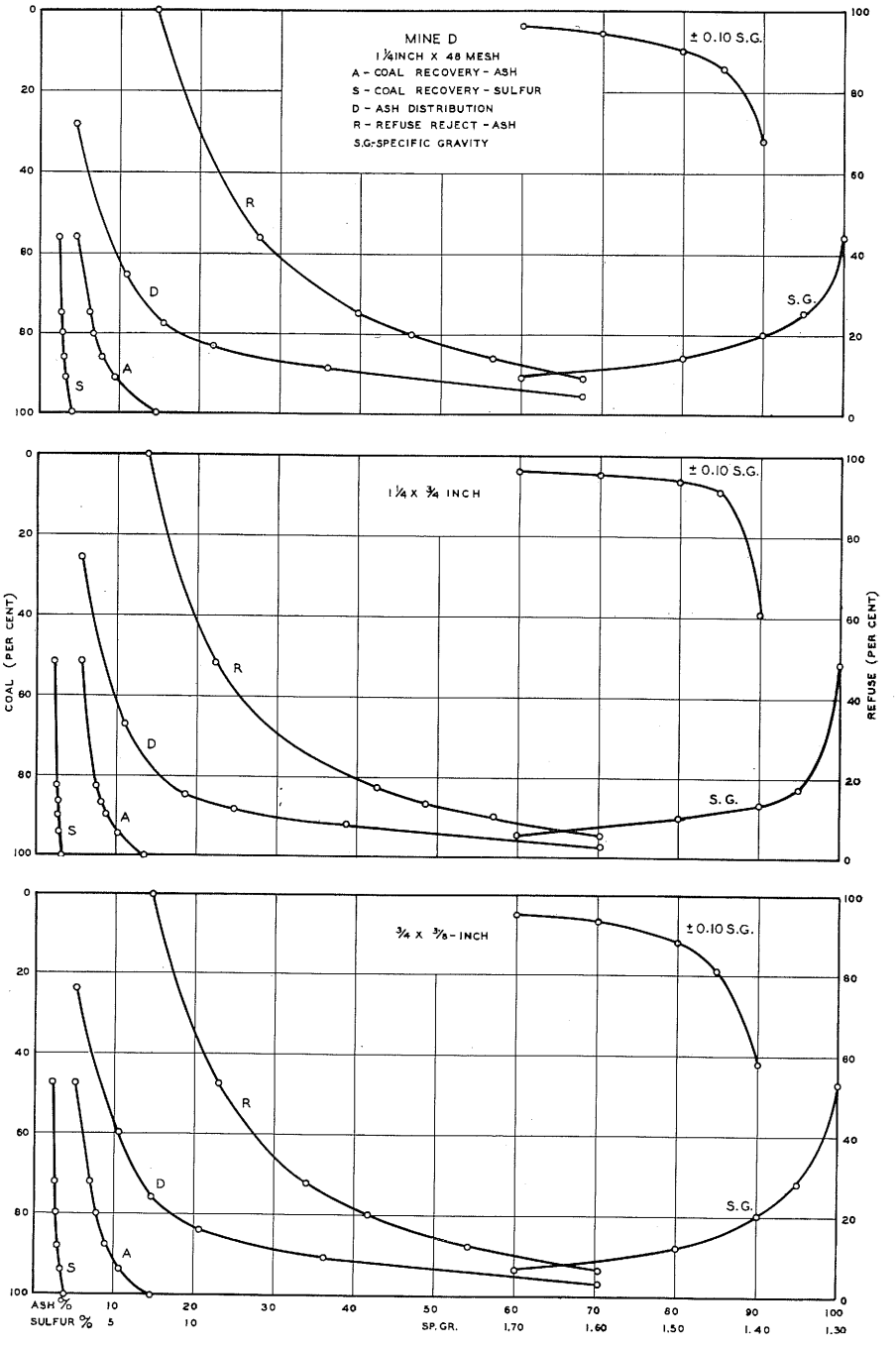

FIGURE 8.—WASHABILITY CURVES, MINE D

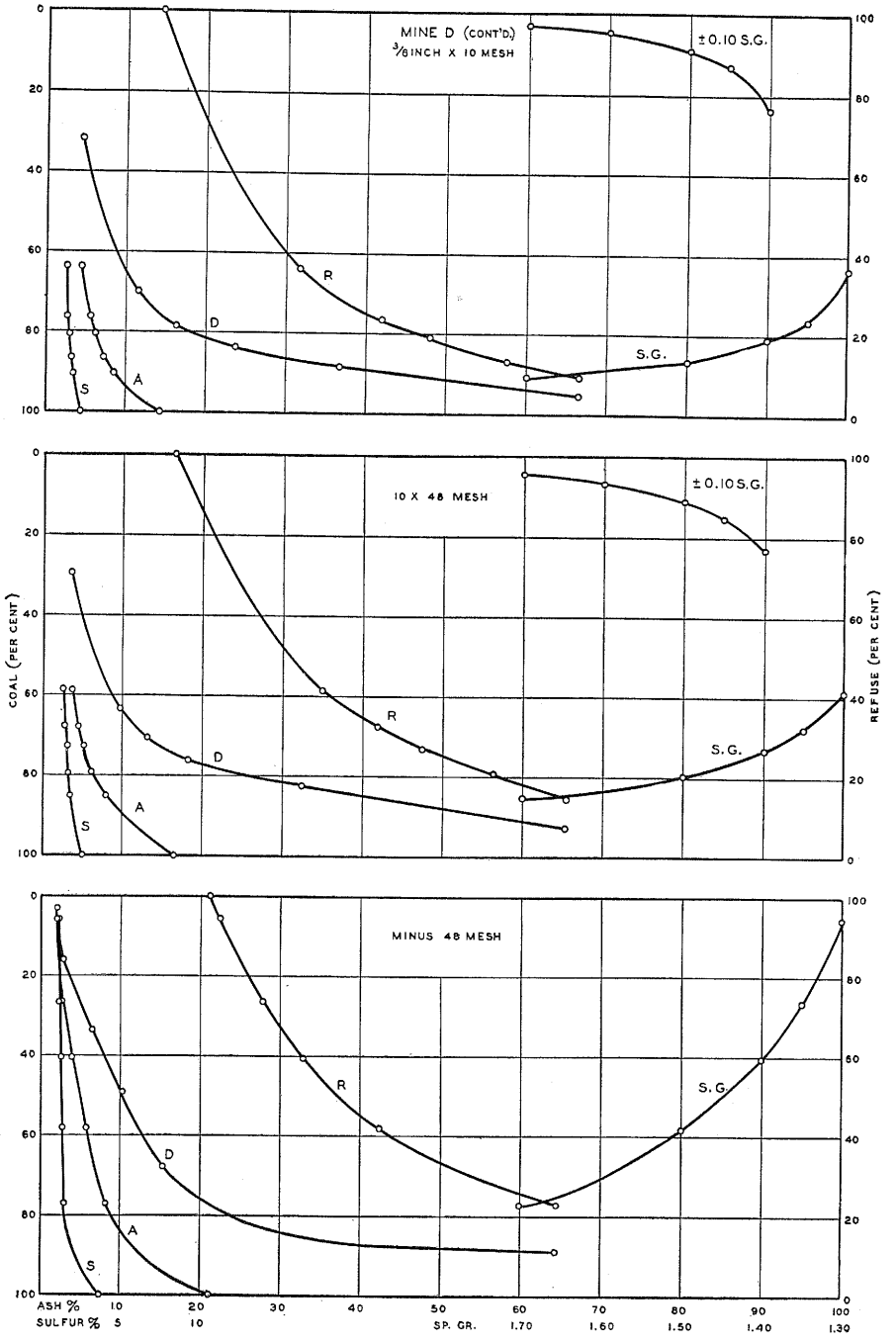

FIGURE 8.—CONTINUED

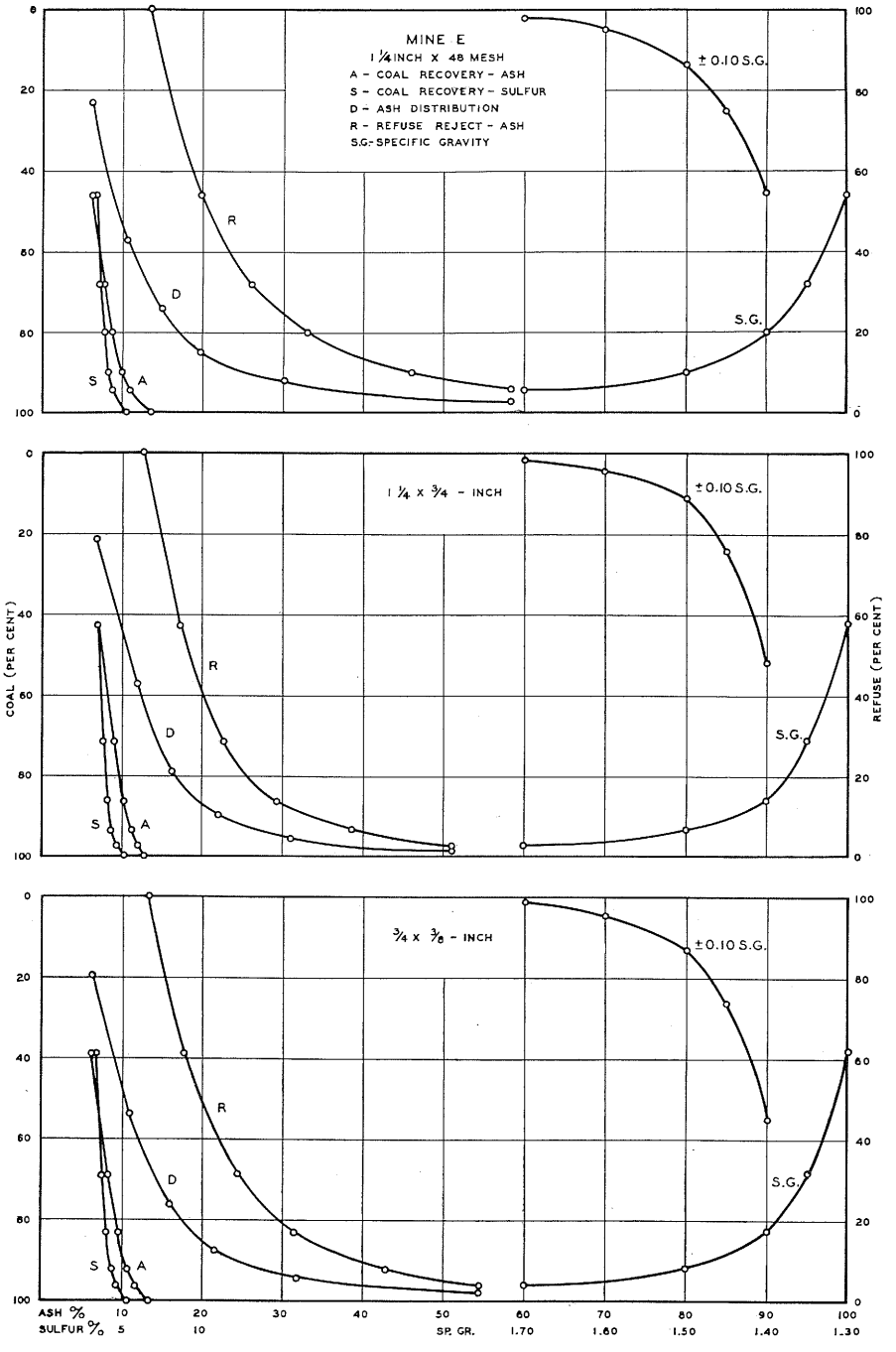

FIGURE 9.—WASHABILITY CURVES, MINE E

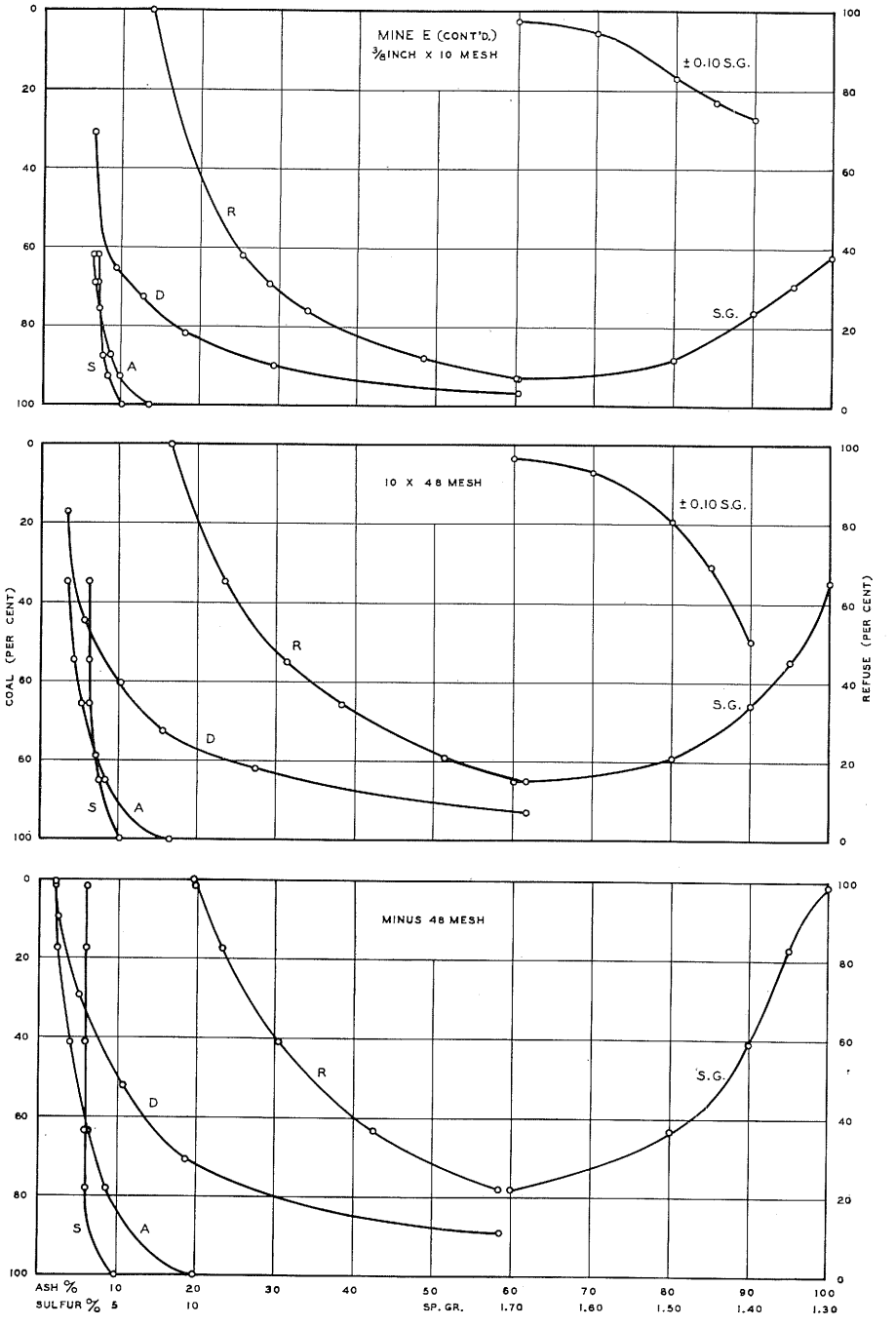

FIGURE 9.—CONTINUED

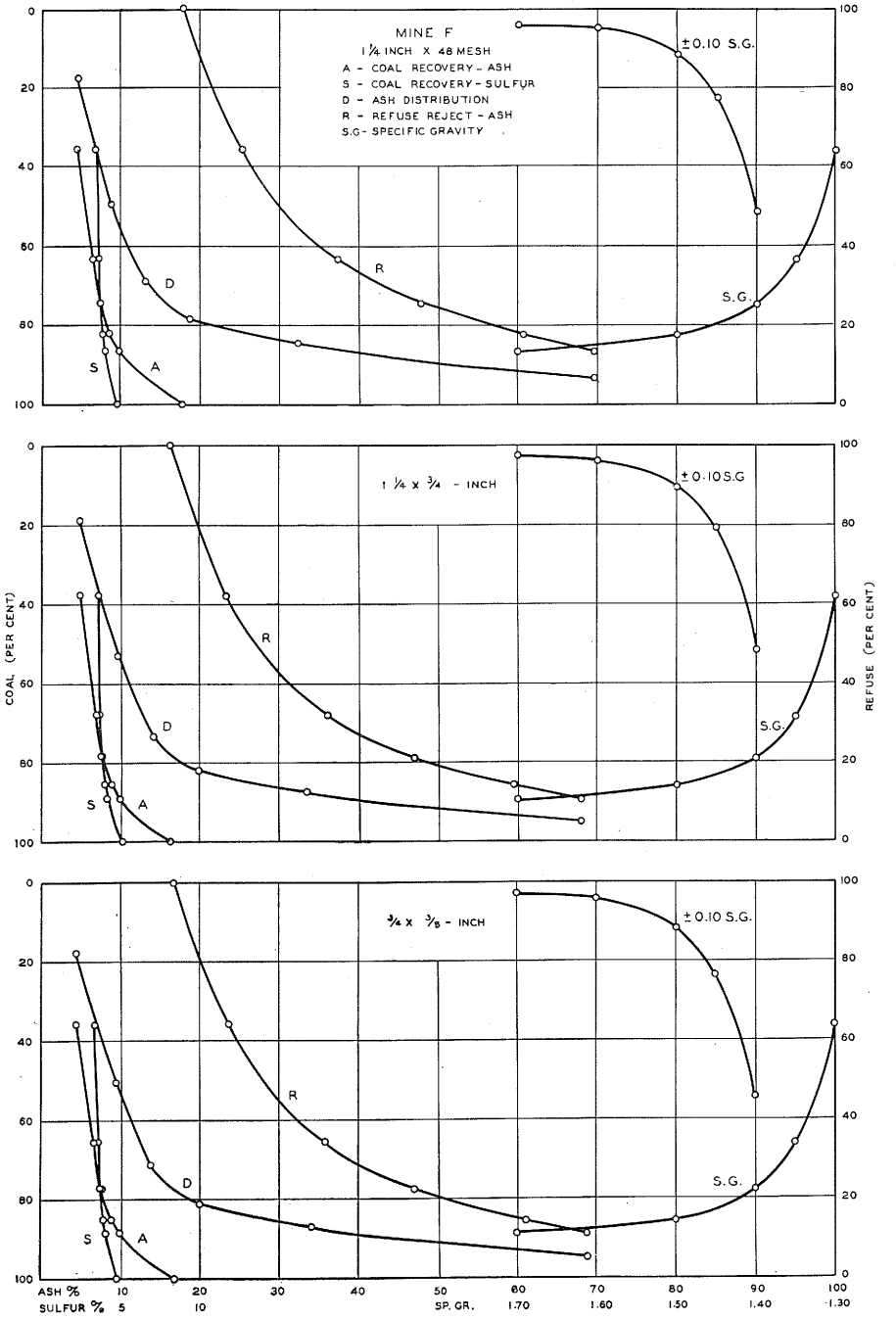

FIGURE 10.—WASHABILITY CURVES, MINE F

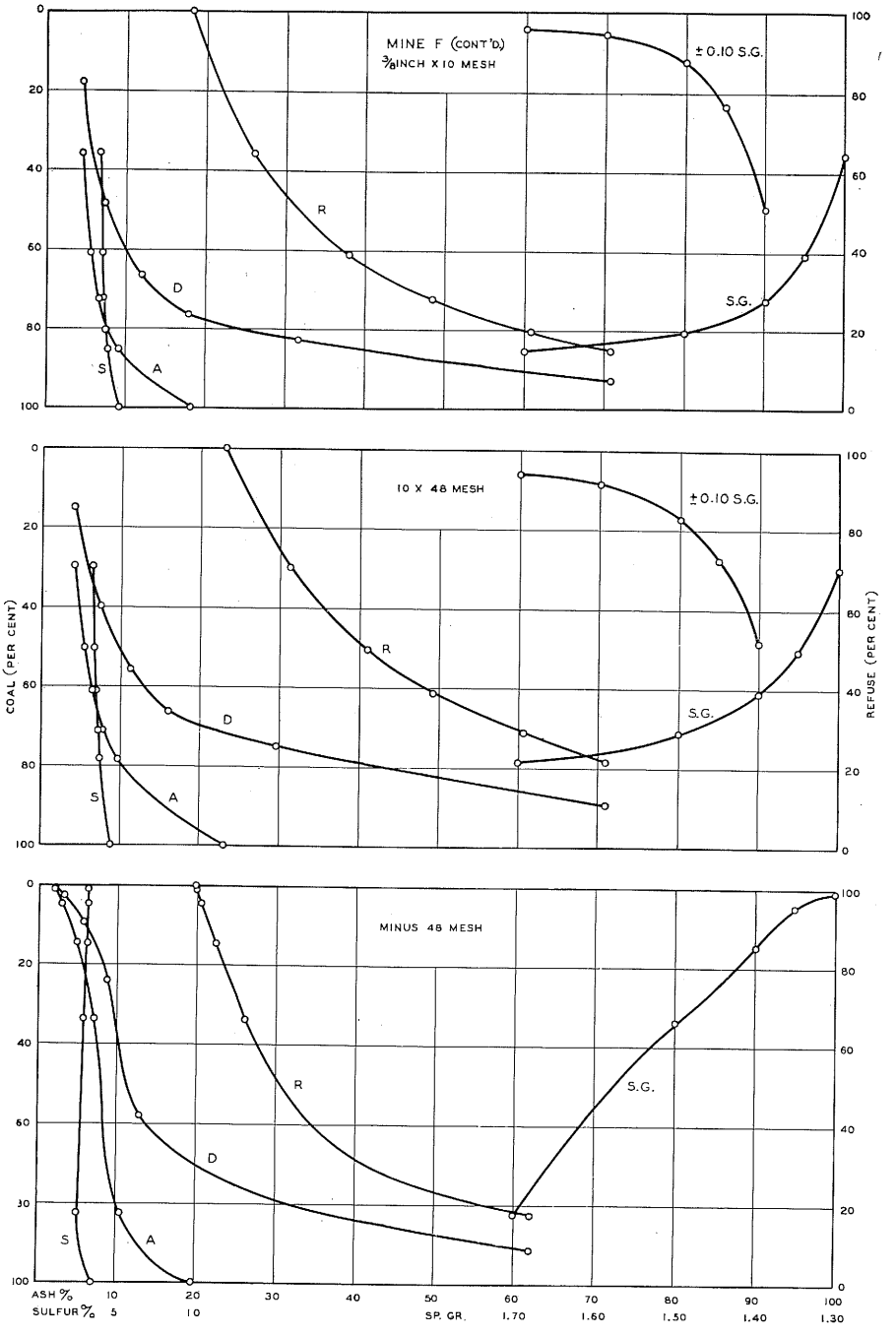

FIGURE 10.—CONTINUED

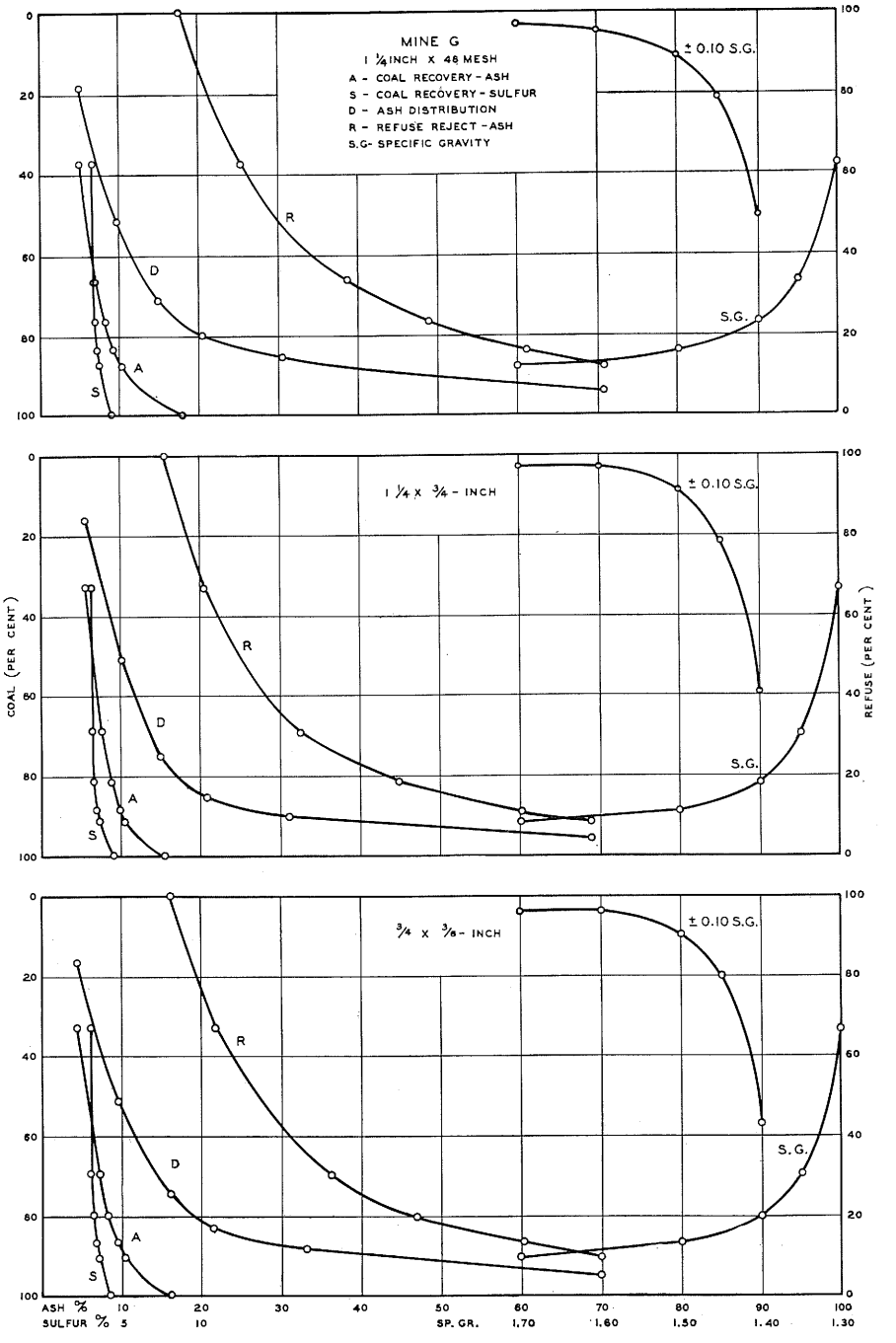

FIGURE 11.—WASHABILITY CURVES, MINE G

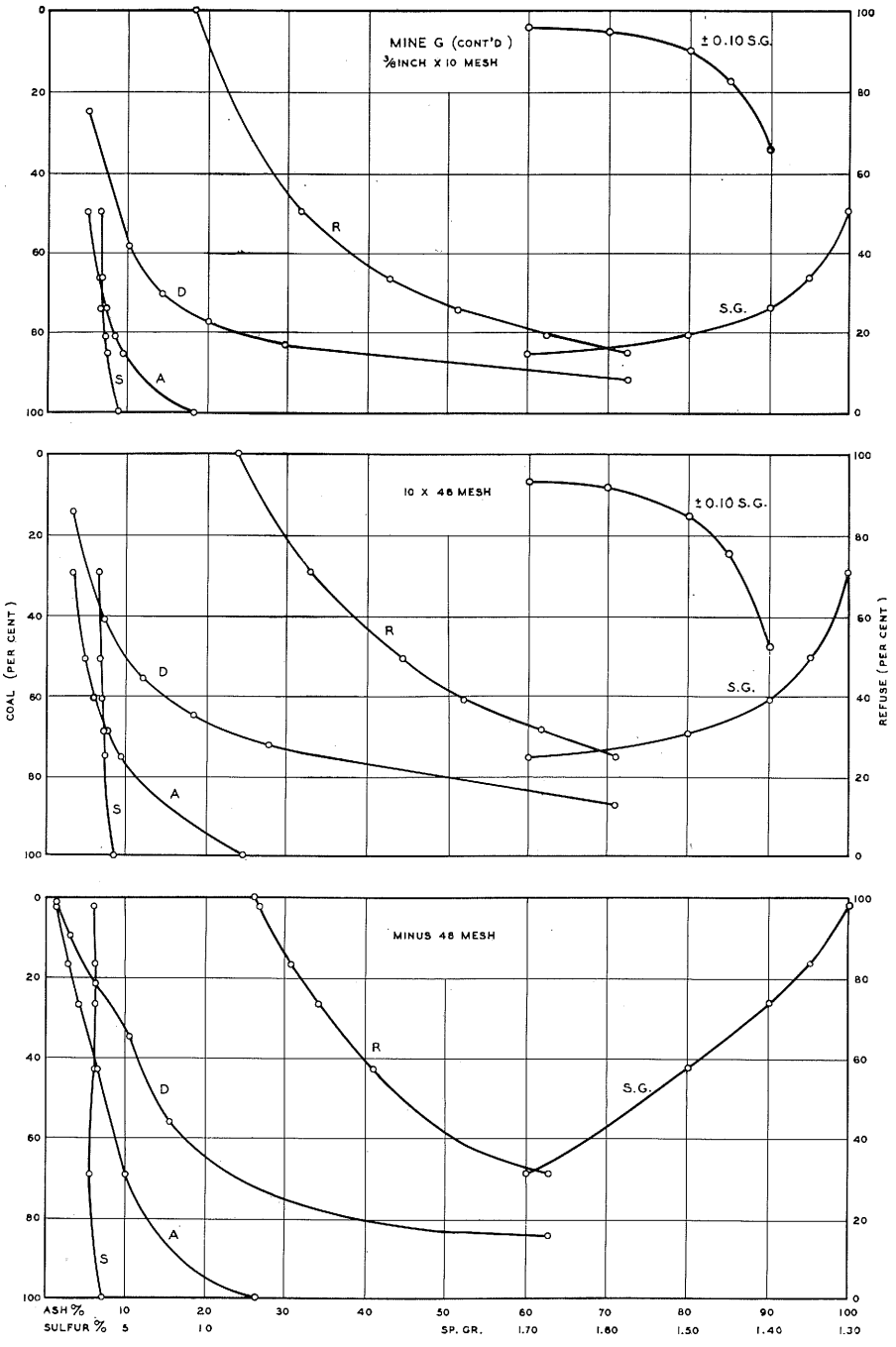

FIGURE 11.—CONTINUED

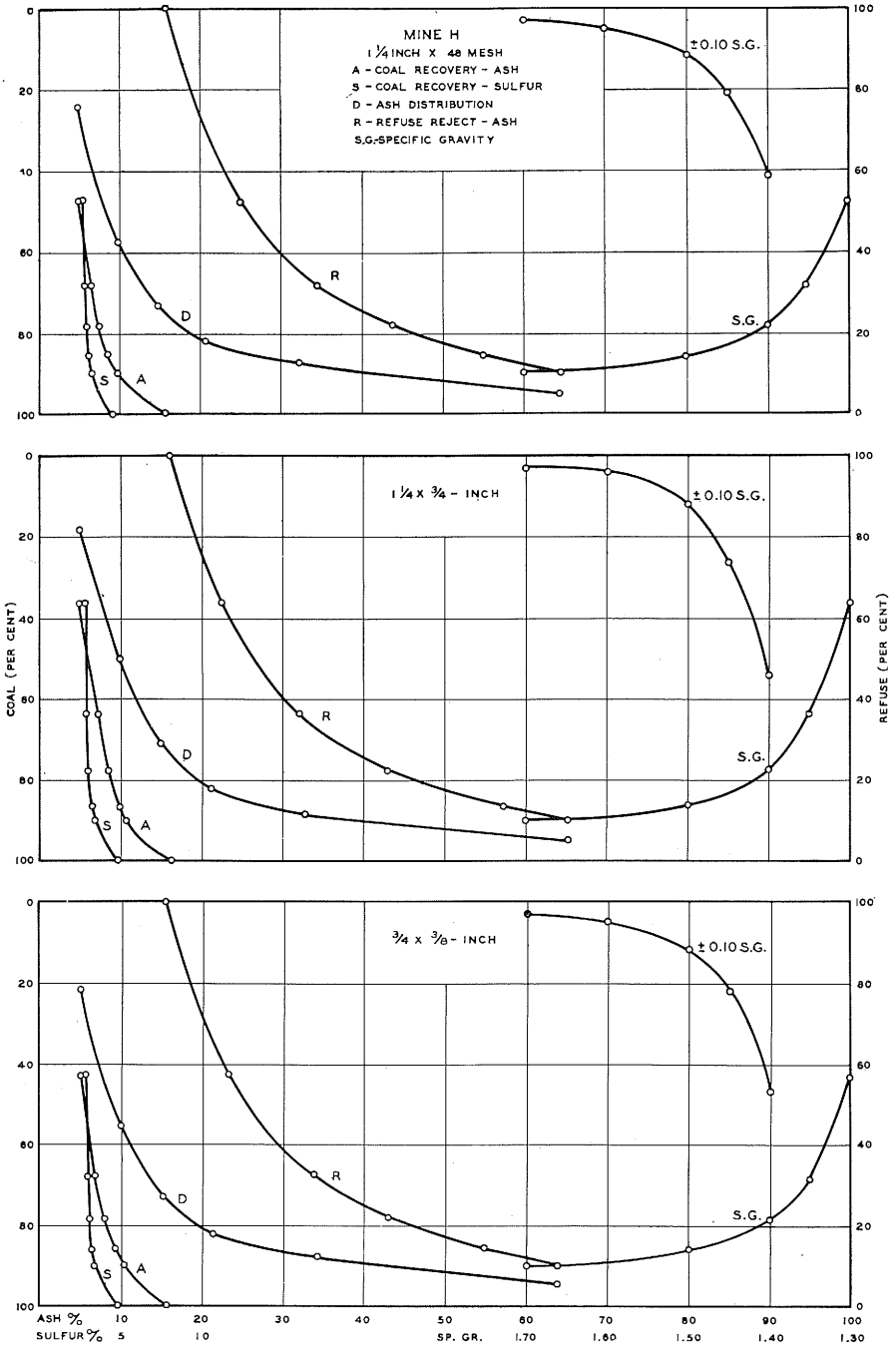

FIGURE 12.—WASHABILITY CURVES, MINE H

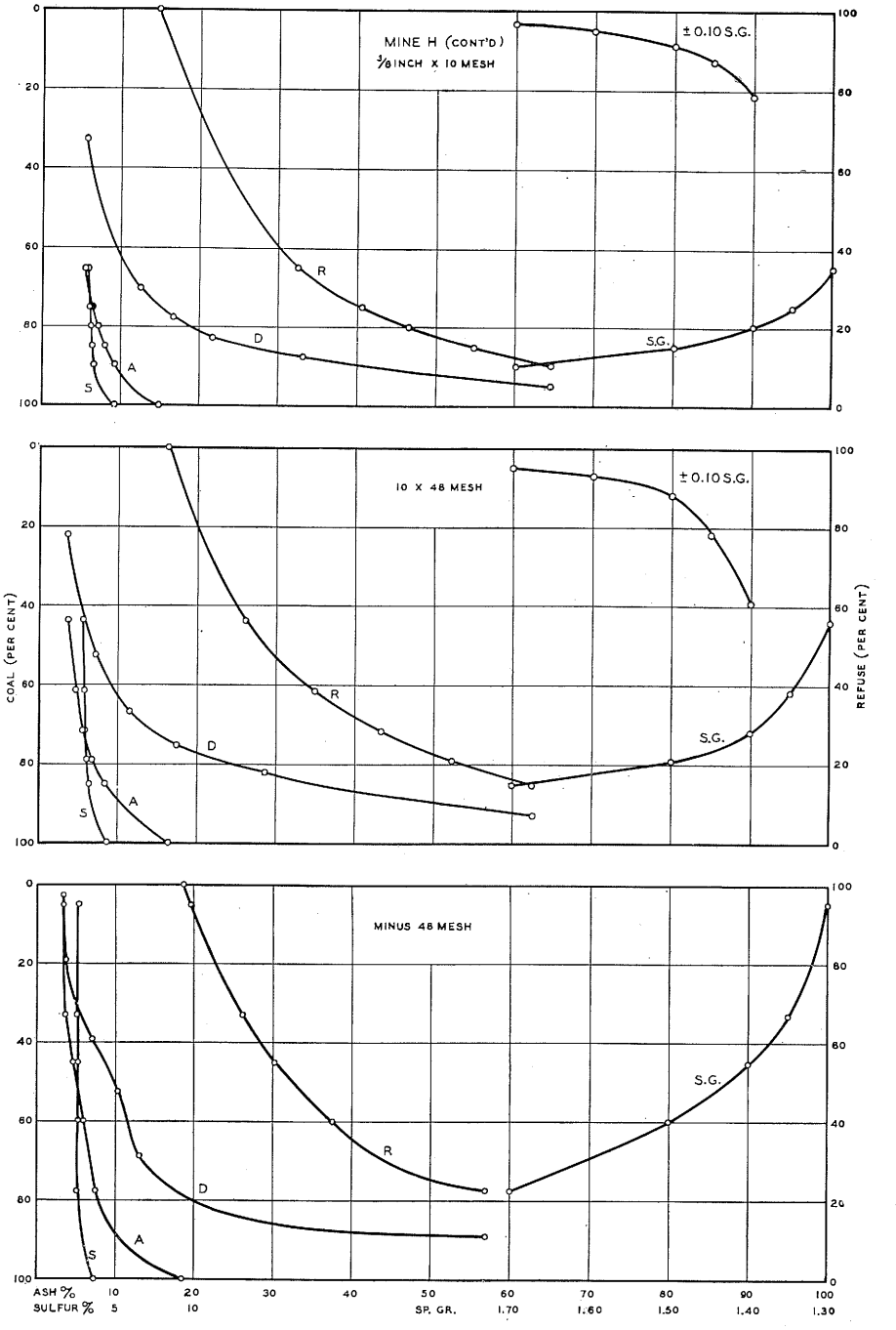

FIGURE 12.—CONTINUED

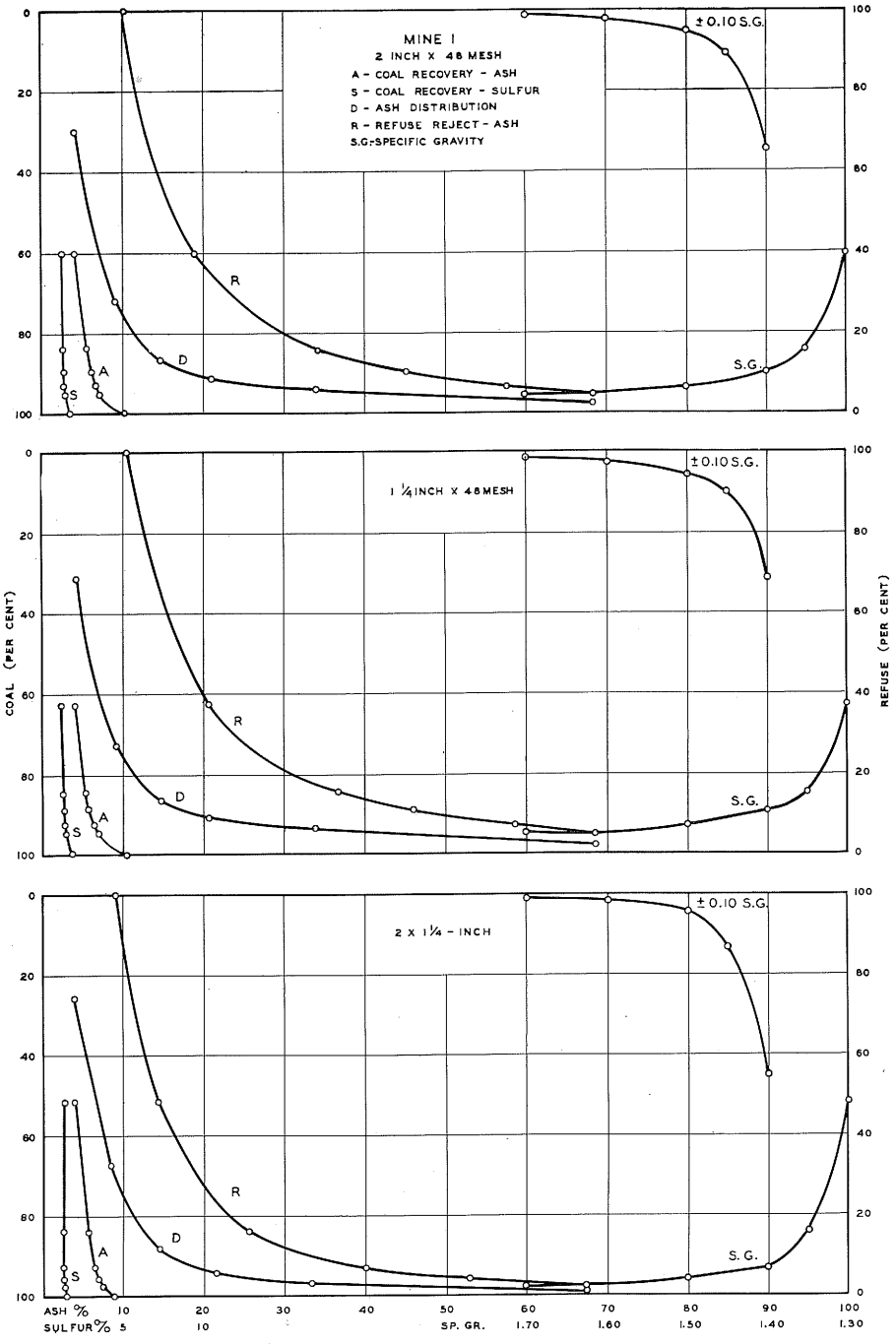

FIGURE 13.—WASHABILITY CURVES, MINE I

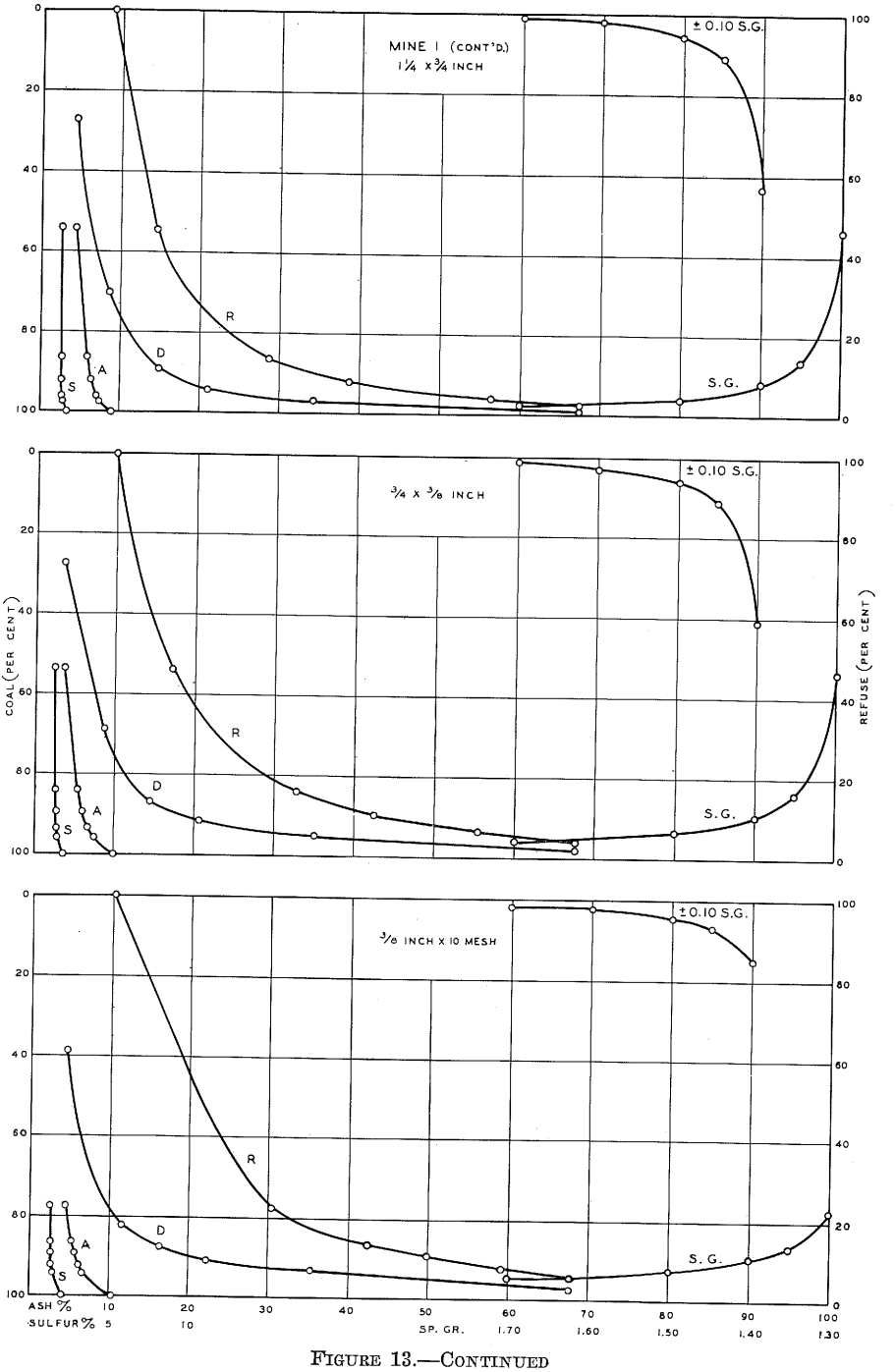

FIGURE 13.—CONTINUED

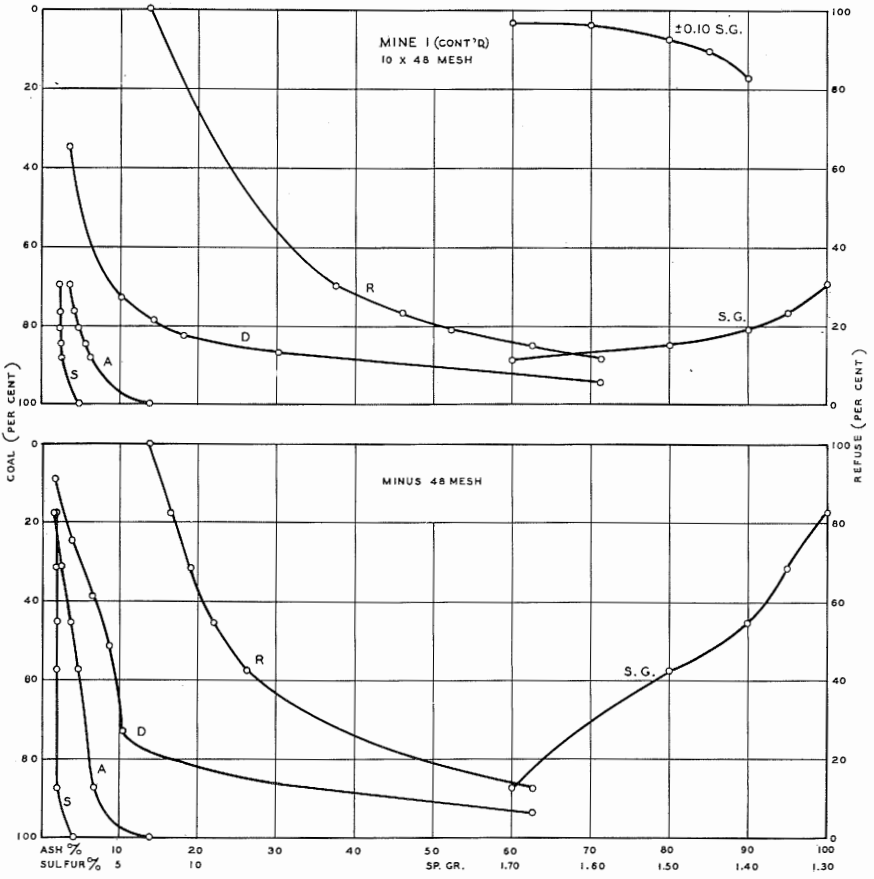

FIGURE 13.—CONCLUDED

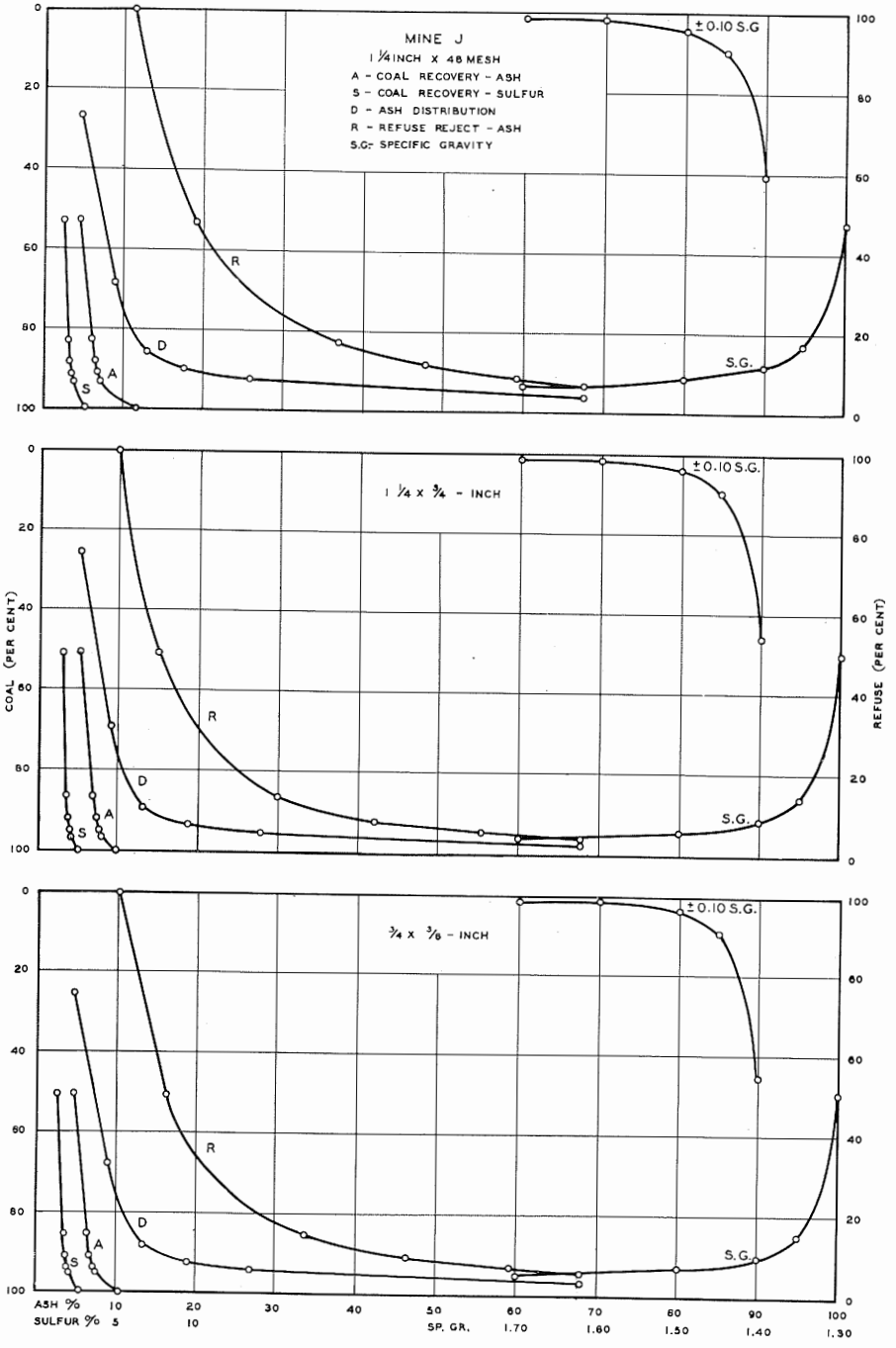

FIGURE 14.—WASHABILITY CURVES, MINE J

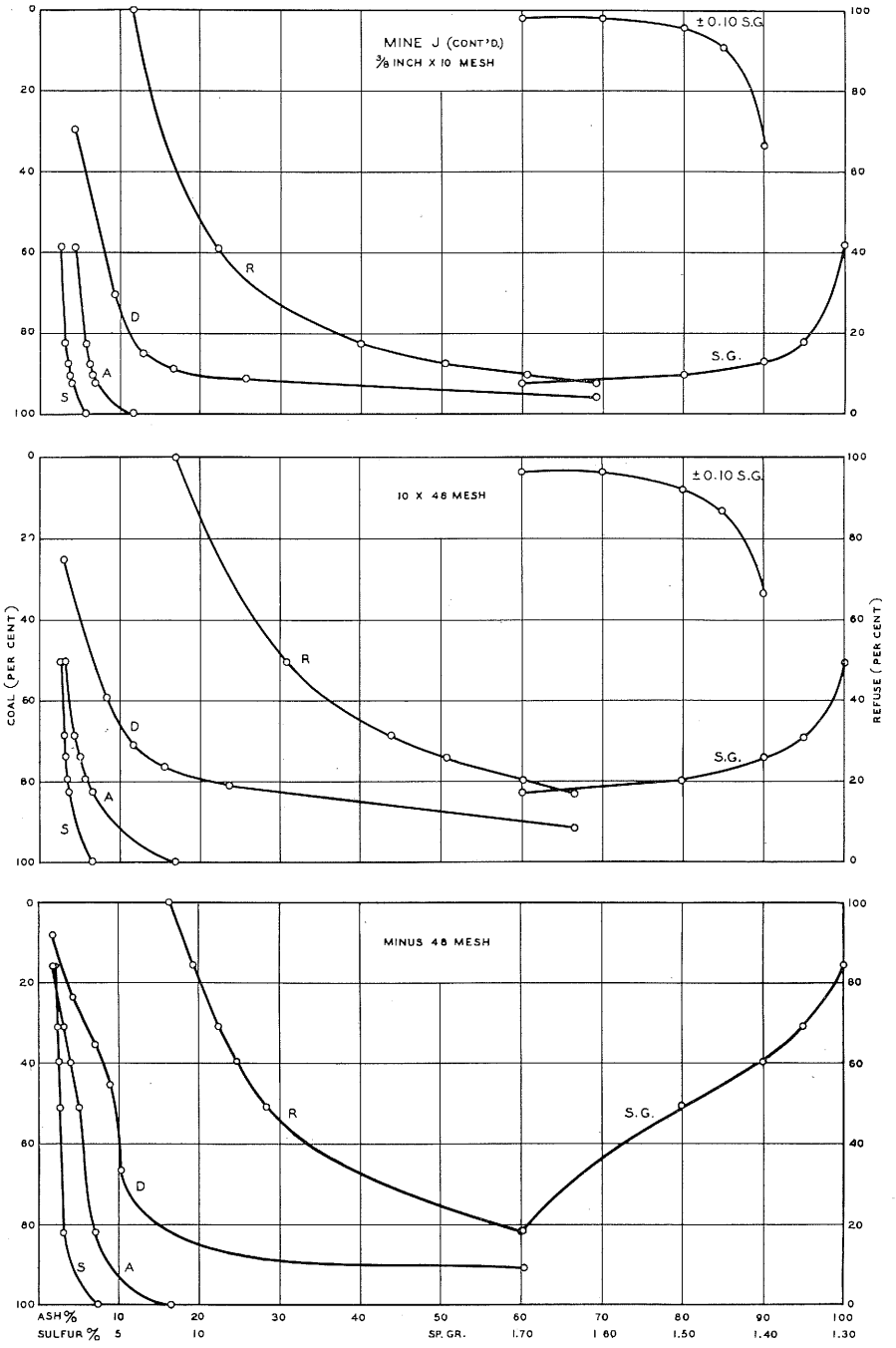

FIGURE 14.—CONTINUED