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WASHABILITY OF COALS FROM THE MATANUSKA VALLEY AND BELUGA RIVER FIELDS, ALASKA

By M. R. Geer and F. D. Fennessy

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

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UNITED STATES DEPARTMENT OF THE INTERIOR
Stewart L. Udall, Secretary

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CONTENTS

TABLES

Sections of Beds

Float-and-Sink Tables

WASHABILITY OF COALS FROM THE MATANUSKA VALLEY AND BELUGA RIVER FIELDS, ALASKA[1]

by

M. R. Geer[2] and F. D. Fennessy[3]

INTRODUCTION AND SUMMARY

All the coal lands in Alaska are publicly owned, and the Federal Government is the principal consumer of coal. Therefore the Government has long been concerned with the wise utilization of the coal reserves of Alaska as well as with the availability of coals meeting the specifications for use in various Government installations. Coal preparation plays a key role in both of these areas of interest. The proper choice and operation of coal-washing equipment permits the mining of inferior deposits, minimizes waste of coal in preparation, and assures a prepared product of the best quality obtainable from the raw coal. Thus, from time to time, the Bureau of Mines has made washability examinations on most of the coals mined in Alaska. Generally, these examinations were made when new mines or new beds were opened, when construction of new preparation plants was being considered, or when the operation of existing plants could be improved by better knowledge of the raw coal. The purpose of this report is to bring together all the washability data available on the coals of the Matanuska Valley and Beluga River fields.

The pattern of energy development for the rapidly growing Anchorage area is not clear at this time. Formerly coal was the only fuel available for large-scale space heating and power generation. More recently both oil and natural gas have entered the market, and several hydroelectric projects have been completed. Additional major hydroelectric projects are being considered. The role that will be played by coal in this competitive energy market is uncertain. However, if coal is the fuel used in future power plants or industrial installations, the information contained in this report will be useful in indicating the quality of the coals that can be supplied and in selecting proper preparation techniques.

The washability characteristics of the coals examined vary widely. Some of the coals are not amenable to mechanical cleaning, some can provide only

[1]Work on manuscript completed October 1961.
[2]Chief, Seattle Coal Research Laboratory, Bureau of Mines, Seattle, Wash.
[3]Mining engineering technician, Seattle Coal Research Laboratory, Bureau of Mines, Seattle, Wash.

inferior fuel despite mechanical cleaning, and others are capable of providing coal of premium quality if properly prepared. Several of the coals contain a great deal of intermediate-density material, and, therefore, lend themselves to the production of a middling, or secondary fuel, that might be suitable for low-cost, minesite power generation.

ACKNOWLEDGMENTS

The work described in this report was conducted at the Bureau of Mines Coal Research Laboratory in Seattle, Washington, which operated under a cooperative agreement with the School of Mineral Engineering of the University of Washington. Without exception, the Alaska coal operators cooperated fully in collecting samples, often defraying the substantial costs of transportation to the laboratory.

LABORATORY PROCEDURE

In float-and-sink tests on coal coarser than 20-mesh, aqueous solutions of zinc chloride were used, whereas organic solutions were employed with the finer sizes. Except with coal from the Buffalo mine, the specific gravity of the baths ranged from 1.30 to 1.80 in steps of 0.10. With bituminous coals, the entire size range from the coarsest material down to 20-mesh was tested together, then each resulting density fraction was further screened into several more sizes to evaluate the distribution of impurities by size. With subbituminous coal, this procedure is not feasible, and, therefore, the individual sizes were tested separately.

All ash contents are given on a moisture-free basis.

BELUGA RIVER DEPOSIT

During the field seasons of 1959, 1960, and 1961, the Bureau of Mines explored a deposit of coal on the Beluga River[4] 60 airline miles northwest of Anchorage by diamond drilling to determine the extent and quality of the reserves. In 1960 a sample was taken for washability examination. A bulldozer was used to remove weathered coal from the outcrop, after which a 1,600-pound channel sample was cut by hand across the full thickness of the bed. A section of the bed at the sample location (about 150 feet north of borehole one) is shown in the following tabulation:

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[4]Maloney, R. P., Reconnaissance of the Beluga River Coalfield, Alaska: Bureau of Mines Rept. of Investigations 5430, 1958, 18 pp.
Warfield, R. S., Investigations of Subbituminous Coal Deposits in the Beluga River Coalfield, Alaska: Bureau of Mines Open File Report, 1961, 70 pp.

Section of bed[1]

Composition	Thickness	
	Feet	Inches
Coal	8	5
Fusain	-	2
Coal	3	7
Clay	-	2
Coal	18	8
Coal, shale streaks	3	10
Clay	-	4
Coal	10	2
Clay	-	1
Coal, shale streaks	3	2
Clay	-	5
Coal	1	6
Total thickness of bed and sample	50	6

[1]Roof: Clay; floor: Clay and coal streaks.

The coal has the strong, tough structure that is typical of subbituminous rank.

The sample was shipped to the laboratory in Seattle in sealed drums and protected against loss of moisture during all steps leading up to the float-and-sink tests. All coal was crushed to pass a 4-inch round-hole screen before testing. Table 1-A (appendix) shows the specific-gravity analyses. The specific-gravity composition of the individual sizes are not significantly different from that of the 4-inch to 0 composite. Little of the material was lighter than 1.30 specific gravity, and the specific gravity of most of the coal ranged from 1.30 to 1.50. The heavy impurity content of the coal was only 5.9 percent. Removal of these impurities would reduce the ash content from 22.3 to 19.6 percent. However, the amount of heavy impurities in the sample and the degree of improvement accruing from its removal may be misleading so far as an actual mining operation is concerned. Both the roof and floor of the bed are clay that is certain to contaminate the run-of-mine product to some extent, but none of this material was included in the washability sample.

The clay partings and the clay from the roof and floor are reasonably firm when dry but tend to soften and swell when exposed to water. Successful removal of this clay in a cleaning operation would require special attention to plant design because of the ease with which the clay disintegrates.

Comparatively little additional reduction in ash content could be achieved by washing at a specific gravity less than 1.80. The loss in yield sustained would be large compared to the improvement in quality achieved. The coal has a high inherent ash content, contains an unusually large proportion of intermediate-density material, and, therefore, does not lend itself to the production of a low-ash product.

The following tabulation shows an analysis of the raw coal:

	As received	Moisture free
Moisture.....percent	24.4	-
Volatile matter.....do..	30.1	39.8
Fixed carbon.....do..	28.7	38.0
Ash.....do..	16.8	22.2
Sulfur.....do..	0.2	0.2
B.t.u. per pound.....	7,160	9,470

The fusibility characteristics of the ash were:

Initial deformation.....° F.	2,550
Softening.....° F.	2,680
Fluid.....° F.	2,760

BUFFALO MINE

The Buffalo Mine in sec. 23, T. 19N., R. 2E. about 50 miles northeast of of Anchorage produced some coal during World War II. In 1942 the area was drilled by the Bureau[5] to determine reserves. In 1951 an attempt was made to reopen the mine, and washability samples were obtained for use in designing a preparation plant. At the time of sampling there was no production, the slope workings were flooded, and the only feasible method of sampling was to cut large channel samples on entries driven from a water-level rock tunnel that crosscuts the eight beds comprising the Buffalo series. At three locations in the No. 2 bed, weathered coal was removed, and a channel sample was cut from the hanging wall to the footwall; the coal from the three channel samples was combined into a single sample weighing about 1 ton. The sample procedure was used in obtaining a sample of the No. 5 bed. Table 1 shows average sections of the two beds:

TABLE 1. - Sections of beds, Buffalo mine[1]

No. 2 bed			No. 5 bed		
	Thickness			Thickness	
Composition of section	Feet	Inches	Composition of section	Feet	Inches
Coal.....	1	5-1/2	Coal.....	3	-
Shale, brown, hard, sandy	-	1	Shale, sandy, coal streaks	-	10
Coal.....	4	1	Coal.....	1	7
Total thickness of bed and sample....	5	7-1/2	Shale.....	-	3-1/2
			Coal.....	1	6
			Total thickness of bed and sample.....	7	2-1/2

[1]Hanging wall and footwall: Slickensided, carbonaceous shale and bone.

Actually, neither bed has a true footwall or hanging wall; the beds are merely coal-rich horizons in a carbonaceous series that is about 52 feet thick. The carbonaceous shale and bone enclosing the beds are highly slickensided, fractured, and weak. Therefore contamination of a run-of-mine product by wall

[5]Apell, G. A., Moose Creek District of Matanuska Coal Fields, Alaska: Bureau of Mines Rept. of Investigations 3784, 1944, 36 pp.

rock would be greater than usual. The float-and-sink samples contained no material from the walls other than that included accidentally, and, therefore, proper allowance must be made in interpreting float-and-sink results.

Table 2-A shows the specific gravity analyses of the No. 2 bed. The sample analyzed only 11.0 percent ash and contained 6.7 percent of impurities heavier than 1.70 specific gravity. Elimination of these heavy impurities would reduce the ash content to 7.3 percent. The coal contains a high proportion of material lighter than 1.30 specific gravity, has a low inherent ash content, and, therefore, lends itself readily to the production of a premium-quality washed coal. For example, a separation at 1.40 specific gravity would provide a float coal with 4.0 percent ash at a theoretical yield of 80.8 percent. However, as mentioned previously, the yield would not be so high in a run-of-mine product because of dilution with wall rock.

Table 3-A shows specific-gravity analyses of coal from the No. 5 bed. This coal analyzed 21.0 percent ash in raw form and had a considerably larger heavy impurity content than the No. 2 coal--21.7 percent. Removal of the heavy impurities would provide a float coal of 8.1 percent ash. Like coal from the No. 2 bed, the coal from the No. 5 bed contains a high proportion of float at 1.30 specific gravity and has a low inherent ash content. Therefore this coal also is suitable for the production of a clean product of good quality.

EVAN JONES MINE

The Evan Jones mine about 60 miles northeast of Anchorage is one of the oldest and largest operations in Alaska. Before 1953 all the production was from underground workings. Stripping was started in 1953, and by 1960 economic factors dictated closing the underground operation entirely. Some washability data on coal from this mine and the adjacent Eska mine of the Alaska Railroad were published in 1946.[6]

Late in 1959 the possibility of using coals from this area in a minesite plant to generate electricity for the rapidly growing Anchorage area was being considered. Therefore the Bureau undertook washability examinations of the Evan Jones and nearby Mrak coals to establish: (1) The quality of the raw and washed coals that would be available for such a plant, and (2) the possibility of producing a middling product for cheaper boiler fuel and concurrently producing premium-quality coal for use in the military installations served by these mines. Samples for this investigation were collected in 1960.

At the time of sampling, six beds were being mined in the Evan Jones pit, and two of these were mined in separate benches, making a total of eight different sources of coal. The proportion from the various beds being mined at any one time was highly variable, and, therefore, arrangements were made to mine and process the beds separately to permit collecting samples of each coal. At the cleaning plant the run-of-mine coal was crushed to a top size of about 2-1/2 inches before cleaning. Samples were collected from a conveyor belt carrying the 2-1/2-inch to 0 raw coal.

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[6]Geer, M. R., and Yancey, H. F., Washability Characteristics and Washing of Coals from the Matanuska Field of Alaska: Bureau of Mines Rept. of Investigations 3840, 1946, 17 pp.

Sections of the individual beds are shown in table 2.

TABLE 2. - Sections of beds, Evan Jones mine[1]

No. 5 bed		
Composition of section	Thickness Feet	Inches
Bone, coal streaks.....	2	2
Coal.....	-	9
Sandstone, brown.....	-	2
Coal.....	-	9
Coal and bony coal.....	8	-
Coal.....	3	8
Bone.....	1	3
Bone, coal streaks.....	4	5
Thickness of bed....	21	2

No. 6 bed		
Composition of section	Thickness Feet	Inches
Coal.....	2	-
Bone and sandstone.....	1	-
Coal.....	1	7
Sandstone.....	-	2
Coal.....	-	2
Sandstone.....	-	1
Coal.....	-	2
Thickness of bed....	5	2

No. 7 bed, upper bench		
Composition of section	Thickness Feet	Inches
Coal.....	-	4
Sandstone, buff, coal streak.....	-	3
Coal.....	1	5
Bone.....	-	6
Coal.....	-	5
Thickness of bench..	2	11

No. 7 bed, lower bench		
Composition of section	Thickness Feet	Inches
Coal.....	-	9
Coal, bony.....	-	3
Coal.....	-	6
Bone, sandstone, coal streaks.....	-	2
Coal.....	-	9
Thickness of bench..	2	5

No. 7A bed		
Composition of section	Thickness Feet	Inches
Coal, bony.....	-	5
Coal.....	1	8
Shale, carbonaceous, coal streaks.....	-	6
Bone.....	-	5
Shale.....	-	1-1/2
Coal.....	2	5
Bone.....	-	6
Thickness of bed....	6	1/2

No. 7B bed, upper bench		
Composition of section	Thickness Feet	Inches
Coal.....	2	6-1/2
Coal, bony and bone.....	-	5
Thickness of bench..	2	11-1/2

No. 7B bed, lower bench		
Composition of section	Thickness Feet	Inches
Coal.....	2	6
Bone.....	-	4
Shale, carbonaceous.....	-	3
Thickness of bench..	3	1

No. 7C bed		
Composition of section	Thickness Feet	Inches
Shale.....	-	1
Coal.....	-	7
Coal, bony.....	-	2
Coal.....	-	5
Shale, carbonaceous.....	-	1
Coal.....	-	10
Thickness of bed.....	2	2

[1]Hanging walls and footwalls: Principally gray shale.

Tables 4-A through 11-A show the specific-gravity analyses of the coals. The coal from the No. 5 bed is distinctly the dirtiest and most difficult to treat of the group. This bed contains much less light coal, has a much higher inherent ash content, and contains more bony material. Beds 6, 7A, and 7C have an impurity content almost as high as that of bed No. 5 but have a lower inherent ash content and contain less material of intermediate density. The raw coal from the upper bench of No. 7B bed analyzed only 13 percent ash, which equals the quality of the washed coal that can be produced readily from No. 5 bed by cleaning. This comparison illustrates the extreme range in washability characteristics exhibited by this group of beds.

In cleaning this group of coals to meet one specification for quality, as normally is the case in Alaska, satisfactory plant efficiency would require either careful blending of the raw coal or treatment of the individual coals at different densities. From a conservation standpoint, the latter course is preferable. If all the beds are treated at the density required to provide marketable coal from the No. 5 bed, an inordinately high loss of salable coal is sustained with the other beds.

Lacking established specifications for the ash content of primary clean coal and middling or secondary coal, the proportion and quality of material with specific gravities ranging from 1.40 to 1.60 can be used as an approximate evaluation of the suitability for production of middling. The following tabulation shows this information:

	Float 1.40		1.40 to 1.60			Sink 1.60	
	Yield, percent	Ash, percent	Yield, percent	Ash, percent	B.t.u.[1] per pound	Yield, percent	Ash, percent
5.....	37.0	8.6	23.4	28.3	10,270	39.6	64.0
6.....	50.1	5.7	13.1	27.8	10,370	36.8	70.2
7, upper bench.	62.9	4.9	16.6	27.9	10,380	20.5	70.7
7, lower bench.	61.7	4.8	13.0	28.9	10,250	25.3	57.9
7A.....	51.3	5.3	12.5	28.4	10,300	36.2	72.3
7B, upper bench	79.4	4.1	8.1	27.4	10,490	12.5	60.2
7B, lower bench	66.7	4.3	9.7	28.3	10,400	23.6	63.9
7C.....	59.4	3.9	5.3	27.0	10,490	35.3	72.2

[1]Moisture free; calculated from moisture and ash-free values.

All the potential middling products have about the same ash content and heating value, but the proportion of such material varies widely. The No. 5 bed contains 23 percent of intermediate-density material, whereas the No. 7C bed contains only about 5 percent.

The foregoing tabulation shows clearly that use of a middling product for minesite power generation could make available high-quality, primary washed coal for the remainder of the market. The following tabulation shows proximate analyses made on the composite float 1.50 specific-gravity fraction from each bed:

Characteristic	Bed							
			7			7B		
	5	6	Upper	Lower	7A	Upper	Lower	7C
Volatile matter.....percent	39.8	41.2	41.9	41.8	41.2	41.6	42.8	41.7
Fixed carbon.....do..	47.1	50.5	50.3	51.4	51.0	53.0	51.4	53.4
Ash.....do..	13.1	8.3	7.8	6.8	7.8	5.4	5.8	4.9
Sulfur.....do..	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
B.t.u. per pound.....	12,450	13,180	13,270	13,440	13,270	13,660	13,660	13,670
Ash fusion:								
Initial deformation..° F.	2,850	2,850	2,875	2,800	2,850	2,900+	2,875	2,800
Softening temperature.° F.	2,900+	2,900+	2,900+	2,850+	2,900±	2,900+	2,900+	2,850+

MRAK MINE

The Mrak mine about 70 miles north of Anchorage in the Eska Creek district is a strip operation at the site of the former Eska mine of the Alaska Railroad.[7] This part of the coalfield is badly broken by faults, and, therefore, mining is conducted in a number of relatively small pits. Several beds are worked on the property, but owing to the extensive faulting these beds are difficult to correlate between themselves or with the Jonesville series in the adjacent Evan Jones mine. The quality of the coal in the various pits is highly variable.

A sample for washability examination was collected early in 1960 as part of the investigation of coals available for power generation. At that time mining was being done in the No. 3 pit, East Extension, in a bed locally called the No. 3. A section of the bed is shown in the following tabulation:

Section of bed[1]

Composition	Thickness		Composition	Thickness	
	Feet	Inches		Feet	Inches
Coal.....	2	7	Shale, sandy.....	-	1/2
Shale, carbonaceous, hard..	-	4	Coal.....	1	8
Coal.....	2	6-1/2	Coal, bony.....	-	1-1/2
Coal, bony.....	-	8	Coal.....	1	4
Coal.....	1	-	Clay.....	-	2
Shale, sandy.....	-	1-1/2	Coal.....	-	6
Coal.....	1	8	Clay.....	-	3
Shale, coal streaks.....	-	10	Coal.....	-	6
Coal.....	-	8	Total thickness of bed.	15	-

[1]Hanging wall: Sandy shale; footwall: Shale.

Here the No. 3 bed did not contain much interbedded heavy impurity, but because of the pitch of the strata and other conditions in the pit, hanging wall and footwall material could not effectively be kept out of the run-of-mine product.

After the raw coal was crushed to a top size of 2-1/2 inches it was sampled at the cleaning plant. The specific-gravity analyses are shown in table 12-A. The raw

[7]Work cited in footnote 6.
Jolley, Theodore R., Toenges, Albert L., and Turnbull, Louis A., Bituminous-Coal Deposits in the Vicinity of Eska Matanuska Valley Coal Field, Alaska: Bureau of Mines Rept. of Investigations 4838, 1952, 87 pp.

coal analyzed 23.7 percent ash and contained 20.9 percent impurities with a specific gravity greater than 1.80. The removal of the impurities would provide a float coal containing 10.6 percent ash. An additional reduction in ash content of about 2 percentage points could be made without great loss in yield, but the production of a clean coal with less than 8 or 9 percent ash would involve a rejection of much intermediate-density material. The impurities exhibited a pronounced tendency to concentrate in the coarsest and finest sizes of the raw coal, with the intermediate sizes containing less than half as much sink 1.80 specific-gravity material.

Because of the variations in both bed composition and mining conditions that are characteristics of this property, the present analysis may or may not be typical, particularly with respect to the amount of impurities.

PREMIER MINE

In 1953 a stripping operation known as the Premier mine was opened in the NW1/4 sec. 27, T. 19N., R. 2E. in the Moose Creek district at the site of an earlier underground mine with the same name. Difficulty in meeting market specifications and loss of coal in the washery dictated a washability examination, and samples for this purpose were collected in 1956.

The mine consisted of two strip pits in which the strata were inclined from 60° to vertical. In one of the pits, beds locally-termed "A" and "C" and believed to be members of the Jonesville series were worked. In the other pit, beds Nos. 2 and 4 of the Premier series were mined. Arrangements were made to mine and process coal from each bed separately to permit the collection of samples. These samples were obtained in the washery after the run-of-mine product had been crushed to a top size of 2-1/2 inches. Each sample weighed about 1,200 pounds.

Table 3 shows sections of the beds. With the exception of the footwall of the "A" bed, the walls of all the beds were composed of comparatively weak material that could not be kept completely out of the coal during loading. Thus the samples contain wall rock as well as interbedded impurities.

Tables 13-A through 16-A show the specific-gravity analyses of these coals. The proportion of impurities with a specific gravity greater than 1.80 was unusually high in all the coals, ranging from 36.9 percent in the "A" bed to 56.8 percent in the No. 4. Similarly, the proportion of intermediate-density material was universally high. Both the heavy impurity and the intermediate-density material tended to concentrate in the coarser sizes. This is particularly evident with the No. 4 coal, in which the 2-1/2- to 1-inch size contained 78 percent of the heavy impurities and analyzed 65.7 percent ash.

TABLE 3. - Sections of beds, Premier mine[1]

"A" bed		
Composition of section	Thickness Feet	Inches
Coal	-	10-3/8
Bone and shale	-	7-3/4
Coal	4	10
Shale, firm	-	3-1/2
Coal	1	3-1/2
Shale, firm	-	3-1/2
Coal	-	7
Thickness of bed	8	9-5/8

No. 2 bed		
Composition of section	Thickness Feet	Inches
Coal, bone streaks	2	3
Shale, firm	-	4
Coal, bright	-	5
Bone	1	6
Shale, brown, friable	-	3
Bone	-	6
Coal, bright	-	2
Coal, bony	-	11
Coal	1	-
Bone and shale, hard	-	6
Coal, bright	1	5
Bone	1	1
Coal, bright	1	8
Bone	-	5
Coal	-	4
Bone	1	8
Thickness of bed	14	5

"C" bed		
Composition of section	Thickness Feet	Inches
Bone, slickensided, coal streaks	1	7
Shale, hard	-	7
Coal, bone streaks	4	2-1/4
Bone and bony coal	2	7-1/8
Coal	-	7
Bone	1	2-3/4
Coal, bony streaks	1	2-3/4
Coal, bright	2	2-7/8
Bone, bony coal, coal streaks	3	2-1/8
Thickness of bed	17	4-7/8

No. 4 bed		
Composition of section	Thickness Feet	Inches
Coal, partly bony	3	-
Shale and bone	2	-
Coal, partly bony	2	7
Thickness of bed	7	7

[1]Hanging walls and footwalls: Principally slickensided, carbonaceous shale.

None of these beds lends itself to the production of low-ash coal. Under current market conditions, these coals would have to be cleaned to about 12 percent ash. The yields of float coal of this quality ranged from 37.8 to 51.5 percent. Rejection of so much refuse is prohibitive. Even the production of middling is not attractive, as shown by the following tabulation:

Bed	Float 1.40		1.40 to 1.60			Sink 1.60	
	Yield, percent	Ash, percent	Yield, percent	Ash, percent	B.t.u.[1] per pound	Yield, percent	Ash, percent
"A"	39.4	8.3	15.6	27.4	10,340	45.0	74.0
"C"	28.2	7.2	19.1	28.7	10,050	52.7	67.3
2	38.1	5.1	10.5	29.3	10,130	51.4	71.9
4	27.6	4.9	8.7	29.5	10,060	63.7	74.4

[1]Calculated from moisture-free and ash-free values.

The amount of the 1.40 to 1.60 specific-gravity fraction ranged from 8.7 to 19.1 percent and contained 27 to 30 percent ash; this material would have a heating value in excess of 10,000 B.t.u. per pound. However, even with the production of a middling with this grade, the proportion of refuse to be rejected would still average over 50 percent of the raw product. The proportion of primary clean coal, ranging from 28 to 39 percent, probably is too small to be of interest. If a market for high-ash fuel were available in the immediate area, a two-product cleaning operation to remove only the clean rock would be the best means of utilizing these coals.

The following tabulation shows the proximate analyses of the composite float coal at 1.60 specific gravity from each bed:

Characteristic	Bed			
	A	C	2	4
Volatile matter.....percent	36.2	33.9	35.2	35.9
Fixed carbon.....do..	50.1	50.2	54.5	53.3
Ash.....do..	13.7	15.9	10.3	10.8
Sulfur.....do..	0.4	0.4	0.3	0.4
B.t.u. per pound.....	12,290	11,850	12,850	12,760

APPENDIX. - FLOAT-AND-SINK TABLES

TABLE 1-A. - Specific-gravity analyses of coal from Beluga River deposit

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
4 to 2 inches: 35.3 percent.....	Under 1.30	8.6	4.7	8.6	4.7
	1.30 to 1.40	55.4	13.3	64.0	12.1
	1.40 to 1.50	21.8	28.3	85.8	16.2
	1.50 to 1.60	6.4	39.9	92.2	17.9
	1.60 to 1.70	2.0	49.2	94.2	18.6
	1.70 to 1.80	1.3	59.5	95.5	19.1
	Over 1.80	4.5	71.4	100.0	21.5
2 inches to 1 inch: 31.5 percent.....	Under 1.30	7.0	4.7	7.0	4.7
	1.30 to 1.40	54.5	13.0	61.5	12.1
	1.40 to 1.50	16.1	27.5	77.6	15.3
	1.50 to 1.60	10.0	38.3	87.6	17.9
	1.60 to 1.70	3.6	48.4	91.2	19.1
	1.70 to 1.80	2.3	56.5	93.5	20.0
	Over 1.80	6.5	67.2	100.0	23.1
1 to 1/4 inch: 24.5 percent.....	Under 1.30	5.0	4.5	5.0	4.5
	1.30 to 1.40	53.1	11.3	58.1	10.7
	1.40 to 1.50	18.7	26.6	76.8	14.6
	1.50 to 1.60	6.4	37.1	83.2	16.3
	1.60 to 1.70	6.9	44.0	90.1	18.4
	1.70 to 1.80	4.9	53.2	95.0	20.2
	Over 1.80	5.0	65.3	100.0	22.5
1/4 inch to 20-mesh: 7.6 percent.....	Under 1.30	.2	10.1	.2	10.1
	1.30 to 1.40	30.3	7.5	30.5	7.5
	1.40 to 1.50	34.0	16.2	64.5	12.1
	1.50 to 1.60	3.8	25.3	68.3	12.8
	1.60 to 1.70	11.3	32.3	79.6	15.6
	1.70 to 1.80	8.7	40.4	88.3	18.0
	Over 1.80	11.7	54.1	100.0	22.3
20-mesh to 0: 1.1 percent.....	Under 1.30	.4	9.0	.4	9.0
	1.30 to 1.40	10.3	8.0	10.7	8.0
	1.40 to 1.50	37.1	15.2	47.8	13.6
	1.50 to 1.60	18.1	25.1	65.9	16.8
	1.60 to 1.70	12.7	32.3	78.6	19.3
	1.70 to 1.80	7.7	42.1	86.3	21.3
	Over 1.80	13.7	60.7	100.0	26.7
Composite, 4 inches to 0: 100.0 percent.....	Under 1.30	6.5	4.7	6.5	4.7
	1.30 to 1.40	52.2	12.4	58.7	11.5
	1.40 to 1.50	20.3	25.9	79.0	15.2
	1.50 to 1.60	7.5	37.7	86.5	17.2
	1.60 to 1.70	4.5	43.3	91.0	18.5
	1.70 to 1.80	3.1	51.9	94.1	19.6
	Over 1.80	5.9	65.8	100.0	22.3

TABLE 2-A. - Specific-gravity analyses of coal from No. 2 bed, Buffalo mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2 inches to 1 inch: 25.2 percent.....	Under 1.30	48.2	2.6	48.2	2.6
	1.30 to 1.40	21.6	10.4	69.8	5.0
	1.40 to 1.50	9.9	23.1	79.7	7.3
	1.50 to 1.60	8.0	32.0	87.7	9.5
	1.60 to 1.70	3.1	35.8	90.8	10.4
	Over 1.70	9.2	59.5	100.0	14.9
1 to 1/4 inch: 44.1 percent.....	Under 1.30	63.8	2.3	63.8	2.3
	1.30 to 1.40	19.9	9.9	83.7	4.1
	1.40 to 1.50	5.2	23.4	88.9	5.2
	1.50 to 1.60	3.5	33.2	92.4	6.3
	1.60 to 1.70	2.1	40.5	94.5	7.1
	Over 1.70	5.5	60.9	100.0	10.0
1/4 inch to 20-mesh: 25.8 percent.....	Under 1.30	62.4	1.7	62.4	1.7
	1.30 to 1.40	24.9	6.2	87.3	3.0
	1.40 to 1.50	3.9	22.0	91.2	3.8
	1.50 to 1.60	2.3	31.8	93.5	4.5
	1.60 to 1.70	1.4	40.5	94.9	5.0
	Over 1.70	5.1	63.9	100.0	8.0
Under 20-mesh: 4.9 percent.....	Under 1.30	52.2	1.6	52.2	1.6
	1.30 to 1.40	26.4	5.3	78.6	2.8
	1.40 to 1.50	3.8	20.4	82.4	3.7
	1.50 to 1.60	2.4	33.7	84.8	4.5
	1.60 to 1.70	1.8	39.6	86.6	5.2
	Over 1.70	13.4	70.1	100.0	13.9
Composite, 2 inches to 0: 100.0 percent.....	Under 1.30	58.9	2.2	58.9	2.2
	1.30 to 1.40	21.9	8.7	80.8	4.0
	1.40 to 1.50	6.0	22.9	86.8	5.3
	1.50 to 1.60	4.3	32.5	91.1	6.6
	1.60 to 1.70	2.2	38.8	93.3	7.3
	Over 1.70	6.7	61.9	100.0	11.0

TABLE 3-A. - Specific-gravity analyses of coal from No. 5 bed, Buffalo mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2 inches to 1 inch: 25.1 percent.....	Under 1.30	33.9	2.0	33.9	2.0
	1.30 to 1.40	12.4	12.0	46.3	4.7
	1.40 to 1.50	7.3	23.9	53.6	7.3
	1.50 to 1.60	6.9	34.0	60.5	10.3
	1.60 to 1.70	7.2	43.2	67.7	13.8
	Over 1.70	32.3	66.3	100.0	30.8
1 to 1/4 inch: 48.7 percent.....	Under 1.30	55.2	1.8	55.2	1.8
	1.30 to 1.40	15.1	10.3	70.3	3.6
	1.40 to 1.50	5.1	23.4	75.4	5.0
	1.50 to 1.60	3.1	33.6	78.5	6.1
	1.60 to 1.70	2.5	42.1	81.0	7.2
	Over 1.70	19.0	67.7	100.0	18.7
1/4 inch to 20-mesh: 21.1 percent.....	Under 1.30	55.9	1.5	55.9	1.5
	1.30 to 1.40	20.1	6.8	76.0	2.9
	1.40 to 1.50	4.0	22.6	80.0	3.9
	1.50 to 1.60	2.3	33.5	82.3	4.7
	1.60 to 1.70	1.9	41.9	84.2	5.6
	Over 1.70	15.8	68.3	100.0	15.5
Under 20-mesh: 5.1 percent.....	Under 1.30	54.6	1.4	54.6	1.4
	1.30 to 1.40	17.7	6.3	72.3	2.6
	1.40 to 1.50	4.0	28.3	76.3	3.9
	1.50 to 1.60	2.1	32.8	78.4	4.7
	1.60 to 1.70	2.1	42.0	80.5	5.7
	Over 1.70	19.5	69.9	100.0	18.2
Composite, 2 inches to 0: 100.0 percent.....	Under 1.30	50.0	1.7	50.0	1.7
	1.30 to 1.40	15.6	9.5	65.6	3.6
	1.40 to 1.50	5.4	23.6	71.0	5.1
	1.50 to 1.60	3.8	33.7	74.8	6.5
	1.60 to 1.70	3.5	42.6	78.3	8.1
	Over 1.70	21.7	67.4	100.0	21.0

TABLE 4-A. - Specific-gravity analyses of coal from No. 5 bed, Evan Jones mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 20.8 percent.....	Under 1.30	2.7	3.6	2.7	3.6
	1.30 to 1.40	18.4	14.5	21.1	13.1
	1.40 to 1.50	20.4	25.0	41.5	19.0
	1.50 to 1.60	10.7	35.5	52.2	22.3
	1.60 to 1.70	7.2	44.8	59.4	25.1
	1.70 to 1.80	8.0	52.1	67.4	28.3
	Over 1.80	32.6	71.1	100.0	42.2
1 to 1/4 inch: 46.0 percent.....	Under 1.30	13.1	3.1	13.1	3.1
	1.30 to 1.40	22.4	13.4	35.5	9.6
	1.40 to 1.50	15.6	25.3	51.1	14.4
	1.50 to 1.60	9.5	35.2	60.6	17.7
	1.60 to 1.70	6.2	44.4	66.8	20.1
	1.70 to 1.80	5.4	51.2	72.2	22.5
	Over 1.80	27.8	70.6	100.0	35.8
1/4 inch to 20-mesh: 27.0 percent.....	Under 1.30	27.4	2.3	27.4	2.3
	1.30 to 1.40	21.7	10.9	49.1	6.1
	1.40 to 1.50	10.4	23.8	59.5	9.2
	1.50 to 1.60	6.0	34.5	65.5	11.5
	1.60 to 1.70	4.6	43.2	70.1	13.6
	1.70 to 1.80	4.2	50.1	74.3	15.7
	Over 1.80	25.7	71.0	100.0	29.9
20-mesh to 0: 6.2 percent.....	Under 1.30	23.1	3.5	23.1	3.5
	1.30 to 1.40	26.5	9.9	49.6	6.9
	1.40 to 1.50	9.2	23.2	58.8	9.5
	1.50 to 1.60	6.3	33.6	65.1	11.8
	1.60 to 1.70	5.2	41.5	70.3	14.0
	1.70 to 1.80	4.6	49.5	74.9	16.2
	Over 1.80	25.1	68.6	100.0	29.3
Composite, 2-1/2 inches to 1/4 inch: 66.8 percent.....	Under 1.30	9.9	3.1	9.9	3.1
	1.30 to 1.40	21.1	13.7	31.0	10.3
	1.40 to 1.50	17.1	25.2	48.1	15.6
	1.50 to 1.60	9.9	35.3	58.0	19.0
	1.60 to 1.70	6.5	44.5	64.5	21.5
	1.70 to 1.80	6.2	51.6	70.7	24.2
	Over 1.80	29.3	70.8	100.0	37.8
Composite, 1/4 inch to 0: 33.2 percent.....	Under 1.30	26.6	2.5	26.6	2.5
	1.30 to 1.40	22.6	10.7	49.2	6.3
	1.40 to 1.50	10.2	23.7	59.4	9.3
	1.50 to 1.60	6.0	34.3	65.4	11.6
	1.60 to 1.70	4.7	42.9	70.1	13.7
	1.70 to 1.80	4.3	50.0	74.4	15.8
	Over 1.80	25.6	70.6	100.0	29.8

TABLE 4-A. - Specific-gravity analyses of coal from No. 5 bed, Evan Jones mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	15.4	2.8	15.4	2.8
	1.30 to 1.40	21.6	12.7	37.0	8.6
	1.40 to 1.50	14.8	24.8	51.8	13.2
	1.50 to 1.60	8.6	35.1	60.4	16.3
	1.60 to 1.70	5.9	44.1	66.3	18.8
	1.70 to 1.80	5.6	51.2	71.9	21.3
	Over 1.80	28.1	70.7	100.0	35.2

TABLE 5-A. - Specific-gravity analyses of coal from No. 6 bed, Evan Jones mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 15.2 percent.....	Under 1.30	9.8	2.8	9.8	2.8
	1.30 to 1.40	16.5	11.9	26.3	8.5
	1.40 to 1.50	8.5	24.6	34.8	12.4
	1.50 to 1.60	6.0	35.2	40.8	15.8
	1.60 to 1.70	4.5	42.7	45.3	18.5
	1.70 to 1.80	5.9	50.4	51.2	22.1
	Over 1.80	48.8	75.9	100.0	48.4
1 to 1/4 inch: 45.2 percent.....	Under 1.30	27.7	2.4	27.7	2.4
	1.30 to 1.40	20.2	11.5	47.9	6.2
	1.40 to 1.50	9.7	24.2	57.6	9.3
	1.50 to 1.60	5.6	34.8	63.2	11.5
	1.60 to 1.70	4.0	43.5	67.2	13.4
	1.70 to 1.80	3.4	51.1	70.6	15.2
	Over 1.80	29.4	76.0	100.0	33.1
1/4 inch to 20-mesh: 32.5 percent.....	Under 1.30	43.6	2.0	43.6	2.0
	1.30 to 1.40	19.2	9.6	62.8	4.3
	1.40 to 1.50	6.2	22.9	69.0	6.0
	1.50 to 1.60	3.6	33.6	72.6	7.4
	1.60 to 1.70	2.6	42.4	75.2	8.6
	1.70 to 1.80	2.3	49.5	77.5	9.8
	Over 1.80	22.5	76.3	100.0	24.8
20-mesh to 0: 7.1 percent.....	Under 1.30	33.4	3.9	33.4	3.9
	1.30 to 1.40	24.0	10.9	57.4	6.8
	1.40 to 1.50	6.6	23.2	64.0	8.5
	1.50 to 1.60	4.5	32.5	68.5	10.1
	1.60 to 1.70	3.6	40.8	72.1	11.6
	1.70 to 1.80	2.9	47.7	75.0	13.0
	Over 1.80	25.0	71.6	100.0	27.7

TABLE 5-A. - Specific-gravity analyses of coal from No. 6 bed, Evan Jones mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
Composite, 2-1/2 inches to 1/4 inch: 60.4 percent.....	Under	23.2	2.4	23.2	2.4
	1.30 to 1.40	19.3	11.6	42.5	6.6
	1.40 to 1.50	9.4	24.3	51.9	9.8
	1.50 to 1.60	5.7	34.9	57.6	12.3
	1.60 to 1.70	4.1	43.3	61.7	14.3
	1.70 to 1.80	4.0	50.8	65.7	16.6
	Over 1.80	34.3	76.0	100.0	36.9
Composite, 1/4 inch to 0: 39.6 percent.....	Under 1.30	41.8	2.3	41.8	2.3
	1.30 to 1.40	20.0	9.9	61.8	4.8
	1.40 to 1.50	6.3	23.0	68.1	6.4
	1.50 to 1.60	3.8	33.4	71.9	7.9
	1.60 to 1.70	2.8	42.0	74.7	9.2
	1.70 to 1.80	2.4	49.1	77.1	10.4
	Over 1.80	22.9	75.4	100.0	25.3
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	30.5	2.4	30.5	2.4
	1.30 to 1.40	19.6	10.9	50.1	5.7
	1.40 to 1.50	8.2	23.9	58.3	8.3
	1.50 to 1.60	4.9	34.4	63.2	10.3
	1.60 to 1.70	3.6	42.9	66.8	12.1
	1.70 to 1.80	3.4	50.4	70.2	13.9
	Over 1.80	29.8	75.8	100.0	32.4

TABLE 6-A. - Specific-gravity analyses of coal from No. 7A bed, Evan Jones mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight, percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 16.5 percent.....	Under 1.30	18.3	2.7	18.3	2.7
	1.30 to 1.40	18.6	12.5	36.9	7.6
	1.40 to 1.50	11.0	24.6	47.9	11.5
	1.50 to 1.60	7.3	35.1	55.2	14.7
	1.60 to 1.70	4.5	45.6	59.7	17.0
	1.70 to 1.80	4.6	53.3	64.3	19.6
	Over 1.80	35.7	76.5	100.0	39.9
1 to 1/4 inch: 49.1 percent.....	Under 1.30	35.3	2.1	35.3	2.1
	1.30 to 1.40	18.7	11.6	54.0	5.4
	1.40 to 1.50	7.6	24.5	61.6	7.7
	1.50 to 1.60	5.2	34.6	66.8	9.8
	1.60 to 1.70	3.8	44.0	70.6	11.7
	1.70 to 1.80	3.3	52.0	73.9	13.5
	Over 1.80	26.1	77.6	100.0	30.2

TABLE 6-A. - Specific-gravity analyses of coal from No. 7A bed, Evan Jones mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
1/4 inch to 20-mesh: 28.6 percent.....	Under 1.30	39.5	1.8	39.5	1.8
	1.30 to 1.40	17.2	9.5	56.7	4.1
	1.40 to 1.50	5.3	23.3	62.0	5.8
	1.50 to 1.60	3.4	34.2	65.4	7.3
	1.60 to 1.70	2.5	42.6	67.9	8.6
	1.70 to 1.80	2.6	49.2	70.5	10.1
	Over 1.80	29.5	80.3	100.0	30.8
20-mesh to 0: 5.8 percent.....	Under 1.30	16.6	3.7	16.6	3.7
	1.30 to 1.40	25.8	9.8	42.4	7.4
	1.40 to 1.50	7.6	24.2	50.0	10.0
	1.50 to 1.60	4.8	32.5	54.8	11.9
	1.60 to 1.70	4.2	42.5	59.0	14.1
	1.70 to 1.80	3.7	51.0	62.7	16.3
	Over 1.80	37.3	76.7	100.0	38.8
Composite, 2-1/2 inches to 1/4 inch: 65.6 percent.....	Under 1.30	31.0	2.2	31.0	2.2
	1.30 to 1.40	18.7	11.8	49.7	5.8
	1.40 to 1.50	8.5	24.5	58.2	8.5
	1.50 to 1.60	5.7	34.8	63.9	10.9
	1.60 to 1.70	4.0	44.5	67.9	12.9
	1.70 to 1.80	3.6	52.4	71.5	14.9
	Over 1.80	28.5	77.3	100.0	32.7
Composite, 1/4 inch to 0: 34.4 percent.....	Under 1.30	35.6	1.9	35.6	1.9
	1.30 to 1.40	18.7	9.6	54.3	4.6
	1.40 to 1.50	5.7	23.5	60.0	6.4
	1.50 to 1.60	3.6	33.8	63.6	7.9
	1.60 to 1.70	2.8	42.6	66.4	9.4
	1.70 to 1.80	2.8	49.6	69.2	11.0
	Over 1.80	30.8	79.6	100.0	32.1
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	32.6	2.1	32.6	2.1
	1.30 to 1.40	18.7	11.0	51.3	5.3
	1.40 to 1.50	7.5	24.3	58.8	7.8
	1.50 to 1.60	5.0	34.5	63.8	9.9
	1.60 to 1.70	3.6	43.9	67.4	11.7
	1.70 to 1.80	3.3	51.6	70.7	13.5
	Over 1.80	29.3	78.1	100.0	32.5

TABLE 7-A. - Specific-gravity analyses of coal from No. 7B bed, lower bench, Evan Jones mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 16.0 percent.....	Under 1.30	39.2	3.2	39.2	3.2
	1.30 to 1.40	17.2	12.2	56.4	5.9
	1.40 to 1.50	6.9	24.9	63.3	8.0
	1.50 to 1.60	7.7	34.3	71.0	10.9
	1.60 to 1.70	6.0	43.9	77.0	13.4
	1.70 to 1.80	4.4	51.1	81.4	15.5
	Over 1.80	18.6	66.4	100.0	24.9
1 to 1/4 inch: 46.9 percent.....	Under 1.30	54.6	2.4	54.6	2.4
	1.30 to 1.40	14.9	10.9	69.5	4.2
	1.40 to 1.50	5.7	24.0	75.2	5.7
	1.50 to 1.60	3.8	34.9	79.0	7.1
	1.60 to 1.70	3.0	43.9	82.0	8.5
	1.70 to 1.80	3.0	51.7	85.0	10.0
	Over 1.80	15.0	70.6	100.0	19.1
1/4 inch to 20-mesh 30.2 percent.....	Under 1.30	55.2	1.9	55.2	1.9
	1.30 to 1.40	14.6	8.9	69.8	3.4
	1.40 to 1.50	4.6	22.5	74.4	4.5
	1.50 to 1.60	3.1	34.2	77.5	5.7
	1.60 to 1.70	2.7	42.4	80.2	7.0
	1.70 to 1.80	2.5	50.0	82.7	8.3
	Over 1.80	17.3	71.8	100.0	19.3
20-mesh to 0: 6.9 percent.....	Under 1.30	37.4	2.8	37.4	2.8
	1.30 to 1.40	20.2	10.0	57.6	5.3
	1.40 to 1.50	5.3	23.2	62.9	6.8
	1.50 to 1.60	4.1	32.6	67.0	8.4
	1.60 to 1.70	3.3	40.9	70.3	9.9
	1.70 to 1.80	3.2	48.4	73.5	11.6
	Over 1.80	26.5	71.5	100.0	27.5
Composite, 2-1/2 inches to 1/4 inch: 62.9 percent.....	Under 1.30	50.7	2.6	50.7	2.6
	1.30 to 1.40	15.5	11.3	66.2	4.6
	1.40 to 1.50	6.0	24.3	72.2	6.3
	1.50 to 1.60	4.8	34.7	77.0	8.0
	1.60 to 1.70	3.8	43.9	80.8	9.7
	1.70 to 1.80	3.3	51.5	84.1	11.4
	Over 1.80	15.9	69.4	100.0	20.6

TABLE 7-A. - Specific-gravity analyses of coal from No. 7B bed, lower bench, Evan Jones mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
Composite, 1/4 inch to 0: 37.1 percent.....	Under 1.30	51.9	2.0	51.9	2.0
	1.30 to 1.40	15.6	9.2	67.5	3.7
	1.40 to 1.50	4.8	22.6	72.3	4.9
	1.50 to 1.60	3.3	33.8	75.6	6.2
	1.60 to 1.70	2.8	42.1	78.4	7.5
	1.70 to 1.80	2.6	49.6	81.0	8.8
	Over 1.80	19.0	71.7	100.0	20.8
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	51.1	2.4	51.1	2.4
	1.30 to 1.40	15.6	10.5	66.7	4.3
	1.40 to 1.50	5.5	23.7	72.2	5.8
	1.50 to 1.60	4.2	34.4	76.4	7.3
	1.60 to 1.70	3.4	43.3	79.8	8.9
	1.70 to 1.80	3.1	50.9	82.9	10.4
	Over 1.80	17.1	70.3	100.0	20.7

TABLE 8-A. - Specific-gravity analyses of coal from No. 7B bed, upper bench, Evan Jones mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 16.2 percent.....	Under 1.30	47.4	2.3	47.4	2.3
	1.30 to 1.40	24.1	10.8	71.5	5.2
	1.40 to 1.50	7.7	24.4	79.2	7.0
	1.50 to 1.60	3.9	33.7	83.1	8.3
	1.60 to 1.70	2.9	43.7	86.0	9.5
	1.70 to 1.80	2.6	51.9	88.6	10.7
	Over 1.80	11.4	59.4	100.0	16.3
1 to 1/4 inch: 54.6 percent.....	Under 1.30	61.4	1.9	61.4	1.9
	1.30 to 1.40	20.8	10.5	82.2	4.1
	1.40 to 1.50	5.1	24.7	87.3	5.3
	1.50 to 1.60	2.5	34.0	89.8	6.1
	1.60 to 1.70	1.8	42.4	91.6	6.8
	1.70 to 1.80	1.5	50.8	93.1	7.5
	Over 1.80	6.9	66.2	100.0	11.6
1/4 inch to 20-mesh: 24.8 percent.....	Under 1.30	62.1	1.6	62.1	1.6
	1.30 to 1.40	18.7	9.1	80.8	3.3
	1.40 to 1.50	4.0	23.3	84.8	4.3
	1.50 to 1.60	2.3	33.1	87.1	5.0
	1.60 to 1.70	1.7	41.1	88.8	5.7
	1.70 to 1.80	1.5	49.1	90.3	6.4
	Over 1.80	9.7	70.4	100.0	12.7

TABLE 8-A. - Specific-gravity analyses of coal from No. 7B bed, upper bench, Evan Jones mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
20-mesh to 0: 4.4 percent.....	Under 1.30	40.9	2.6	40.9	2.6
	1.30 to 1.40	26.1	9.2	67.0	5.2
	1.40 to 1.50	6.1	22.0	73.1	6.6
	1.50 to 1.60	4.1	32.2	77.2	7.9
	1.60 to 1.70	2.6	39.6	79.8	9.0
	1.70 to 1.80	2.1	47.6	81.9	10.0
	Over 1.80	18.1	69.2	100.0	20.7
Composite, 2-1/2 inches to 1/4 inch: 70.8 percent.....	Under 1.30	58.2	2.0	58.2	2.0
	1.30 to 1.40	21.6	10.6	79.8	4.3
	1.40 to 1.50	5.7	24.6	85.5	5.7
	1.50 to 1.60	2.8	33.9	88.3	6.6
	1.60 to 1.70	2.0	42.8	90.3	7.4
	1.70 to 1.80	1.8	51.2	92.1	8.2
	Over 1.80	7.9	64.0	100.0	12.6
Composite, 1/4 inch to 0: 29.2 percent.....	Under 1.30	58.9	1.7	58.9	1.7
	1.30 to 1.40	19.8	9.1	78.7	3.6
	1.40 to 1.50	4.3	23.0	83.0	4.6
	1.50 to 1.60	2.6	32.9	85.6	5.4
	1.60 to 1.70	1.8	40.8	87.4	6.2
	1.70 to 1.80	1.6	48.8	89.0	6.9
	Over 1.80	11.0	70.1	100.0	13.9
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	58.4	1.9	58.4	1.9
	1.30 to 1.40	21.0	10.2	79.4	4.1
	1.40 to 1.50	5.3	24.2	84.7	5.4
	1.50 to 1.60	2.8	33.6	87.5	6.3
	1.60 to 1.70	2.0	42.3	89.5	7.1
	1.70 to 1.80	1.7	50.5	91.2	7.9
	Over 1.80	8.8	66.2	100.0	13.0

TABLE 9-A. - Specific-gravity analyses of coal from No. 7 bed, upper bench, Evan Jones mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 14.8 percent.....	Under 1.30	22.2	3.2	22.2	3.2
	1.30 to 1.40	20.6	12.1	42.8	7.5
	1.40 to 1.50	22.0	24.6	64.8	13.3
	1.50 to 1.60	9.0	34.7	73.8	15.9
	1.60 to 1.70	2.7	42.7	76.5	16.9
	1.70 to 1.80	1.6	49.4	78.1	17.5
	Over 1.80	21.9	77.2	100.0	30.6

TABLE 9-A. - Specific-gravity analyses of coal from No. 7 bed, upper bench, Evan Jones mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
1 to 1/4 inch: 43.5 percent.....	Under 1.30	45.3	2.6	45.3	2.6
	1.30 to 1.40	18.7	11.7	64.0	5.3
	1.40 to 1.50	11.6	25.2	75.6	8.3
	1.50 to 1.60	6.3	35.3	81.9	10.4
	1.60 to 1.70	3.2	43.7	85.1	11.6
	1.70 to 1.80	1.3	50.7	86.4	12.2
	Over 1.80	13.6	77.3	100.0	21.1
1/4 inch to 20-mesh: 35.7 percent.....	Under 1.30	53.2	1.9	53.2	1.9
	1.30 to 1.40	16.9	9.0	70.1	3.6
	1.40 to 1.50	6.2	23.2	76.3	5.2
	1.50 to 1.60	3.9	33.5	80.2	6.6
	1.60 to 1.70	2.5	42.4	82.7	7.7
	1.70 to 1.80	1.6	49.7	84.3	8.5
	Over 1.80	15.7	79.8	100.0	19.7
20-mesh to 0: 6.0 percent.....	Under 1.30	36.2	3.8	36.2	3.8
	1.30 to 1.40	24.3	10.5	60.5	6.5
	1.40 to 1.50	6.9	21.7	67.4	8.0
	1.50 to 1.60	4.9	31.5	72.3	9.6
	1.60 to 1.70	3.8	39.8	76.1	11.1
	1.70 to 1.80	3.0	46.9	79.1	12.5
	Over 1.80	20.9	73.4	100.0	25.2
Composite, 2-1/2 inches to 1/4 inch: 58.3 percent.....	Under 1.30	39.4	2.7	39.4	2.7
	1.30 to 1.40	19.2	11.8	58.6	5.7
	1.40 to 1.50	14.2	25.0	72.8	9.4
	1.50 to 1.60	7.0	35.1	79.8	11.7
	1.60 to 1.70	3.1	43.5	82.9	12.9
	1.70 to 1.80	1.4	50.3	84.3	13.5
	Over 1.80	15.7	77.3	100.0	23.5
Composite, 1/4 inch to 0: 41.7 percent.....	Under 1.30	50.8	2.1	50.8	2.1
	1.30 to 1.40	18.0	9.3	68.8	4.0
	1.40 to 1.50	6.3	23.0	75.1	5.6
	1.50 to 1.60	4.0	33.2	79.1	7.0
	1.60 to 1.70	2.7	41.9	81.8	8.1
	1.70 to 1.80	1.8	49.0	83.6	9.0
	Over 1.80	16.4	78.6	100.0	20.4
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	44.2	2.4	44.2	2.4
	1.30 to 1.40	18.7	10.8	62.9	4.9
	1.40 to 1.50	10.9	24.5	73.8	7.8
	1.50 to 1.60	5.7	34.5	79.5	9.7
	1.60 to 1.70	2.9	42.9	82.4	10.9
	1.70 to 1.80	1.6	49.7	84.0	11.6
	Over 1.80	16.0	77.8	100.0	22.2

TABLE 10-A. - Specific-gravity analyses of coal from No. 7 bed, lower bench, Evan Jones mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 17.7 percent.....	Under 1.30	20.2	3.0	20.2	3.0
	1.30 to 1.40	20.5	12.7	40.7	7.9
	1.40 to 1.50	11.1	24.8	51.8	11.5
	1.50 to 1.60	9.1	34.7	60.9	15.0
	1.60 to 1.70	10.3	43.4	71.2	19.1
	1.70 to 1.80	6.9	50.9	78.1	21.9
	Over 1.80	21.9	62.5	100.0	30.8
1 to 1/4 inch: 44.1 percent.....	Under 1.30	46.3	2.3	46.3	2.3
	1.30 to 1.40	17.2	11.9	63.5	4.9
	1.40 to 1.50	7.1	25.0	70.6	6.9
	1.50 to 1.60	6.2	35.0	76.8	9.2
	1.60 to 1.70	5.3	43.7	82.1	11.4
	1.70 to 1.80	4.4	50.8	86.5	13.4
	Over 1.80	13.5	65.0	100.0	20.4
1/4 inch to 20-mesh: 32.1 percent.....	Under 1.30	56.1	1.8	56.1	1.8
	1.30 to 1.40	14.5	10.3	70.6	3.5
	1.40 to 1.50	5.3	23.7	75.9	5.0
	1.50 to 1.60	3.8	33.0	79.7	6.3
	1.60 to 1.70	3.6	42.7	83.3	7.9
	1.70 to 1.80	3.2	50.4	86.5	9.4
	Over 1.80	13.5	68.2	100.0	17.4
20-mesh to 0: 6.1 percent.....	Under 1.30	35.0	3.6	35.0	3.6
	1.30 to 1.40	28.2	9.2	63.2	6.1
	1.40 to 1.50	5.9	22.6	69.1	7.5
	1.50 to 1.60	4.7	31.4	73.8	9.0
	1.60 to 1.70	3.8	39.8	77.6	10.5
	1.70 to 1.80	3.6	47.4	81.2	12.2
	Over 1.80	18.8	66.6	100.0	22.4
Composite, 2-1/2 inches to 1/4 inch: 61.8 percent.....	Under 1.30	38.8	2.4	38.8	2.4
	1.30 to 1.40	18.2	12.2	57.0	5.5
	1.40 to 1.50	8.3	24.9	65.3	8.0
	1.50 to 1.60	7.0	34.9	72.3	10.6
	1.60 to 1.70	6.7	43.6	79.0	13.4
	1.70 to 1.80	5.1	50.8	84.1	15.7
	Over 1.80	15.9	64.0	100.0	23.3
Composite, 1/4 inch to 0: 38.2 percent.....	Under 1.30	52.7	2.0	52.7	2.0
	1.30 to 1.40	16.7	10.0	69.4	3.9
	1.40 to 1.50	5.4	23.5	74.8	5.3
	1.50 to 1.60	4.0	32.7	78.8	6.7
	1.60 to 1.70	3.6	42.2	82.4	8.3
	1.70 to 1.80	3.3	49.9	85.7	9.9
	Over 1.80	14.3	67.9	100.0	18.2

TABLE 10-A. - Specific-gravity analyses of coal from No. 7 bed, lower bench, Evan Jones mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	44.1	2.2	44.1	2.2
	1.30 to 1.40	17.6	11.4	61.7	4.8
	1.40 to 1.50	7.1	24.5	68.8	6.9
	1.50 to 1.60	5.9	34.3	74.7	9.0
	1.60 to 1.70	5.6	43.2	80.3	11.4
	1.70 to 1.80	4.4	50.6	84.7	13.4
	Over 1.80	15.3	65.4	100.0	21.4

TABLE 11-A. - Specific-gravity analyses of coal from No. 7C bed, Evan Jones mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 21.6 percent.....	Under 1.30	28.9	2.4	28.9	2.4
	1.30 to 1.40	17.4	9.4	46.3	5.0
	1.40 to 1.50	3.3	23.4	49.6	6.3
	1.50 to 1.60	2.3	33.5	51.9	7.5
	1.60 to 1.70	2.2	43.8	54.1	8.9
	1.70 to 1.80	3.7	51.1	57.8	11.6
	Over 1.80	42.2	75.1	100.0	38.4
1 to 1/4 inch: 48.4 percent.....	Under 1.30	47.2	1.9	47.2	1.9
	1.30 to 1.40	16.9	9.7	64.1	4.0
	1.40 to 1.50	3.0	23.7	67.1	4.8
	1.50 to 1.60	1.8	34.0	68.9	5.6
	1.60 to 1.70	2.1	43.4	71.0	6.7
	1.70 to 1.80	2.5	51.1	73.5	8.2
	Over 1.80	26.5	76.3	100.0	26.3
1/4 inch to 20-mesh: 27.3 percent.....	Under 1.30	46.8	1.6	46.8	1.6
	1.30 to 1.40	14.9	7.4	61.7	3.0
	1.40 to 1.50	3.3	21.1	65.0	3.9
	1.50 to 1.60	2.3	32.7	67.3	4.9
	1.60 to 1.70	2.3	41.4	69.6	6.1
	1.70 to 1.80	2.5	49.6	72.1	7.6
	Over 1.80	27.9	78.4	100.0	27.4
20-mesh to 0: 2.7 percent.....	Under 1.30	23.6	2.9	23.6	2.9
	1.30 to 1.40	30.4	7.4	54.0	5.4
	1.40 to 1.50	6.4	21.1	60.4	7.1
	1.50 to 1.60	4.3	31.0	64.7	8.7
	1.60 to 1.70	3.7	39.2	68.4	10.3
	1.70 to 1.80	3.7	47.4	72.1	12.2
	Over 1.80	27.9	70.3	100.0	28.4

TABLE 11-A. - Specific-gravity analyses of coal from No. 7C bed, Evan Jones mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
Composite, 2-1/2 inches to 1/4 inch: 70.0 percent.....	Under 1.30	41.5	2.0	41.5	2.0
	1.30 to 1.40	17.1	9.6	58.6	4.2
	1.40 to 1.50	3.1	23.6	61.7	5.2
	1.50 to 1.60	2.0	33.8	63.7	6.1
	1.60 to 1.70	2.1	43.5	65.8	7.3
	1.70 to 1.80	2.9	51.1	68.7	9.1
	Over 1.80	31.3	75.8	100.0	30.0
Composite, 1/4 inch to 0: 30.0 percent.....	Under 1.30	44.7	1.7	44.7	1.7
	1.30 to 1.40	16.3	7.4	61.0	3.2
	1.40 to 1.50	3.6	21.1	64.6	4.2
	1.50 to 1.60	2.5	32.4	67.1	5.3
	1.60 to 1.70	2.4	41.1	69.5	6.5
	1.70 to 1.80	2.6	49.3	72.1	8.0
	Over 1.80	27.9	77.7	100.0	27.5
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	42.5	1.9	42.5	1.9
	1.30 to 1.40	16.9	9.0	59.4	3.9
	1.40 to 1.50	3.2	22.8	62.6	4.9
	1.50 to 1.60	2.1	33.3	64.7	5.8
	1.60 to 1.70	2.2	42.7	66.9	7.0
	1.70 to 1.80	2.8	50.6	69.7	8.8
	Over 1.80	30.3	76.3	100.0	29.2

TABLE 12-A. - Specific-gravity analyses of coal from Mrak mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 25.6 percent.....	Under 1.30	28.0	4.5	28.0	4.5
	1.30 to 1.40	18.7	13.1	46.7	7.9
	1.40 to 1.50	7.7	25.0	54.4	10.4
	1.50 to 1.60	5.3	33.4	59.7	12.4
	1.60 to 1.70	4.9	41.0	64.6	14.6
	1.70 to 1.80	3.1	51.3	67.7	16.3
	Over 1.80	32.3	68.0	100.0	33.0
1 to 1/2 inch: 20.3 percent.....	Under 1.30	50.7	4.2	50.7	4.2
	1.30 to 1.40	23.0	13.2	73.7	7.0
	1.40 to 1.50	4.8	26.1	78.5	8.2
	1.50 to 1.60	3.0	35.9	81.5	9.2
	1.60 to 1.70	2.1	44.3	83.6	10.1
	1.70 to 1.80	1.3	51.2	84.9	10.7
	Over 1.80	15.1	73.3	100.0	20.2

TABLE 12-A. - Specific-gravity analyses of coal from Mrak mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
1/2 to 1/4 inch: 20.0 percent.....	Under 1.30	63.6	3.6	63.6	3.6
	1.30 to 1.40	17.3	12.8	80.9	5.6
	1.40 to 1.50	3.0	25.7	83.9	6.3
	1.50 to 1.60	2.1	35.5	86.0	7.0
	1.60 to 1.70	1.4	43.9	87.4	7.6
	1.70 to 1.80	1.1	51.5	88.5	8.1
	Over 1.80	11.5	76.7	100.0	16.0
1/4 inch to 20-mesh: 24.7 percent.....	Under 1.30	61.8	2.9	61.8	2.9
	1.30 to 1.40	12.5	12.1	74.3	4.4
	1.40 to 1.50	3.2	23.4	77.5	5.2
	1.50 to 1.60	1.8	34.4	79.3	5.9
	1.60 to 1.70	1.5	42.3	80.8	6.6
	1.70 to 1.80	1.3	48.8	82.1	7.2
	Over 1.80	17.9	79.6	100.0	20.2
20-mesh to 0: 9.4 percent.....	Under 1.30	29.4	4.2	29.4	4.2
	1.30 to 1.40	24.0	10.5	53.4	7.0
	1.40 to 1.50	7.5	22.8	60.9	9.0
	1.50 to 1.60	3.6	33.1	64.5	10.3
	1.60 to 1.70	2.8	41.0	67.3	11.6
	1.70 to 1.80	2.7	47.7	70.0	13.0
	Over 1.80	30.0	73.5	100.0	31.1
Composite, 2-1/2 inches to 1/2 inch: 45.9 percent.....	Under 1.30	38.0	4.3	38.0	4.3
	1.30 to 1.40	20.6	13.1	58.6	7.4
	1.40 to 1.50	6.4	25.4	65.0	9.2
	1.50 to 1.60	4.3	34.2	69.3	10.7
	1.60 to 1.70	3.7	41.8	73.0	12.3
	1.70 to 1.80	2.3	51.3	75.3	13.5
	Over 1.80	24.7	69.4	100.0	27.3
Composite, 2-1/2 inches to 1/4 inch: 65.9 percent.....	Under 1.30	45.8	4.0	45.8	4.0
	1.30 to 1.40	19.6	13.1	65.4	6.7
	1.40 to 1.50	5.4	25.4	70.8	8.2
	1.50 to 1.60	3.6	34.4	74.4	9.4
	1.60 to 1.70	3.0	42.1	77.4	10.7
	1.70 to 1.80	1.9	51.3	79.3	11.7
	Over 1.80	20.7	70.7	100.0	23.9
Composite, 1/2 inch to 0: 54.1 percent.....	Under 1.30	56.8	3.3	56.8	3.3
	1.30 to 1.40	16.3	12.0	73.1	5.2
	1.40 to 1.50	3.9	23.9	77.0	6.2
	1.50 to 1.60	2.2	34.4	79.2	7.0
	1.60 to 1.70	1.7	42.4	80.9	7.7
	1.70 to 1.80	1.5	49.2	82.4	8.5
	Over 1.80	17.6	77.1	100.0	20.5

TABLE 12-A. - Specific-gravity analyses of coal from Mrak mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
Composite, 1/4 inch to 0: 34.1 percent.....	Under 1.30	52.9	3.1	52.9	3.1
	1.30 to 1.40	15.7	11.4	68.6	5.0
	1.40 to 1.50	4.4	23.1	73.0	6.1
	1.50 to 1.60	2.3	33.8	75.3	6.9
	1.60 to 1.70	1.8	41.8	77.1	7.8
	1.70 to 1.80	1.7	48.3	78.8	8.6
	Over 1.80	21.2	77.2	100.0	23.2
Composite, 2-1/2 inches to 0: 100 percent.....	Under 1.30	48.2	3.7	48.2	3.7
	1.30 to 1.40	18.3	12.6	66.5	6.1
	1.40 to 1.50	5.0	24.7	71.5	7.4
	1.50 to 1.60	3.2	34.3	74.7	8.6
	1.60 to 1.70	2.6	42.0	77.3	9.7
	1.70 to 1.80	1.8	50.4	79.1	10.6
	Over 1.80	20.9	72.9	100.0	23.7

TABLE 13-A. - Specific-gravity analyses of coal from "A" bed, Premier mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 45.9 percent.....	Under 1.30	7.5	4.9	7.5	4.9
	1.30 to 1.40	18.7	12.6	26.2	10.4
	1.40 to 1.50	9.2	23.6	35.4	13.8
	1.50 to 1.60	7.3	33.8	42.7	17.2
	1.60 to 1.70	6.3	43.6	49.0	20.6
	1.70 to 1.80	3.5	53.2	52.5	22.8
	Over 1.80	47.5	80.4	100.0	50.2
1 to 1/2 inch: 20.5 percent.....	Under 1.30	21.4	4.2	21.4	4.2
	1.30 to 1.40	27.7	11.5	49.1	8.3
	1.40 to 1.50	10.0	23.6	59.1	10.9
	1.50 to 1.60	6.7	34.5	65.8	13.3
	1.60 to 1.70	4.2	43.4	70.0	15.1
	1.70 to 1.80	3.3	52.0	73.3	16.8
	Over 1.80	26.7	79.3	100.0	33.5
1/2 to 1/4 inch: 13.1 percent.....	Under 1.30	23.8	3.6	23.8	3.6
	1.30 to 1.40	31.7	10.4	55.5	7.5
	1.40 to 1.50	9.7	23.2	65.2	9.8
	1.50 to 1.60	5.6	33.8	70.8	11.7
	1.60 to 1.70	3.6	42.9	74.4	13.2
	1.70 to 1.80	2.8	51.4	77.2	14.6
	Over 1.80	22.8	80.3	100.0	29.6

TABLE 13-A. - Specific-gravity analyses of coal from "A" bed, Premier mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
1/4 inch to 20-mesh: 16.9 percent.....	Under 1.30	23.6	3.0	23.6	3.0
	1.30 to 1.40	27.8	8.5	51.4	6.0
	1.40 to 1.50	8.1	21.2	59.5	8.0
	1.50 to 1.60	4.8	30.9	64.3	9.8
	1.60 to 1.70	3.1	39.7	67.4	11.1
	1.70 to 1.80	2.5	48.8	69.9	12.5
	Over 1.80	30.1	80.5	100.0	33.0
20-mesh to 0: 3.6 percent.....	Under 1.30	8.2	3.4	8.2	3.4
	1.30 to 1.40	29.8	7.7	38.0	6.8
	1.40 to 1.50	7.2	20.4	45.2	8.9
	1.50 to 1.60	3.9	29.3	49.1	10.6
	1.60 to 1.70	3.5	37.0	52.6	12.3
	1.70 to 1.80	3.0	44.5	55.6	14.1
	Over 1.80	44.4	75.1	100.0	41.2
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	15.2	3.9	15.2	3.9
	1.30 to 1.40	24.2	11.0	39.4	8.3
	1.40 to 1.50	9.2	23.1	48.6	11.1
	1.50 to 1.60	6.4	33.5	55.0	13.7
	1.60 to 1.70	4.9	42.9	59.9	16.1
	1.70 to 1.80	3.2	51.9	63.1	17.9
	Over 1.80	36.9	80.0	100.0	40.8
Composite, 2-1/2 inches to 1/4 inch: 79.5 percent.....	Under 1.30	13.8	4.2	13.8	4.2
	1.30 to 1.40	23.2	11.8	37.0	9.0
	1.40 to 1.50	9.5	23.5	46.5	11.9
	1.50 to 1.60	6.8	34.0	53.3	14.7
	1.60 to 1.70	5.3	43.5	58.6	17.4
	1.70 to 1.80	3.3	52.6	61.9	19.2
	Over 1.80	38.1	80.2	100.0	42.5
Composite, 1/4 inch to 0: 20.5 percent.....	Under 1.30	20.9	3.0	20.9	3.0
	1.30 to 1.40	28.1	8.4	49.0	6.1
	1.40 to 1.50	8.0	21.1	57.0	8.2
	1.50 to 1.60	4.6	30.7	61.6	9.9
	1.60 to 1.70	3.2	39.2	64.8	11.3
	1.70 to 1.80	2.6	47.9	67.4	12.7
	Over 1.80	32.6	79.2	100.0	34.4

TABLE 14-A. - Specific-gravity analyses of coal from "C" bed, Premier mine

Size and weight	Specific gravity	Weight-percent	Ash percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 44.8 percent.....	Under 1.30	4.5	3.5	4.5	3.5
	1.30 to 1.40	16.3	9.3	20.8	8.0
	1.40 to 1.50	8.3	22.8	29.1	12.3
	1.50 to 1.60	12.0	33.5	41.1	18.5
	1.60 to 1.70	9.8	43.3	50.9	23.2
	1.70 to 1.80	7.9	51.8	58.8	27.1
	Over 1.80	41.2	76.6	100.0	47.5
1 to 1/2 inch: 20.8 percent.....	Under 1.30	8.8	3.4	8.8	3.4
	1.30 to 1.40	22.1	9.4	30.9	7.7
	1.40 to 1.50	9.7	23.0	40.6	11.3
	1.50 to 1.60	12.0	34.2	52.6	16.6
	1.60 to 1.70	9.7	43.2	62.3	20.7
	1.70 to 1.80	5.6	52.1	67.9	23.3
	Over 1.80	32.1	76.8	100.0	40.5
1/2 to 1/4 inch: 13.2 percent.....	Under 1.30	13.1	3.1	13.1	3.1
	1.30 to 1.40	22.5	9.2	35.6	7.0
	1.40 to 1.50	9.4	23.6	45.0	10.4
	1.50 to 1.60	9.0	34.4	54.0	14.4
	1.60 to 1.70	8.9	43.3	62.9	18.5
	1.70 to 1.80	6.0	51.6	68.9	21.4
	Over 1.80	31.1	75.4	100.0	38.2
1/4 inch to 20-mesh: 16.9 percent.....	Under 1.30	16.2	2.6	16.2	2.6
	1.30 to 1.40	22.7	8.2	38.9	5.9
	1.40 to 1.50	7.7	22.6	46.6	8.6
	1.50 to 1.60	6.7	33.3	53.3	11.7
	1.60 to 1.70	7.1	42.4	60.4	15.3
	1.70 to 1.80	4.6	50.3	65.0	17.8
	Over 1.80	35.0	74.7	100.0	37.7
20-mesh to 0: 4.3 percent.....	Under 1.30	2.3	3.3	2.3	3.3
	1.30 to 1.40	24.3	8.0	26.6	7.6
	1.40 to 1.50	9.0	19.5	35.6	10.6
	1.50 to 1.60	5.6	30.1	41.2	13.3
	1.60 to 1.70	5.2	39.7	46.4	16.2
	1.70 to 1.80	5.5	45.1	51.9	19.3
	Over 1.80	48.1	71.5	100.0	44.4
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	8.4	3.1	8.4	3.1
	1.30 to 1.40	19.8	9.0	28.2	7.2
	1.40 to 1.50	8.7	22.8	36.9	10.9
	1.50 to 1.60	10.4	33.7	47.3	15.9
	1.60 to 1.70	9.0	43.1	56.3	20.3
	1.70 to 1.80	6.5	51.4	62.8	23.5
	Over 1.80	37.2	75.9	100.0	43.0

TABLE 14-A. - Specific-gravity analyses of coal from "C" bed, Premier mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
Composite, 2-1/2 inches to 1/4 inch: 78.8 percent.....	Under 1.30	7.1	3.4	7.1	3.4
	1.30 to 1.40	18.9	9.3	26.0	7.7
	1.40 to 1.50	8.8	23.0	34.8	11.6
	1.50 to 1.60	11.5	33.8	46.3	17.1
	1.60 to 1.70	9.6	43.3	55.9	21.6
	1.70 to 1.80	7.0	51.8	62.9	24.9
	Over 1.80	37.1	76.4	100.0	44.0
Composite, 1/4 inch to 0: 21.2 percent.....	Under 1.30	13.4	2.7	13.4	2.7
	1.30 to 1.40	23.0	8.2	36.4	6.2
	1.40 to 1.50	8.0	22.0	44.4	9.0
	1.50 to 1.60	6.4	32.6	50.8	12.0
	1.60 to 1.70	6.7	41.8	57.5	15.5
	1.70 to 1.80	4.8	49.2	62.3	18.1
	Over 1.80	37.7	74.0	100.0	39.2

TABLE 15-A. - Specific-gravity analyses of coal from No. 2 bed, Premier mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 29.0 percent.....	Under 1.30	14.8	2.7	14.8	2.7
	1.30 to 1.40	9.2	12.0	24.0	6.3
	1.40 to 1.50	7.3	25.2	31.3	10.7
	1.50 to 1.60	9.3	35.1	40.6	16.3
	1.60 to 1.70	8.6	44.4	49.2	21.2
	1.70 to 1.80	8.7	52.4	57.9	25.9
	Over 1.80	42.1	78.5	100.0	48.0
1 to 1/2 inch: 25.2 percent.....	Under 1.30	21.5	2.7	21.5	2.7
	1.30 to 1.40	10.2	11.0	31.7	5.4
	1.40 to 1.50	4.5	25.1	36.2	7.8
	1.50 to 1.60	4.4	34.9	40.6	10.8
	1.60 to 1.70	3.7	43.9	44.3	13.5
	1.70 to 1.80	3.7	51.9	48.0	16.5
	Over 1.80	52.0	77.5	100.0	48.2
1/2 to 1/4 inch: 16.4 percent.....	Under 1.30	35.6	2.3	35.6	2.3
	1.30 to 1.40	13.0	10.4	48.6	4.5
	1.40 to 1.50	4.8	24.4	53.4	6.3
	1.50 to 1.60	3.7	34.0	57.1	8.1
	1.60 to 1.70	3.2	43.5	60.3	9.9
	1.70 to 1.80	3.2	51.3	63.5	12.0
	Over 1.80	36.5	76.5	100.0	35.6

TABLE 15-A. - Specific gravity analyses of coal from No. 2 bed, Premier mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
1/4 inch to 20-mesh: 24.3 percent.....	Under 1.30	38.1	2.0	38.1	2.0
	1.30 to 1.40	15.0	8.5	53.1	3.8
	1.40 to 1.50	3.7	23.3	56.8	5.1
	1.50 to 1.60	2.9	33.1	59.7	6.5
	1.60 to 1.70	2.7	42.2	62.4	8.0
	1.70 to 1.80	2.3	48.8	64.7	9.5
	Over 1.80	35.3	77.4	100.0	33.4
20-mesh to 0: 5.1 percent.....	Under 1.30	19.5	2.6	19.5	2.6
	1.30 to 1.40	25.7	7.9	45.2	5.6
	1.40 to 1.50	5.8	20.9	51.0	7.4
	1.50 to 1.60	3.8	32.2	54.8	9.1
	1.60 to 1.70	3.2	34.3	58.0	10.5
	1.70 to 1.80	2.8	46.7	60.8	12.1
	Over 1.80	39.2	75.4	100.0	36.9
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	25.8	2.4	25.8	2.4
	1.30 to 1.40	12.3	10.4	38.1	5.1
	1.40 to 1.50	5.2	24.4	43.3	7.4
	1.50 to 1.60	5.3	34.2	48.6	10.3
	1.60 to 1.70	4.8	43.1	53.4	13.2
	1.70 to 1.80	4.7	50.9	58.1	16.3
	Over 1.80	41.9	77.5	100.0	41.9
Composite, 2-1/2 inches to 1/4 inch: 70.6 percent.....	Under 1.30	22.0	2.5	22.0	2.5
	1.30 to 1.40	10.4	11.3	32.4	5.4
	1.40 to 1.50	5.7	25.0	38.1	8.3
	1.50 to 1.60	6.3	34.8	44.4	12.1
	1.60 to 1.70	5.6	44.0	50.0	15.7
	1.70 to 1.80	5.6	52.0	55.6	19.3
	Over 1.80	44.4	77.7	100.0	45.2
Composite, 1/4 inch to 0: 29.4 percent.....	Under 1.30	34.8	2.1	34.8	2.1
	1.30 to 1.40	16.9	8.4	51.7	4.2
	1.40 to 1.50	4.1	22.9	55.8	5.5
	1.50 to 1.60	3.0	32.9	58.8	6.9
	1.60 to 1.70	2.8	40.8	61.6	8.5
	1.70 to 1.80	2.4	48.4	64.0	10.0
	Over 1.80	36.0	77.1	100.0	34.1

TABLE 16-A. - Specific-gravity analyses of coal from No. 4 bed, Premier mine

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
2-1/2 inches to 1 inch: 46.3 percent.....	Under 1.30	4.2	2.4	4.2	2.4
	1.30 to 1.40	3.5	11.6	7.7	6.6
	1.40 to 1.50	3.5	25.7	11.2	12.6
	1.50 to 1.60	3.8	35.8	15.0	18.4
	1.60 to 1.70	4.1	43.5	19.1	23.8
	1.70 to 1.80	2.9	52.3	22.0	27.6
	Over 1.80	78.0	76.5	100.0	65.7
1 to 1/2 inch: 15.4 percent.....	Under 1.30	21.9	2.5	21.9	2.5
	1.30 to 1.40	13.7	10.8	35.6	5.7
	1.40 to 1.50	7.0	25.2	42.6	8.9
	1.50 to 1.60	7.4	35.5	50.0	12.8
	1.60 to 1.70	5.9	44.6	55.9	16.2
	1.70 to 1.80	4.6	51.5	60.5	18.9
	Over 1.80	39.5	77.2	100.0	41.9
1/2 to 1/4 inch: 12.9 percent.....	Under 1.30	33.2	2.2	33.2	2.2
	1.30 to 1.40	14.1	9.8	47.3	4.5
	1.40 to 1.50	5.4	24.7	52.7	6.5
	1.50 to 1.60	4.2	34.5	56.9	8.6
	1.60 to 1.70	3.5	43.5	60.4	10.6
	1.70 to 1.80	2.9	51.1	63.3	12.5
	Over 1.80	36.7	80.0	100.0	37.3
1/4 inch to 20-mesh: 19.7 percent.....	Under 1.30	37.1	1.9	37.1	1.9
	1.30 to 1.40	17.0	7.9	54.1	3.8
	1.40 to 1.50	4.1	22.8	58.2	5.1
	1.50 to 1.60	3.0	33.1	61.2	6.5
	1.60 to 1.70	2.8	42.4	64.0	8.1
	1.70 to 1.80	2.2	47.6	66.2	9.4
	Over 1.80	33.8	81.4	100.0	33.7
20-mesh to 0: 5.7 percent.....	Under 1.30	8.4	2.9	8.4	2.9
	1.30 to 1.40	22.7	7.4	31.1	6.2
	1.40 to 1.50	5.7	19.9	36.8	8.3
	1.50 to 1.60	3.3	30.7	40.1	10.2
	1.60 to 1.70	2.3	40.1	42.4	11.8
	1.70 to 1.80	1.7	46.4	44.1	13.1
	Over 1.80	55.9	80.9	100.0	51.0

TABLE 16-A. - Specific-gravity analyses of coal from No. 4 bed, Premier mine (Con.)

Size and weight	Specific gravity	Weight-percent	Ash, percent	Cumulative Weight-percent	Cumulative Ash, percent
Composite, 2-1/2 inches to 0: 100.0 percent.....	Under 1.30	17.4	2.2	17.4	2.2
	1.30 to 1.40	10.2	9.4	27.6	4.9
	1.40 to 1.50	4.5	24.5	32.1	7.6
	1.50 to 1.60	4.2	34.9	36.3	10.8
	1.60 to 1.70	3.9	43.5	40.2	13.9
	1.70 to 1.80	3.0	51.1	43.2	16.5
	Over 1.80	56.8	77.7	100.0	51.3
Composite, 2-1/2 inches to 1/4 inch: 74.6 percent.....	Under 1.30	12.9	2.3	12.9	2.3
	1.30 to 1.40	7.4	11.1	20.3	5.5
	1.40 to 1.50	4.6	25.4	24.9	9.2
	1.50 to 1.60	4.6	35.5	29.5	13.3
	1.60 to 1.70	4.4	43.7	33.9	17.2
	1.70 to 1.80	3.2	51.9	37.1	20.2
	Over 1.80	62.9	77.3	100.0	56.1
Composite, 1/4 inch to 0: 25.4 percent.....	Under 1.30	30.6	2.1	30.6	2.1
	1.30 to 1.40	18.3	7.8	48.9	4.2
	1.40 to 1.50	4.4	22.1	53.3	5.7
	1.50 to 1.60	3.1	32.6	56.4	7.2
	1.60 to 1.70	2.7	41.9	59.1	8.8
	1.70 to 1.80	2.1	47.3	61.2	10.1
	Over 1.80	38.8	81.3	100.0	37.7

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