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Chemical analysis of 617 coal samples from the Eastern United States

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By

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This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards and nomenclature.

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Abstract

This report includes all the analytical data on 617 coal samples from 8 states east of the Mississippi River. The samples from each state are, Pennsylvania 71, Ohio 40, West Virginia 252, Virginia 72, Kentucky 27, Tennessee 27, Alabama 20, and Indiana 108.

The U.S. Geological Survey has quantitatively determined the amounts of 35 major, minor and trace elements in each sample. It has also searched for 35 other trace elements using semi-quantitative spectrographic methods. In addition, the Coal Analysis Section of the Department of Energy has provided proximate and ultimate analyses, Btu, forms of sulfur, free swelling index, and ash fusion temperatures on 491 samples.

Comparison of the geometric means of these samples with 331 bituminous coal samples of the Appalachian region reported by Swanson and others (1976) are as follows. As shown by the means for ultimate and proximate analyses small differences exist between the two sets of data, only the moisture content and oxygen are significantly different. The forms of sulfur and heat of combustion are also similar. The means for the major and minor oxides in ash are similar for SiO_2, Al_2O_3, CaO, MgO, K_2O_3 and TiO_2. Na_2O is significantly lower and Fe_2O_3 and MnO higher in the analyses of the 617 samples of this report. Most means for the trace elements in the coals studied for this report are lower. Only Be is significantly higher in these coals.

Introduction

Current usage and planned large increases in the mining and utilization of coal have resulted in increasingly frequent requests from industry, university and government groups for detailed high-quality data on the composition of coal in the United States. Such data will be fundamental in determining the initial economic value of coal, in evaluating environmental effects of coal mining and coal use, and in determining the adaptability of the coal to beneficiation (cleaning), gasification, liquefaction, and other technologic processes of coal treatment.

For 7 years, the U.S. Geological Survey, in cooperation with State Geological Surveys has had a growing coal geochemistry program to collect representative samples from the hundreds of beds of coal (lignite, subbituminous, bituminous, and anthracite) from which coal is being produced, or will be produced in the United States. Beginning with the collection and analysis of 71 coal samples and 16 power-plant ash samples for the U.S. Department of the Interior's Southwest Envergy Study in 1971, the program has steadily expanded. Now, more than 5000 samples have been analyzed by the U.S. Geological Survey, and most of the analyses have been made publicly available in several reports (Swanson, 1972; U.S. Geological Survey and Montana Bureau of Mines and Geology, 1973, 1974, 1976; Swanson, Huffman, and Hamilton, 1974: U.S. Bureau of Land Management, 1975a, b, c; Staff, U.S. Geological Survey, 1975; Swanson and others, 1976; Culbertson, Hatch, and Affolter, 1978; Hatch, Affolter, and Farrow, 1978; Hatch and Affolter, 1978.)

Major segments of the data have also been summarized in a series of papers presented at national scientific meetings (Swanson and Vine, 1972;

Medlin and others, 1975a, b, and 1976; Coleman and others, 1975; Millard and Swanson, 1975). Additional data has been reported by State Geological Surveys [Wyoming], 1975; Conwell [Alaska], 1976; Williamson [Mississippi], 1976; Skema [Pennsylvania], 1977; Botoman and Stith, [Ohio], 1978.

On April 30, 1975, the coal geochemistry program was expanded by the infusion of funds provided by the U.S. Energy Research and Development Administration. Coincident with this expansion, the geological surveys of the coal-bearing states were invited to cooperate in the program by submitting samples for analysis. As a result, the program gradually was enlarged so as to accomodate the collection and analysis of 1500 samples per year.

When the Energy Research and Development Administration was incorporated into the Department of Energy funding for the program from that agency was curtailed and dropped. Subsequently, the Environmental Protection Agency provided funds for fiscal year 1978. The funding was provided for the collection and analysis of 600 coal samples from the area east of the Mississippi River. For coals west of the Mississippi River funding has been provided by other programs in the U.S. Geological Survey and by other agencies. This report provides the data on 600 coal samples in fulfillment of the U.S. Geological Survey, Environmental Protection Agency agreement.

Acknowledgments

The work that resulted in this report involved the direct and close cooperation of four groups--the U.S. Geological Survey, the State Geological Surveys, Energy Research and Development Administration and the Environmental Protection Agency. Many individuals in each group contributed materially to the program, and each individual is herein recognized and given credit for the accomplishment of objectives attained to date.

The U.S. Geological Survey initiated the program, coordinated the effort, conducted the analytical study, and is primarily responsible for reporting the results. Vernon E. Swanson, Gordon H. Wood, Jr., and Jack H. Medlin conceived the program, and were mainly responsible for bringing the study to its present stage. Joseph R. Hatch and S. Lynn Coleman carried much of the day-to-day load of sample processing and data compilation, assisted by Arthur R. Norton, Thomas E. Carter, Ricky T. Hildebrand, Scott D. Woodruff, Antoinette L. Medlin, and Josephine G. Boerngen. John E. Johnston and Val Zadnick provided much of the direction in obtaining the assistance of the State Geological Surveys to collect samples.

Fundamental to the success of the analytical program on the samples of this report was and is the team of chemical laboratory personnel in the U.S. Geological Survey, Reston, Virginia, under the direction of Brent P. Fabbi, Irving May, Harry J. Rose, Jr., Jack J. Rowe, Frederick O. Simon and Charles S. Annel. The chemical laboratory personnel are Philip J. Aruscavage, PHilip Al Baedecker, Sol Berman, Floyd W. Brown, Joseph W. Budinsky, Esma Y. Campbell, Anne E. Childress, Anthony F. Dorrzapf, Jr., Francis J. Flanagan, Paul L. Greenland, Jean S. Kane, Herbert Kirschenbaum, Benjamin A. McCall, Hugh T. Millard, Jr., Rossevelt Moore, Norma Rait,

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Methods of sample collection and analysis

Since the inception of the program, the U.S. Geological Survey has issued and informally distributed a set of guidelines on collecting coal samples and a summary of the chemical methods used in analyzing the samples. This information is now available in a U.S. Geological Survey Circular (Swanson and Huffman, 1976). Fragmented samples weighing about 2 kg (4-5 lb) are placed in plastic bags for transportation and storage to minimize moisture loss and possible chemical contamination, particularly trace-metal contamination by cloth bags or metal containers. The sequence of sample preparation and the methods of chemical analysis routinely used on samples are shown in the following chart (fig. 1).

All completed coal chemical analyses, including both U.S. Bureau of Mines and U.S. Geological Survey analyses, are stored on magnetic tapes in the U.S. Geological Survey's National Coal Resource Data System. The data stored on tapes can be rapidly retrieved and statistically manipulated for local, regional, or National summation, correlation, and map-display purposes.

Discussion of the samples

All of the coal samples collected for the analyses listed in this report are from Appalachian and Eastern Interior Regions bituminous coals. A generalized computer drawn map of the distribution of the samples is shown as figure 2. Figures 3-10 are computer drawn maps showing the distribution of the samples in each of the states. The number of coal samples from each of the states is listed in table 1. Most are channel samples (606) of individual beds, 9 are drill core samples, 1 is a run of mine sample and 1 is a grab sample.

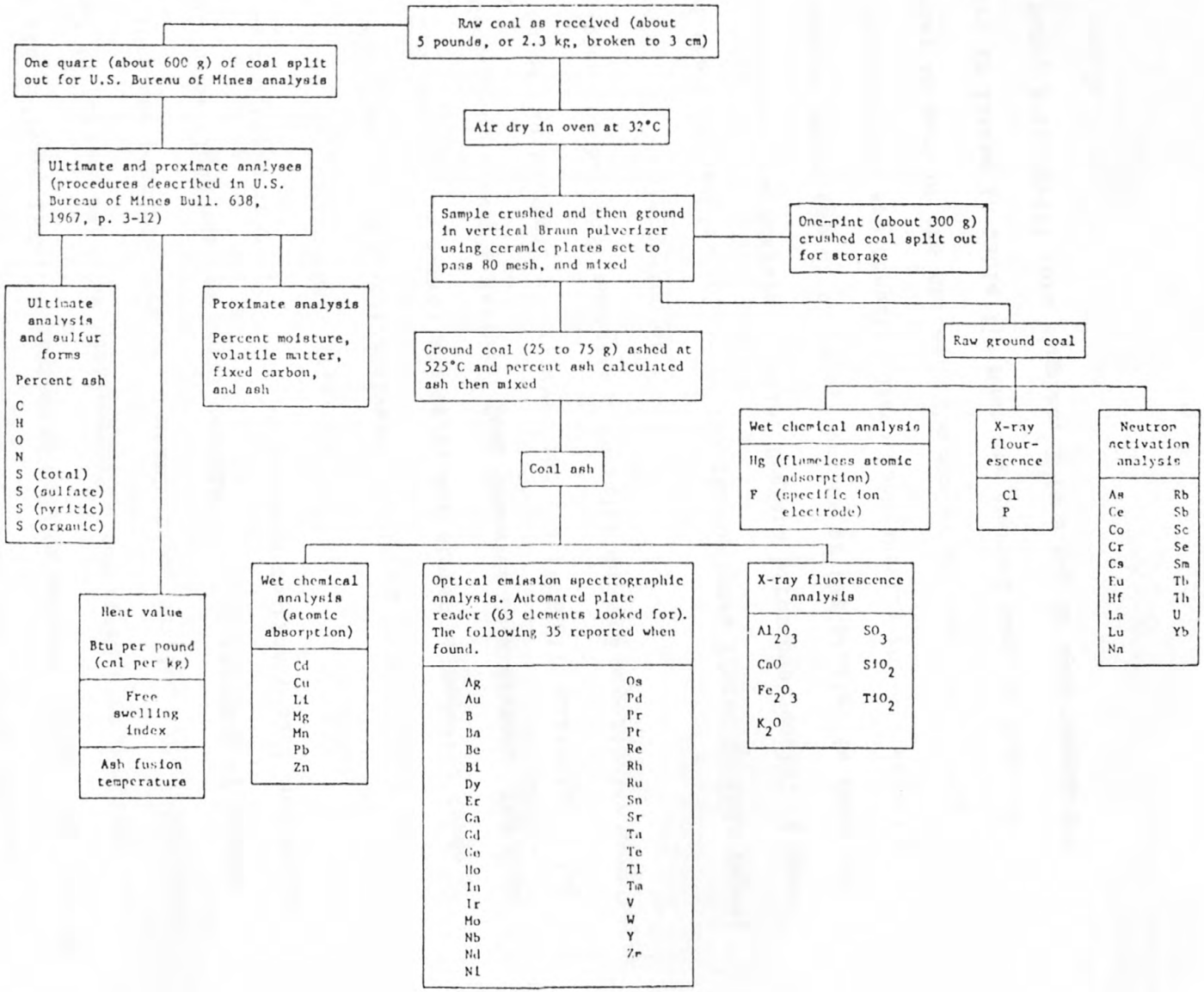

Figure 1 -- Analyses performed on the coal samples.

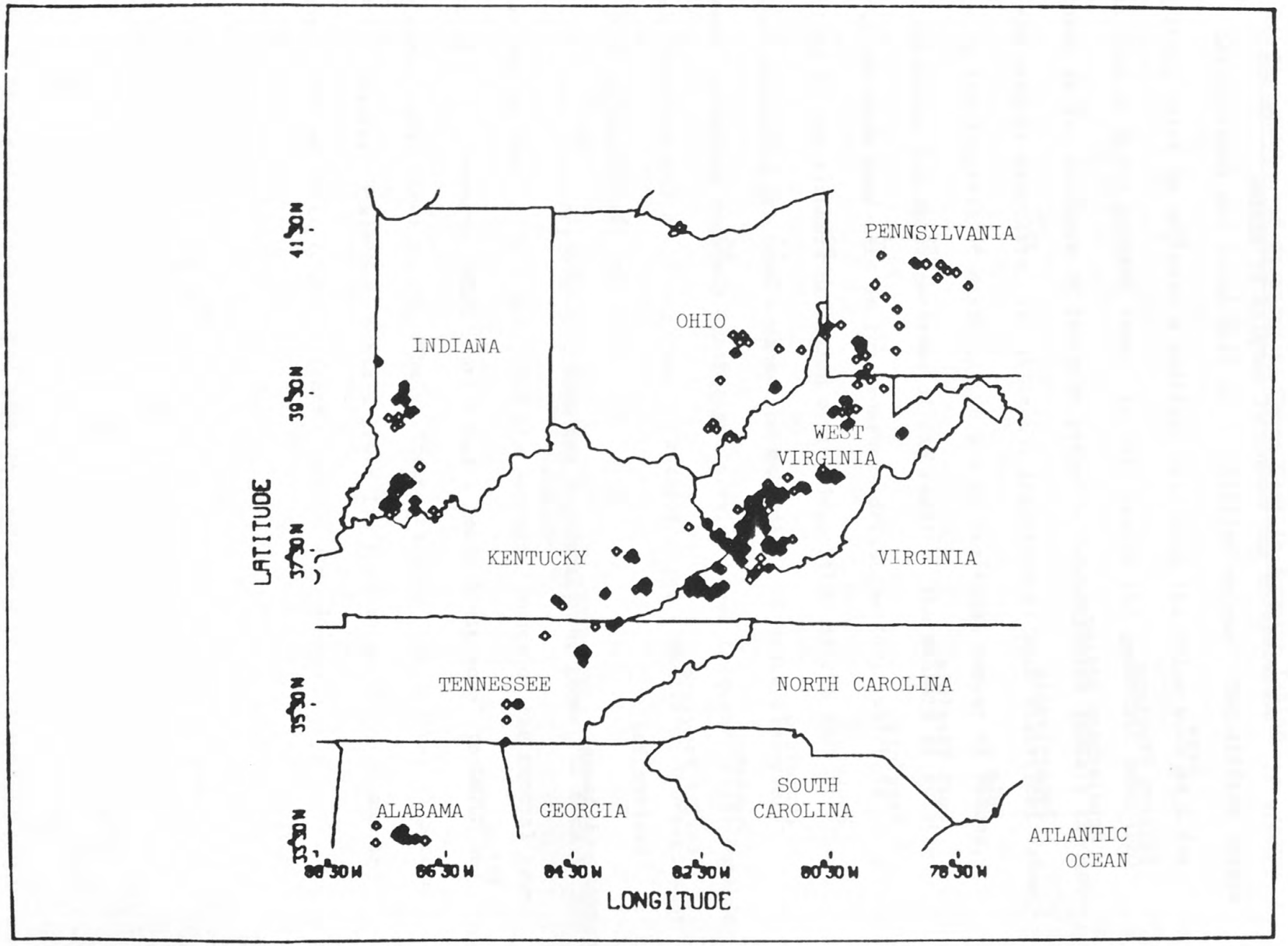

Figure 2 -- Distribution of Eastern Coal Samples.

Table 1. - Distribution and number of samples by States

Area	No.
Eastern Province	
Appalachian Region	
Pennsylvania	71
Ohio	40
West Virginia	252
Virginia	72
Kentucky	27
Tennessee	27
Alabama	20
Interior Province	
Eastern Region	
Indiana	108
Total	617

Explanation of Statistical Terms Used in Summary Tables

Calculations are based only on unqualified values. Unqualified values are those which do not have a modifier following the value such as L for less than or G for greater than. In this report the geometric mean (GM) is used as the estimate of the most probable concentration (mode); the geometric mean is calculated by taking the logarithm of each analytical value, summing the logarithms, dividing the sum by the total number of values, and obtaining the antilogarithms of the result. The measure of scatter about the mode used here is the geometric deviation (GD), which is the antilog of the standard deviation of the logarithms of the analytical values. These statistics are used because the quantities of trace elements in natural materials commonly exhibit positively skewed frequency distributions; such distributions are normalized by analyzing and summarizing trace-element data on a logarithmic basis.

If the frequency distributions are lognormal, the geometric mean is the best estimate of the mode, and the estimated range of the central two-thirds of the observed distribution has a lower limit equal to GM/GD and an upper limit equal to GM. The estimated range of the central 95 percent of the observed distribution has a lower limit equal to $GM/(GD)^2$ and an upper limit equal to $GM.(GD)^2$ (Connor and others, 1976).

Explanation of data presentation

The data in this report are arranged in the following format.

1. Comparison of the statistical data on the 617 coal samples of this report with that of the 331 bituminous coal samples from the Appalachian Region reported by Swanson and others, 1976.
2. Comparison of the means of the analytical data for the coals from each of the states.
3. Tables containing the statistical summaries and the analytical data on each sample by states. These include the following tables for each state.
   (a) tables, statistical tables on the Bureau of Mines analyses
   (b) tables, statistical tables on the major and minor oxides in coal ash
   (c) tables, statistical tables on 38 trace elements in coal
   (d) tables, location and description of the coal samples
   (e) tables, Bureau of Mines type analtyical data
   (f) tables, U.S. Geological Survey analyses for major and minor oxides in ash
   (g) tables, U.S. Geological Survey analyses for 22 trace elements in the whole coal
   (h) tables, all trace elements reported on a whole coal basis

The geographic locality of each sample is given as to State, county, and latitude and longitude coordinates.

The names of some coal bed locally are not listed because of correlation problems within basins. Because of this problem, such coal-bed names are designated as no data entered in the tables. It is likely that State Geological Surveys will supply the required correlations in the near future.

Comparison of the 617 coal samples of this report with those reported by Swanson and others (1976)

The coals analysed for this report are of bituminous rank and except for the 108 Indiana coal samples are from the Appalachian Region. Comparisons are made with the 331 bituminous coals analysed for the Appalachian Region and reported by Swanson and others (1976 p. 54-56). Bureau of Mines type analyses were performed on 158 of the 331 samples, whereas U.S. Geological Survey analyses were conducted on all 331 samples. Four hundred ninety one of the 617 coal samples were analyses for the Bureau of Mines type analyses by the Department of Energy. Differences in the ash means between columns (a) and (b) in tables 3 to 12 resulted from the differences in ashing temperatures used by the Department of Energy (750°C) and the Geological Survey (525°C).

Comparison of the geometric means of the proximate and ultimate analyses of the 491 samples of this report with the 158 samples reported by Swanson and others (1976) shows small differences for most of the analyzed components. Only the moisture content and oxygen have significant differences. Most of the differences are caused by the inclusion of the lower rank Indiana coals in computing the means for the samples of this report. In addition to the similarity of the proximate and ultimate analysis the heat of combustion and forms of sulfur are not significantly different.

Comparison of the geometric means for the major and minor oxides in the ash shows relatively small differences for SiO_2, Al_2O_3, CaO, MgO, K_2O and TiO_2. The means indicate that the ash sample of this report is significantly higher in Na_2O and SO_3 and lower in Fe_2O_3 and MnO than that of the 331 samples reported by Swanson and others (1976).

Comparison of the geometric means for the trace elements of the samples in this report with the 331 samples reported by Swanson and others (1976) (table 3c) shows lower means for most of the trace elements in the samples of this report. Only Be is significantly higher whereas As, Ba, Cd, Ga, Hg, Li, Nb, Ni, Pb, Se, Sr, and Zr are significantly lower. Only 26 elements were compared.

Comparison of the geometric means of the trace elements with their averages in shale (table 2) reported by Turekian and Wedepohl (1961) show only Se and Ge are found in larger average amounts in coal. Beryllium, Ag and Mo are found in comparable amounts. All of the other elements are found in significantly higher amounts in shales. Lithium, Zn, B, Cr, Nb, Ni, Sr, V, and Zr are at least 5 times higher in the shales and F, Ba, Mn and La at least 10 times higher.

Comparison of the means for the trace elements in coal with their averages in the earth's crust (table 2, Taylor 1964) shows that As, Sb, and Se are found in much larger quantities in the coals. This is particularly true for Se which is enriched almost 60 fold in the coals. This is comparable to the sulfur enrichment in coals relative to the earth's crust. Boron and Ge show a twofold enrichment in coals whereas Hg, Ag, Be and Mo are found in about equal amounts in coal and the earth's crust. These elements, which are in equal amounts in coals and the earth's crust or in higher amounts in coals, fall into two categories. Those which are chalcophillic in character and can be expected to follow sulfur in the geochemical cycle such as As, Sb, Se, Hg and Ag and those which can form stable organic complexes such as B, Be, Ge and Mo. Zubovic, 1966 and Gluskoter, 1974 reported that these elements have high organic affinities in coal.

Table 2. -- Average content of 32 elements in shale and in the Earth's crust, to be used for comparison with the contents of these elements in coal listed in other tables in this report.

	Shale, average (Turekian and Wedepohl, 1961)	Earth's crust, average (Taylor, 1964)
Ag	.07 ppm	.07 ppm
As	13 ppm	1.8 ppm
B	100 ppm	10 ppm
Ba	580 ppm	425 ppm
Be	3 ppm	2.8 ppm
Cd	.3 ppm	.2 ppm
Ce	59 ppm	60 ppm
Co	19 ppm	25 ppm
Cr	90 ppm	100 ppm
Cu	45 ppm	55 ppm
F	740 ppm	625 ppm
Ga	19 ppm	15 ppm
Ge	1.6 ppm	1.5 ppm
Hg	.4 ppm	.08 ppm
La	92 ppm	30 ppm
Li	66 ppm	20 ppm
Mn	850 ppm	950 ppm
Mo	2.6 ppm	1.5 ppm
Nb	11 ppm	20 ppm
Nd	24 ppm	28 ppm
Ni	68 ppm	75 ppm
Pb	20 ppm	12.5 ppm
Sb	1.5 ppm	.2 ppm
Sc	13 ppm	22 ppm
Se	.6 ppm	.05 ppm
Sr	300 ppm	375 ppm
U	3.7 ppm	2.7 ppm
V	130 ppm	135 ppm
Y	26 ppm	33 ppm
Yb	2.6 ppm	3.0 ppm
Zn	95 ppm	70 ppm
Zr	160 ppm	165 ppm

Table 3a. -- Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, and ash-fusion temperatures of all coal samples from Eastern United States.

[For comparison, geometric means for 158 bituminous coal samples from the Appalachian Region are included, (Swanson and others 1976). All values are in percent except Btu/lb, free swelling index, and ash-fusion temperatures, and are reported on the as-received basis. Leaders (---) indicate no data available.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	Geometric mean 158 samples
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	4.3	.6	21.4	3.3	2	2.4
Volatile matter	32.4	12.8	51.5	31.9	1.2	30.8
Fixed carbon	52.8	32	78.3	52.2	1.2	53.7
Ash	10.4	1	40.5	8.8	1.8	9.2
Hydrogen	5.2	3.4	6.5	5.5	1.1	4.9
Carbon	70.9	48.2	85.9	70.5	1.1	72.0
Nitrogen	1.3	.5	2.1	1.3	1.2	1.3
Oxygen	10.2	2.1	31.3	9.3	1.5	7.2
Sulfur	2	.3	13	1.5	2.1	1.6
Heat of combustion						
Btu/lb	12,670	8,470	14,950	12,590	1.2	12,800
Forms of sulfur						
Sulfate	.19	.01	1.28	.07	4.2	.05
Pyritic	1.18	.02	5.99	.65	3.5	.60
Organic	.95	.02	3.22	.80	1.9	.66
Ash fusion temperature °C						
Initial deformation	1,320	1,010	1,600	1,300	1.2	---
Softening temperature	1,320	1,060	1,600	1,300	1.1	---
Fluid temperature	1,340	1,090	1,600	1,340	1.1	---
Free Swelling Index	5.5	.5	9	4.3	2.3	---

Table 3b. -- Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of 11 major and minor oxides in the laboratory ash of 617 coal samples from Eastern United States.

[For comparison, geometric means of 331 bituminous coal samples from the Appalachian Region are included, (Swanson and others 1976). All samples were ashed at 525°C; all data except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	Geometric Mean 331 samples
		Minimum	Maximum			
(Ash)	11.6	1.	48.1	9.5	1.9	11
SiO_2	44.1	5.9	72	42.1	1.4	39
Al_2O_3	24.5	.7	45	23.1	1.5	22
CaO	2.3	.06	78	1.3	2.8	1.2
MgO	.87	.07	3.3	.78	1.6	.80
Na_2O	.58	.02	2.8	.44	2.1	.30
K_2O	1.9	.01	5	1.6	1.9	1.5
Fe_2O_3	16.6	.3	83	11.2	2.8	14
MnO	.03	.01	.67	.02	2.1	.05
TiO_2	1.24	.09	3.8	1.1	1.6	1.1
P_2O_5	.35	.01	5.2	.17	3.3	---
SO_3	2.8	.01	18	2	2.3	1.2

Table 3c. -- Arithmetic mean, observed range, geometric mean, and geometric deviation of 38 elements in 617 coal samples from Eastern United States.

[For comparison data on 331 bituminous coal samples from the Appalachian Region are included (Swanson and others (1976). All analyses are in parts per million and are reported on a whole-coal basis. Twenty-two values used to calculate the statistics were determined directly on whole-coal samples. All other values used were calculated from determinations made on ash. Leaders (---) indicate no data available.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	Geometric Mean 331 samples
		Minimum	Maximum			
Ag	.06	.01	1.4	.05	2	---
As	18	.12	950	7.4	3.7	11
B	31	1.2	220	21	2.5	20
Ba	81	6.3	770	56	2.4	70
Be	3	.3	25	2.4	1.9	2
Cd	.14	.01	5.7	.08	2.6	.3
Ce	19	2	300	15	1.9	---
Co	6.9	.7	100	5.5	1.9	5
Cr	17	1.8	130	14	1.9	15
Cs	1.1	.02	15	.75	2.5	---
Cu	17	.87	240	14	1.8	16
Eu	.37	.06	2.6	.31	1.8	---
F	83	20	780	64	2	60
Ga	6.3	.46	41	5.1	2	7
Ge	6.5	.15	160	2.9	3.6	---
Hf	.81	.1	5.8	.65	2	---
Hg	.16	.01	2.4	.1	2.7	.14
La	10	.5	140	7.8	2	---
Li	18	.7	140	12	2.5	19
Lu	.16	.1	.8	.14	1.6	---
Mn	25	.75	540	14	2.7	---
Mo	2.6	.18	46	1.8	2.3	2
Nb	2.6	.15	15	1.9	2.4	3
Nd	12.7	1.4	100	9.8	2	---
Ni	16	1.1	520	12	2	15
Pb	9.8	.37	240	5.9	2.4	11
Sb	1.1	.1	26	.69	2.4	.8
Sc	3.8	.1	25	3.1	1.9	3
Se	3.5	.5	11	2.9	1.8	3.5
Sm	1.9	.1	67	1.5	1.8	---
Sr	83	3.4	1,400	57	2.4	70
Tb	.3	.1	2.1	.26	1.7	---
U	1.6	.2	41	1.2	2.1	1.
V	23	1.5	150	17	2.1	20
Y	8.9	1.78	68	7.2	1.9	7
Yb	.89	.1	9	.74	1.8	.7
Zn	33	1.5	3,300	13	2.9	13
Zr	30	1.5	310	20	2.6	30

Comparison of the geometric means for the coal samples by States

Because the means were calculated from analytic data determined on an "as received basis" rather than from data on a "moisture and ash free basis" it is difficult to compare ranks of coals from the different states (table 4a). However, examination of the means for moisture, ash, volatile matter, and fixed carbon suggests that the Ohio, Kentucky and Indiana coals are of lower rank than are the Virginia, West Virginia and Tennessee coals. The means for the Btu's and the free swelling indexes also support this observation. The ash fusion temperature means are lowest for the Ohio and Indiana coal ash and highest for the West Virginia, Tennessee and Alabama coal ash.

Comparison of the geometric means for the major and minor oxides in ash produces a mixture of results (table 4b). The lowest means for SiO_2, Al_2O_3, MgO, K_2O, TiO_2 and P_2O_5 are in Ohio coal ash. These low means are principally the result of the large amount of Fe_2O_3 (31%) in this coal ash. The three states with the lowest means for the ash fusion temperatures of coal ash have the highest means for the Fe_2O_3 content. On the other extreme states whose coal ash have low Fe_2O_3 means and high SiO_2 and Al_2O_3 means, such as, Alabama, Tennessee, West Virginia, Virginia and Kentucky have the highest ash fusion temperature means. It appears that these three oxides are critical in controlling the ash fusion temperatures of coal ash. Two oxides which have high correlation coefficients are CaO and SO_3. Although Indiana, Ohio and Pennsylvania coals contain the highest amounts of sulfur (table 4a) the ash of Pennsylvania coals contains the least SO_3, whereas Ohio and Indian have intermediate amounts. The two states with the highest means for SO_3 in coal ash, (Tennessee and Virginia) have the lowest sulfur contents in their coals (table 4a). Correlation coefficients

were run for CaO/SO_3 on the original data for a number of states and the following coefficients were determined: Alabama 0.79, Kentucky 0.78, Tennessee 0.70, and West Virginia 0.59. These coefficients suggest that the retention of SO_3 in coal ash obtained at 525°C is largely controlled by the amount of calcium present in the coal. Such data on the SO_3 content of coal ash should be used with caution. They cannot be used to estimate the amount of original sulfur in coal. The ultimate analyses, in this report provide reliable data on the sulfur content of individual coal samples.

Comparison of the geometric means for the trace element content of the coals (table 4c) reveals some unusual relations. Of the 38 trace elements listed 23 have their highest means in Alabama coals. Pennsylvania coals have 8 of the highest means and shares the dubious distinction for the highest arsenic mean with Alabama. The remainder of the highest means for trace elements are associated with Indiana coals. None of the other states have any of the highest means. The lowest means for 27 of the 38 trace elements are associated with Tennessee coals. Two of these lowest means are shared with other states, Ag in Virginia and Cd in West Virginia. Six of the lowest means associated with Ohio coals, three with West Virginia coals and two with Virginia coals.

Comparison of the means for some of the environmentally hazardous elements for all coals from each of the states (table 4c) shows that the highest means for As, Cu, F, Mo, Sb, Se, U, and V are associated with Alabama coals. Means for As, F, Sb, and Se are equally high or almost as high in other states. The highest means for Be, Cd, Ni, Pb, Zn and Sb are found in the Indiana coal samples. Highest means for Co, Cr and Hg are found for Pennsylvania coal samples. Many of the lowest means for the

preceding elements are found in the Tennessee coals. It should be pointed out that Alabama and Tennessee are represented by the lowest number of samples. The findings described may change as more samples become available. The variation among the state means for each element is considerable. The largest state mean variation is for boron with a maximum/minimum ratio of 7.3, the lowest is for Lu with a ratio of 1.6. Five other elements, F, Se, Sm, Tb and Yb, have ratios of less than 2. In addition to B eight other elements, Ba, Cd, Li, Ni, Pb, Sr, Zn and Zr have maximum/minimum ratios of their means greater than 4. The ratios for the other elements range from 2 to less than 4. An interpretation of these is data elements with high ratios have significant regional variations in their distributions in coal and that areas can be found where coals with high or low contents of these elements can be delineated.

One of the problems with the preceding discussion is that these coal samples and the statistical data on the samples are grouped within political boundaries rather than in geological units. The main reason geological units have not been used is insufficient samples are available from a succession of such units (coal beds). For instance, in Alabama only an average of about 3 samples per bed are reported, in Pennsylvania there is an average of 6 samples per bed, in Ohio 8 samples per bed. These quantities of samples are not adequate for performing interbed comparisons or intrabed distributions. As data from more samples become available such comparisons and distribution analyses should be made.

Table 4a. -- Comparison of the geometric means of analyses for all the samples and samples from each state.

[All values are in percent except Btu/lb, free swelling index, and ash-fusion temperatures data are reported on the as-received basis.

	All	Pennsylvania	Ohio	West Virginia	Virginia	Kentucky	Tennessee	Alabama	Indiana
Number of Samples	491	61	40	168	72	18	27	20	85
Moisture	3.3	2.7	4.1	2.4	2.7	2.4	2.4	1.8	10.5
Volatile matter	31.9	33.5	38.7	29.7	30.3	36.6	32.8	31.4	32.8
Fixed carbon	52.2	46.8	44	56.6	57	51.3	56.8	53.5	47.1
Ash	8.8	13.7	10.9	8.1	7.4	8	5.2	11.8	8.5
Hydrogen	5.2	4.8	5.2	5.1	5.2	5.4	5.3	5	5.6
Carbon	70.5	67	64.9	74.7	74.9	72	75.2	70.8	62.7
Nitrogen	1.3	1.2	1.1	1.2	1.4	1.4	1.6	1.3	1.2
Oxygen	9.3	7.1	11.4	7.7	7.5	9.9	8.6	8	18.4
Sulfur	1.5	2.4	3.9	.96	1.1	1.5	1.2	1.4	2.4
Heat of combustion									
Btu/lb	12,590	12,010	11,770	13,260	13,380	12,940	13,510	13,000	11,220
Forms of sulfur									
Sulfate	.07	---	.16	.04	.03	.03	.03	.03	.21
Pyritic	.65	---	1.99	.46	.37	.49	.24	.66	.97
Organic	.80	---	1.50	.45	.59	.82	.73	.67	.95

Table 4a. -- Comparison of the geometric means of analyses for all the samples and samples from each state. Continued

	All	Pennsylvania	Ohio	West Virginia	Virginia	Kentucky	Tennessee	Alabama	Indiana
				Ash fusion temperature °C					
Initial deformation	1,230	1,230	1,130	1,290	1,280	1,260	1,330	1,260	1,180
Softening temperature	1,280	1,270	1,170	1,340	1,330	1,320	1,380	1,340	1,220
Fluid temperatu temperature	1,340	1,320	1,220	1,400	1,380	1,370	1,420	1,410	1,250
Free Swelling Index	4.3	6.3	3.1	5.8	7.6	2.7	5	4.9	1.2

Table 4b. -- Comparison of the geometric means of the major and minor oxides in ash of all coal samples and samples from each state.

[All samples were ashed at 525°C; all data are in percent.]

Oxide	All	Pennsylvania	Ohio	West Virginia	Virginia	Kentucky	Tennessee	Alabama	Indiana
(Ash)	9.5	14.2	11.5	8.3	7.9	7.6	5.4	12.6	11.9
SiO_2	42	39	31	49	41	42	39	48	36
Al_2O_3	23	22	17	27	23	26	25	30	18
CaO	1.3	.79	2.5	1.1	2.1	1.4	2.8	.97	1.3
MgO	.78	.75	.61	.84	.87	.69	.71	.83	.71
Na_2O	.44	.38	.51	.57	.52	.30	.28	.46	.27
K_2O	1.6	1.8	1.1	1.7	1.9	1.5	1.7	1.7	1.5
Fe_2O_3	11	18	31	6.5	12	11	12	11	19
MnO	.02	.02	.02	.02	.03	.02	.02	.01	.03
TiO_2	1.1	.98	.80	1.4	1.1	1.2	1.2	1.5	.82
P_2O_5	.17	.29	.12	.13	.16	.17	.43	.51	.17
SO_3	2	1.0	2.8	1.8	3.2	2.3	3.7	1.8	2.2

Table 4c. -- Geometric means for 38 trace elements in all samples and samples from each state.

[All data are in parts per million and are reported on a whole-coal basis.]

Element	All	Pennsylvania	Ohio	West Virginia	Virginia	Kentucky	Tennessee	Alabama	Indiana
Ag	.05	.06	.05	.04	.03	.06	.03	.08	.07
As	7.4	17	5.1	4.8	9.4	6.5	7.4	17	10
B	21	23	59	16	13	32	35	30	95
Ba	56	62	37	61	80	52	36	160	39
Be	2.4	2.1	1.8	2.5	1.9	2.7	1.1	2.4	3.6
Cd	.08	.08	.1	.05	.07	.06	.05	.07	.2
Ce	15	19	12	16	13	18	11	25	14
Co	5.5	6.6	3.2	5.4	5.6	5.9	4.4	5.5	6.3
Cr	14	21	14	13	9.9	14	7.4	19	15
Cs	.75	1.2	.78	.68	.53	.53	.42	1.4	.93
Cu	14	11	8.9	14	16	18	13	21	14
Eu	.31	.42	.28	.30	.26	.36	.22	.46	.31
F	64	88	71	53	69	56	64	90	69
Ga	5.1	7.6	4.7	5.2	3.7	6.3	2.0	6.9	5.2
Ge	2.9	4.1	2.8	1.7	1.5	2.9	.86	2.6	11
Hf	.65	.94	.53	.67	.53	.62	.47	1.1	.58
Hg	.10	.23	.17	.07	.08	.09	.08	.18	.11
La	7.8	9.4	6.4	7.9	6.9	9.3	5.6	14	7.6
Li	12	19	10	12	9.5	12	6.5	35	10
Lu	.14	.18	.14	.13	.13	.14	.11	.17	.14
Mn	14	20	21	10	14	9.1	7.6	12	23
Mo	1.8	2.4	2.4	1.2	1.7	1.7	1.1	3.5	3.1
Nb	1.9	3	1.7	1.7	1.4	1.4	1.0	3.5	2.6
Nd	9.8	13	8.2	9.1	8	11	5.7	18	14
Ni	12	14	6	10	9	12	6.9	11	24
Pb	5.9	7.1	3.2	5.1	4	5.6	4	5.2	14
Sb	.69	.89	.29	.63	.67	.76	.48	1.1	1.1
Sc	3.1	4.4	3	2.9	2.6	3.3	2	4.6	3.4
Se	2.9	2.5	2.9	3.3	2.6	3.2	2	3.4	2.9
Sm	1.5	1.9	1.3	1.4	1.3	1.8	1.1	2.1	1.6
Sr	57	45	37	67	81	80	47	150	36

Table 4c . -- Geometric means for 38 trace elements in all samples and samples from each state.--Continued

Element	All	Pennsylvania	Ohio	West Virginia	Virginia	Kentucky	Tennessee	Alabama	Indiana
Tb	.26	.33	.24	.25	.23	.25	.18	.31	.28
U	1.2	1.1	.86	1.1	1.2	1.5	.78	1.8	1.5
V	17	21	13	17	13	19	9.3	29	23
Y	7.2	7.4	6.6	7	5.9	8.6	5	11	8.7
Yb	.74	.96	.69	.71	.68	.8	.51	.95	.76
Zn	13	21	18	8	9.6	11	7.4	7.8	40
Zr	20	25	18	18	11	21	9.9	49	34

Summary of the analytical data from 71 Pennsylvania bituminous coal samples

Analytical data on 97 bituminous and 57 anthracite coal samples were reported by Swanson and others (1976), Skema and others (1977) also reported analytical data on 124 coal samples from Pennsylvania. The 71 samples in this report were collected from 12 coal beds. The largest number (22 samples) came from the Waynesburg coal bed. The generalized distribution of the samples is shown on figure 3. Descriptions and specific location of the samples is given in table 5d. The statistical comparisons of the 71 Pennsylvania coal samples with all 617 samples of this report are made in tables 5a, b and c. The analytical data are reported in tables 5e, f, g and h.

The following three paragraphs compare the geometric means of Pennsylvania coal samples with the 617 samples of this report.

Comparison of the geometric means for the proximate and ultimate analyses (table 5a) shows that except for the ash and sulfur contents the Pennsylvania coals are similar in their composition to the average coal of this report. The means for ash, sulfur and the free swelling index are significantly higher in the Pennsylvania coals whereas the Btu and ash fusion temperatures are slightly lower than in the 617 samples of this report.

Comparison of the means for the major ash forming oxides in the ash (table 5b) reveals similar values for most of these components. Only Fe_2O_3 is significantly higher and CaO lower in the Pennsylvania coal samples compared to all the samples.

The means for the trace elements Be, Cu, Se, Sr and U are lower in the Pennsylvania coal samples, Cd is equal, whereas, As, Ba, Ce, Cr, F, Ga, Ge, Hf, Hg, La, Li, Lu, Mn, Mo, Nb, Nd, Pb, Sb, Sc, Th, V, Yb, and Zn are significantly higher (table 5c). The rest of the elements are slightly higher in the Pennsylvania samples.

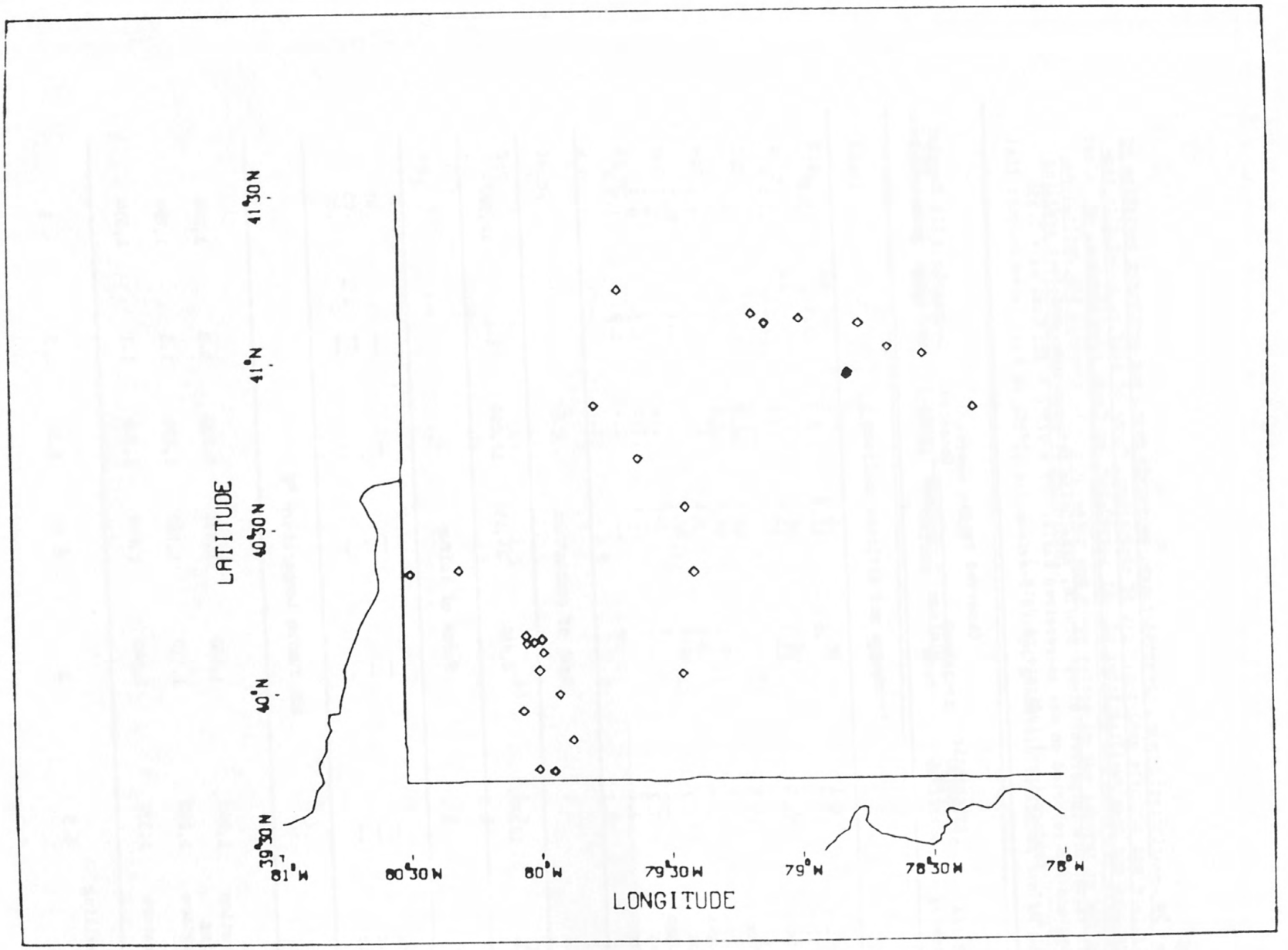

Figure 3 -- Distribution of Pennsylvania coal samples.

Table 5a.--Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, ash-fusion temperatures and free swelling index of 61 coal samples from Pennsylvania.

[All values are in percent except Btu/lb, ash-fusion temperatures, and free swelling index and are reported on the as-received basis. °F = 9/5°C + 32; Kcal/kg = 0.556 (Btu/lb). Leaders (---) indicate no data.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	3.1	.6	11.8	2.7	1.7	3.3
Volatile matter	33.8	23.7	43.7	33.5	1.1	31.9
Fixed carbon	47.3	32	62.7	46.8	1.2	52.2
Ash	15.8	2.5	38.1	13.7	1.7	8.8
Hydrogen	4.8	3.6	5.6	4.8	1.1	5.2
Carbon	67.5	49.8	80.5	67	1.1	70.5
Nitrogen	1.2	.5	1.6	1.2	1.3	1.3
Oxygen	7.7	2.1	21.9	7.1	1.5	9.3
Sulfur	2.8	.5	13	2.4	1.9	1.5
Heat of combustion						
Btu/lb	12,090	8,910	14,150	12,010	1.1	12,590
Forms of sulfur						
Sulfate	--	--	--	--	--	.07
Pyritic	--	--	--	--	--	.65
Organic	--	--	--	--	--	.80
Ash fusion temperature °C						
Initial deformation	1,240	1,080	1,471	1,230	1.1	1,240
Softening temperature	1,280	1,110	1,560	1,270	1.1	1,290
Fluid temperature	1,330	1,140	1,600	1,320	1.1	1,350
Free Swelling Index	6.5	2	8.5	6.3	1.3	4.3

Table 5b .--Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of eleven major and minor oxides in the laboratory ash of 71 coal samples from Pennsylvania.

[All samples were ashed at 525°C; all analyses except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
(Ash)	16.2	2.7	36.9	14.2	1.7	9.46
SiO_2	40	18	65	39	1.3	42
Al_2O_3	23	7.4	32	22	1.3	23
CaO	1.2	.07	5.8	.79	2.5	1.3
MgO	.83	.2	2	.75	1.6	.78
MnO	.02	.01	.19	.02	1.9	.02
Na_2O	.49	.09	1.9	.38	2	.44
K_2O	2	.23	3.8	1.8	1.8	1.6
Fe_2O_3	22	3.5	66	18	2	11
TiO_2	1.03	.48	2.3	.98	1.3	1.13
P_2O_5	.46	.05	2.4	.29	2.6	.17
SO_3	1.6	.12	10	1	2.6	2.03

Table 5c.--Arithmetic mean, observed range, geometric mean, and geometric deviation of 36 elements in 71 coal samples from Pennsylvania.

[All analyses are in percent or parts per million and are reported on a whole-coal basis. Leaders (---) indicate means could not be calculated because an insufficient number of analyses were above the detection limit.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Ag	.07	.01	.21	.06	2	.05
As	30	1	170	17	3.2	7.4
B	29	3.1	62	23	2.1	21
Ba	83	13	330	62	2.2	56
Be	2.5	.49	6	2.1	1.9	2.4
Cd	.12	.01	.73	.08	2.4	.08
Ce	22	6	60	19	1.8	15
Co	8.2	1.6	55	6.6	1.9	5.5
Cr	24	6.3	53	21	1.7	14
Cs	1.7	.1	5.4	1.2	2.5	.75
Cu	14	3.7	66	11	1.9	14
Eu	.48	.15	2.1	.42	1.7	.31
F	100	20	290	88	1.9	64
Ga	8.9	1.9	20	7.6	1.8	5.1
Ge	9.1	.4	61	4.1	3.6	2.9
Hf	1.1	.3	2.3	.94	1.8	.65
Hg	.34	.02	1.6	.23	2.5	.10
La	11	2	25	9.4	1.8	7.8
Li	27	3.6	130	19	2.3	12
Lu	.21	.1	.8	.18	1.7	.14
Mn	32	4.1	430	20	2.3	14
Mo	3.3	.2	12	2.4	2.4	1.8
Nb	3.8	.81	9	3	2	1.9
Nd	16	5.7	47	13	1.9	9.8
Ni	17	2.7	49	14	1.8	12
Pb	8.6	2.3	42	7.1	1.8	5.9
Sb	1.7	.2	26	.89	2.8	.69
Sc	5.1	1.3	13	4.4	1.8	3.1
Se	2.8	.86	7.8	2.5	1.6	2.9
Sm	2.2	.7	7.7	1.9	1.7	1.5
Sr	61	13	350	45	2	57
Tb	.39	.1	1.9	.33	1.8	.26
U	1.4	.2	4.1	1.1	1.9	1.2
V	28	4.3	140	21	2.1	17
Y	9.3	1.9	32	7.4	2	7.2
Yb	1.1	.3	4.8	.96	1.8	.74
Zn	30	5.9	260	21	2.2	13
Zr	35	3.6	130	25	2.4	20

Table 5d Descriptions for 71 bituminous coal samples from Pennsylvania

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w189266	pennsylvania	clearfield	405114n	781936w	allegheny	lower kittanning	channel	37.0
w189267	pennsylvania	clearfield	405114n	781942w	allegheny	lower kittanning	channel	37.0
w189268	pennsylvania	clearfield	410100n	783110w	allegheny	lower kittanning	channel	25.0
w189269	pennsylvania	fayette	395936n	795530w	monongahela	waynesburg	channel	56.0
w189270	pennsylvania	clearfield	410213n	763900w	monongahela	brookville	channel	24.0
w190554	pennsylvania	washington	401013n	800308w	waynesburg	waynesburg	channel	14.0
w190555	pennsylvania	washington	401013n	800308w	waynesburg	waynesburg	channel	38.0
w190556	pennsylvania	washington	402134n	802938w	pittsburgh	pittsburgh	channel	6.0
w190557	pennsylvania	washington	402134n	802938w	pittsburgh	pittsburgh	channel	33.0
w190558	pennsylvania	washington	402134n	802938w	pittsburgh	pittsburgh	channel	14.0
w190559	pennsylvania	washington	402137n	802938w	pittsburgh	pittsburgh	channel	6.0
w190560	pennsylvania	washington	402137n	802938w	pittsburgh	pittsburgh	channel	35.0
w190561	pennsylvania	washington	402137n	802938w	pittsburgh	pittsburgh	channel	22.0
w190562	pennsylvania	washington	402212n	801822w	pittsburgh	pittsburgh	channel	37.0
w190563	pennsylvania	washington	402212n	801822w	pittsburgh	pittsburgh	channel	7.0
w190564	pennsylvania	washington	400710n	795908w	waynesburg	waynesburg	channel	
w190565	pennsylvania	washington	400710n	795908w	waynesburg	waynesburg	channel	19.0
w190566	pennsylvania	washington	400710n	795908w	waynesburg	waynesburg	channel	15.0
w190567	pennsylvania	washington	400710n	795908w	waynesburg	waynesburg	channel	10.0
w190568	pennsylvania	washington	400710n	795908w	monongahela	waynesburg	channel	7.0
w190569	pennsylvania	washington	400354n	800005w	waynesburg	waynesburg	channel	10.0
w190570	pennsylvania	washington	400354n	800005w	waynesburg	waynesburg	channel	37.0
w190571	pennsylvania	washington	400354n	800005w	waynesburg	waynesburg	channel	3.0
w190572	pennsylvania	washington	400354n	800005w	waynesburg	waynesburg	channel	12.0
w190573	pennsylvania	washington	400846n	800256w	waynesburg	waynesburg	channel	12.0
w190574	pennsylvania	washington	400846n	800256w	waynesburg	waynesburg	channel	51.0
w190575	pennsylvania	greene	394516n	795652w	pittsburgh	sewickley	channel	58.0
w190576	pennsylvania	greene	394517n	795652w	pittsburgh	sewickley	channel	58.0
w190577	pennsylvania	greene	394540n	800028w	waynesburg	waynesburg	channel	25.0
w190578	pennsylvania	greene	394540n	800028w	waynesburg	waynesburg	channel	63.0
w190579	pennsylvania	fayette	400307n	792703w	freeport	lower freeport	channel	46.0
w190580	pennsylvania	fayette	400310n	792703w	freeport	lower freeport	channel	46.0
w190581	pennsylvania	fayette	395109n	795232w	pittsburgh	redstone	channel	37.0
w190582	pennsylvania	fayette	395109n	795232w	pittsburgh	redstone	channel	7.0
w190583	pennsylvania	armstrong	403332n	792559w	pittsburgh	pittsburgh	channel	19.0

Table 5d Descriptions for 71 bituminous coal samples from Pennsylvania Continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w190534	pennsylvania	armstrong	403332n	792559w	pittsburgh	pittsburgh	channel	21.0
w190535	pennsylvania	armstrong	403332n	792559w	pittsburgh	pittsburgh	channel	8.0
w190536	pennsylvania	armstrong	403332n	792559w	pittsburgh	pittsburgh	channel	17.0
w190537	pennsylvania	jefferson	410816n	791013w	clarion	clarion	channel	23.0
w190538	pennsylvania	jefferson	410816n	791013w	clarion	clarion	channel	12.0
w190589	pennsylvania	butler	405158n	794644w	freeport	lower freeport	channel	18.0
w190590	pennsylvania	butler	405158n	794644w	freeport	lower freeport	channel	14.0
w190591	pennsylvania	westmoreland	402139n	792411w	glenshaw	bakerstown	channel	23.0
w190592	pennsylvania	westmoreland	402139n	792411w	glenshaw	bakerstown	channel	6.0
w190593	pennsylvania	westmoreland	402139n	792411w	glenshaw	bakerstown	channel	9.0
w190594	pennsylvania	westmoreland	402139n	792411w	glenshaw	bakerstown	channel	4.0
w190595	pennsylvania	venango	411245n	794104w	glenshaw	clarion	channel	7.0
w190596	pennsylvania	venango	411245n	794104w	glenshaw	clarion	channel	14.0
w190597	pennsylvania	armstrong	404225n	793645w	freeport	upper freeport	channel	19.0
w190598	pennsylvania	washington	400901n	800100w	waynesburg	waynesburg	channel	43.0
w190599	pennsylvania	armstrong	404225n	793645w	freeport	upper freeport	channel	6.0
w191309	pennsylvania	jefferson	410725n	785918w	kittanning	middle kittanning	channel	19.0
w191310	pennsylvania	jefferson	410725n	785918w	kittanning	middle kittanning	channel	4.0
w191311	pennsylvania	clearfield	410632n	784535w	glenshaw	mahoning	channel	5.0
w191312	pennsylvania	clearfield	410632n	784535w	freeport	upper freeport	channel	5.0
w191313	pennsylvania	clearfield	410632n	784535w	freeport	upper freeport	channel	13.0
w191314	pennsylvania	clearfield	410632n	784535w	freeport	upper freeport	channel	3.0
w191315	pennsylvania	clearfield	410632n	784535w	freeport	upper freeport	channel	10.0
w191316	pennsylvania	clearfield	410632n	784535w	freeport	upper freeport	channel	29.0
w191317	pennsylvania	clearfield	410632n	784535w	freeport	upper freeport	channel	10.0
w191318	pennsylvania	washington	400934n	795923w	waynesburg	waynesburg	channel	12.0
w191319	pennsylvania	washington	400934n	795923w	waynesburg	waynesburg	channel	33.0
w191320	pennsylvania	washington	400934n	795923w	waynesburg	waynesburg	channel	10.0
w191321	pennsylvania	jefferson	410636n	790713w	kittanning	lower kittanning	channel	20.0
w191322	pennsylvania	jefferson	410637n	790715w	kittanning	lower kittanning	channel	20.0
w191323	pennsylvania	jefferson	405710n	784826w	freeport	upper freeport	channel	25.0
w191324	pennsylvania	clearfield	405747n	784807w	freeport	lower freeport	channel	25.0
w191325	pennsylvania	clearfield	405747n	784807w	freeport	lower freeport	channel	9.0
w191326	pennsylvania	clearfield	405747n	784807w	freeport	lower freeport	channel	9.0
w191327	pennsylvania	washington	400901n	800100w	waynesburg	waynesburg	channel	14.0
w193125	pennsylvania	greene	395636n	800354w	no data entered	waynesburg	channel	65.0

Table 5e.— Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania.

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in percent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section Department of Energy, Pittsburgh, Pa. B means not determined. O for ash fusion temperatures means greater than 1600°C.]

		Proximate Analysis			Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190554	8.1	30.0	42.6	19.3	4.7	59.7	1.3	13.7	1.3	5,830	10,490
	---	32.6	46.4	21.0	4.1	65.0	1.4	7.1	1.4	6,340	11,410
	---	41.3	58.7	---	5.2	82.2	1.8	9.0	1.8	8,030	14,450
w190555	2.1	38.8	44.5	14.6	5.1	68.8	1.4	7.4	2.7	6,910	12,430
	---	39.6	45.5	14.9	5.0	70.3	1.4	5.7	2.8	7,050	12,700
	---	46.6	53.4	---	5.8	82.6	1.7	6.6	3.2	8,290	14,920
w190556	2.7	38.9	32.0	26.4	4.4	55.1	1.1	6.7	6.3	5,630	10,130
	---	40.0	32.9	27.1	4.2	56.6	1.1	4.4	6.5	5,780	10,410
	---	54.9	45.1	---	5.8	77.7	1.6	6.1	8.9	7,940	14,290
w190557	2.8	43.7	46.7	6.8	5.6	74.1	1.5	8.9	3.1	7,440	13,400
	---	45.0	48.0	7.0	5.4	76.2	1.5	6.6	3.2	7,660	13,790
	---	48.3	51.7	---	5.9	82.0	1.7	7.1	3.4	8,240	14,820
w190558	3.5	38.0	47.0	11.5	4.9	68.3	1.3	8.9	5.1	6,900	12,420
	---	39.4	48.7	11.9	4.7	70.8	1.3	6.0	5.3	7,150	12,870
	---	44.7	55.3	---	5.3	80.4	1.5	6.8	6.0	8,120	14,610
w190559	3.4	35.9	33.9	26.8	4.3	54.7	1.1	9.1	4.0	5,550	9,990
	---	37.2	35.1	27.7	4.1	56.6	1.1	6.3	4.1	5,750	10,340
	---	51.4	48.6	---	5.6	78.4	1.6	8.7	5.7	7,950	14,310
w190560	3.4	37.6	51.6	7.4	5.3	73.4	1.4	9.7	2.8	7,300	13,140
	---	38.9	53.4	7.7	5.1	76.0	1.4	6.9	2.9	7,560	13,600
	---	42.2	57.8	---	5.5	82.3	1.6	7.5	3.1	8,180	14,730
w190561	3.7	38.3	48.9	9.1	5.2	71.6	1.4	9.7	3.0	7,100	12,780
	---	39.8	50.8	9.4	5.0	74.4	1.5	6.7	3.1	7,370	13,270
	---	43.9	56.1	---	5.5	82.1	1.6	7.4	3.4	8,140	14,660
w190562	3.8	37.8	44.1	14.3	5.1	67.4	1.4	11.1	.7	6,710	12,080
	---	39.3	45.8	14.9	4.9	70.1	1.5	8.0	.7	6,980	12,560
	---	46.2	53.8	---	5.7	82.3	1.7	9.4	.9	8,190	14,750
w190563	4.9	34.3	40.4	20.4	4.8	59.7	1.2	11.2	2.7	5,980	10,770
	---	36.1	42.5	21.5	4.5	62.8	1.3	7.2	2.8	6,290	11,320
	---	45.9	54.1	---	5.7	79.9	1.6	9.2	3.6	8,010	14,420
w190564	2.9	33.0	43.7	20.4	4.6	63.0	1.3	8.1	2.6	6,310	11,360
	---	34.0	45.0	21.0	4.4	64.9	1.3	5.7	2.7	6,500	11,700
	---	43.0	57.0	---	5.6	82.1	1.7	7.2	3.4	8,230	14,810
w190565	1.8	39.1	47.6	11.5	5.3	72.0	1.5	6.4	3.3	7,230	13,020
	---	39.8	48.5	11.7	5.2	73.3	1.5	4.9	3.4	7,370	13,260
	---	45.1	54.9	---	5.9	83.0	1.7	5.5	3.8	8,340	15,020

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w190554	0.0	0.00	0.00	0.00	2.0	1,170	1,200	1,250
	---	.00	.00	.00				
	---	.00	.00	.00				
w190555	.0	.00	.00	.00	6.5	1,305	1,330	1,360
	---	.00	.00	.00				
	---	.00	.00	.00				
w190556	.0	.00	.00	.00	4.0	1,110	1,140	1,190
	---	.00	.00	.00				
	---	.00	.00	.00				
w190557	.0	.00	.00	.00	5.0	1,115	1,145	1,170
	---	.00	.00	.00				
	---	.00	.00	.00				
w190558	.0	.00	.00	.00	6.0	1,090	1,115	1,145
	---	.00	.00	.00				
	---	.00	.00	.00				
w190559	.0	.00	.00	.00	5.5	1,145	1,195	1,300
	---	.00	.00	.00				
	---	.00	.00	.00				
w190560	.0	.00	.00	.00	4.5	1,090	1,115	1,145
	---	.00	.00	.00				
	---	.00	.00	.00				
w190561	.0	.00	.00	.00	7.0	1,110	1,140	1,165
	---	.00	.00	.00				
	---	.00	.00	.00				
w190562	.0	.00	.00	.00	5.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190563	.0	.00	.00	.00	5.0	1,260	1,290	1,320
	---	.00	.00	.00				
	---	.00	.00	.00				
w190564	.0	.00	.00	.00	7.5	1,170	1,200	1,260
	---	.00	.00	.00				
	---	.00	.00	.00				
w190565	.0	.00	.00	.00	7.5	1,220	1,255	1,290
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Moisture	Proximate Analysis			Ultimate Analysis					Heat of Combustion	
		Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190566	3.7	35.8	46.0	14.5	5.0	67.8	1.3	9.0	2.4	6,720	12,100
	---	37.2	47.8	15.1	4.8	70.4	1.3	5.9	2.5	6,980	12,560
	---	43.8	56.2	---	5.6	82.9	1.6	7.0	2.9	8,220	14,790
w190567	2.1	32.2	39.1	26.6	4.4	58.5	1.2	7.4	1.9	5,840	10,510
	---	32.9	39.9	27.2	4.3	59.8	1.2	5.7	1.9	5,960	10,740
	---	45.2	54.8	---	5.8	82.0	1.7	7.8	2.7	8,190	14,740
w190568	4.0	32.3	44.9	18.8	4.7	63.5	1.4	8.9	2.7	6,330	11,400
	---	33.6	46.8	19.6	4.4	66.1	1.5	5.6	2.8	6,600	11,870
	---	41.8	58.2	---	5.5	82.3	1.8	6.9	3.5	8,200	14,770
w190569	4.8	33.4	41.1	20.7	4.7	60.6	1.2	10.5	2.3	5,980	10,770
	---	35.1	43.2	21.7	4.4	63.7	1.3	6.5	2.4	6,290	11,310
	---	44.8	55.2	---	5.6	81.3	1.6	8.4	3.1	8,030	14,460
w190570	4.9	34.8	46.9	13.4	5.2	67.1	1.4	11.1	1.8	6,670	12,000
	---	36.6	49.3	14.1	4.9	70.6	1.5	7.1	1.9	7,010	12,620
	---	42.6	57.4	---	5.7	82.1	1.7	8.3	2.2	8,160	14,690
w190571	2.7	37.4	44.2	15.7	5.0	67.1	1.4	8.4	2.4	6,780	12,200
	---	38.4	45.4	16.1	4.8	69.0	1.4	6.2	2.5	6,970	12,540
	---	45.8	54.2	---	5.8	82.2	1.7	7.4	2.9	8,310	14,950
w190572	4.2	31.3	39.8	24.7	4.5	58.8	1.3	8.9	1.8	5,820	10,480
	---	32.7	41.5	25.8	4.2	61.4	1.4	5.4	1.9	6,080	10,940
	---	44.0	56.0	---	5.7	82.7	1.8	7.3	2.5	8,190	14,740
w190573	4.7	36.1	40.2	19.0	4.9	62.7	1.3	8.8	3.3	6,280	11,300
	---	37.9	42.2	19.9	4.6	65.8	1.4	4.9	3.5	6,590	11,860
	---	47.3	52.7	---	5.7	82.2	1.7	6.1	4.3	8,230	14,810
w190574	2.6	37.2	42.3	17.9	4.9	65.1	1.3	7.3	3.5	6,550	11,790
	---	38.2	43.4	18.4	4.7	66.8	1.3	5.1	3.6	6,720	12,100
	---	46.8	53.2	---	5.8	81.9	1.6	6.3	4.4	8,240	14,830
w190575	2.2	36.1	53.9	7.8	5.3	76.2	1.6	7.7	1.4	7,560	13,600
	---	36.9	55.1	8.0	5.2	77.9	1.6	5.9	1.4	7,730	13,910
	---	40.1	59.9	---	5.6	84.7	1.8	6.4	1.6	8,400	15,110
w190576	2.3	35.7	53.2	8.8	5.3	75.3	1.6	8.3	.7	7,470	13,440
	---	36.5	54.5	9.0	5.2	77.1	1.6	6.4	.7	7,640	13,760
	---	40.2	59.8	---	5.7	84.7	1.8	7.0	.8	8,400	15,120
w190577	1.7	39.7	46.3	12.3	5.2	71.9	1.5	6.7	2.4	7,180	12,930
	---	40.4	47.1	12.5	5.1	73.1	1.5	5.3	2.4	7,310	13,150
	---	46.2	53.8	---	5.8	83.6	1.7	6.0	2.8	8,350	15,030

Table 5a.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Forms of sulfur: Pyritic	Forms of sulfur: Organic	Free swelling	Ash fusion temperature C°: Initial deform.	Ash fusion temperature C°: soften.	Ash fusion temperature C°: fluid
w190566	0.0	0.00	0.00	0.00	8.0	1,410	1,440	1,470
	---	.00	.00	.00				
	---	.00	.00	.00				
w190567	.0	.00	.00	.00	5.5	1,560	1,600	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190568	.0	.00	.00	.00	7.0	1,275	1,310	1,345
	---	.00	.00	.00				
	---	.00	.00	.00				
w190569	.0	.00	.00	.00	5.5	1,170	1,200	1,255
	---	.00	.00	.00				
	---	.00	.00	.00				
w190570	.0	.00	.00	.00	5.0	1,445	1,470	1,525
	---	.00	.00	.00				
	---	.00	.00	.00				
w190571	.0	.00	.00	.00	7.0	1,415	1,445	1,470
	---	.00	.00	.00				
	---	.00	.00	.00				
w190572	.0	.00	.00	.00	7.0	1,470	1,500	1,600
	---	.00	.00	.00				
	---	.00	.00	.00				
w190573	.0	.00	.00	.00	7.0	1,170	1,230	1,300
	---	.00	.00	.00				
	---	.00	.00	.00				
w190574	.0	.00	.00	.00	5.0	1,290	1,320	1,345
	---	.00	.00	.00				
	---	.00	.00	.00				
w190575	.0	.00	.00	.00	8.0	1,350	1,380	1,440
	---	.00	.00	.00				
	---	.00	.00	.00				
w190576	.0	.00	.00	.00	8.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190577	.0	.00	.00	.00	7.0	1,355	1,380	1,410
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190578	2.1	35.4	47.1	15.4	5.0	68.9	1.4	7.2	2.1	6,880	12,380
	---	36.2	48.1	15.7	4.9	70.4	1.4	5.4	2.1	7,030	12,650
	---	42.9	57.1	---	5.8	83.5	1.7	6.5	2.5	8,340	15,010
w190579	2.6	27.9	62.7	6.8	5.0	79.4	1.4	5.4	2.0	7,810	14,050
	---	28.6	64.4	7.0	4.8	81.5	1.4	3.2	2.1	8,010	14,430
	---	30.8	69.2	---	5.2	87.6	1.5	3.4	2.2	8,620	15,510
w190580	2.4	28.3	61.2	8.1	4.9	78.3	1.3	4.5	2.9	7,710	13,880
	---	29.0	62.7	8.3	4.7	80.2	1.3	2.4	3.0	7,900	14,220
	---	31.6	68.4	---	5.2	87.5	1.5	2.6	3.2	8,620	15,510
w190581	11.8	31.8	48.1	8.3	5.0	61.9	1.3	21.9	1.6	5,870	10,560
	---	36.1	54.5	9.4	4.2	70.2	1.5	12.9	1.8	6,650	11,970
	---	39.8	60.2	---	4.6	77.5	1.6	14.3	2.0	7,340	13,220
w190582	6.4	29.1	41.9	22.6	4.6	58.1	1.1	11.8	1.7	5,740	10,330
	---	31.1	44.8	24.1	4.2	62.1	1.2	6.5	1.8	6,130	11,040
	---	41.0	59.0	---	5.5	81.8	1.5	8.6	2.4	8,080	14,550
w190583	1.6	38.3	50.1	10.0	4.9	73.8	1.5	5.4	4.4	7,450	13,410
	---	38.9	50.9	10.2	4.8	75.0	1.5	4.0	4.5	7,570	13,630
	---	43.3	56.7	---	5.3	83.5	1.7	4.5	5.0	8,430	15,170
w190584	2.6	32.2	50.9	14.3	5.0	71.1	1.3	6.3	2.0	6,970	12,550
	---	33.1	52.3	14.7	4.8	73.0	1.3	4.1	2.1	7,160	12,890
	---	38.7	61.3	---	5.7	85.6	1.6	4.8	2.4	8,390	15,100
w190585	2.8	27.4	34.5	35.3	3.9	49.8	1.0	6.1	3.9	4,950	8,910
	---	28.2	35.5	36.3	3.7	51.2	1.0	3.7	4.0	5,090	9,170
	---	44.3	55.7	---	5.8	80.5	1.6	5.8	6.3	8,000	14,390
w190586	1.6	29.5	36.5	32.4	4.0	52.1	1.0	3.1	7.4	5,290	9,520
	---	30.0	37.1	32.9	3.9	52.9	1.0	1.7	7.5	5,370	9,670
	---	44.7	55.3	---	5.8	78.9	1.5	2.5	11.2	8,010	14,420
w190587	1.9	38.6	47.3	12.2	5.0	71.0	1.1	4.6	6.1	7,180	12,930
	---	39.3	48.2	12.4	4.9	72.4	1.1	3.0	6.2	7,320	13,180
	---	44.9	55.1	---	5.6	82.7	1.3	3.4	7.1	8,360	15,050
w190588	3.1	37.5	51.2	8.2	5.2	73.6	1.2	7.3	4.5	7,430	13,370
	---	38.7	52.8	8.5	5.0	76.0	1.2	4.7	4.6	7,670	13,800
	---	42.3	57.7	---	5.5	83.0	1.4	5.1	5.1	8,370	15,070
w190589	3.3	35.0	52.6	9.1	5.2	72.8	1.4	9.5	2.0	7,170	12,910
	---	36.2	54.4	9.4	5.0	75.3	1.4	6.8	2.1	7,420	13,350
	---	40.0	60.0	---	5.5	83.1	1.6	7.5	2.3	8,190	14,740

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Forms of sulfur: Pyritic	Forms of sulfur: Organic	Free swelling	Ash fusion temperature C°: Initial deform.	Ash fusion temperature C°: soften.	Ash fusion temperature C°: fluid
w190578	0.0	0.00	0.00	0.00	5.5	1,380	1,410	1,450
	---	.00	.00	.00				
	---	.00	.00	.00				
w190579	.0	.00	.00	.00	8.5	1,170	1,230	1,280
	---	.00	.00	.00				
	---	.00	.00	.00				
w190580	.0	.00	.00	.00	8.0	1,170	1,230	1,280
	---	.00	.00	.00				
	---	.00	.00	.00				
w190581	.0	.00	.00	.00	.0	1,325	1,380	1,440
	---	.00	.00	.00				
	---	.00	.00	.00				
w190582	.0	.00	.00	.00	2.5	1,470	1,500	1,525
	---	.00	.00	.00				
	---	.00	.00	.00				
w190583	.0	.00	.00	.00	7.5	1,105	1,130	1,175
	---	.00	.00	.00				
	---	.00	.00	.00				
w190584	.0	.00	.00	.00	7.0	1,405	1,430	1,465
	---	.00	.00	.00				
	---	.00	.00	.00				
w190585	.0	.00	.00	.00	4.5	1,315	1,375	1,500
	---	.00	.00	.00				
	---	.00	.00	.00				
w190586	.0	.00	.00	.00	5.0	1,150	1,175	1,205
	---	.00	.00	.00				
	---	.00	.00	.00				
w190587	.0	.00	.00	.00	7.0	1,105	1,130	1,165
	---	.00	.00	.00				
	---	.00	.00	.00				
w190588	.0	.00	.00	.00	7.5	1,110	1,140	1,165
	---	.00	.00	.00				
	---	.00	.00	.00				
w190589	.0	.00	.00	.00	7.5	1,145	1,200	1,265
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Moisture	Proximate Analysis			Ultimate Analysis					Heat of Combustion	
		Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190590	3.5	33.6	53.0	9.9	5.1	72.8	1.4	9.4	1.4	7,140	12,860
	---	34.8	54.9	10.3	4.9	75.4	1.5	6.5	1.5	7,400	13,330
	---	38.8	61.2	---	5.4	84.1	1.6	7.3	1.6	8,250	14,850
w190591	1.1	32.2	47.1	19.6	4.5	66.8	1.0	2.2	5.9	6,670	12,010
	---	32.6	47.6	19.8	4.4	67.5	1.0	1.2	6.0	6,750	12,140
	---	40.6	59.4	---	5.5	84.2	1.3	1.5	7.4	8,410	15,150
w190592	1.2	33.2	50.6	15.0	4.9	72.2	1.2	5.0	1.7	7,170	12,910
	---	33.6	51.2	15.2	4.8	73.1	1.2	4.0	1.7	7,260	13,070
	---	39.6	60.4	---	5.7	86.2	1.4	4.7	2.0	8,560	15,410
w190593	2.0	31.6	46.1	20.3	4.6	66.1	1.1	5.6	2.3	6,590	11,860
	---	32.2	47.0	20.7	4.5	67.4	1.1	3.9	2.3	6,720	12,100
	---	40.7	59.3	---	5.6	85.1	1.4	4.9	3.0	8,480	15,260
w190594	3.2	30.7	45.9	20.2	4.5	63.9	.9	3.0	7.5	6,390	11,510
	---	31.7	47.4	20.9	4.3	66.0	.9	.2	7.7	6,610	11,890
	---	40.1	59.9	---	5.4	83.4	1.2	.2	9.8	8,350	15,030
w190595	2.0	35.5	37.4	25.1	4.1	54.9	.8	2.1	13.0	5,520	9,930
	---	36.2	38.2	25.6	4.0	56.0	.8	.3	13.3	5,630	10,130
	---	48.7	51.3	---	5.3	75.3	1.1	.4	17.8	7,570	13,620
w190596	3.1	40.7	45.8	10.4	5.2	71.2	1.2	7.5	4.5	7,130	12,840
	---	42.0	47.3	10.7	5.0	73.5	1.2	4.9	4.6	7,360	13,250
	---	47.1	52.9	---	5.6	82.3	1.4	5.5	5.2	8,250	14,840
w190597	4.1	37.0	53.2	5.7	5.4	76.7	1.4	8.3	2.5	7,610	13,700
	---	38.6	55.5	5.9	5.2	80.0	1.5	4.9	2.6	7,940	14,290
	---	41.0	59.0	---	5.5	85.0	1.6	5.2	2.8	8,440	15,190
w190599	3.0	36.0	51.1	9.9	5.2	73.2	1.4	8.1	2.2	7,290	13,120
	---	37.1	52.7	10.2	5.0	75.5	1.4	5.6	2.3	7,510	13,530
	---	41.3	58.7	---	5.6	84.0	1.6	6.2	2.5	8,370	15,060
w191309	7.1	29.8	58.3	4.8	5.5	75.9	1.2	12.1	.5	7,410	13,330
	---	32.1	62.8	5.2	5.1	81.7	1.3	6.2	.5	7,970	14,350
	---	33.8	66.2	---	5.3	86.2	1.4	6.6	.6	8,410	15,130
w191310	4.0	32.0	61.5	2.5	5.4	80.5	1.3	9.8	.5	7,860	14,150
	---	33.3	64.1	2.6	5.2	83.9	1.4	6.5	.5	8,190	14,740
	---	34.2	65.8	---	5.3	86.1	1.4	6.7	.5	8,410	15,130
w191311	1.3	30.8	47.7	20.2	4.5	65.3	1.3	3.6	5.1	6,590	11,860
	---	31.2	48.3	20.5	4.4	66.2	1.3	2.5	5.2	6,680	12,020
	---	39.2	60.8	---	5.5	83.2	1.7	3.1	6.5	8,390	15,110

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Moisture	Proximate Analysis: Volatile matter	Proximate Analysis: Fixed carbon	Proximate Analysis: Ash	Ultimate Analysis: Hydrogen	Ultimate Analysis: Carbon	Ultimate Analysis: Nitrogen	Ultimate Analysis: Oxygen	Ultimate Analysis: Sulfur	Heat of Combustion: Kcal/kg	Heat of Combustion: Btu/lb
w191312	0.6	28.5	44.7	26.2	4.2	61.2	0.6	5.6	2.2	6,080	10,950
	---	28.7	45.0	26.4	4.2	61.6	.6	5.1	2.2	6,120	11,020
	---	38.9	61.1	---	5.6	83.6	.8	6.9	3.0	8,310	14,960
w191313	1.1	29.9	54.5	14.5	4.8	72.9	.7	5.6	1.5	7,230	13,020
	---	30.2	55.1	14.7	4.7	73.7	.7	4.7	1.5	7,310	13,160
	---	35.4	64.6	---	5.5	86.4	.8	5.5	1.8	8,570	15,430
w191314	1.4	23.7	36.8	38.1	3.6	50.7	.5	5.7	1.4	4,960	8,920
	---	24.0	37.3	38.6	3.5	51.4	.5	4.5	1.4	5,030	9,050
	---	39.2	60.8	---	5.7	83.8	.8	7.4	2.3	8,190	14,740
w191315	1.1	32.7	58.4	7.8	5.1	78.2	.8	5.9	2.2	7,800	14,040
	---	33.1	59.0	7.9	5.0	79.1	.8	5.0	2.2	7,890	14,200
	---	35.9	64.1	---	5.5	85.8	.9	5.4	2.4	8,560	15,410
w191316	1.0	24.2	41.0	33.8	3.7	54.4	.5	4.4	3.2	5,380	9,680
	---	24.4	41.4	34.1	3.6	54.9	.5	3.5	3.2	5,430	9,780
	---	37.1	62.9	---	5.5	83.4	.8	5.4	4.9	8,250	14,850
w191317	1.3	25.8	42.9	30.0	3.8	57.3	.5	4.7	3.7	5,700	10,260
	---	26.1	43.5	30.4	3.7	58.1	.5	3.6	3.7	5,780	10,400
	---	37.6	62.4	---	5.3	83.4	.7	5.2	5.4	8,300	14,930
w191321	2.1	37.3	48.9	11.7	5.3	73.2	1.4	7.6	.8	7,290	13,130
	---	38.1	49.9	12.0	5.2	74.8	1.4	5.9	.8	7,450	13,410
	---	43.3	56.7	---	5.9	84.9	1.6	6.7	.9	8,460	15,230
w191322	1.7	37.0	50.9	10.4	5.0	74.1	1.5	7.8	1.2	7,410	13,330
	---	37.6	51.8	10.6	4.9	75.4	1.5	6.4	1.2	7,530	13,560
	---	42.1	57.9	---	5.5	84.3	1.7	7.2	1.4	8,420	15,160
w191323	2.5	31.4	60.6	5.5	5.1	79.7	1.4	7.3	1.0	7,840	14,110
	---	32.2	62.2	5.6	4.9	81.7	1.4	5.2	1.0	8,040	14,470
	---	34.1	65.9	---	5.2	86.6	1.5	5.5	1.1	8,520	15,340
w191324	1.9	32.5	52.8	12.8	4.8	73.4	1.3	6.1	1.6	7,270	13,090
	---	33.1	53.8	13.0	4.7	74.8	1.3	4.5	1.6	7,410	13,340
	---	38.1	61.9	---	5.4	86.0	1.5	5.2	1.9	8,530	15,350
w191325	2.6	33.5	51.5	12.4	4.9	70.1	1.2	4.4	7.0	7,120	12,820
	---	34.4	52.9	12.7	4.7	72.0	1.2	2.1	7.2	7,310	13,160
	---	39.4	60.6	---	5.4	82.5	1.4	2.5	8.2	8,380	15,080
w191326	8.7	28.3	55.8	7.2	5.1	71.2	1.2	14.2	1.1	6,970	12,540
	---	31.0	61.1	7.9	4.5	78.0	1.3	7.1	1.2	7,630	13,730
	---	33.7	66.3	---	4.9	84.7	1.4	7.7	1.3	8,280	14,910

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w190590	0.0	0.00	0.00	0.00	5.5	1,330	1,360	1,390
	---	.00	.00	.00				
	---	.00	.00	.00				
w190591	.0	.00	.00	.00	8.0	1,140	1,165	1,250
	---	.00	.00	.00				
	---	.00	.00	.00				
w190592	.0	.00	.00	.00	7.5	1,320	1,350	1,405
	---	.00	.00	.00				
	---	.00	.00	.00				
w190593	.0	.00	.00	.00	7.5	1,320	1,350	1,455
	---	.00	.00	.00				
	---	.00	.00	.00				
w190594	.0	.00	.00	.00	8.5	1,095	1,120	1,170
	---	.00	.00	.00				
	---	.00	.00	.00				
w190595	.0	.00	.00	.00	5.5	1,095	1,120	1,165
	---	.00	.00	.00				
	---	.00	.00	.00				
w190596	.0	.00	.00	.00	7.5	1,080	1,110	1,165
	---	.00	.00	.00				
	---	.00	.00	.00				
w190597	.0	.00	.00	.00	8.0	1,115	1,145	1,195
	---	.00	.00	.00				
	---	.00	.00	.00				
w190599	.0	.00	.00	.00	8.0	1,170	1,230	1,290
	---	.00	.00	.00				
	---	.00	.00	.00				
w191309	.0	.00	.00	.00	7.5	1,320	1,350	1,415
	---	.00	.00	.00				
	---	.00	.00	.00				
w191310	.0	.00	.00	.00	8.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191311	.0	.00	.00	.00	5.0	1,090	1,115	1,145
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191312	0.0	0.00	0.00	0.00	5.5	1,320	1,350	1,380
	---	.00	.00	.00				
	---	.00	.00	.00				
w191313	.0	.00	.00	.00	5.5	1,350	1,405	1,600
	---	.00	.00	.00				
	---	.00	.00	.00				
w191314	.0	.00	.00	.00	4.0	1,450	1,560	1,600
	---	.00	.00	.00				
	---	.00	.00	.00				
w191315	.0	.00	.00	.00	7.5	1,170	1,200	1,265
	---	.00	.00	.00				
	---	.00	.00	.00				
w191316	.0	.00	.00	.00	4.5	1,245	1,315	1,425
	---	.00	.00	.00				
	---	.00	.00	.00				
w191317	.0	.00	.00	.00	5.5	1,220	1,290	1,355
	---	.00	.00	.00				
	---	.00	.00	.00				
w191321	.0	.00	.00	.00	6.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191322	.0	.00	.00	.00	7.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191323	.0	.00	.00	.00	8.5	1,380	1,410	1,440
	---	.00	.00	.00				
	---	.00	.00	.00				
w191324	.0	.00	.00	.00	8.0	1,295	1,315	1,345
	---	.00	.00	.00				
	---	.00	.00	.00				
w191325	.0	.00	.00	.00	7.5	1,140	1,195	1,260
	---	.00	.00	.00				
	---	.00	.00	.00				
w191326	.0	.00	.00	.00	6.5	1,260	1,295	1,320
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191327	2.9	35.6	44.9	16.6	4.8	67.0	1.5	7.5	2.6	6,700	12,060
	---	36.7	46.2	17.1	4.6	69.0	1.5	5.1	2.7	6,900	12,420
	---	44.2	55.8	---	5.6	83.2	1.9	6.1	3.2	8,320	14,980

Table 5e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 61 coal samples from Pennsylvania--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191327	0.0	0.00	0.00	0.00	7.5	1,170	1,200	1,305
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania.

[Values in percent or parts-per-million. Coal ashed at 525°C. L means less than the value shown; N, not detected; B, not determined; S after element title indicates determinations by automatic plate reading computer assisted, emission spectographic analyses. The standard deviation of any single answer should be taken as plus 50% and minus 35%. Methods of analyses for other elements as shown in figures.]

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w189266	17.4	44	29	0.53	0.86	0.77	3.2	9.8	1.1	1.0L	w189266
w189267	16.4	46	28	.47	.80	.34	2.5	9.8	1.0	1.0L	w189267
w189268	9.6	24	15	1.2	.37	.35	.78	34	.69	1.0L	w189268
w189269	35.0	45	18	.69	.96	.26	2.0	13	.86	1.0L	w189269
w189270	5.8	26	16	1.6	.46	.45	.65	28	1.3	1.0L	w189270
w190554	20.4	49	20	1.7	1.0	.35	2.9	13	1.0	.13	w190554
w190555	15.0	39	26	.63	.60	.42	1.7	20	1.1	.10	w190555
w190556	27.5	32	16	5.8	1.0	.17	2.0	31	.68	.10L	w190556
w190557	6.8	24	17	1.9	1.0	.33	.72	46	.66	.10L	w190557
w190558	11.5	26	13	.86	1.1	.23	1.1	50	.56	.10L	w190558
w190559	27.6	43	20	.37	.98	.21	2.6	21	.91	.10L	w190559
w190560	8.8	29	17	1.5	.60	.31	1.1	40	.69	.21	w190560
w190561	9.2	35	18	.87	.68	.28	1.4	34	.75	.10L	w190561
w190562	15.0	43	30	3.7	.85	.35	2.5	3.6	1.1	1.7	w190562
w190563	21.5	43	24	.39	.88	.27	2.8	16	1.1	.10L	w190563
w190564	11.9	35	24	.52	.46	.34	1.5	28	1.0	.10L	w190564
w190565	21.5	47	21	.62	1.1	.29	3.2	16	1.1	.10L	w190565
w190566	15.3	39	29	.28	.86	.24	1.8	16	.76	.10L	w190566
w190567	27.9	49	25	.23	.88	.29	2.3	7.8	1.2	.10L	w190567
w190568	20.1	45	22	.34	.56	.29	3.0	16	.94	.10L	w190568
w190569	21.7	46	20	.73	.93	.29	2.9	16	.99	.10L	w190569
w190570	14.1	41	28	.45	.68	.33	1.9	14	1.0	.12	w190570
w190571	16.5	43	27	.23	.66	.23	2.0	16	.95	.10L	w190571
w190572	26.5	51	26	.13	.94	.27	3.0	7.7	1.1	.10L	w190572
w190573	20.1	45	19	.69	1.0	.42	2.6	18	.97	.12	w190573
w190574	18.6	40	25	.66	.63	.36	1.9	20	1.1	.28	w190574
w190575	8.0	45	28	.61	.58	.53	2.1	13	1.1	.37	w190575
w190576	9.1	45	30	.79	.56	.60	2.0	5.5	1.0	.73	w190576
w190577	12.5	43	26	.62	.71	.31	2.3	16	.97	.10L	w190577
w190578	16.0	43	28	.48	.66	.35	2.3	13	1.4	.10L	w190578
w190579	7.0	30	26	1.5	.51	.26	1.4	30	1.1	.10L	w190579
w190580	9.0	22	20	1.5	.32	.16	.61	43	.95	.16	w190580
w190581	9.1	38	27	4.7	1.3	.65	2.0	9.3	1.1	.10L	w190581
w190582	24.0	54	24	.33	.85	.27	3.2	6.9	1.2	.10L	w190582
w190583	10.4	24	17	3.5	.20	.40	.33	43	.72	2.4	w190583
w190584	15.1	49	26	.39	.53	.43	1.7	10	1.4	.10L	w190584
w190585	36.9	47	25	.22	.70	.21	2.9	14	1.1	.10L	w190585
w190586	33.8	36	23	.11	.55	.15	1.9	28	.63	.10L	w190586
w190587	15.0	23	13	2.2	.22	.13	.51	53	.89	.10L	w190587
w190588	8.2	19	18	2.0	.28	.15	.23	51	.48	.10L	w190588

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w189266	0.85	0.57	94	720	12	5L	0.22	170	30	150	w189266
w189267	.79	1.3	74	540	29	5L	.66	280	82	210	w189267
w189268	1.8	.91	33	250	15	5L	.72	130	31	130	w189268
w189269	.95	.46L	120	610	10	5L	.54	120	34	140	w189269
w189270	3.5	3.6	57	2,100G	64	5L	1.7	100	200	210	w189270
w190554	1.3	.46L	160	710	10	5L	.24	93	19	160	w190554
w190555	.50	.46L	230	510	6.0	5L	.23	130	29	140	w190555
w190556	3.7	.46L	200	380	8.6	5L	.98	65	56	130	w190556
w190557	1.8	.62	460G	430	7.3	5L	1.1	120	38	280	w190557
w190558	.62	.57	350	140	11	5L	.72	70	26	83	w190558
w190559	.33	.46L	230	460	8.5	5L	.72	80	36	180	w190559
w190560	1.7	.46L	460G	150	7.6	5L	.70	91	24	100	w190560
w190561	.34	.57	440	200	12	9	.86	98	28	120	w190561
w190562	.20	.46L	290	710	9.6	5L	.72	170	49	170	w190562
w190563	.30	.46L	220	320	12	5L	.84	110	42	200	w190563
w190564	.10L	.46	250	320	7.6	5L	.34	130	39	130	w190564
w190565	.52	.46L	140	490	13	5L	.37	88	34	170	w190565
w190566	.17	.46L	250	350	9.9	5L	.76	150	42	130	w190566
w190567	.12	.46L	140	350	13	5L	.42	140	32	160	w190567
w190568	.10L	.46L	150	380	20	5L	.38	95	65	150	w190568
w190569	1.1	.46L	170	830	26	5L	.30	83	55	130	w190569
w190570	.40	.46	270	530	12	5L	.26	150	45	160	w190570
w190571	.10L	.46L	210	300	21	5L	.28	190	65	250	w190571
w190572	.10L	.46L	150	410	13	5L	.32	140	32	150	w190572
w190573	.49	.46L	210	380	14	5L	.26	85	30	160	w190573
w190574	.39	.46L	250	550	6.2	5L	.44	120	23	130	w190574
w190575	.10L	.46L	320	550	7.9	5L	.60	150	33	140	w190575
w190576	.10L	.46L	320	700	7.7	5L	.35	160	45	140	w190576
w190577	.27	.46L	320	530	8.5	5L	.30	130	30	140	w190577
w190578	.10L	.46L	240	620	11	5	.22	150	21	170	w190578
w190579	1.2	.84	94	210	15	5L	.63	130	43	140	w190579
w190580	1.1	.80	45	180	16	5L	.54	120	57	110	w190580
w190581	6.2	.51	290	1,500	13	5L	.16	140	25	160	w190581
w190582	.10L	.46L	170	680	13	5L	.16	88	12	160	w190582
w190583	.88	.57	320	530	11	5L	.90	140	50	100	w190583
w190584	.14	.46L	270	290	6.7	5L	1.0	190	41	190	w190584
w190585	.10L	.46L	150	330	7.0	5L	1.3	120	26	140	w190585
w190586	.10L	.46L	120	340	8.3	6	1.2	170	91	140	w190586
w190587	2.1	.58	170	100	25	5L	.64	110	69	84	w190587
w190588	2.2	.77	250	180	39	5L	.25	130	100	130	w190588

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w189266	17	180	15L	11	2.6	55	22L	3.2L	5.2	3.2L	w189266
w189267	16	400	60	18	5.2	84	22L	78	7.9	3.2L	w189267
w189268	4.2	100	15L	4.6L	2.9	56	22L	8.2	8.3L	3.2L	w189268
w189269	11	100	15L	4.6L	2.2	39	22L	3.2L	6.0	3.2L	w189269
w189270	5.2	230	15L	23	4.3	140	22L	170	10	3.2L	w189270
w190554	9.3	43	15L	4.6L	1.6	74	22L	19	6.9	3.2L	w190554
w190555	10	65	15L	9.1	2.1	37	22L	3.2L	7.3	3.2L	w190555
w190556	8.4	53	15L	4.6L	1.6	48	15L	14	5.1	3.2L	w190556
w190557	4.4	60	15L	6.8	2.2	28	22L	3.2L	5.9	3.2L	w190557
w190558	5.2	70	15L	4.6L	1.9	32	22L	73	3.5	3.2L	w190558
w190559	11	56	15L	4.6L	1.6	63	22L	18	6.2	3.2L	w190559
w190560	4.5	42	15L	4.6L	2.4	33	15L	3.2L	4.5	3.2L	w190560
w190561	7.6	65	15L	4.6L	2.0	38	22L	21	4.3	3.2L	w190561
w190562	13	10L	15L	5.8	3.1	43	22L	12	7.3	5.6	w190562
w190563	11	10L	15L	6.3	2.1	79	22L	30	7.0	3.2L	w190563
w190564	6.7	10L	15L	4.6L	3.2	43	22L	3.2L	6.7	32L	w190564
w190565	10	10L	15L	4.6L	1.7	51	22L	19	7.0	3.2L	w190565
w190566	11	48	15L	4.8	3.0	32	22L	3.2	5.2	15L	w190566
w190567	13	28	15L	9.0	2.4	49	22L	5.5	7.2	15L	w190567
w190568	11	41	15L	5.5	1.9	45	22L	150	6.0	15L	w190568
w190569	9.7	37	15L	4.6L	2.4	58	22L	23	7.8	3.2L	w190569
w190570	11	80	15L	9.5	2.7	49	22L	3.2L	7.1	3.2L	w190570
w190571	9.7	110	15L	18	4.5	89	22L	11	9.1	15L	w190571
w190572	12	95	15L	8.7	3.7	51	22L	14	6.0	3.2L	w190572
w190573	9.0	60	15L	10	2.3	51	22L	27	7.0	3.2L	w190573
w190574	10	56	15L	14	2.0	40	22L	3.2L	6.5	3.2L	w190574
w190575	10	50	15L	4.6L	4.0	31	22L	3.2L	6.3	3.2L	w190575
w190576	11	82	18	7.9	2.6	32	22L	4.3	6.6	3.2L	w190576
w190577	11	50	15L	8.4	2.7	34	22L	3.2L	6.4	15L	w190577
w190578	12	60	15L	11	2.9	48	22L	5.0	7.5	15L	w190578
w190579	7.1	120	15L	4.6L	3.0	37	22L	3.2L	5.7	68L	w190579
w190580	2.2	180	15L	4.6L	2.8	44	22L	3.2L	5.6	3.2L	w190580
w190581	6.6	41	15L	9.8	4.8	50	24	6.8	6.6	15L	w190581
w190582	15	22	15L	4.6L	1.5	58	22L	64	7.9	15L	w190582
w190583	1.9	62	15L	4.6L	2.9	30	22L	3.2L	4.8	3.2L	w190583
w190584	15	65	15L	4.6L	3.8	32	22L	3.2L	9.3	3.2L	w190584
w190585	12	84	15L	5.8	2.3	42	22L	4.2	6.2	3.2L	w190585
w190586	8.6	70	15L	7.8	3.7	39	22L	3.2L	6.5	3.2L	w190586
w190587	2.7	71	15L	4.6L	2.3	24	22L	3.2L	4.0	3.2L	w190587
w190588	1.2	120	15L	21	3.7	79	15L	25	3.7	3.2L	w190588

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Sample number
w189266	98	200	1	130	18	15	100L	69	65	16	w189266
w189267	120	150	2	130	66	16	110	230	130	25	w189267
w189268	42	100	1	130	H	15L	68L	70	37	14	w189268
w189269	66	260	1	150	16	17	68L	110	24	15	w189269
w189270	34	82	2	420	81	15L	68L	600	150	14	w189270
w190554	49	81	1	810	2.2L	15L	68L	34	23	10L	w190554
w190555	67	240	.7	130	5.3	15L	68L	60	31	12	w190555
w190556	36	74	1	750	8.1	15L	68L	78	38	10L	w190556
w190557	74	80	1	140	9.9	15L	68L	63	34	13	w190557
w190558	35	160	.9	92	11	15L	68L	56	38	12	w190558
w190559	40	110	1	130	5.0	15L	68L	97	89	10L	w190559
w190560	57	53	1	92	4.7	15L	68L	31	29	10L	w190560
w190561	54	88	1	85	18	15L	68L	71	32	11	w190561
w190562	93	210	1	300	2.2L	15L	68L	75	51	10	w190562
w190563	60	140	1	130	8.2	15L	68L	110	57	10L	w190563
w190564	67	180	.8	140	7.5	15L	68L	79	27	10L	w190564
w190565	47	100	.9	200	3.5	15L	68L	61	27	10L	w190565
w190566	78	300	1	110	9.7	15L	68L	77	37	10L	w190566
w190567	72	460	1	83	7.9	15L	68L	71	46	12	w190567
w190568	60	48	1	130	18	15L	68L	88	72	10L	w190568
w190569	51	58	1	480	5.0	15L	68L	94	24	10L	w190569
w190570	85	240	1	150	14	15L	68L	92	41	14	w190570
w190571	97	320	3	110	28	18	68L	88	52	11	w190571
w190572	83	270	1	120	22	15L	68L	70	42	10L	w190572
w190573	50	92	1	160	5.1	15L	68L	61	27	10L	w190573
w190574	75	210	.5	120	6.3	15L	68L	66	35	12	w190574
w190575	88	100	1	80	9.5	15L	68L	78	39	11	w190575
w190576	88	230	1	110	2.3	15L	68L	80	43	10L	w190576
w190577	64	130	.8	160	2.2L	15L	68L	61	25	10	w190577
w190578	75	150	1	120	4.6	17	68L	68	32	10L	w190578
w190579	57	130	1	59	25	15L	68L	220	37	13	w190579
w190580	67	94	1	52	32	15L	68L	110	84	14	w190580
w190581	88	130	1	160	3.8	16	68L	120	20L	15	w190581
w190582	50	120	.8	76	6.3	15L	68L	36	30	10L	w190582
w190583	77	110	1	130	26	15L	68L	110	32	14	w190583
w190584	120	180	1	100	2.2L	15L	68L	71	48	10L	w190584
w190585	62	170	.8	100	3.2	15L	68L	72	52	10L	w190585
w190586	74	260	1	120	5.6	15L	68L	130	27	11	w190586
w190587	47	94	.7	85	23	15L	68L	87	20L	14	w190587
w190588	49	44	2	120	25	15L	68L	170	65	16	w190588

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	Pt-S (ppm)	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm (ppm)	Sample number
w189266	7L	220	31	14	15L	540	2.9	17L	4.6L	3.2L	w189266
w189267	7L	150	55	27	15L	380	3.7	18L	4.6L	3.2L	w189267
w189268	7L	360L	19	14	15L	350	3.1	310	4.6L	3.2L	w189268
w189269	7L	200	23	11	15L	560	2.0	8.6L	4.6L	3.2L	w189269
w189270	7L	530L	45	17	15L	470	6.9	530	4.6L	3.2L	w189270
w190554	7L	160	30	8.8	15L	160	1.5	27	4.6L	3.2L	w190554
w190555	7L	160	26	12	15L	280	1.3	20L	4.6L	3.2L	w190555
w190556	7L	120	25	7.6	15L	150	1.5	20	4.6L	3.2L	w190556
w190557	7L	310L	25	12	15L	260	1.5	44L	4.6L	3.2L	w190557
w190558	7L	230L	17	7.0	15L	110	1.7	26L	4.6L	3.2L	w190558
w190559	7L	190	37	8.0	15L	120	1.8	23	4.6L	3.2L	w190559
w190560	7L	250L	18	10	15L	210	1.1	34L	4.6L	3.2L	w190560
w190561	7L	240L	22	9.8	15L	150	1.1	33L	4.6L	3.2L	w190561
w190562	7L	150	33	17	15L	920	2.0	27	4.6L	3.2L	w190562
w190563	7L	170	53	11	15L	230	1.9	24	4.6L	3.2L	w190563
w190564	7L	200L	25	12	15L	250	1.7	25L	4.6L	3.2L	w190564
w190565	7L	200	30	8.8	15L	160	1.4	19L	4.6L	3.2L	w190565
w190566	7L	120	31	16	15L	160	2.0	25	4.6L	3.2L	w190566
w190567	7L	180	34	14	15L	160	2.2	31	4.6L	3.2L	w190567
w190568	7L	210	29	10	15L	130	1.5	24	4.6L	3.2L	w190568
w190569	7L	170	32	11	15L	200	1.8	22	4.6L	3.2L	w190569
w190570	8	140	35	14	15L	380	2.1	44	4.6L	3.2L	w190570
w190571	7L	150	78	23	15L	200	3.6	100	4.6L	3.2L	w190571
w190572	7L	180	31	16	15L	150	1.9	30	4.6L	3.2L	w190572
w190573	7L	140	29	10	15L	220	1.5	22	4.6L	3.2L	w190573
w190574	7L	110	24	11	15L	510	1.6	24	4.6L	3.2L	w190574
w190575	7L	100	26	13	15L	600	13L	38L	4.6L	3.2L	w190575
w190576	7L	160	27	13	15L	1,600	2.2	33L	4.6L	3.2L	w190576
w190577	7L	140	26	12	15L	430	1.6	24L	4.6L	3.2L	w190577
w190578	7L	110	36	13	15L	400	1.9	35	4.6L	3.2L	w190578
w190579	7	190L	26	11	15L	240	1.4	43L	4.6L	3.2L	w190579
w190580	7L	130L	22	12	15L	320	1.1	33L	4.6L	3.2L	w190580
w190581	7L	180L	33	23	15L	610	3.3	33L	5.5	3.2L	w190581
w190582	7L	200	31	7.1	15L	190	1.3	18	4.6L	3.2L	w190582
w190583	7L	130L	21	13	15L	1,200	1.9	29L	4.6L	3.2L	w190583
w190584	7L	240	36	17	15L	160	2.0	20L	4.6L	3.2L	w190584
w190585	7L	140	26	8.9	15L	98	1.6	34	4.6L	3.2L	w190585
w190586	7L	83	29	15	15L	98	2.1	24	4.6L	3.2L	w190586
w190587	7L	80L	14	11	21	190	1.3	20L	4.6L	3.2L	w190587
w190588	7L	120L	28	20	15L	230	3.7	37L	4.6L	3.2L	w190588

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w189266	9.5	210	79	6.3	77	330	w189266
w189267	19	390	150	13	110	680	w189267
w189268	2.1L	110	86	7.3L	180	92	w189268
w189269	7.2	220	63	5.1	63	370	w189269
w189270	3.4L	220	150	12	500	450	w189270
w190554	10	160	19	5.4	88	84	w190554
w190555	7.8	130	35	4.7	43	200	w190555
w190556	6.9	110	25	6.5	200	140	w190556
w190557	4.4	92	31	5.9	94	77	w190557
w190558	1.7	50	17	4.3	290	48	w190558
w190559	6.9	160	21	6.5	160	96	w190559
w190560	2.3	49	24	4.5	73	62	w190560
w190561	6.3	95	28	3.3	99	69	w190561
w190562	7.5	160	38	6.0	150	97	w190562
w190563	7.7	160	32	8.4	140	64	w190563
w190564	7.2	100	29	4.2	52	80	w190564
w190565	9.9	200	22	6.0	160	79	w190565
w190566	9.0	120	30	7.2	370	63	w190566
w190567	8.5	200	63	8.2	110	180	w190567
w190568	7.4	140	28	6.0	74	69	w190568
w190569	6.3	120	27	7.8	270	84	w190569
w190570	8.6	180	61	7.1	150	210	w190570
w190571	19	470	90	17	200	210	w190571
w190572	8.9	160	45	7.2	120	150	w190572
w190573	7.4	200	31	6.0	94	160	w190573
w190574	6.9	150	41	4.8	34	250	w190574
w190575	7.3	150	39	3.8	110	190	w190575
w190576	5.6	160	38	4.4	130	150	w190576
w190577	7.6	130	39	4.8	57	190	w190577
w190578	8.1	230	53	5.6	110	280	w190578
w190579	6.4	140	60	5.7	110	350	w190579
w190580	5.3	97	59	4.4	110	410	w190580
w190581	9.7	160	97	7.7	180	290	w190581
w190582	8.3	210	31	4.2	79	210	w190582
w190583	5.8	110	53	4.8	150	260	w190583
w190584	8.9	110	30	6.0	250	150	w190584
w190585	6.3	120	26	4.3	110	170	w190585
w190586	8.5	160	39	6.2	410	210	w190586
w190587	3.7	75	64	4.0	86	380	w190587
w190588	6.1	120	130	12	130	400	w190588

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w190589	9.5	33	25	1.8	1.0	0.29	2.8	25	0.85	0.47	w190589
w190590	10.8	45	28	1.2	.90	.27	3.1	12	1.2	.80	w190590
w190591	20.0	29	18	.78	.60	.15	1.6	40	.66	.10L	w190591
w190592	15.4	44	25	.88	.78	.23	2.7	13	1.2	.11	w190592
w190593	21.1	44	26	.76	.83	.27	2.7	14	1.1	.10L	w190593
w190594	20.9	26	15	.75	.48	.19	1.8	46	.76	.10L	w190594
w190595	29.0	18	7.4	.42	.30	.09	.56	66	.60	.10L	w190595
w190596	10.8	25	17	1.3	.30	.16	.57	48	.74	.10L	w190596
w190597	6.0	20	15	3.5	.60	.24	.90	49	.54	.73	w190597
w190598	16.5	37	24	.62	.58	.29	1.6	24	1.0	.32	w190598
w190599	10.3	37	23	1.5	.65	.27	2.5	23	.95	.39	w190599
w191309	4.7	51	28	2.4	1.7	1.5	2.8	7.9	1.1	.60	w191309
w191310	2.7	45	32	3.7	1.1	1.5	1.5	3.5	1.6	.50	w191310
w191311	20.5	44	19	.20	1.1	.63	1.7	30	1.0	.07	w191311
w191312	27.9	51	28	1.2	1.3	1.0	2.6	11	1.1	1.0	w191312
w191313	14.8	52	28	2.7	.76	.46	1.9	9.1	1.3	1.5	w191313
w191314	7.5	40	24	1.2	1.2	1.5	1.5	27	.90	.09	w191314
w191315	7.6	40	25	1.2	1.2	1.9	1.5	27	.90	.30	w191315
w191316	36.1	50	26	.07	2.0	.90	3.7	13	.90	.07	w191316
w191317	31.3	48	23	.30	2.0	1.2	3.8	17	1.0	.30	w191317
w191318	18.9	55	22	.60	1.3	1.1	2.9	14	1.9	.20	w191318
w191319	13.5	40	24	.50	.78	1.1	1.6	30	.90	.30	w191319
w191320	24.3	53	26	.20	1.1	.78	2.2	13	1.3	.05	w191320
w191321	13.1	65	23	.70	.63	.55	1.2	3.6	2.3	.90	w191321
w191322	11.2	52	29	1.2	1.1	.98	1.7	11	1.6	.80	w191322
w191323	5.2	48	28	1.3	.58	1.1	1.5	16	1.4	.30	w191323
w191324	11.4	51	27	.70	1.1	.74	2.8	14	1.3	.20	w191324
w191325	12.7	42	32	2.7	.40	.11	3.3	4.8	1.4	.20	w191325
w191326	7.9	20	11	.80	1.2	.89	1.0	64	.50	.05	w191326
w191327	17.1	54	23	.60	1.6	.97	3.1	16	1.2	.30	w191327
w193125	15.5	46	20	.72	.76	.25	2.4	19	1.2	.25	w193125

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w190589	1.1	0.47	280	390	9.9	5L	0.32	130	49	140	w190589
w190590	.56	.54	250	920	13	5L	.14	200	42	150	w190590
w190591	.57	.46L	93	170	29	5L	1.9	300	280	88	w190591
w190592	.10L	.46L	120	390	11	5L	.76	140	41	170	w190592
w190593	.10L	.46L	100	350	14	5L	.95	120	49	130	w190593
w190594	.42	.75	57	210	16	5L	3.0	62	49	160	w190594
w190595	.77	.48	150	290	21	15	.30	79	31	49	w190595
w190596	.94	.72	340	260	37	5L	.90	310	130	130	w190596
w190597	3.0	.89	310	240	27	5L	.24	100	60	110	w190597
w190598	.18	.46L	210	370	5.8	5L	.36	150	29	140	w190598
w190599	.67	.54	220	310	22	5L	.72	170	49	160	w190599
w191309	4.6	.22	200	720	88	22L	.90	210	230	180	w191309
w191310	4.1	.33	320	560	130	22L	.92	220	590	300	w191310
w191311	1.4	.55	39	280	26	22L	.58	73	67	120	w191311
w191312	1.5	.27	77	970	14	22L	.42	140	42	100	w191312
w191313	1.5	.34	86	910	11	22L	.52	160	45	150	w191313
w191314	2.4	.66	70	420	16	22L	2.2	590	79	630	w191314
w191315	2.6	.63	61	400	16	22L	2.2	120	99	150	w191315
w191316	1.7	.20	69	320	8.3	22L	.90	130	25	110	w191316
w191317	1.6	.33	69	440	18	22L	1.2	120	39	110	w191317
w191318	1.9	.13	230	480	20	22L	.48	110	31	270	w191318
w191319	1.5	.31	430	470	8.8	22L	.72	130	41	140	w191319
w191320	1.4	.17	190	360	15	22L	.70	160	26	130	w191320
w191321	1.3	.42	180	770	33	22L	.74	220	50	150	w191321
w191322	1.9	1.2	190	1,100	28	22L	1.0	220	61	160	w191322
w191323	2.7	.61	83	330	51	22L	2.3	210	280	230	w191323
w191324	2.1	.30	110	2,900	16	22L	6.4	160	40	180	w191324
w191325	10	.72	H	470	34	22L	.92	71	43	80	w191325
w191326	1.7	1.5	130	3,900	41	22L	.26	110	20	210	w191326
w191327	1.8	.12	230	470	16	22L	.34	94	41	180	w191327
w193125	1.0	.10	290	450	7.0	22L	.54	140	35	160	w193125

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w190589	9.5	180	15L	4.6L	3.3	45	22L	3.2L	5.3	3.2L	w190589
w190590	13	93	15L	5.0	4.4	57	22L	3.2L	6.5	3.2L	w190590
w190591	6.5	22	15L	35	11	62	15L	100	2.5	3.2L	w190591
w190592	11	88	15L	6.4	2.4	46	22L	3.3	6.5	3.2L	w190592
w190593	11	74	15L	4.6L	2.1	37	22L	3.5	5.7	15L	w190593
w190594	6.7	82	15L	4.6L	2.0	98	22L	290	3.8	3.2L	w190594
w190595	2.4	29	15L	4.6L	2.1	28	22L	3.2L	3.1	3.2L	w190595
w190596	2.8	110	15L	24	8.9	50	15L	62	3.7	32L	w190596
w190597	3.3	66	15L	11	3.5	98	15L	120	5.0	3.2L	w190597
w190598	9.1	53	15L	4.6L	2.6	38	22L	3.2L	6.1	15L	w190598
w190599	9.7	100	15L	13	4.5	140	22L	42	5.8	3.2L	w190599
w191309	11	240	40	27	9.6	180	32	200	43	10	w191309
w191310	44L	490	100	57	19	740	92	1,300	70	20	w191310
w191311	11	93	32L	10L	2.1	53	6.8L	230	3.9	6.8L	w191311
w191312	12	90	32L	11	2.5	57	19	73	7.2	6.8L	w191312
w191313	10	67	32L	10L	2.8	49	16	4.6L	6.1	6.8L	w191313
w191314	67	75	32L	10L	11	50	19	20	25	6.8L	w191314
w191315	5.3	150	32L	10L	2.5	55	17	20	18	6.8L	w191315
w191316	15	160	32L	10L	3.1	40	6.8L	4.6L	5.3	6.8L	w191316
w191317	16	180	32L	13	3.1	47	14	35	5.4	6.8L	w191317
w191318	12	170	32L	10L	2.2	77	15	31	8.5	6.8L	w191318
w191319	8.1	77	32L	10L	2.5	46	16	5.9	5.9	6.8L	w191319
w191320	13	72	32L	11	3.0	41	14	4.7	6.2	6.8L	w191320
w191321	3.1	130	32L	17	3.8	61	19	81	6.1	6.8L	w191321
w191322	5.4	140	32L	12	3.8	94	13	46	14	6.8L	w191322
w191323	9.6	160	32L	10L	4.2	88	13	84	13	6.8L	w191323
w191324	14	90	32L	10L	2.5	39	6.8L	4.6L	6.1	6.8L	w191324
w191325	3.9	70	32L	10L	1.4	79	6.8L	46	2.4	6.8L	w191325
w191326	14	54	32L	10L	2.3	170	17	530	6.3	6.8L	w191326
w191327	9.4	59	32L	10L	2.2	74	6.8L	30	7.0	6.8L	w191327
w193125	10	75	32L	10L	2.6	41	7.0L	6.0	5.8	7.0L	w193125

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Sample number
w190589	74	230	1	120	18	15L	68L	75	77	10L	w190589
w190590	100	160	.9	120	31	15L	68L	120	65	13	w190590
w190591	90	110	4	130	26	15L	68L	230	210	20	w190591
w190592	78	150	1	98	8.7	15L	68L	76	48	12	w190592
w190593	62	140	.9	110	7.3	15L	68L	77	34	10L	w190593
w190594	29	68	1	170	31	17	68L	97	55	11	w190594
w190595	34	84	.7	1,500	15	15L	68L	32	20L	15	w190595
w190596	100	88	4	92	43	19	68L	190	96	22	w190596
w190597	50	62	2	140	48	15L	68L	140	70	14	w190597
w190598	79	280	.6	120	5.6	15L	68L	49	27	10L	w190598
w190599	87	120	2	120	35	15L	68L	160	120	10	w190599
w191309	85	140	2	320	64	20	160	570	150	68L	w191309
w191310	74	190	7	470	160	30	210	1,800	180	68L	w191310
w191311	39	270	2	130	53	27	54	150	95	68L	w191311
w191312	65	250	1	130	17	33	170	86	45	68L	w191312
w191313	88	170	.7	72	30	33	100	110	48	75	w191313
w191314	250	220	3	120	120	26	99	270	91	68L	w191314
w191315	53	230	1	120	130	24	96	280	81	68L	w191315
w191316	61	270	1	140	14	10	64	62	53	68L	w191316
w191317	67	130	1	150	38	24	120	120	50	68L	w191317
w191318	53	64	2	220	14	30	120	87	26	68L	w191318
w191319	67	160	1	140	22	28	85	72	26	68L	w191319
w191320	78	250	1	89	8.6	35	89	43	31	68L	w191320
w191321	110	130	2	77	30	69	220	190	94	68L	w191321
w191322	130	180	2	84	31	21	140	200	110	68L	w191322
w191323	96	89	2	100	75	29	110	390	140	79	w191323
w191324	79	110	.9	85	20	21	71	59	28	71	w191324
w191325	24	34	.8L	240	71	16	60	190	85	68L	w191325
w191326	63	58	3	380	64	48	82	95	68	68L	w191326
w191327	47	81	1	230	17	29	81	94	32	68L	w191327
w193125	65	170	1	130	7.0	6	46L	53	38	68L	w193125

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	Pt-S (ppm)	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm (ppm)	Sample number
w190589	7L	95	25	14	15L	340	3.2	32L	35	3.2L	w190589
w190590	7L	180	32	19	15L	870	2.8	28L	4.6L	3.2L	w190590
w190591	7L	70	38	39	15L	120	9.5	27	4.6L	3.2L	w190591
w190592	7L	160	33	13	15L	280	2.6	34	4.6L	3.2L	w190592
w190593	7L	130	24	11	15L	210	1.9	25	4.6L	3.2L	w190593
w190594	7L	100	41	6.2	15L	150	1.9	32	4.6L	3.2L	w190594
w190595	7L	55L	9.3	8.3	19	78	1.4	16	4.6L	3.2L	w190595
w190596	7L	110L	34	38	15L	170	7.4	28L	4.6L	3.2L	w190596
w190597	7L	150L	22	13	15L	290	1.7	50L	4.6L	3.2L	w190597
w190598	7L	91	25	13	15L	450	1.8	29	4.6L	3.2L	w190598
w190599	7L	110	32	20	15L	200	3.9	29L	4.6L	3.2L	w190599
w191309	7L	640L	51	36	35	770	6.4	64L	10L	4.6L	w191309
w191310	7L	890L	110	59	33	1,500	15	110	10L	7.5	w191310
w191311	7L	73	29	5.4	12	200	2.4	26	24	4.6L	w191311
w191312	7L	170L	29	4.3	15	1,200	2.2	18	10L	4.6L	w191312
w191313	7L	260L	30	14	19	1,300	2.0	20L	10L	4.6L	w191313
w191314	7L	710L	120	40	25	490	6.7	110	10L	4.6L	w191314
w191315	7L	490L	33	13	24	490	3.9L	39L	10L	4.6L	w191315
w191316	7L	120	27	12	6.8L	150	2.5	35	10L	4.6L	w191316
w191317	7L	180	28	12	13	220	2.6	13	10L	4.6L	w191317
w191318	7L	200L	50	11	20	280	2.1	16L	10L	4.6L	w191318
w191319	7L	210L	32	15	11	760	2.2	22L	10L	4.6L	w191319
w191320	7L	91	32	16	6.8L	230	2.5	36	10L	4.6L	w191320
w191321	7L	180L	34	22	15	2,700	3.1	23	10L	4.6L	w191321
w191322	7L	210L	37	22	6.8L	2,100	3.6	27L	10L	4.6L	w191322
w191323	7L	420L	46	23	6.8L	630	3.8	58L	10L	4.6L	w191323
w191324	7L	110	32	15	6.8L	400	1.8	35	10L	4.6L	w191324
w191325	7L	230L	16	5.5	10	200	3.1L	24L	10L	4.6L	w191325
w191326	7L	270	51	13	14	870	2.5	38L	14	4.6L	w191326
w191327	7L	110	39	9.4	6.8L	290	1.8	30	10L	4.6L	w191327
w193125	7L	150	32	12	7.0L	380	1.9	19L	10L	5.0L	w193125

Table 5f.-- Major and minor oxide and trace element composition of the laboratory ash of 71 coal samples from Pennsylvania--continued

Sample number	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w190589	7.6	120	27	6.3	85	50	w190589
w190590	9.6	160	45	6.5	86	85	w190590
w190591	4.7	58	160	24	1,300	66	w190591
w190592	8.8	170	55	5.8	160	240	w190592
w190593	6.8	91	23	5.2	380	58	w190593
w190594	10	140	52	5.3	610	290	w190594
w190595	2.0	37	39	2.4	64	73	w190595
w190596	6.9	100	170	18	280	490	w190596
w190597	3.3L	92	77	8.3	98	59	w190597
w190598	5.0	100	17	4.2	61	60	w190598
w190599	6.3	140	67	9.7	370	84	w190599
w191309	11	220	170	17	340	230	w191309
w191310	27	370	260	44	600	440	w191310
w191311	9.3	140	90	7.8	78	250	w191311
w191312	6.8	250	94	6.1	110	350	w191312
w191313	9.2	210	80	4.7	72	370	w191313
w191314	38	190	65	15	380	370	w191314
w191315	8.2	210	66	3.9	380	310	w191315
w191316	11	170	44	5.0	140	100	w191316
w191317	13	240	84	5.1	170	340	w191317
w191318	10	720	78	5.8	110	430	w191318
w191319	7.3	170	59	5.9	62	340	w191319
w191320	8.1	160	84	7.0	100	380	w191320
w191321	10	200	170	7.6	140	730	w191321
w191322	9.5	210	87	9.8	190	140	w191322
w191323	11	180	100	7.7	400	340	w191323
w191324	8.5	150	42	6.1	700	180	w191324
w191325	3.4	65	32	16	210	71	w191325
w191326	18	320	190	13	120	670	w191326
w191327	7.4	370	84	7.6	140	380	w191327
w193125	8.4	140	12	6.5	82	50	w193125

Table 5g.-- Content of 22 trace elements in 71 coal samples from Pennsylvania.

[Analysis performed on whole coal. Values in parts-per-million (ppm). L, less than the value shown, B, not determined.]

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w189266	16	30	5.3	26	2.9	0.46	110	0.9	0.51	17	w189266
w189267	15	46	13	35	2.7	.86	78	1.3	.32	20	w189267
w189268	34	12	3.0	13	.4	.28	21	.8L	.41	4	w189268
w189269	42	42	12	47	3.9	.78	190	2.1	.41	23	w189269
w189270	14	6.0	12	12	.3	.25	36	.6	.40	2	w189270
w190554	8.0	19	3.8	32	1.9	.33	140	1.4	.10	10	w190554
w190555	5.0	20	4.3	21	1.5	.31	61	1.1	.19	10	w190555
w190556	60	18	16	37	2.3	.43	120	1.4	.33	10	w190556
w190557	23	8.0	2.6	19	.3	.15	33	.4	.13	5	w190557
w190558	170	8.0	3.0	9.5	.6	.22	53	.4	.12	4	w190558
w190559	29	22	9.8	49	3.1	.44	150	1.7	.17	11	w190559
w190560	70	8.0	2.1	9.2	.4	.21	46	.4	.23	5	w190560
w190561	120	9.0	2.6	11	.7	.18	48	.4	.060	5	w190561
w190562	1.0	25	7.3	26	1.9	.46	230	1.1	.035	14	w190562
w190563	22	23	9.0	43	2.3	.45	130	1.5	.20	13	w190563
w190564	10	15	4.7	15	.8	.38	46	.8	.080	8	w190564
w190565	8.0	19	7.3	36	2.2	.36	220	1.5	.080	10	w190565
w190566	22	23	6.4	20	1.7	.46	60	.8	.087	12	w190566
w190567	26	38	9.0	43	3.7	.68	140	2.0	.21	20	w190567
w190568	35	19	13	30	2.2	.38	130	1.2	.050	12	w190568
w190569	10	18	12	28	2.1	.52	130	1.7	.16	11	w190569
w190570	14	21	6.3	23	1.5	.38	63	1.0	.15	12	w190570
w190571	22	31	11	41	1.6	.75	88	1.5	.20	16	w190571
w190572	18	38	8.4	40	3.2	.97	180	1.6	.18	22	w190572
w190573	13	17	6.1	33	1.8	.47	130	1.4	.13	10	w190573
w190574	15	23	4.3	25	1.9	.38	110	1.2	.17	14	w190574
w190575	8.0	12	2.6	11	.8	.32	20L	.5	.17	7	w190575
w190576	2.0	15	4.1	13	1.0	.24	80	.6	.034	8	w190576
w190577	3.0	16	3.7	18	1.4	.34	74	.8	.080	8	w190577
w190578	10	24	3.4	27	1.9	.47	84	1.2	.12	12	w190578
w190579	18	9.0	3.0	9.5	.5	.21	34	.4	.79	4	w190579
w190580	20	11	5.1	10	.2	.25	36	.5	1.6	6	w190580
w190581	3.0	13	2.3	15	.6	.44	49	.6	.41	8	w190581
w190582	7.0	21	2.8	38	3.7	.37	160	1.9	.23	12	w190582
w190583	23	15	5.2	11	.2	.30	210	.5	.59	8	w190583
w190584	11	29	6.2	29	2.3	.57	84	1.4	.16	18	w190584
w190585	14	44	9.6	53	4.3	.84	210	2.3	.46	23	w190585
w190586	30	59	31	46	2.9	1.2	120	2.2	.83	25	w190586
w190587	18	16	10	13	.4	.34	23	.6	.50	7	w190587
w190588	7.0	11	8.4	11	.1	.30	29	.3	.16	4	w190588

Table 5g.-- Content of 22 trace elements in 71 coal samples from Pennsylvania--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w189266	0.2	990	760L	39	1.0	5.4	3.3	2.4	0.5	3.0L	w189266
w189267	.4	410	720L	25	2.5	9.1	4.2	4.4	.6	3.0L	w189267
w189268	.1	250	420L	35L	.60	1.8	2.3L	1.3	.3	30	w189268
w189269	.4	670	1,500L	70	2.0	8.0	6.5	3.8	.7	3.0L	w189269
w189270	.1	190	250L	31L	2.5	2.6	1.2	1.0	.4	31	w189270
w190554	.2	530	120	32	.40	6.2	4.0	1.8	.3	5.5	w190554
w190555	.1	470	66	24	.30	3.9	4.3	1.8	.2	3.0L	w190555
w190556	.3	350	120L	34	1.5	6.8	2.2	2.1	.4	5.5	w190556
w190557	.1	170	30L	21L	.40	1.7	2.1	.80	.1	3.0L	w190557
w190558	.1	200	50L	26L	2.2	2.0	1.0	.80	.2	3.0L	w190558
w190559	.3	430	120L	53	1.7	10	2.2	2.2	.5	6.4	w190559
w190560	.1	200	81	22L	.80	1.6	2.3	.90	.1	3.0L	w190560
w190561	.1	190	40L	22L	1.2	2.0	1.2	.90	.1	3.0L	w190561
w190562	.2	390	1,100	23	.40	4.9	1.3	2.6	.3	4.0	w190562
w190563	.3	430	94L	37	2.8	11	2.6	2.3	.4	5.2	w190563
w190564	.1	300	52L	24L	.30	3.0	3.4	1.4	.2	3.0L	w190564
w190565	.2	460	94L	44	26	6.5	2.2	1.9	.3	4.0L	w190565
w190566	.2	270	67L	18	.40	4.7	2.5	2.4	.3	3.9	w190566
w190567	.4	600	120L	49	.90	9.4	3.5	4.0	.6	8.5	w190567
w190568	.2	430	88L	43	1.7	5.8	1.8	2.1	.3	4.8	w190568
w190569	.3	470	95L	37	.40	6.9	1.5	2.3	.4	4.9	w190569
w190570	.2	340	74	20	.40	4.9	4.1	2.0	.3	6.3	w190570
w190571	.5	280	72L	24	1.0	13	3.1	3.8	.6	16	w190571
w190572	.3	530	120L	47	1.4	8.3	2.5	4.3	.5	8.0	w190572
w190573	.2	630	110	28	.30	5.8	1.2	2.0	.3	4.5	w190573
w190574	.1	500	230	21	.30	4.4	5.3	2.1	.3	4.4	w190574
w190575	.1	310	130	8	.20	2.1	2.3	1.0	1L	3.0L	w190575
w190576	.1	400	290	15	.20	2.5	2.2	1.2	.2	3.0L	w190576
w190577	.1	290	55L	18	.20	3.2	1.1	1.5	.2	3.0L	w190577
w190578	.2	410	70L	17	.40	5.7	3.1	2.1	.3	5.7	w190578
w190579	.1	130	31L	13L	.30	1.8	2.0	.80	.1	3.0L	w190579
w190580	.1	110	63	12L	.30	2.0	3.0	1.1	.1	3.0L	w190580
w190581	.1	440	40L	16L	.20	3.0	1.4	2.1	.3	3.0L	w190581
w190582	.2	480	100L	48	.40	7.5	3.3	1.7	.3	4.4	w190582
w190583	.1	310	1,100	13L	.40	2.2	7.1	1.4	.2	3.0L	w190583
w190584	.2	480	66L	36	1.3	5.5	1.7	2.6	.3	3.0L	w190584
w190585	.3	570	160L	50	2.1	9.5	4.8	3.3	.6	13	w190585
w190586	.4	380	150L	28	1.0	9.7	7.8	5.0	.7	8.1	w190586
w190587	.1	140	66L	12L	.20	2.1	4.4	1.6	.2	3.0L	w190587
w190588	.2	91	36L	10L	.20	2.3	3.2	1.6	.3	3.0L	w190588

Table 5g.-- Content of 22 trace elements in 71 coal samples from Pennsylvania--continued

Sample number	U (ppm)	Yb (ppm)
w190589	0.72	0.6
w190590	1.0	.7
w190591	.93	4.8
w190592	1.4	.9
w190593	1.4	1.1
w190594	2.1	1.1
w190595	.59	.7
w190596	.75	1.9
w190597	.20L	.5
w190598	.83	.7
w190599	.65	1.0
w191309	.53	.8
w191310	.72	1.2
w191311	1.9	1.6
w191312	1.9	1.7
w191313	1.4	.7
w191314	2.9	1.1
w191315	.62	.3
w191316	4.1	1.8
w191317	4.1	1.6
w191318	1.9	1.1
w191319	.99	.8
w191320	2.0	1.7
w191321	1.4	1.0
w191322	1.1	1.1
w191323	.59	.4
w191324	.97	.7
w191325	.43	2.0
w191326	1.4	1.0
w191327	1.3	1.3
w193125	1.3	1.0

Table 5g.-- Content of 22 trace elements in 71 coal samples from Pennsylvania--continued

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w190589	84	12	4.7	13	0.9	0.31	110	0.5	0.82	7	w190589
w190590	13	22	4.5	17	1.4	.47	120	.7	.15	11	w190590
w190591	92	60	55	18	1.3	2.1	74	.5	.64	18	w190591
w190592	22	21	6.3	26	1.7	.37	90	1.0	.17	12	w190592
w190593	27	25	10	27	2.3	.45	110	1.2	.36	13	w190593
w190594	150	13	10	33	1.4	.41	84	.8	.61	6	w190594
w190595	140	23	8.9	14	.7	.61	20L	.9	1.6	10	w190595
w190596	43	33	14	14	.3	.96	43	.4	.47	11	w190596
w190597	55	6.0	3.6	6.3	.2	.21	62	.3	.49	3	w190597
w190598	19	24	4.8	23	1.5	.43	86	1.0	.22	13	w190598
w190599	35	17	5.0	17	1.0	.46	76	.6	.35	9	w190599
w191309	1.0	10	11	8.5	.5	.45	20	2.0	.025	4	w191309
w191310	1.0	6.0	16	8.2	1.2L	.51	20L	1.9	.038	2	w191310
w191311	1.0	15	14	25	2.3	.43	64	.8	.99	8	w191311
w191312	57	38	12	28	3.4	.71	290	2.0	.48	18	w191312
w191313	26	24	6.6	22	1.5	.41	240	.9	.38	13	w191313
w191314	14	44	5.9	48	5.0	.80	160	1.9	.16	19	w191314
w191315	37	9.0	7.5	12	.4	.19	40	1.4	.65	4	w191315
w191316	14	47	9.2	40	5.4	1.1	220	1.9	.24	22	w191316
w191317	18	38	12	36	5.0	.97	72	1.7	.21	21	w191317
w191318	6.0	20	5.9	50	2.3	.41	150	1.6	.095	10	w191318
w191319	23	17	5.6	19	1.1	.34	160	.8	.16	9	w191319
w191320	21	39	6.2	32	3.2	.74	130	1.5	.15	19	w191320
w191321	4.0	29	6.6	20	.4	.50	100	.8	.31	15	w191321
w191322	6.4	25	6.8	18	.6	.43	80	1.6	.66	14	w191322
w191323	31	11	15	12	.5	.22	40	.7	.50	5	w191323
w191324	35	18	4.6	20	1.6	.29	100	.7	.57	9	w191324
w191325	140	9.0	5.4	10	.5	.18	140	.3	.97	3	w191325
w191326	4.0	9.0	1.6	17	1.1	.18	100	.5	.52	5	w191326
w191327	9.0	16	7.0	31	1.6	.38	110	1.2	.11	8	w191327
w193125	12	21	5.5	24	1.6	.41	96	.9	.060	10	w193125

Table 5g.-- Content of 22 trace elements in 71 coal samples from Pennsylvania--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w190589	0.1	200	200	9	0.90	2.4	1.5	1.3	0.3	3.0L	w190589
w190590	.1	220	380	19	.50	3.5	1.4	2.1	.3	3.0L	w190590
w190591	.8	220	87L	14	1.6	7.6	.9	7.7	2	5.4	w190591
w190592	.2	260	74	24	.60	5.1	2.9	2.0	.4	5.3	w190592
w190593	.2	420	92L	28	.50	5.1	2.6	2.4	.4	5.4	w190593
w190594	.2	290	91L	21	2.0	8.6	2.9	1.3	.4	6.6	w190594
w190595	.2	190	130L	16L	1.1	2.7	5.4	2.4	.4	4.7	w190595
w190596	.4	130	47L	12L	.40	3.7	3.1	4.1	.8	3.0L	w190596
w190597	.1	110	190	9L	1.0	1.3	1.4	.80	.1	3.0L	w190597
w190598	.1	350	230	15	.40	4.1	4.4	2.1	.3	4.8	w190598
w190599	.2	210	180	11	1.1	3.3	2.4	2.1	.4	3.0L	w190599
w191309	.1	520	120	30L	3.4	2.4	2.1	1.7	.3	3.0L	w191309
w191310	.2	300	59	24L	9.9	3.1	3.2L	1.6	.4	3.0	w191310
w191311	.4	960	63	15	9.8	5.9	2.6	1.1	.5	5.4	w191311
w191312	.3	2,100	1,200	48L	2.0	8.2	2.8	1.2	.6	5.1	w191312
w191313	.1	500	970	38L	.76	4.4	2.5	2.1	.3	3.0L	w191313
w191314	.2	820	29	53L	.87	9.3	3.4	3.0	.5	7.9	w191314
w191315	.1	1,100	100	37L	.85	2.5	2.7	1.0	.3L	3.0L	w191315
w191316	.4	2,400	110	44	1.9	9.9	1.8	4.4	.9	13	w191316
w191317	.4	2,800	410	55	3.8	8.7	4.5L	3.7	.8	4.0	w191317
w191318	.3	1,500	170	38L	.47	9.4	2.8	2.1	.4	3.0L	w191318
w191319	.2	1,100	180	28L	.45	4.3	4.0	2.0	.3	3.0L	w191319
w191320	.3	1,400	53	22	.68	7.7	3.1	3.9	.6	8.7	w191320
w191321	.2	530	520	23L	1.6	4.4	3.0	2.9	.4	3.0	w191321
w191322	.2	810	390	24L	1.0	4.1	3.5	2.5	.4	3.0L	w191322
w191323	.1	410	68	22L	2.8	2.4	1.9	1.2	.2	3.0L	w191323
w191324	.1	630	100	12	.77	3.6	1.5	1.7	.2	4.0	w191324
w191325	.1L	100	110	29L	4.0	2.0	2.4	.70	.4L	3.0L	w191325
w191326	.2	520	17	21	7.0	4.0	2.5	1.0	.2	3.0L	w191326
w191327	.2	1,200	220	18	.62	6.6	1.7	1.6	.3	5.2	w191327
w193125	.2	290	170	23	.60	5.0	3.2	1.8	.3	3.0L	w193125

Table 5g.-- Content of 22 trace elements in 71 coal samples from Pennsylvania--continued

Sample number	U (ppm)	Yb (ppm)
w189266	1.7	1.1
w189267	3.2	2.2
w189268	.20L	.7L
w189269	2.5	1.8
w189270	.20L	.7
w190554	2.1	1.1
w190555	1.2	.7
w190556	1.9	1.8
w190557	.30	.4
w190558	.20	.5
w190559	1.9	1.8
w190560	.20	.4
w190561	.58	.3
w190562	1.1	.9
w190563	1.7	1.8
w190564	.86	.5
w190565	2.1	1.3
w190566	1.4	1.1
w190567	2.4	2.3
w190568	1.5	1.2
w190569	1.4	1.7
w190570	1.2	1.0
w190571	3.2	2.8
w190572	2.4	1.9
w190573	1.5	1.2
w190574	1.3	.9
w190575	.58	.3
w190576	.51	.4
w190577	.95	.6
w190578	1.3	.9
w190579	.45	.4
w190580	.48	.4
w190581	.88	.7
w190582	2.0	1.0
w190583	.60	.5
w190584	1.3	.9
w190585	2.3	1.6
w190586	2.9	2.1
w190587	.55	.6
w190588	.50	1.0

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis.

[Values in percent or parts-per-million; 22 values are from direct determinations on whole coal; all other values calculated from analyses of ash. S means analysis by emission spectrography; L, less than the value shown; N, not detected; B, not determined.]

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w189266	3.6	2.6	0.066	0.090	0.099	0.14	1.2	0.11	0.10	16	w189266
w189267	3.5	2.5	.055	.079	.041	.14	1.1	.098	.21	15	w189267
w189268	1.1	.75	.080	.021	.025	.080	2.3	.040	.09	34	w189268
w189269	7.3	3.4	.17	.20	.067	.29	3.1	.18	.16L	42	w189269
w189270	.70	.50	.065	.016	.019	.048	1.1	.045	.21	14	w189270
w190554	4.6	2.2	.25	.13	.053	.17	1.8	.13	.09L	8.0	w190554
w190555	2.8	2.0	.067	.054	.047	.12	2.1	.10	.07L	5.0	w190555
w190556	4.0	2.3	1.1	.17	.035	.23	5.9	.11	.13L	60	w190556
w190557	.76	.60	.094	.042	.017	.057	2.2	.027	.04	23	w190557
w190558	1.4	.77	.071	.075	.020	.096	4.1	.039	.07	170	w190558
w190559	5.5	3.0	.073	.16	.043	.23	4.0	.15	.13L	29	w190559
w190560	1.2	.81	.094	.032	.020	.073	2.4	.036	.04L	70	w190560
w190561	1.5	.89	.057	.038	.019	.077	2.2	.041	.05	120	w190561
w190562	3.0	2.4	.39	.077	.039	.12	.38	.10	.07L	1.0	w190562
w190563	4.3	2.8	.060	.11	.043	.18	2.4	.14	.10L	22	w190563
w190564	2.0	1.5	.044	.033	.030	.099	2.3	.072	.05	10	w190564
w190565	4.7	2.3	.095	.15	.046	.18	2.5	.14	.10L	8.0	w190565
w190566	2.8	2.3	.031	.079	.027	.13	1.8	.070	.07L	22	w190566
w190567	6.4	3.8	.046	.15	.060	.23	1.5	.20	.13L	26	w190567
w190568	4.2	2.4	.049	.068	.043	.17	2.3	.11	.09L	35	w190568
w190569	4.7	2.3	.11	.12	.047	.18	2.4	.13	.10L	10	w190569
w190570	2.7	2.1	.045	.058	.034	.12	1.4	.086	.06	14	w190570
w190571	3.3	2.4	.027	.066	.028	.14	1.8	.094	.08L	22	w190571
w190572	6.3	3.6	.025	.15	.053	.22	1.4	.17	.12L	18	w190572
w190573	4.2	2.1	.099	.12	.063	.17	2.5	.12	.09L	13	w190573
w190574	3.4	2.4	.088	.071	.050	.15	2.6	.12	.09L	15	w190574
w190575	1.7	1.2	.035	.028	.031	.067	.72	.051	.04L	8.0	w190575
w190576	1.9	1.4	.051	.031	.040	.076	.35	.055	.04L	2.0	w190576
w190577	2.5	1.7	.055	.053	.029	.10	1.4	.073	.06L	3.0	w190577
w190578	3.2	2.3	.055	.064	.042	.13	1.4	.13	.07L	10	w190578
w190579	.99	.97	.075	.021	.013	.058	1.5	.044	.06	18	w190579
w190580	.94	.97	.094	.017	.011	.075	2.7	.051	.07	20	w190580
w190581	1.6	1.3	.31	.070	.044	.076	.59	.061	.05	3.0	w190581
w190582	6.0	3.0	.057	.12	.048	.20	1.2	.17	.11L	7.0	w190582
w190583	1.2	.95	.26	.013	.031	.087	3.1	.045	.06	23	w190583
w190584	3.5	2.1	.042	.048	.048	.13	1.1	.13	.07L	11	w190584
w190585	8.0	4.9	.058	.16	.057	.31	3.5	.24	.17L	14	w190585
w190586	5.7	4.2	.027	.11	.038	.28	6.5	.13	.16L	30	w190586
w190587	1.6	1.0	.23	.020	.014	.12	5.6	.080	.09	18	w190587
w190588	.72	.78	.11	.014	.009	.068	2.9	.024	.06	7.0	w190588

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w189266	16	130	2.1	0.8L	0.04	30	5.3	26	2.9	31	w189266
w189267	12	88	4.7	.8L	.11	46	13	35	2.7	66	w189267
w189268	3.1	24	1.4	.4L	.07	12	3.0	13	.4	9.6	w189268
w189269	43	210	3.6	1.6L	.19	42	12	47	3.9	35	w189269
w189270	3.3	120G	3.7	.3L	.10	6.0	12	12	.3	13	w189270
w190554	33	140	2.1	.9L	.05	19	3.8	32	1.9	8.8	w190554
w190555	35	76	.9	.7L	.03	20	4.3	21	1.5	9.8	w190555
w190556	55	100	2.4	1.3L	.27	18	16	37	2.3	15	w190556
w190557	32G	29	.5	.3L	.07	8.0	2.6	19	.3	4.1	w190557
w190558	40	16	1.2	.5L	.08	8.0	3.0	9.5	.6	8.1	w190558
w190559	62	130	2.3	1.3L	.20	22	9.8	49	3.1	15	w190559
w190560	41G	13	.7	.4L	.06	8.0	2.1	9.2	.4	3.7	w190560
w190561	40	19	1.1	.8	.08	9.0	2.6	11	.7	6.0	w190561
w190562	43	110	1.4	.7L	.11	25	7.3	26	1.9	1.5L	w190562
w190563	47	69	2.6	1.0L	.18	23	9.0	43	2.3	2.2L	w190563
w190564	29	38	.9	.6L	.04	15	4.7	15	.8	1.2L	w190564
w190565	29	110	2.8	1.0L	.08	19	7.3	36	2.2	2.2L	w190565
w190566	38	54	1.5	.7L	.12	23	6.4	20	1.7	7.3	w190566
w190567	40	98	3.7	1.3L	.12	38	9.0	43	3.7	7.8	w190567
w190568	30	77	4.0	.9L	.08	19	13	30	2.2	8.2	w190568
w190569	38	180	5.7	1.0L	.07	18	12	28	2.1	8.0	w190569
w190570	38	75	1.7	.7L	.04	21	6.3	23	1.5	11	w190570
w190571	34	49	3.5	.8L	.05	31	11	41	1.6	18	w190571
w190572	38	110	3.3	1.2L	.08	38	8.4	40	3.2	25	w190572
w190573	43	76	2.8	.9L	.05	17	6.1	33	1.8	12	w190573
w190574	47	100	1.2	.9L	.08	23	4.3	25	1.9	10	w190574
w190575	25	44	.6	.4L	.05	12	2.6	11	.8	4.0	w190575
w190576	29	64	.7	.4L	.03	15	4.1	13	1.0	7.5	w190576
w190577	40	67	1.1	.6L	.04	16	3.7	18	1.4	6.3	w190577
w190578	38	98	1.7	.7	.04	24	3.4	27	1.9	9.6	w190578
w190579	6.6	14	1.0	.3L	.04	9.0	3.0	9.5	.5	8.4	w190579
w190580	4.0	17	1.4	.4L	.05	11	5.1	10	.2	16	w190580
w190581	26	130	1.1	.4L	.01	13	2.3	15	.6	3.7	w190581
w190582	41	160	3.1	1.1L	.04	21	2.8	38	3.7	5.3	w190582
w190583	33	55	1.1	.5L	.09	15	5.2	11	.2	6.4	w190583
w190584	40	44	1.0	.7L	.15	29	6.2	29	2.3	9.8	w190584
w190585	55	120	2.6	1.7L	.48	44	9.6	53	4.3	31	w190585
w190586	42	120	2.8	1.9	.41	59	31	46	2.9	24	w190586
w190587	25	15	3.8	.7L	.10	16	10	13	.4	11	w190587
w190588	21	14	3.2	.4L	.02	11	8.4	11	.1	9.8	w190588

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w189266	2.6L	1.9	0.46	110	9.6	3.7L	0.55L	0.9	0.51	0.55L	w189266
w189267	9.8	3.0	.86	78	14	3.5L	13	1.3	.32	.52L	w189267
w189268	1.4L	.4L	.28	21	5.3	2.1L	.78	.8L	.41	.30L	w189268
w189269	5.1L	1.6L	.78	190	13	7.5L	1.1L	2.1	.41	1.1L	w189269
w189270	.9L	1.3	.25	36	8.4	1.2L	10	.6	.40	.18L	w189270
w190554	3.0L	.9L	.33	140	15	4.4L	3.9	1.4	.10	.64L	w190554
w190555	2.2L	1.4	.31	61	5.6	3.2L	.47L	1.1	.19	.47L	w190555
w190556	4.0L	1.3L	.43	120	13	4.0L	3.7	1.4	.33	.87L	w190556
w190557	1.0L	.5	.15	33	1.9	1.5L	.21L	.4	.13	.21L	w190557
w190558	1.7L	.5L	.22	53	3.7	2.5L	8.4	.4	.12	.36L	w190558
w190559	4.1L	1.3L	.44	150	17	5.9L	4.9	1.7	.17	.87L	w190559
w190560	1.3L	.4L	.21	46	2.9	1.3L	.28L	.4	.23	.28L	w190560
w190561	1.4L	.4L	.18	48	3.5	2.0L	2.0	.4	.060	.29L	w190561
w190562	2.2L	.9	.46	230	6.4	3.2L	1.9	1.1	.035	.83	w190562
w190563	3.2L	1.3	.45	130	17	4.6L	6.3	1.5	.20	.68L	w190563
w190564	1.7L	.6L	.38	46	5.1	2.6L	.38L	.8	.080	3.8L	w190564
w190565	3.2L	1.0L	.36	220	11	4.6L	4.0	1.5	.080	.68L	w190565
w190566	2.2L	.7	.46	60	4.9	3.3L	.49	.8	.087	2.2L	w190566
w190567	4.1L	2.5	.68	140	14	6.0L	1.5	2.0	.21	4.1L	w190567
w190568	3.0L	1.1	.38	130	9.1	4.3L	30	1.2	.050	3.0L	w190568
w190569	3.2L	1.0L	.52	130	13	4.7L	4.9	1.7	.16	.69L	w190569
w190570	2.1L	1.3	.38	63	6.9	3.0L	.45L	1.0	.15	.45L	w190570
w190571	2.4L	2.9	.75	88	15	3.5L	1.8	1.5	.20	2.4L	w190571
w190572	3.9L	2.3	.97	180	14	5.7L	3.6	1.6	.18	.84L	w190572
w190573	3.0L	2.1	.47	130	10	4.3L	5.4	1.4	.13	.64L	w190573
w190574	2.7L	2.6	.38	110	7.3	4.0L	.59L	1.2	.17	.59L	w190574
w190575	1.2L	.4L	.32	20L	2.5	1.7L	.25L	.5	.17	.25L	w190575
w190576	1.7	.7	.24	80	2.9	2.0L	.39	.6	.034	.29L	w190576
w190577	1.8L	1.1	.34	74	4.3	2.7L	.40L	.8	.080	1.8L	w190577
w190578	2.4L	1.8	.47	84	7.7	3.4L	.81	1.2	.12	2.4L	w190578
w190579	1.0L	.3L	.21	34	2.6	1.5L	.22L	.4	.79	4.8L	w190579
w190580	1.3L	.4L	.25	36	4.0	1.9L	.28L	.5	1.6	.28L	w190580
w190581	1.3L	.9	.44	49	4.6	2.1	.62	.6	.41	1.3L	w190581
w190582	3.5L	1.1L	.37	160	14	5.2L	15	1.9	.23	3.5L	w190582
w190583	1.5L	.5L	.30	210	3.2	2.2L	.33L	.5	.59	.33L	w190583
w190584	2.2L	.7L	.57	84	4.8	3.2L	.48L	1.4	.16	.48L	w190584
w190585	5.4L	2.1	.84	210	15	7.9L	1.6	2.3	.46	1.2L	w190585
w190586	5.0L	2.6	1.2	120	13	7.3L	1.1L	2.2	.83	1.1L	w190586
w190587	2.2L	.7L	.34	23	3.6	3.2L	.47L	.6	.50	.47L	w190587
w190588	1.2L	1.7	.30	29	6.5	1.2L	2.0	.3	.16	.26L	w190588

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Sample number
w189266	17	35	0.2	23	3.0	2.6	17L	12	760L	11	w189266
w189267	20	25	.4	21	11	2.7	18	38	720L	21	w189267
w189268	4	9.6	.1	12	H	1.4L	6.5L	6.7	420L	3.6	w189268
w189269	23	91	.4	51	5.5	5.8	24L	39	1,500L	8.4	w189269
w189270	2	4.8	.1	24	4.7	.85L	3.9L	35	250L	8.7	w189270
w190554	10	17	.2	160	.44L	3.0L	14L	7.0	120	4.7	w190554
w190555	10	36	.1	20	.80	2.2L	10L	9.1	66	4.7	w190555
w190556	10	20	.3	200	2.2	4.0L	19L	21	120L	10	w190556
w190557	5	5.4	.1	9.6	.67	1.0L	4.6L	4.3	30L	2.3	w190557
w190558	4	18	.1	11	1.2	1.7L	7.8L	6.5	50L	4.4	w190558
w190559	11	30	.3	37	1.4	4.1L	19L	27	120L	25	w190559
w190560	5	4.7	.1	8.1	.41	1.3L	6.0L	2.7	81	2.6	w190560
w190561	5	8.1	.1	7.9	1.7	1.4L	6.3L	6.5	40L	2.9	w190561
w190562	14	32	.2	46	.32L	2.2L	10L	11	1,100	7.7	w190562
w190563	13	30	.3	28	1.8	3.2L	15L	24	94L	12	w190563
w190564	8	21	.1	17	.89	1.7L	8.1L	9.4	52L	3.2	w190564
w190565	10	22	.2	43	.75	3.2L	15L	13	94L	5.8	w190565
w190566	12	46	.2	17	1.5	2.2L	10L	12	67L	5.7	w190566
w190567	20	130	.4	23	2.2	4.1L	19L	20	120L	13	w190567
w190568	12	9.6	.2	26	3.6	3.0L	14L	18	88L	14	w190568
w190569	11	13	.3	100	1.1	3.2L	15L	20	95L	5.2	w190569
w190570	12	34	.2	21	1.9	2.1L	9.6L	13	74	5.8	w190570
w190571	16	53	.5	17	4.6	3.0	11L	15	72L	8.6	w190571
w190572	22	72	.3	32	5.8	3.9L	18L	19	120L	11	w190572
w190573	10	18	.2	32	1.0	3.0L	14L	12	110	5.4	w190573
w190574	14	39	.1	22	1.2	2.7L	13L	12	230	6.5	w190574
w190575	7	8.0	.1	6.4	.76	1.2L	5.4L	6.3	130	3.1	w190575
w190576	8	21	.1	10	.21	1.3L	6.2L	7.3	290	3.9	w190576
w190577	8	16	.1	20	.27L	1.8L	8.5L	7.6	55L	3.1	w190577
w190578	12	24	.2	18	.74	2.7	11L	11	70L	5.1	w190578
w190579	4	9.1	.1	4.1	1.7	1.0L	4.8L	15	31L	2.6	w190579
w190580	6	8.5	.1	4.7	2.9	1.3L	6.1L	9.5	63	7.6	w190580
w190581	8	12	.1	14	.34	1.5	6.2L	11	40L	1.8L	w190581
w190582	12	29	.2	18	1.5	3.5L	16L	8.7	100L	7.2	w190582
w190583	8	11	.1	13	2.7	1.5L	7.1L	12	1,100	3.3	w190583
w190584	18	27	.2	15	.32L	2.2L	10L	11	66L	7.2	w190584
w190585	23	63	.3	38	1.2	5.4L	25L	26	160L	19	w190585
w190586	25	88	.4	42	1.9	5.0L	23L	45	150L	9.1	w190586
w190587	7	14	.1	13	3.4	2.2L	10L	13	66L	3.0L	w190587
w190588	4	3.6	.2	9.8	2.1	1.2L	5.6L	14	36L	5.3	w190588

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	Pr-S (ppm)	Pt-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Sample number
w189266	2.7	1.2L	39	1.0	5.4	3.3	2.4	2.6L	94	0.5	w189266
w189267	4.2	1.1L	25	2.5	9.1	4.2	4.4	2.4L	62	.6	w189267
w189268	1.3	.65L	35L	.60	1.8	2.3L	1.3	1.4L	34	.3	w189268
w189269	5.2	2.4L	70	2.0	8.0	6.5	3.8	5.1L	200	.7	w189269
w189270	.8	.39L	31L	2.5	2.6	1.2	1.0	.85L	27	.4	w189270
w190554	2.0L	1.4L	32	.40	6.2	4.0	1.8	3.0L	32	.3	w190554
w190555	1.7	1.0L	24	.30	3.9	4.3	1.8	2.2L	42	.2	w190555
w190556	2.8L	1.9L	34	1.5	6.8	2.2	2.1	4.0L	42	.4	w190556
w190557	.9	.46L	21L	.40	1.7	2.1	.80	1.0L	18	.1	w190557
w190558	1.4	.78L	26L	2.2	2.0	1.0	.80	1.7L	13	.2	w190558
w190559	2.8L	1.9L	53	1.7	10	2.2	2.2	4.1L	32	.5	w190559
w190560	.9L	.60L	22L	.80	1.6	2.3	.90	1.3L	18	.1	w190560
w190561	1.0	.63L	22L	1.2	2.0	1.2	.90	1.4L	13	.1	w190561
w190562	1.5	1.0L	23	.40	4.9	1.3	2.6	2.2L	140	.3	w190562
w190563	2.2L	1.5L	37	2.8	11	2.6	2.3	3.2L	49	.4	w190563
w190564	1.2L	.81L	24L	.30	3.0	3.4	1.4	1.7L	30	.2	w190564
w190565	2.2L	1.5L	44	26	6.5	2.2	1.9	3.2L	34	.3	w190565
w190566	1.5L	1.0L	18	.40	4.7	2.5	2.4	2.2L	25	.3	w190566
w190567	3.2	1.9L	49	.90	9.4	3.5	4.0	4.1L	44	.6	w190567
w190568	2.0L	1.4L	43	1.7	5.8	1.8	2.1	3.0L	26	.3	w190568
w190569	2.2L	1.5L	37	.40	6.9	1.5	2.3	3.2L	44	.4	w190569
w190570	2.0	1.2	20	.40	4.9	4.1	2.0	2.1L	53	.3	w190570
w190571	1.9	1.1L	24	1.0	13	3.1	3.8	2.4L	33	.6	w190571
w190572	2.7L	1.8L	47	1.4	8.3	2.5	4.3	3.9L	40	.5	w190572
w190573	2.0L	1.4L	28	.30	5.8	1.2	2.0	3.0L	43	.3	w190573
w190574	2.3	1.3L	21	.30	4.4	5.3	2.1	2.7L	94	.3	w190574
w190575	.9	.54L	8	.20	2.1	2.3	1.0	1.2L	48	1L	w190575
w190576	.9L	.62L	15	.20	2.5	2.2	1.2	1.3L	150	.2	w190576
w190577	1.3	.85L	18	.20	3.2	1.1	1.5	1.8L	54	.2	w190577
w190578	1.6L	1.1L	17	.40	5.7	3.1	2.1	2.4L	63	.3	w190578
w190579	.9	.48	13L	.30	1.8	2.0	.80	1.0L	17	.1	w190579
w190580	1.3	.61L	12L	.30	2.0	3.0	1.1	1.3L	29	.1	w190580
w190581	1.3	.62L	16L	.20	3.0	1.4	2.1	1.3L	56	.3	w190581
w190582	2.4L	1.6L	48	.40	7.5	3.3	1.7	3.5L	44	.3	w190582
w190583	1.5	.71L	13L	.40	2.2	7.1	1.4	1.5L	120	.2	w190583
w190584	1.5L	1.0L	36	1.3	5.5	1.7	2.6	2.2L	25	.3	w190584
w190585	3.7L	2.5L	50	2.1	9.5	4.8	3.3	5.4L	36	.6	w190585
w190586	3.7	2.3L	28	1.0	9.7	7.8	5.0	5.0L	33	.7	w190586
w190587	2.0	1.0L	12L	.20	2.1	4.4	1.6	3.1	28	.2	w190587
w190588	1.3	.56L	10L	.20	2.3	3.2	1.6	1.2L	19	.3	w190588

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w189266	3.0L	0.81L	0.55L	1.7	37	14	1.1	13	57	w189266
w189267	3.0L	.76L	.52L	3.2	63	25	2.2	18	110	w189267
w189268	30	.45L	.30L	.20L	10	8.2	.7L	17	8.8	w189268
w189269	3.0L	1.6L	1.1L	2.5	75	22	1.8	22	130	w189269
w189270	31	.27L	.18L	.20L	13	8.9	.7	29	26	w189270
w190554	5.5	.95L	.64L	2.1	32	3.8	1.1	18	17	w190554
w190555	3.0L	.70L	.47L	1.2	20	5.2	.7	6.5	30	w190555
w190556	5.5	1.3L	.87L	1.9	31	6.8	1.8	55	40	w190556
w190557	3.0L	.32L	.21L	.30	6.2	2.1	.4	6.4	5.3	w190557
w190558	3.0L	.53L	.36L	.20	5.7	1.9	.5	33	5.5	w190558
w190559	6.4	1.3L	.87L	1.9	43	5.7	1.8	44	26	w190559
w190560	3.0L	.41L	.28L	.20	4.3	2.1	.4	6.4	5.4	w190560
w190561	3.0L	.43L	.29L	.58	8.7	2.6	.3	9.1	6.3	w190561
w190562	4.0	.70L	.47L	1.1	23	5.6	.9	23	14	w190562
w190563	5.2	1.0L	.68L	1.7	35	6.8	1.8	30	14	w190563
w190564	3.0L	.55L	.38L	.86	12	3.4	.5	6.2	9.6	w190564
w190565	4.0L	1.0L	.68L	2.1	43	4.7	1.3	34	17	w190565
w190566	3.9	.71L	.48L	1.4	18	4.5	1.1	57	9.7	w190566
w190567	8.5	1.3L	.88L	2.4	57	18	2.3	31	49	w190567
w190568	4.8	.93L	.64L	1.5	28	5.6	1.2	15	14	w190568
w190569	4.9	1.0L	.69L	1.4	27	5.8	1.7	59	18	w190569
w190570	6.3	.65L	.45L	1.2	26	8.6	1.0	21	29	w190570
w190571	16	.77L	.52L	3.2	77	15	2.8	33	34	w190571
w190572	8.0	1.2L	.84L	2.4	43	12	1.9	32	40	w190572
w190573	4.5	.93L	.64L	1.5	41	6.2	1.2	19	33	w190573
w190574	4.4	.86L	.59L	1.3	28	7.5	.9	6.3	47	w190574
w190575	3.0L	.37L	.25L	.58	12	3.1	.3	8.8	15	w190575
w190576	3.0L	.42L	.29L	.51	15	3.4	.4	12	13	w190576
w190577	3.0L	.58L	.40L	.95	17	4.9	.6	7.1	23	w190577
w190578	5.7	.74L	.51L	1.3	37	8.5	.9	18	45	w190578
w190579	3.0L	.32L	.22L	.45	9.9	4.2	.4	7.7	24	w190579
w190580	3.0L	.42L	.28L	.48	8.7	5.3	.4	9.9	37	w190580
w190581	3.0L	.50	.29L	.88	15	8.8	.7	16	27	w190581
w190582	4.4	1.1L	.76L	2.0	49	7.5	1.0	19	51	w190582
w190583	3.0L	.48L	.33L	.60	11	5.5	.5	16	27	w190583
w190584	3.0L	.70L	.48L	1.3	16	4.5	.9	38	22	w190584
w190585	13	1.7L	1.2L	2.3	46	9.7	1.6	41	61	w190585
w190586	8.1	1.6L	1.1L	2.9	55	13	2.1	140	69	w190586
w190587	3.0L	.70L	.47L	.55	11	9.6	.6	13	57	w190587
w190588	3.0L	.38L	.26L	.50	9.6	11	1.0	11	33	w190588

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w190589	1.5	1.2	0.12	0.058	0.020	0.079	1.7	0.048	0.04	84	w190589
w190590	2.2	1.6	.094	.059	.022	.090	.88	.078	.06	13	w190590
w190591	2.7	1.9	.11	.072	.022	.17	5.6	.079	.09L	92	w190591
w190592	3.2	2.1	.097	.072	.026	.13	1.4	.11	.07L	22	w190592
w190593	4.3	2.9	.11	.11	.042	.18	2.1	.13	.10L	27	w190593
w190594	2.5	1.7	.11	.060	.029	.17	6.7	.095	.16	150	w190594
w190595	2.5	1.1	.087	.052	.019	.24	13	.10	.14	140	w190595
w190596	1.3	.95	.10	.020	.013	.090	3.6	.048	.08	43	w190596
w190597	.55	.49	.15	.022	.011	.050	2.0	.019	.05	55	w190597
w190598	2.8	2.1	.073	.058	.035	.14	2.8	.10	.08L	19	w190598
w190599	1.8	1.3	.11	.040	.021	.086	1.7	.059	.06	35	w190599
w191309	1.1	.70	.081	.047	.052	.039	.26	.031	.01	1.0	w191309
w191310	.57	.46	.071	.018	.030	.022	.066	.026	.01	1.0	w191310
w191311	4.2	2.1	.029	.13	.096	.17	4.3	.12	.11	1.0	w191311
w191312	6.6	4.1	.24	.21	.21	.23	2.1	.18	.08	57	w191312
w191313	3.6	2.2	.29	.068	.050	.12	.94	.12	.05	26	w191313
w191314	1.4	.95	.064	.054	.082	.062	1.4	.040	.05	14	w191314
w191315	1.4	1.0	.065	.054	.11	.063	1.4	.041	.05	37	w191315
w191316	8.4	5.0	.018	.43	.24	.30	3.3	.19	.07	14	w191316
w191317	7.0	3.8	.067	.37	.28	.26	3.7	.19	.10	18	w191317
w191318	4.9	2.2	.081	.15	.15	.16	1.8	.22	.02	6.0	w191318
w191319	2.5	1.7	.048	.063	.11	.11	2.8	.073	.04	23	w191319
w191320	6.0	3.3	.035	.16	.14	.20	2.2	.19	.04	21	w191320
w191321	4.0	1.6	.065	.050	.053	.11	.33	.18	.06	4.0	w191321
w191322	2.7	1.7	.096	.071	.081	.093	.86	.11	.13	6.4	w191322
w191323	1.2	.77	.048	.018	.041	.043	.58	.044	.03	31	w191323
w191324	2.7	1.6	.057	.072	.063	.095	1.1	.089	.03	35	w191324
w191325	2.5	2.1	.24	.031	.010	.11	.43	.11	.09	140	w191325
w191326	.74	.46	.045	.056	.052	.066	3.5	.024	.12	4.0	w191326
w191327	4.3	2.1	.073	.17	.12	.14	1.9	.12	.02	9.0	w191327
w193125	3.3	1.6	.080	.071	.029	.13	2.1	.11	.02	12	w193125

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w190589	27	37	0.9	0.4L	0.03	12	4.7	13	0.9	17	w190589
w190590	27	99	1.4	.5L	.02	22	4.5	17	1.4	10	w190590
w190591	19	33	5.8	.9L	.38	60	55	18	1.3	4.4	w190591
w190592	18	60	1.6	.7L	.12	21	6.3	26	1.7	14	w190592
w190593	22	73	2.9	1.0L	.20	25	10	27	2.3	16	w190593
w190594	12	44	3.4	1.0L	.63	13	10	33	1.4	17	w190594
w190595	42	84	6.0	4.3	.09	23	8.9	14	.7	8.4	w190595
w190596	37	28	4.0	.5L	.10	33	14	14	.3	12	w190596
w190597	19	14	1.6	.3L	.01	6.0	3.6	6.3	.2	4.0	w190597
w190598	35	61	1.0	.8L	.06	24	4.8	23	1.5	8.7	w190598
w190599	23	32	2.3	.5L	.07	17	5.0	17	1.0	10	w190599
w191309	9.4	34	4.1	1.0L	.04	10	11	8.5	.5	11	w191309
w191310	8.6	15	3.5	.6L	.02	6.0	16	8.2	1.2L	13	w191310
w191311	8.0	57	5.3	4.5L	.12	15	14	25	2.3	19	w191311
w191312	21	270	3.9	6.1L	.12	38	12	28	3.4	25	w191312
w191313	13	130	1.6	3.3L	.08	24	6.6	22	1.5	9.9	w191313
w191314	5.3	32	1.2	1.7L	.17	44	5.9	48	5.0	5.6	w191314
w191315	4.6	30	1.2	1.7L	.17	9.0	7.5	12	.4	11	w191315
w191316	25	120	3.0	7.9L	.32	47	9.2	40	5.4	58	w191316
w191317	22	140	5.6	6.9L	.38	38	12	36	5.0	56	w191317
w191318	43	91	3.8	4.2L	.09	20	5.9	50	2.3	32	w191318
w191319	58	63	1.2	3.0L	.10	17	5.6	19	1.1	10	w191319
w191320	46	87	3.6	5.3L	.17	39	6.2	32	3.2	17	w191320
w191321	24	100	4.3	2.9L	.10	29	6.6	20	.4	17	w191321
w191322	21	120	3.1	2.5L	.11	25	6.8	18	.6	16	w191322
w191323	4.3	17	2.7	1.1L	.12	11	15	12	.5	8.3	w191323
w191324	13	330	1.8	2.5L	.73	18	4.6	20	1.6	10	w191324
w191325	H	60	4.3	2.8L	.12	9.0	5.4	10	.5	8.9	w191325
w191326	10	310	3.2	1.7L	.02	9.0	1.6	17	1.1	4.3	w191326
w191327	39	80	2.7	3.8L	.06	16	7.0	31	1.6	10	w191327
w193125	45	70	1.1	3.4L	.08	21	5.5	24	1.6	12	w193125

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w190589	1.4L	0.4L	0.31	110	4.3	2.0L	0.30L	0.5	0.82	0.30L	w190589
w190590	1.6L	.5	.47	120	6.2	2.3L	.34L	.7	.15	.34L	w190590
w190591	2.9L	7.0	2.1	74	12	2.9L	20	.5	.64	.63L	w190591
w190592	2.3L	1.0	.37	90	7.1	3.3L	.51	1.0	.17	.49L	w190592
w190593	3.1L	1.0L	.45	110	7.8	4.5L	.73	1.2	.36	3.1L	w190593
w190594	3.1L	1.0L	.41	84	20	4.5L	61	.8	.61	.66L	w190594
w190595	4.3L	1.3L	.61	20L	8.0	6.2L	.92L	.9	1.6	.92L	w190595
w190596	1.6L	2.6	.96	43	5.4	1.6L	6.7	.4	.47	3.4L	w190596
w190597	.9L	.7	.21	62	5.9	.88L	6.9	.3	.49	.19L	w190597
w190598	2.4L	.8L	.43	86	6.3	3.5L	.52L	1.0	.22	2.4L	w190598
w190599	1.5L	1.3	.46	76	14	2.2L	4.3	.6	.35	.33L	w190599
w191309	1.9	1.3	.45	20	8.5	1.5	9.4	2.0	.025	.47	w191309
w191310	2.7	1.5	.51	20L	20	2.5	35	1.9	.038	.54	w191310
w191311	6.6L	2.1L	.43	64	11	1.4L	47	.8	.99	1.4L	w191311
w191312	8.9L	3.1	.71	290	16	5.3	20	2.0	.48	1.9L	w191312
w191313	4.7L	1.5L	.41	240	7.3	2.4	.68L	.9	.38	1.0L	w191313
w191314	2.4L	.8L	.80	160	3.8	1.4	1.5	1.9	.16	.51L	w191314
w191315	2.4L	.8L	.19	40	4.2	1.3	1.5	1.4	.65	.52L	w191315
w191316	12L	3.6L	1.1	220	14	2.5L	1.7L	1.9	.24	2.5L	w191316
w191317	10L	4.1	.97	72	15	4.4	11	1.7	.21	2.1L	w191317
w191318	6.0L	1.9L	.41	150	15	2.8	5.9	1.6	.095	1.3L	w191318
w191319	4.3L	1.4L	.34	160	6.2	2.2	.80	.8	.16	.92L	w191319
w191320	7.8L	2.7	.74	130	10	3.4	1.1	1.5	.15	1.7L	w191320
w191321	4.2L	2.2	.50	100	8.0	2.5	11	.8	.31	.89L	w191321
w191322	3.6L	1.3	.43	80	11	1.5	5.2	1.6	.66	.76L	w191322
w191323	1.7L	.5L	.22	40	4.6	.68	4.4	.7	.50	.35L	w191323
w191324	3.6L	1.1L	.29	100	4.4	.78L	.52L	.7	.57	.78L	w191324
w191325	4.1L	1.3L	.18	140	10	.86L	5.8	.3	.97	.86L	w191325
w191326	2.5L	.8L	.18	100	13	1.3	42	.5	.52	.54L	w191326
w191327	5.5L	1.7L	.38	110	13	1.2L	5.1	1.2	.11	1.2L	w191327
w193125	5.0L	1.6L	.41	96	6.4	1.1L	.93	.9	.060	1.1L	w193125

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Sample number
w190589	7	22	0.1	11	1.7	1.4L	6.5L	7.1	200	7.3	w190589
w190590	11	17	.1	12	3.3	1.6L	7.4L	13	380	7.0	w190590
w190591	18	22	.8	25	5.3	2.9L	14L	45	87L	42	w190591
w190592	12	23	.2	15	1.3	2.3L	10L	12	74	7.4	w190592
w190593	13	30	.2	22	1.5	3.1L	14L	16	92L	7.2	w190593
w190594	6	14	.2	36	6.5	3.6	14L	20	91L	11	w190594
w190595	10	24	.2	430	4.4	4.3L	20L	9.2	130L	5.8L	w190595
w190596	11	9.5	.4	9.9	4.6	2.1	7.4L	20	47L	10	w190596
w190597	3	3.7	.1	8.2	2.9	.88L	4.1L	8.2	190	4.2	w190597
w190598	13	46	.1	20	.93	2.4L	11L	8.2	230	4.5	w190598
w190599	9	12	.2	12	3.6	1.5L	7.0L	16	180	12	w190599
w191309	4	6.6	.1	15	3.0	.94	7.5	27	120	7.1	w191309
w191310	2	5.1	.2	13	4.3	.81	5.7	49	59	4.9	w191310
w191311	8	55	.4	27	11	5.5	11	31	63	19	w191311
w191312	18	70	.3	36	4.7	9.2	47	24	1,200	13	w191312
w191313	13	25	.1	11	4.4	4.9	15	16	970	7.1	w191313
w191314	19	17	.2	9.0	9.0	2.0	7.4	20	29	6.8	w191314
w191315	4	17	.1	9.1	9.9	1.8	7.3	21	100	6.2	w191315
w191316	22	97	.4	51	5.1	3.6	23	22	110	19	w191316
w191317	21	41	.4	47	12	7.5	38	38	410	16	w191317
w191318	10	12	.3	42	2.6	5.7	23	16	170	4.9	w191318
w191319	9	22	.2	19	3.0	3.8	11	9.7	180	3.5	w191319
w191320	19	61	.3	22	2.1	8.5	22	10	53	7.5	w191320
w191321	15	17	.2	10	3.9	9.0	29	25	520	12	w191321
w191322	14	20	.2	9.4	3.5	2.4	16	22	390	12	w191322
w191323	5	4.6	.1	5.2	3.9	1.5	5.7	20	68	7.3	w191323
w191324	9	13	.1	9.7	2.3	2.4	8.1	6.7	100	3.2	w191324
w191325	3	4.3	.1L	30	9.0	2.0	7.6	24	110	11	w191325
w191326	5	4.6	.2	30	5.1	3.8	6.5	7.5	17	5.4	w191326
w191327	8	14	.2	39	2.9	5.0	14	16	220	5.5	w191327
w193125	10	26	.2	20	1.1	.93	7.1L	8.2	170	5.9	w193125

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	Pr-S (ppm)	Pt-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Sample number
w190589	1.0L	0.65L	9	0.90	2.4	1.5	1.3	1.4L	32	0.3	w190589
w190590	1.4	.74L	19	.50	3.5	1.4	2.1	1.6L	93	.3	w190590
w190591	3.9	1.4L	14	1.6	7.6	.9	7.7	2.9L	24	2	w190591
w190592	1.8	1.0L	24	.60	5.1	2.9	2.0	2.3L	42	.4	w190592
w190593	2.1L	1.4L	28	.50	5.1	2.6	2.4	3.1L	45	.4	w190593
w190594	2.3	1.4L	21	2.0	8.6	2.9	1.3	3.1L	31	.4	w190594
w190595	4.3	2.0L	16L	1.1	2.7	5.4	2.4	5.4	23	.4	w190595
w190596	2.4	.74L	12L	.40	3.7	3.1	4.1	1.6L	18	.8	w190596
w190597	.8	.41L	9L	1.0	1.3	1.4	.80	.88L	18	.1	w190597
w190598	1.7L	1.1L	15	.40	4.1	4.4	2.1	2.4L	74	.3	w190598
w190599	1.1	.70L	11	1.1	3.3	2.4	2.1	1.5L	20	.4	w190599
w191309	3.2L	.32L	30L	3.4	2.4	2.1	1.7	1.6	36	.3	w191309
w191310	1.8L	.18L	24L	9.9	3.1	3.2L	1.6	.89	41	.4	w191310
w191311	14L	1.4L	15	9.8	5.9	2.6	1.1	2.5	41	.5	w191311
w191312	19L	1.9L	48L	2.0	8.2	2.8	1.2	4.2	330	.6	w191312
w191313	11	1.0L	38L	.76	4.4	2.5	2.1	2.8	190	.3	w191313
w191314	5.1L	.51L	53L	.87	9.3	3.4	3.0	1.9	37	.5	w191314
w191315	5.2L	.52L	37L	.85	2.5	2.7	1.0	1.8	37	.3L	w191315
w191316	25L	2.5L	44	1.9	9.9	1.8	4.4	2.5L	54	.9	w191316
w191317	21L	2.1L	55	3.8	8.7	4.5L	3.7	4.1	69	.8	w191317
w191318	13L	1.3L	38L	.47	9.4	2.8	2.1	3.8	53	.4	w191318
w191319	9.2L	.92L	28L	.45	4.3	4.0	2.0	1.5	100	.3	w191319
w191320	17L	1.7L	22	.68	7.7	3.1	3.9	1.7L	56	.6	w191320
w191321	8.9L	.89L	23L	1.6	4.4	3.0	2.9	2.0	350	.4	w191321
w191322	7.6L	.76L	24L	1.0	4.1	3.5	2.5	.76L	240	.4	w191322
w191323	4.1	.35L	22L	2.8	2.4	1.9	1.2	.35L	33	.2	w191323
w191324	8.1	.78L	12	.77	3.6	1.5	1.7	.78L	46	.2	w191324
w191325	8.6L	.86L	29L	4.0	2.0	2.4	.70	1.3	25	.4L	w191325
w191326	5.4L	.54L	21	7.0	4.0	2.5	1.0	1.1	69	.2	w191326
w191327	12L	1.2L	18	.62	6.6	1.7	1.6	1.2L	50	.3	w191327
w193125	11L	1.1L	23	.60	5.0	3.2	1.8	1.1L	59	.3	w193125

Table 5h.-- Major, minor, and trace element composition of 71 coal samples from Pennsylvania reported on whole coal basis--continued

Sample number	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w190589	3.0L	3.4	0.30L	0.72	11	2.6	0.6	8.1	4.7	w190589
w190590	3.0L	.50L	.34L	1.0	17	4.9	.7	9.3	9.2	w190590
w190591	5.4	.93L	.63L	.93	12	32	4.8	260	13	w190591
w190592	5.3	.71L	.49L	1.4	26	8.5	.9	25	37	w190592
w190593	5.4	.98L	.67L	1.4	19	4.8	1.1	80	12	w190593
w190594	6.6	.97L	.66L	2.1	30	11	1.1	130	61	w190594
w190595	4.7	1.3L	.92L	.59	11	11	.7	19	21	w190595
w190596	3.0L	.50L	.34L	.75	11	18	1.9	30	52	w190596
w190597	3.0L	.28L	.19L	.20L	5.5	4.6	.5	5.9	3.6	w190597
w190598	4.8	.77L	.52L	.83	17	2.8	.7	10	9.9	w190598
w190599	3.0L	.48L	.33L	.65	14	6.9	1.0	38	8.6	w190599
w191309	3.0L	.47L	.22L	.53	10	8.0	.8	16	11	w191309
w191310	3.0	.27L	.20	.72	10	7.0	1.2	16	12	w191310
w191311	5.4	4.9	.94L	1.9	29	18	1.6	16	51	w191311
w191312	5.1	2.8L	1.3L	1.9	70	26	1.7	31	98	w191312
w191313	3.0L	1.5L	.68L	1.4	31	12	.7	11	55	w191313
w191314	7.9	.75L	.35L	2.9	14	4.9	1.1	29	28	w191314
w191315	3.0L	.76L	.35L	.62	16	5.0	.3	29	24	w191315
w191316	13	3.6L	1.7L	4.1	61	16	1.8	51	36	w191316
w191317	4.0	3.1L	1.4L	4.1	75	26	1.6	53	110	w191317
w191318	3.0L	1.9L	.87L	1.9	140	15	1.1	21	81	w191318
w191319	3.0L	1.4L	.62L	.99	23	8.0	.8	8.4	46	w191319
w191320	8.7	2.4L	1.1L	2.0	39	20	1.7	24	92	w191320
w191321	3.0	1.3L	.60L	1.4	26	22	1.0	18	96	w191321
w191322	3.0L	1.1L	.52L	1.1	24	9.7	1.1	21	16	w191322
w191323	3.0L	.52L	.24L	.59	9.4	5.2	.4	21	18	w191323
w191324	4.0	1.1L	.52L	.97	17	4.8	.7	80	21	w191324
w191325	3.0L	1.3L	.58L	.43	8.3	4.1	2.0	27	9.0	w191325
w191326	3.0L	1.1	.36L	1.4	25	15	1.0	9.1	53	w191326
w191327	5.2	1.7L	.79L	1.3	63	14	1.3	24	65	w191327
w193125	3.0L	1.6L	.78L	1.3	22	1.9	1.0	13	7.8	w193125

Summary of the analytical data from 40 Ohio coal samples

Data on 30 Ohio coal samples have been reported by Swanson and others (1976). The Ohio Geological Survey has reported on 151 coal samples analyzed by the U.S. Geological Survey and the Bureau of Mines (Botoman, G. and Stith, D. A., 1978). The distribution of the 40 samples of this report is shown on figure 4. The 40 samples were obtained from 5 different coal beds, 17 of the samples were from the Middle Kittanning coal bed. Additional descriptions and locations of the samples are given in table 6d. Statistical comparisons are reported in tables 6a, b and c, the analytical data is reported in tables 5e, f, g and h.

In the succeeding two paragraphs comparisons are made between the geometric means of the analytical data on Ohio coal samples and the 617 samples of this report.

Comparison of the geometric means for the proximate analysis (table 6a) shows lower fixed carbon and higher volatile matter values for the Ohio coals relative to all coals in this report. These factors indicate that the Ohio coals have a lower average rank than the average coals of this report. This observation is in line with the general rank trends in the Appalachian Region in which coals increase in rank in an easterly to southeast direction. The high sulfur values also follow a trend of increasing sulfur content of coals in a westward direction. The ash fusion temperatures of these coals are also lower compared to the regional averages.

The means for the major oxides in the ash (table 6b) show much lower SiO_2, Al_2O_3 and higher Fe_2O_3 in the Ohio coals compared to all the coals. Comparison of the trace element means (table 6c) shows that only B, F, Hg, Mn, Mo and Zn are significantly higher in the Ohio coals. Most of the other elements occur in lower average amounts in the Ohio coals.

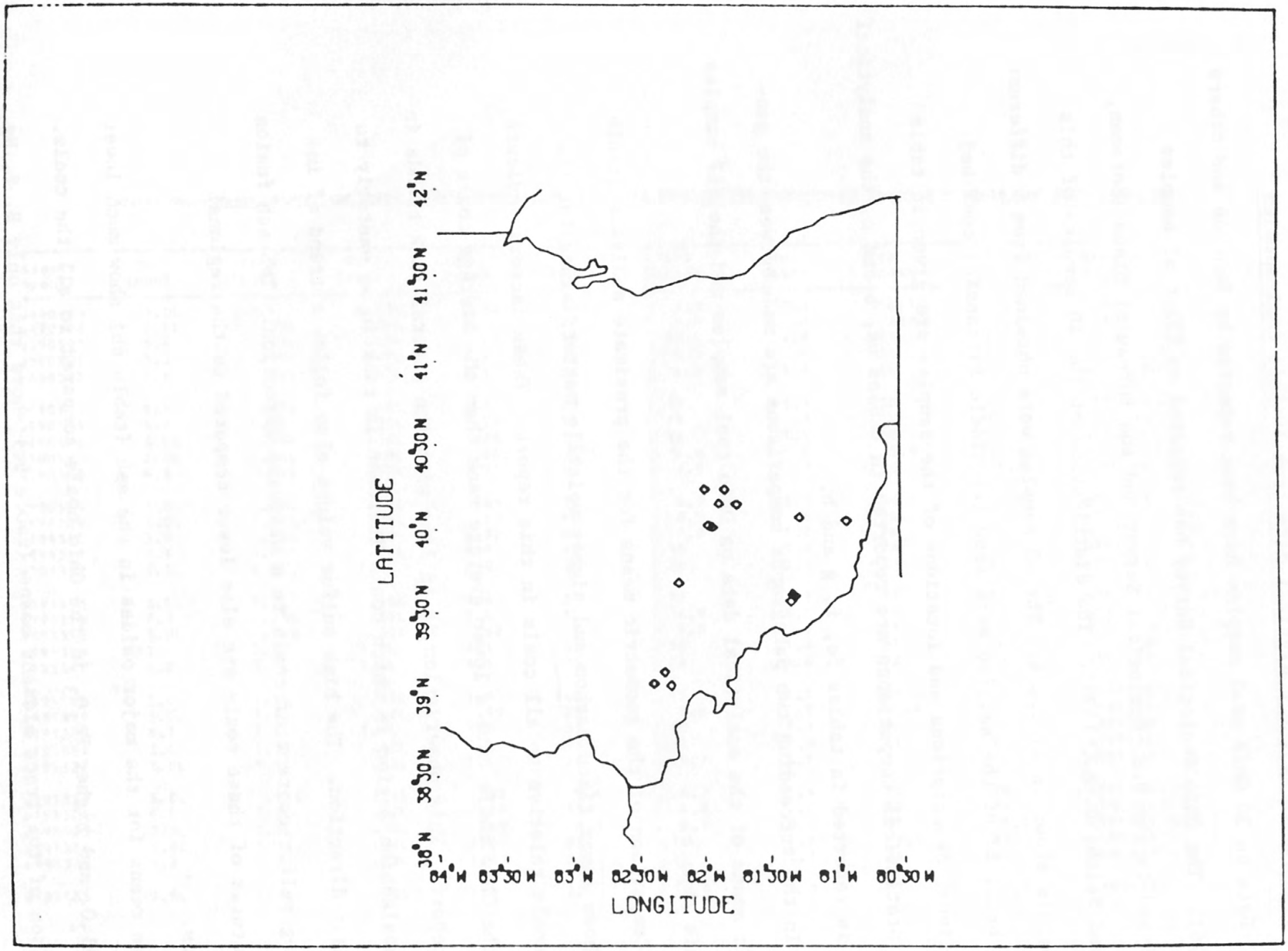

Figure 4 -- Distribution of Ohio coal samples.

Table 6a.--Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, ash-fusion temperatures and free swelling index of 40 coal samples from Ohio.

[All values are in percent except Btu/lb, ash-fusion temperatures, and free swelling index and are reported on the as-received basis. °F = 9/5°C + 32; Kcal/kg = 0.556 (Btu/lb). Leaders (---) indicate no data.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	4.3	1.9	6.9	4.1	1.5	3.3
Volatile matter	38.9	32.8	45.8	38.7	1.1	31.9
Fixed carbon	44.2	33	53.4	44	1.1	52.2
Ash	12.5	3.2	29.5	10.9	1.7	8.8
Hydrogen	5.2	4.2	5.5	5.2	1.1	5.2
Carbon	65.3	48.3	75	64.9	1.1	70.5
Nitrogen	1.1	.7	1.5	1.1	1.2	1.3
Oxygen	11.6	6.9	14.7	11.4	1.2	9.3
Sulfur	4.3	.9	9.0	3.9	1.5	1.5
Heat of combustion						
Btu/lb	11,834	8,790	13,690	11,770	1.1	12,590
Forms of sulfur						
Sulfate	.25	.01	1.03	.16	3.2	.07
Pyritic	2.4	.41	5.99	1.99	1.9	.65
Organic	1.6	.35	3.22	1.50	1.6	.80
Ash fusion temperature °C						
Initial deformation	1,130	1,010	1,330	1,130	1.1	1,240
Softening temperature	1,170	1,060	1,400	1,170	1.1	1,290
Fluid temperature	1,230	1,090	1,500	1,220	1.1	1,350
Free Swelling Index	3.6	1	8.5	3.1	1.8	4.3

Table 6b .--Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of eleven major and minor oxides in the laboratory ash of 40 coal samples from Ohio.

[All samples were ashed at 525°C; all analyses except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
(Ash)	13.2	3.1	31.1	11.5	1.7	9.46
SiO_2	34	8	50	31	1.6	42
Al_2O_3	18	3	26	17	1.5	23
CaO	3.8	.4	20	2.5	2.5	1.3
MgO	.68	.22	1.4	.61	1.6	.78
MnO	.03	.01	.12	.02	2	.02
Na_2O	.62	.15	1.9	.51	1.9	.44
K_2O	1.3	.1	2.4	1.1	2	1.6
Fe_2O_3	36	8.4	83	31	1.7	11
TiO_2	.85	.3	1.4	.8	1.4	1.13
P_2O_5	.17	.01	.5	.12	2.4	.17
SO_3	3.4	.03	9.5	2.8	2.4	2.03

Table 6c .--Arithmetic mean, observed range, geometric mean, and geometric deviation of 38 elements in 40 coal samples from Ohio.

[All analyses are in percent or parts per million and are reported on a whole-coal basis. Leaders (---) indicate means could not be calculated because an insufficient number of analyses were above the detection limit.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Ag	.06	.01	.19	.05	2	.05
As	11	1	92	5.1	3	7.4
B	74	14	150	59	2.1	21
Ba	56	6.3	260	37	2.4	56
Be	2.1	.53	7.8	1.8	1.8	2.4
Cd	.12	.03	.43	.1	1.9	.08
Ce	15	2	47	12	2	15
Co	4.2	.7	23	3.2	2.1	5.5
Cr	17	2.5	60	14	2	14
Cs	1.1	.1	2.9	.78	2.3	.75
Cu	11	2.3	34	8.9	2	14
Eu	.33	.08	1.7	.28	1.8	.31
F	85	21	200	71	1.9	64
Ga	5.7	1.2	15	4.7	1.9	5.1
Ge	6.5	.23	50	2.8	3.7	2.9
Hf	.67	.1	2	.53	2.1	.65
Hg	.20	.07	.48	.17	1.6	.10
La	9	1	35	6.4	2.3	7.8
Li	15	2.6	68	10	2.4	12
Lu	.16	.1	.4	.14	1.6	.14
Mn	29	3.1	140	21	2.2	14
Mo	3	.64	12	2.4	2	1.8
Nb	2.4	.15	8.4	1.7	2.5	1.9
Nd	10	1.8	29	8.2	2	9.8
Ni	8.5	1.1	44	6	2.3	12
Pb	4.6	.37	23	3.2	2.3	5.9
Sb	.45	.1	4.3	.29	2.2	.69
Sc	4.4	.5	22	3	2.4	3.1
Se	3.6	1	9.8	2.9	2	2.9
Sm	1.5	.3	3.7	1.3	1.8	1.5
Sr	47	14	150	37	1.9	57
Tb	.28	.1	.9	.24	1.8	.26
U	1.4	.2	14	.86	2.3	1.2
V	17	1.5	56	13	2.3	17
Y	8.2	1.1	28	6.6	2	7.2
Yb	.92	.1	3.2	.69	2.2	.74
Zn	25	6.3	130	18	2	13
Zr	28	1.5	120	18	2.8	20

Table 3d Descriptions for 40 bituminous coal samples from Ohio

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w189745	ohio	guernsey	400431n	811607w	monongahela	pittsburgh	channel	42.0
w189746	ohio	meigs	390332n	821440w	pottsville	clarion	channel	23.0
w189748	ohio	meigs	390332n	821440w	pottsville	clarion	channel	11.0
w189749	ohio	meigs	390332n	821440w	pottsville	clarion	channel	15.0
w189750	ohio	meigs	390829n	821734w	pottsville	clarion	channel	61.0
w189751	ohio	meigs	390829n	821736w	pottsville	clarion	channel	20.0
w189753	ohio	meigs	390829n	821736w	pottsville	clarion	channel	14.0
w189754	ohio	meigs	390829n	821736w	pottsville	clarion	channel	17.0
w189759	ohio	belmont	400327n	805502w	monongahela	pittsburgh	channel	13.0
w189760	ohio	belmont	400327n	805502w	monongahela	pittsburgh	channel	22.0
w189761	ohio	belmont	400327n	805502w	monongahela	pittsburgh	channel	10.0
w189762	ohio	belmont	400327n	805502w	monongahela	pittsburgh	channel	20.0
w189763	ohio	belmont	400327n	805501w	monongahela	pittsburgh	channel	63.0
w190643	ohio	muskingum	400050n	815544w	allegheny	middle kittanning	channel	26.0
w190644	ohio	muskingum	400050n	815544w	allegheny	middle kittanning	channel	9.0
w190645	ohio	muskingum	400130n	815734w	allegheny	middle kittanning	channel	17.0
w190646	ohio	muskingum	400130n	815734w	allegheny	middle kittanning	channel	9.0
w190647	ohio	muskingum	400130n	815734w	allegheny	middle kittanning	channel	7.0
w190648	ohio	vinton	390414n	822241w	allegheny	clarion	channel	21.0
w190649	ohio	vinton	390414n	822241w	allegheny	clarion	channel	13.0
w190650	ohio	vinton	390414n	822241w	allegheny	clarion	channel	18.0
w190651	ohio	vinton	390413n	822240w	allegheny	clarion	channel	58.0
w191295	ohio	coshocton	401434n	815906w	allegheny	middle kittanning	channel	20.0
w191296	ohio	coshocton	401434n	815906w	allegheny	middle kittanning	channel	12.0
w191297	ohio	coshocton	401434n	815906w	allegheny	middle kittanning	channel	11.0
w191298	ohio	coshocton	401433n	815006w	allegheny	middle kittanning	channel	50.0
w191299	ohio	coshocton	401430n	815906w	allegheny	lower kittanning	channel	11.0
w191300	ohio	coshocton	401430n	815906w	allegheny	lower kittanning	channel	10.0
w191301	ohio	coshocton	401430n	815906w	allegheny	lower kittanning	channel	6.0
w191302	ohio	coshocton	401430n	815906w	allegheny	lower kittanning	channel	9.0
w191303	ohio	muskingum	400921n	815246w	allegheny	middle kittanning	channel	25.0
w191304	ohio	muskingum	400921n	815246w	allegheny	middle kittanning	channel	12.0
w191305	ohio	muskingum	400921n	815246w	allegheny	middle kittanning	channel	4.0
w191306	ohio	perry	394041n	821100w	allegheny	middle kittanning	channel	56.0
w191307	ohio	muskingum	400909n	814442w	allegheny	middle kittanning	channel	40.0

Table 6d Descriptions for 40 bituminous coal samples from Ohio . Continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w192063	ohio	washington	323408n	812011w	allegheny	middle kittanning	drill core	52.0
w192061	ohio	noble	323556n	811910w	allegheny	middle kittanning	channel	46.0
w192264	ohio	noble	323642n	811928w	allegheny	middle kittanning	channel	39.0
w192265	ohio	noble	323642n	811928w	allegheny	lower kittanning	channel	64.0
w192266	ohio	noble	323642n	811928w	allegheny	brookville	channel	31.0

Table 6e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 40 coal samples from Ohio

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in percent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section, Department of Energy, Pittsburgh, Pa. B means not determined. O for ash fusion temperature means greater than 1600°C.

	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w189745	2.9	38.3	47.6	11.2	5.1	68.1	1.3	11.0	3.3	6,780	12,210
	---	39.4	49.0	11.5	4.9	70.1	1.3	8.7	3.4	6,990	12,570
	---	44.6	55.4	---	5.6	79.3	1.5	9.8	3.8	7,900	14,210
w189746	2.9	37.7	38.4	21.0	4.8	58.6	.9	8.6	6.1	5,930	10,680
	---	38.8	39.5	21.6	4.6	60.4	.9	6.2	6.3	6,110	11,000
	---	49.5	50.5	---	5.9	77.0	1.2	7.9	8.0	7,800	14,030
w189748	4.1	42.7	40.9	12.3	5.5	64.4	1.1	10.9	5.8	6,620	11,920
	---	44.5	42.6	12.8	5.3	67.2	1.1	7.6	6.0	6,910	12,430
	---	51.1	48.9	---	6.0	77.0	1.3	8.7	6.9	7,920	14,260
w189749	3.2	34.4	37.9	24.5	4.4	52.9	.9	9.4	7.9	5,430	9,770
	---	35.5	39.2	25.3	4.2	54.6	.9	6.8	8.2	5,610	10,090
	---	47.6	52.4	---	5.6	73.2	1.2	9.1	10.9	7,510	13,510
w189750	5.4	37.2	43.2	14.2	5.3	62.6	1.0	14.0	2.9	6,210	11,180
	---	39.3	45.7	15.0	5.0	66.2	1.1	9.7	3.1	6,570	11,820
	---	46.3	53.7	---	5.8	77.9	1.2	11.4	3.6	7,730	13,910
w189751	5.7	38.8	44.7	10.8	5.5	65.1	.9	14.7	3.0	6,570	11,820
	---	41.1	47.4	11.5	5.2	69.0	1.0	10.2	3.2	6,960	12,530
	---	46.5	53.5	---	5.8	78.0	1.1	11.5	3.6	7,860	14,160
w189753	3.4	37.7	47.3	11.6	5.3	66.3	1.0	12.6	3.2	6,670	12,010
	---	39.0	49.0	12.0	5.1	68.6	1.0	9.9	3.3	6,910	12,430
	---	44.4	55.6	---	5.8	78.0	1.2	11.3	3.8	7,850	14,130
w189754	4.7	34.6	39.8	20.9	4.7	57.4	.8	12.8	3.4	5,730	10,320
	---	36.3	41.8	21.9	4.4	60.2	.8	9.0	3.6	6,020	10,830
	---	46.5	53.5	---	5.6	77.2	1.1	11.6	4.6	7,710	13,870
w189759	2.0	41.3	49.5	7.2	5.4	72.4	1.1	10.0	3.9	7,350	13,230
	---	42.1	50.5	7.3	5.3	73.9	1.1	8.4	4.0	7,500	13,500
	---	45.5	54.5	---	5.7	79.7	1.2	9.1	4.3	8,090	14,570
w189760	2.1	36.3	48.5	13.1	5.1	66.8	1.0	9.3	4.7	6,810	12,250
	---	37.1	49.5	13.4	5.0	68.2	1.0	7.6	4.8	6,950	12,510
	---	42.8	57.2	---	5.7	78.8	1.2	8.8	5.5	8,030	14,450
w189761	2.0	39.8	49.6	8.6	5.4	70.8	1.1	8.7	5.4	7,170	12,910
	---	40.6	50.6	8.8	5.3	72.2	1.1	7.1	5.5	7,320	13,170
	---	44.5	55.5	---	5.8	79.2	1.2	7.7	6.0	8,020	14,440
w189762	2.1	34.4	47.7	15.8	4.7	63.8	1.0	8.5	6.2	6,480	11,670
	---	35.1	48.7	16.1	4.6	65.2	1.0	6.8	6.3	6,620	11,920
	---	41.9	58.1	---	5.4	77.7	1.2	8.1	7.6	7,900	14,210

Table 6e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling and ash fusion temperature determinations for 40 coal samples from Ohio.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w189745	0.0	0.23	1.59	3.22	8.5	1,140	1,165	1,195
	---	.24	1.64	3.32				
	---	.27	1.85	3.75				
w189746	.0	.03	4.40	1.67	1.0	1,005	1,065	1,090
	---	.03	4.53	1.72				
	---	.04	5.78	2.19				
w189748	.0	.30	4.10	1.38	3.5	1,040	1,085	1,110
	---	.31	4.28	1.44				
	---	.36	4.90	1.65				
w189749	.0	.02	5.99	1.86	1.0	1,140	1,165	1,200
	---	.02	6.19	1.92				
	---	.03	8.28	2.57				
w189750	.0	.23	.97	1.65	1.5	1,125	1,180	1,230
	---	.24	1.03	1.74				
	---	.29	1.21	2.05				
w189751	.0	.16	.44	2.42	4.0	1,070	1,160	1,285
	---	.17	.47	2.57				
	---	.19	.53	2.90				
w189753	.0	.15	1.49	1.61	1.5	1,095	1,150	1,245
	---	.16	1.54	1.67				
	---	.18	1.75	1.89				
w189754	.0	.24	1.92	1.28	1.0	1,320	1,395	1,455
	---	.25	2.01	1.34				
	---	.32	2.58	1.72				
w189759	.0	.16	2.23	1.52	5.0	1,085	1,125	1,145
	---	.16	2.28	1.55				
	---	.18	2.46	1.67				
w189760	.0	.25	2.68	1.80	5.0	1,065	1,120	1,145
	---	.26	2.74	1.84				
	---	.29	3.16	2.12				
w189761	.0	.32	2.46	2.50	6.0	1,075	1,115	1,125
	---	.33	2.51	2.55				
	---	.36	2.75	2.80				
w189762	.0	.45	4.28	1.44	6.5	1,040	1,070	1,100
	---	.46	4.37	1.47				
	---	.55	5.21	1.75				

Table 6e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 40 coal samples from Ohio

Sample number	Moisture	Proximate Analysis			Ultimate Analysis					Heat of Combustion	
		Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w189763	1.9	38.2	49.9	10.0	5.2	70.3	1.2	8.0	5.3	7,070	12,720
	---	38.9	50.9	10.2	5.1	71.7	1.2	6.4	5.4	7,200	12,970
	---	43.4	56.6	---	5.7	79.8	1.4	7.2	6.0	8,020	14,440
w190643	5.0	40.8	50.6	3.6	5.8	73.3	1.1	14.1	2.1	7,230	13,020
	---	42.9	53.3	3.8	5.5	77.2	1.2	10.2	2.2	7,610	13,710
	---	44.6	55.4	---	5.7	80.2	1.2	10.6	2.3	7,910	14,250
w190644	4.3	36.3	40.0	19.4	4.7	56.1	1.0	12.9	5.9	5,750	10,350
	---	37.9	41.8	20.3	4.4	58.6	1.0	9.5	6.2	6,010	10,820
	---	47.6	52.4	---	5.5	73.5	1.3	11.9	7.7	7,540	13,560
w190645	5.0	42.1	46.5	6.4	5.3	67.7	1.0	14.6	5.0	6,810	12,250
	---	44.3	48.9	6.7	5.0	71.3	1.1	10.7	5.3	7,160	12,890
	---	47.5	52.5	---	5.4	76.4	1.1	11.5	5.6	7,680	13,830
w190646	5.3	41.4	46.9	6.4	5.7	71.1	1.1	13.7	2.0	7,000	12,600
	---	43.7	49.5	6.8	5.4	75.1	1.2	9.5	2.1	7,390	13,310
	---	46.9	53.1	---	5.8	80.5	1.2	10.2	2.3	7,930	14,270
w190647	4.7	32.8	33.0	29.5	4.2	48.3	.7	11.9	5.4	4,880	8,790
	---	34.4	34.6	31.0	3.9	50.7	.7	8.1	5.7	5,120	9,220
	---	49.8	50.2	---	5.6	73.4	1.1	11.7	8.2	7,420	13,360
w190648	4.4	41.5	40.6	13.5	5.3	64.1	1.0	13.4	2.7	6,490	11,690
	---	43.4	42.5	14.1	5.0	67.1	1.0	9.9	2.8	6,790	12,230
	---	50.5	49.5	---	5.9	78.1	1.2	11.6	3.3	7,910	14,240
w190649	4.5	40.4	43.6	11.5	5.3	65.3	1.1	13.5	3.3	6,520	11,740
	---	42.3	45.7	12.0	5.0	68.4	1.2	9.9	3.5	6,830	12,290
	---	48.1	51.9	---	5.7	77.7	1.3	11.3	3.9	7,760	13,980
w190650	4.2	39.8	40.0	16.0	5.1	62.2	1.0	12.0	3.7	6,180	11,130
	---	41.5	41.8	16.7	4.8	64.9	1.0	8.6	3.9	6,450	11,620
	---	49.9	50.1	---	5.8	77.9	1.3	10.4	4.6	7,750	13,950
w190651	4.6	36.9	36.5	22.0	4.8	56.5	.9	11.8	4.0	5,590	10,060
	---	38.7	38.3	23.1	4.5	59.2	.9	8.1	4.2	5,860	10,550
	---	50.3	49.7	---	5.8	77.0	1.2	10.5	5.4	7,610	13,710
w191295	5.5	42.5	46.9	5.1	5.4	71.2	1.3	13.1	3.9	7,110	12,800
	---	45.0	49.6	5.4	5.1	75.3	1.4	8.7	4.1	7,520	13,540
	---	47.5	52.5	---	5.4	79.6	1.5	9.2	4.4	7,950	14,320
w191296	5.4	45.6	45.6	3.4	5.8	72.9	1.3	12.9	3.7	7,290	13,130
	---	48.2	48.2	3.6	5.5	77.1	1.4	8.6	3.9	7,710	13,880
	---	50.0	50.0	---	5.7	79.9	1.4	8.9	4.1	8,000	14,400

Table 6e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 40 coal samples from Ohio

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w189763	0.0	0.32	3.05	1.98	7.0	1,060	1,095	1,105
	---	.33	3.11	2.02				
	---	.36	3.46	2.25				
w190643	.0	.19	.76	1.21	4.0	1,050	1,075	1,105
	---	.20	.80	1.27				
	---	.21	.83	1.32				
w190644	.0	.76	2.36	2.83	2.5	1,080	1,195	1,295
	---	.79	2.47	2.96				
	---	1.00	3.09	3.71				
w190645	.0	.94	2.34	1.69	3.5	1,270	1,300	1,340
	---	.99	2.46	1.78				
	---	1.06	2.64	1.91				
w190646	.0	.26	.46	1.32	3.5	1,120	1,230	1,320
	---	.27	.49	1.39				
	---	.29	.52	1.49				
w190647	.0	.69	3.43	1.29	1.5	1,170	1,225	1,350
	---	.72	3.60	1.35				
	---	1.05	5.21	1.96				
w190648	.0	.16	.92	1.62	2.0	1,220	1,250	1,365
	---	.17	.96	1.69				
	---	.19	1.12	1.97				
w190649	.0	.25	1.26	1.74	2.0	1,125	1,155	1,395
	---	.26	1.32	1.82				
	---	.30	1.50	2.07				
w190650	.0	.26	1.50	1.92	2.0	1,190	1,215	1,395
	---	.27	1.57	2.00				
	---	.33	1.88	2.41				
w190651	.0	.42	1.99	1.58	1.5	0	0	0
	---	.44	2.09	1.66				
	---	.57	2.71	2.15				
w191295	.0	.01	1.76	2.13	4.0	1,105	1,130	1,160
	---	.01	1.86	2.25				
	---	.01	1.97	2.38				
w191296	.0	.09	1.16	2.47	3.5	1,175	1,205	1,230
	---	.10	1.23	2.61				
	---	.10	1.27	2.71				

Table 6e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 40 coal samples from Ohio

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191297	5.9	32.8	34.6	26.7	4.3	49.8	0.9	11.6	6.7	5,040	9,070
	---	34.9	36.8	28.4	3.9	52.9	1.0	6.8	7.1	5,350	9,640
	---	48.7	51.3	---	5.4	73.9	1.3	9.4	9.9	7,480	13,460
w191298	5.7	42.2	41.9	10.2	5.4	65.8	1.1	12.2	5.3	6,640	11,950
	---	44.8	44.4	10.8	5.1	69.8	1.2	7.6	5.6	7,040	12,670
	---	50.2	49.8	---	5.7	78.2	1.3	8.5	6.3	7,890	14,210
w191299	6.9	37.2	48.4	7.5	5.5	68.5	1.2	14.7	2.6	6,790	12,220
	---	40.0	52.0	8.1	5.1	73.6	1.3	9.2	2.8	7,290	13,130
	---	43.5	56.5	---	5.5	80.0	1.4	10.0	3.0	7,930	14,280
w191300	6.1	41.1	44.9	7.9	5.4	68.3	1.2	13.4	3.8	6,870	12,370
	---	43.8	47.8	8.4	5.0	72.7	1.3	8.5	4.0	7,320	13,170
	---	47.8	52.2	---	5.5	79.4	1.4	9.3	4.4	7,990	14,380
w191301	6.9	40.6	43.8	8.7	5.6	67.2	.8	13.7	4.0	6,760	12,170
	---	43.6	47.0	9.3	5.2	72.2	.9	8.1	4.3	7,260	13,070
	---	48.1	51.9	---	5.7	79.6	.9	9.0	4.7	8,010	14,420
w191302	6.0	42.9	44.9	6.2	5.7	69.1	1.3	13.7	4.0	7,010	12,610
	---	45.6	47.8	6.6	5.4	73.5	1.4	8.9	4.3	7,450	13,410
	---	48.9	51.1	---	5.7	78.7	1.5	9.5	4.6	7,980	14,360
w191303	5.1	45.8	45.9	3.2	5.8	73.5	1.4	13.2	2.9	7,400	13,320
	---	48.3	48.4	3.4	5.5	77.4	1.5	9.1	3.1	7,800	14,040
	---	49.9	50.1	---	5.7	80.2	1.5	9.5	3.2	8,070	14,530
w191304	4.4	42.9	41.3	11.4	5.1	62.4	1.2	10.9	9.0	6,520	11,730
	---	44.9	43.2	11.9	4.8	65.3	1.3	7.3	9.4	6,820	12,270
	---	51.0	49.0	---	5.5	74.1	1.4	8.3	10.7	7,740	13,930
w191305	5.0	32.8	40.0	22.2	4.5	58.0	1.1	12.2	2.0	5,670	10,200
	---	34.5	42.1	23.4	4.2	61.1	1.2	8.2	2.1	5,960	10,740
	---	45.1	54.9	---	5.4	79.7	1.5	10.7	2.7	7,780	14,010
w191306	6.4	33.7	39.0	20.9	4.6	55.4	1.0	12.2	5.9	5,580	10,040
	---	36.0	41.7	22.3	4.2	59.2	1.1	7.0	6.3	5,960	10,730
	---	46.4	53.6	---	5.3	76.2	1.4	9.0	8.1	7,670	13,810
w191307	5.3	41.9	42.7	10.1	5.4	67.5	1.3	11.8	3.9	6,730	12,120
	---	44.2	45.1	10.7	5.1	71.3	1.4	7.5	4.1	7,110	12,800
	---	49.5	50.5	---	5.7	79.8	1.5	8.4	4.6	7,960	14,330
w192032	3.3	38.8	48.5	9.4	5.2	71.3	1.3	8.5	4.3	7,280	13,100
	---	40.1	50.2	9.7	5.0	73.7	1.3	5.8	4.4	7,530	13,550
	---	44.4	55.6	---	5.5	81.7	1.5	6.4	4.9	8,340	15,010

Table 6e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 40 coal samples from Ohio

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191297	0.0	0.51	4.06	2.14	2.5	1,195	1,225	1,260
	---	.54	4.31	2.27				
	---	.76	6.02	3.18				
w191298	.0	.28	2.96	2.05	4.5	1,110	1,140	1,170
	---	.30	3.14	2.17				
	---	.33	3.52	2.44				
w191299	.0	.09	1.17	1.36	4.0	1,050	1,070	1,095
	---	.10	1.26	1.46				
	---	.11	1.37	1.59				
w191300	.0	.15	2.51	1.18	3.5	1,070	1,100	1,165
	---	.16	2.67	1.26				
	---	.17	2.92	1.37				
w191301	.0	.12	2.13	1.79	3.5	1,070	1,100	1,165
	---	.13	2.29	1.92				
	---	.14	2.52	2.12				
w191302	.0	.09	2.12	1.81	4.0	1,090	1,115	1,145
	---	.10	2.26	1.93				
	---	.10	2.41	2.06				
w191303	.0	.07	1.25	1.59	4.0	1,065	1,095	1,155
	---	.07	1.32	1.68				
	---	.08	1.36	1.73				
w191304	.0	1.03	5.24	2.72	3.5	1,175	1,205	1,230
	---	1.08	5.48	2.85				
	---	1.22	6.22	3.23				
w191305	.0	.11	1.16	.72	1.0	1,165	1,195	1,225
	---	.12	1.22	.76				
	---	.15	1.59	.99				
w191306	.0	.21	4.53	1.21	1.0	1,140	1,165	1,195
	---	.22	4.84	1.29				
	---	.29	6.23	1.66				
w191307	.0	.34	2.27	1.31	3.0	1,165	1,200	1,270
	---	.36	2.40	1.38				
	---	.40	2.68	1.55				
w192032	.0	.03	3.38	.92	6.0	1,145	1,170	1,200
	---	.03	3.50	.95				
	---	.03	3.87	1.05				

Table 6e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 40 coal samples from Ohio

Sample number	Moisture	Proximate Analysis			Ultimate Analysis					Heat of Combustion	
		Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w192061	3.4	36.9	50.1	9.6	5.2	71.6	1.3	8.7	3.6	7,190	12,950
	---	38.2	51.9	9.9	5.0	74.1	1.3	5.9	3.7	7,450	13,410
	---	42.4	57.6	---	5.5	82.3	1.5	6.5	4.1	8,270	14,890
w192264	3.0	34.4	48.4	14.2	5.0	68.7	1.3	8.3	2.5	6,850	12,330
	---	35.5	49.9	14.6	4.8	70.8	1.3	5.8	2.6	7,060	12,710
	---	41.5	58.5	---	5.6	83.0	1.6	6.8	3.0	8,270	14,890
w192265	2.8	37.6	53.4	6.2	5.4	75.0	1.5	11.0	.9	7,610	13,690
	---	38.7	54.9	6.4	5.2	77.2	1.5	8.8	.9	7,820	14,080
	---	41.3	58.7	---	5.6	82.4	1.6	9.4	1.0	8,360	15,040
w192266	2.2	42.4	46.5	8.9	5.4	71.7	1.4	6.9	5.7	7,370	13,260
	---	43.4	47.5	9.1	5.3	73.3	1.4	5.1	5.8	7,530	13,560
	---	47.7	52.3	---	5.8	80.7	1.6	5.6	6.4	8,290	14,920

Table 6e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 40 coal samples from Ohio

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w192061	0.0	0.01	3.11	0.51	5.5	1,140	1,165	1,195
	---	.01	3.22	.53				
	---	.01	3.57	.59				
w192264	.0	.10	2.06	.35	4.0	1,145	1,170	1,225
	---	.10	2.12	.36				
	---	.12	2.49	.42				
w192265	.0	.01	.41	.45	5.0	1,330	1,360	1,505
	---	.01	.42	.46				
	---	.01	.45	.49				
w192266	.0	.13	4.15	1.40	7.5	1,140	1,195	1,250
	---	.13	4.24	1.43				
	---	.15	4.67	1.57				

Table 6f — Major and minor oxide and trace element composition of the laboratory ash of 40 coal samples from Ohio

[Values in percent or parts-per-million. Coal ashed at 525°C. L means less than the value shown; N, not detected; B, not determined; S after element title indicates determinations by automatic plate reading computer assisted, emission spectrographic analyses. The standard deviation of any single answer should be taken as plus 50% and minus 35%. Methods of analyses for other elements as shown in figure 2.]

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w189745	11.7	41	18	4.9	0.71	0.28	1.7	25	0.83	0.14	w189745
w189746	20.3	27	14	10	.60	.73	1.6	31	.70	.45	w189746
w189748	13.0	22	16	6.3	.51	.57	.74	42	.53	.11	w189748
w189749	27.7	28	17	6.2	.65	.76	1.6	38	1.0	.27	w189749
w189750	17.4	48	20	5.8	1.0	.65	2.1	11	.89	.10L	w189750
w189751	12.2	48	20	2.9	.98	.58	2.3	16	.91	.10L	w189751
w189753	11.3	43	22	4.5	.65	.78	1.5	19	.88	.10L	w189753
w189754	23.4	48	26	2.8	.75	.46	1.4	13	1.4	.10L	w189754
w189759	7.3	26	16	2.8	.56	.50	1.3	47	.58	.10L	w189759
w189760	13.9	38	18	2.1	.68	.62	1.8	32	.80	.10L	w189760
w189761	8.7	20	12	2.6	.40	.50	.87	57	.42	.10L	w189761
w189762	16.9	34	15	1.9	.61	.27	1.7	42	.65	.16	w189762
w189763	10.3	27	14	3.6	.37	.42	1.1	48	.62	.10L	w189763
w190643	3.7	21	20	2.8	.90	1.5	.60	45	.70	.50	w190643
w190644	19.9	35	22	.60	.75	.93	1.5	34	.90	.30	w190644
w190645	6.5	9.0	8.0	1.5	.60	.82	.40	73	.40	.10	w190645
w190646	4.5	41	25	2.0	1.2	1.9	1.8	22	1.3	.20	w190646
w190647	31.1	47	25	.50	.90	.81	2.0	22	1.3	.10	w190647
w190648	13.0	48	24	4.6	1.3	1.4	2.2	14	1.2	.10	w190648
w190649	11.6	38	24	3.3	1.1	.98	1.5	25	1.0	.05	w190649
w190650	18.5	44	25	3.0	1.4	1.3	2.2	19	1.2	.20	w190650
w190651	23.5	46	23	18	1.4	.78	2.4	18	1.2	.03	w190651
w191295	5.7	27	15	2.0	.38	.53	.80	49	.70	.20	w191295
w191296	3.7	20	16	2.5	.42	.81	.80	53	.70	.04	w191296
w191297	23.2	35	19	.40	.30	.16	1.2	40	.80	.30	w191297
w191298	9.7	22	13	.80	.23	.30	.70	59	.60	.02L	w191298
w191299	10.5	30	11	20	.32	.20	.90	19	.50	.30	w191299
w191300	8.2	42	16	3.0	.30	B	1.0	33	.90	.06	w191300
w191301	10.6	50	15	.90	.22	.36	.70	29	1.3	.05	w191301
w191302	8.3	36	15	1.2	.46	.40	1.4	42	.70	.01	w191302
w191303	3.1	16	13	6.6	.43	.97	.10	52	.50	.20	w191303
w191304	15.1	8.0	3.0	.60	.45	.15	.20	83	1.0	.10	w191304
w191305	22.0	49	19	7.3	1.1	.27	2.1	8.4	1.0	.10	w191305
w191306	18.9	42	24	.70	.94	.25	1.8	27	1.3	.20	w191306
w191307	12.5	31	17	.70	.61	.32	1.7	37	1.0	.04	w191307
w192032	10.5	20	13	2.2	.63	.26	.60	53	.50	.10	w192032
w192061	10.7	32	18	2.6	.27	.25	.70	37	1.0	.20	w192061
w192264	9.6	49	23	1.5	.66	.62	2.3	18	1.1	.10	w192264
w192265	6.5	B			1.1	.58					w192265
w192266	14.6	16	12	1.9	.51	.24	.60	64	.30	.40	w192266

Table 6f — Major and minor oxide and trace element composition of the laboratory ash of 40 coal samples from Ohio

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Sample number
w189745	1.8	0.54	460G	280	18	0.90	94	20	120	8.5	w189745
w189746	6.7	.46L	460G	1,300	16	.72	69	11	110	9.9	w189746
w189748	4.5	.93	460G	260	7.2	.34	110	22	110	5.4	w189748
w189749	3.8	.53	460	350	5.3	.36	94	16	130	7.6	w189749
w189750	3.1	.46L	460G	360	6.4	.60	110	19	100	10	w189750
w189751	2.6	.46L	460G	340	10	1.9	110	22	110	14	w189751
w189753	3.8	.46L	460G	270	13	.34	170	24	130	7.1	w189753
w189754	1.7	.46L	460G	270	10	.40	200	31	200	10	w189754
w189759	2.6	.76	460G	170	11	.88	120	34	120	4.1	w189759
w189760	1.9	.56	410	240	7.6	.82	94	27	110	8.6	w189760
w189761	3.0	.71	460G	170	14	.90	490L	120	78L	4.6	w189761
w189762	2.0	.46L	320	180	11	1.2	250L	69	360	7.7	w189762
w189763	1.8	.60	460G	160	6.0	.80	610L	230	66L	4.9	w189763
w190643	5.2	.60	1,000G	2,500	99	.94	300	43	160	11	w190643
w190644	1.6	.49	430	240	23	1.1	160	19	130	8.0	w190644
w190645	3.2	.84	1,000G	190	58	.74	92	15	51	6.2	w190645
w190646	3.4	.54	1,000G	970	66	.98	160	24	270	13	w190646
w190647	1.4	.61	380	470	25	.84	130	26	120	9.3	w190647
w190648	3.8	.10L	1,000G	390	17	3.3	100	24	130	14	w190648
w190649	4.0	.36	1,000G	230	11	.46	110	25	130	6.9	w190649
w190650	3.5	.39	1,000G	380	7.6	.52	120	24	140	9.7	w190650
w190651	3.3	.10L	650	330	5.8	.60	120	20	130	11	w190651
w191295	4.2	.23	1,100G	390	19	.92	140	28	95	1.8	w191295
w191296	5.8	.46	1,100G	170	30	.76	110	19	170	8.1	w191296
w191297	2.3	.25	420	140	10	.82	56	27	91	7.8	w191297
w191298	2.7	.54	1,100G	360	22	.72	62	25	94	4.1	w191298
w191299	8.8	.11L	1,100G	360	24	.68	76	11	69	2.9	w191299
w191300	4.0	.35	1,100G	220	19	.70	73	18	120	4.9	w191300
w191301	2.3	.48	1,100G	110	26	.88	110	29	120	4.7	w191301
w191302	3.3	.52	1,100G	220	29	2.7	84	52	180	6.0	w191302
w191303	9.5	.30	580	460	17	4.4	97	32	81	6.5L	w191303
w191304	3.7	.41	540	48	4.9	.40	13	5.3	26	2.6L	w191304
w191305	4.9	.11L	380	350	14	.66	95	17	130	8.2	w191305
w191306	2.2	.21	790	260	11	.56	130	26	140	10	w191306
w191307	2.6	.27	1,100G	330	19	.62	96	13	120	8.8	w191307
w192032	B	.50	420	120	28	1.3	86	80	98	2.9	w192032
w192061	.03	.54	380	2,300	17	.76	100	51	130	2.8	w192061
w192264	1.8	1.0L	150	700	15	2.4	170	54	240	10	w192264
w192265		1.0L	300	300	20	.89	120	45	160	6.2	w192265
w192266	2.6	1.0	300	1,500	20	2.0	55	29	53	1.4	w192266

Table 6f — Major and minor oxide and trace element composition of the laboratory ash of 40 coal samples from Ohio

Sample number	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	La (ppm)	Li (ppm)	Sample number
w189745	59	15L	7.3	1.7	32	22L	56	5.1	51	67	w189745
w189746	48	15L	4.6L	1.3	23	22L	3.2L	4.4	39	61	w189746
w189748	68	15L	17	2.6	46	22L	3.2L	3.8	46	130	w189748
w189749	80	15L	14	2.1	53	15L	19	5.1	40	100	w189749
w189750	57	15L	4.6L	2.1	32	15L	3.2L	4.6	52	67	w189750
w189751	69	15L	15	2.5	29	22L	3.2L	5.7	57	45	w189751
w189753	24	15L	9.4	3.2	30	15L	3.7	4.4	80	88	w189753
w189754	98	15L	6.0	3.0	33	22L	3.2L	8.5	120	150	w189754
w189759	55	15L	4.6L	1.9	27	22L	13	5.5	55	43	w189759
w189760	63	15L	4.6L	1.7	29	22L	3.3	5.0	43	98	w189760
w189761	45	15L	4.6L	19	31	22L	11	2.3	370	37	w189761
w189762	42	15L	4.6L	5.9L	27	22L	32	4.1	130	57	w189762
w189763	37	15L	10	9.7L	31	15L	5.3	2.9L	340	69	w189763
w190643	110	50	26	4.6	96	43	120	5.4	160	150	w190643
w190644	140	32L	10L	2.7	64	13	140	4.5	85	200	w190644
w190645	56	32L	10L	2.0	45	6.8L	24	7.7	31	56	w190645
w190646	170	32L	23	5.3	110	23	62	8.9	89	200	w190646
w190647	110	32L	14	1.5	48	6.8L	160	5.1	64	220	w190647
w190648	69	32L	10L	2.0	52	19	12	5.4	54	81	w190648
w190649	75	32L	12	2.5	61	25	6.5	4.3	52	99	w190649
w190650	82	32L	10L	1.8	51	16	6.1	5.4	65	100	w190650
w190651	66	32L	10L	2.1	53	16	4.6L	6.8	68	80	w190651
w191295	73	36L	11L	2.6	22	7.8L	5.2L	3.5	70	140	w191295
w191296	110	36L	11L	3.8	50	23	35	2.7	27	120	w191296
w191297	100	36L	11L	1.5	26	8.7	18	3.4	30	190	w191297
w191298	91	36L	11L	1.8	40	7.8L	42	3.1	21	110	w191298
w191299	42	36L	11L	1.4	19	11	34	2.9	29	26	w191299
w191300	84	36L	11L	2.2	29	7.8L	5.2L	4.9	37	66	w191300
w191301	79	36L	11L	3.6	32	17	6.5	9.4	57	89	w191301
w191302	150	47	30	7.1	50	40	260	7.2	36	39	w191302
w191303	75	36L	11L	2.6	39	7.8L	7.3	3.2	65	99	w191303
w191304	23	36L	11L	.53	23	7.8L	5.7	.7	7	17	w191304
w191305	58	36L	11L	1.5	41	7.8L	62	5.0	45	230	w191305
w191306	70	36L	11L	2.0	38	7.8L	7.6	6.9	69	270	w191306
w191307	81	36L	11L	2.3	39	7.8L	21	5.6	48	250	w191307
w192032	240	32L	10L	2.4	39	7.0L	40	2.9	48	56	w192032
w192061	150	32L	10L	2.3	49	18	67	4.7L	47	67	w192061
w192264	140	100L	100L	3.4	70	100L	50	7.3	94	110	w192264
w192265	120	100L	100L	2.5	70	100L	70	7.7	62	79	w192265
w192266	120	100L	100L	2.7	100	100L	150	2.1	21	45	w192266

Table 6f -- Major and minor oxide and trace element composition of the laboratory ash of 40 coal samples from Ohio

Sample number	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Sc (ppm)	Sample number
w189745	0.9L	160	14	17	68L	54	26	15	150	20	w189745
w189746	.5	160	9.4	15L	68L	22	10L	14	130	14	w189746
w189748	.8	150	5.0	15L	68L	27	11	14	280	22	w189748
w189749	1	140	7.1	15L	68L	22	12	12	170	19	w189749
w189750	.6	180	8.9	15L	68L	47	25	10L	160	18	w189750
w189751	.8L	130	23	15L	68L	57	21	13	360	20	w189751
w189753	.9	130	9.7	15L	68L	50	34	16	290	150	w189753
w189754	.9	99	6.9	15L	68L	69	30	18	190	37	w189754
w189759	1L	120	26	15L	68L	44	11	14	380	14	w189759
w189760	.7L	110	11	15L	68L	56	17	13	250	19	w189760
w189761	1L	120	16	15L	68L	44	10L	14	340	140	w189761
w189762	.6L	90	14	15L	68L	37	15	10	220	40	w189762
w189763	1L	130	33	15L	68L	46	11	15	290	110	w189763
w190643	3L	760	110	25	200	100	24	68L	410	32	w190643
w190644	2	330	11	5	47	63	35	68L	90	31	w190644
w190645	2L	490	120	19	48	42	10L	68L	220	7.7	w190645
w190646	2	390	33	33	130	67	21	68L	310	51	w190646
w190647	1	210	11	27	94	93	53	68L	110	27	w190647
w190648	.8	390	40	36	90	53	18	68L	120	22	w190648
w190649	.9	310	12	25	84	55	23	68L	100	27	w190649
w190650	.5	270	5.4	34	80	51	21	68L	92	24	w190650
w190651	.9	320	9.0	20	92	65	26	68L	170	23	w190651
w191295	2L	270	15	4	52L	33	22	78L	180L	19	w191295
w191296	3L	170	25	10	H	34	10	78L	300L	24	w191296
w191297	.9	85	13	7	52L	34	17	78L	100	20	w191297
w191298	1	140	42	13	52L	42	51	78L	130L	230	w191298
w191299	1	570	56	11	58	32	10L	78L	57	12	w191299
w191300	1	180	32	18	66	27	42	99	24	21	w191300
w191301	2	120	17	24	52L	44	31	78L	94	25	w191301
w191302	5	170	40	27	79	160	42	78L	130	24	w191302
w191303	3L	100	27	5	58	43	10L	78L	290L	16	w191303
w191304	.7L	100	34	4L	52L	7.3	10L	78L	99L	4.6	w191304
w191305	.9	650	56	6	52L	58	28	78L	130	28	w191305
w191306	1	40	11	13	79	40	19	78L	160	25	w191306
w191307	.8	120	23	18	68	30	17	78L	130	26	w191307
w192032	1	920	H	19	220L	280	45	68L	130L	18	w192032
w192061	.9	110	70	19	54	110	87	68L	100L	25	w192061
w192264	1	90	50	30	150L	100	97	200L	250	44	w192264
w192265	2	130	70	30	150L	150	56	200L	150	31	w192265
w192266	1	140	15	30	150L	300	160	200L	21	14	w192266

Table 6f — Major and minor oxide and trace element composition of the laboratory ash of 40 coal samples from Ohio

Sample number	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Sample number
w189745	9.4	15L	260	1.7L	27	3.7	140	57	3.4	120	w189745
w189746	7.4	15L	260	.99	15L	3.0	67	31	2.5	99	w189746
w189748	14	15L	250	1.5	23L	3.7	71	37	6.2	66	w189748
w189749	9.7	15L	170	1.4	17	3.7	130	50	1.8	79	w189749
w189750	10	15L	290	1.1	21	4.7	110	35	3.4	130	w189750
w189751	11	15L	370	1.6	28	3.9	130	66	5.7	290	w189751
w189753	16	15L	400	1.8	27L	4.7	140	80	5.3	71	w189753
w189754	16	15L	430	2.1	29	7.6	160	68	6.0	71	w189754
w189759	6.8	15L	260	6.8	41L	2.7L	80	35	4.1	120	w189759
w189760	8.6	15L	210	.72	22L	6.0	110	33	2.9	120	w189760
w189761	78L	15L	230	1.1	34L	3.9	49	31	30	110	w189761
w189762	40L	15L	160	.59	18L	5.4	42	16	15	100	w189762
w189763	66L	15L	180	5.8L	29L	1.9	61	26	31	83	w189763
w190643	22	14	1,600	2.7	81L	9.5	200	240	8.1	290	w190643
w190644	12	6.8L	620	2.0	26	11	120	39	9.0	200	w190644
w190645	8	6.8L	390	3.1	46L	3.1	55	120	3.1	270	w190645
w190646	22	13	430	4.4	67L	12	230	220	20	250	w190646
w190647	8.0L	6.8L	360	1.6	13	9.7	180	89	7.4	160	w190647
w190648	10L	6.8L	740	1.5	23L	12	180	77	5.4	180	w190648
w190649	13	6.8L	550	1.7	26L	5.6	200	88	6.0	80	w190649
w190650	9.2	6.8L	820	1.6	18	5.3	180	67	4.9	77	w190650
w190651	9.4	6.8L	380	1.3	25	5.5	190	55	3.8	68	w190651
w191295	12	7.8L	350	1.8	53L	5.3	59	23	5.3	190	w191295
w191296	19	15	560	2.7L	81L	8.1	110	110	5.4	170	w191296
w191297	6.0	7.8L	110	2.2	17	11	83	39	6.0	200	w191297
w191298	7.2	11	230	2.1	31L	8.2	83	49	5.2	170	w191298
w191299	7.6	7.8L	290	.95	38	30	83	56	3.8	210	w191299
w191300	11	7.8L	170	2.4	37L	5.4	97	65	6.1	160	w191300
w191301	17	8.1	210	3.8	28L	5.9	110	130	11	190	w191301
w191302	33	14	340	11	36L	18	140	180	27	1,300	w191302
w191303	9.7	8.8	1,300	3.2L	97L	6.5L	48	36	3.2	660	w191303
w191304	2.0	7.8L	130	2.0L	20L	1.3L	15	10	1.3	81	w191304
w191305	9.1	7.8L	180	1.8	43	65	140	22	4.5	54	w191305
w191306	11	7.8L	420	1.6	33	5.8	140	40	5.3	74	w191306
w191307	10	9.0	170	2.4	24L	6.1	160	64	5.6	180	w191307
w192032	10	9.0	280	1.9	29L	4.8	120	81	6.7	150	w192032
w192061	11	12	1,400	1.9	42	8.0	150	71	6.5	97	w192061
w192264	17	20L	150	3.1	31	13	300	70	8.3	1,100	w192264
w192265	12	20L	300	1.5	46L	26	300	100	6.2	160	w192265
w192266	14	20L	300	2.7	21L	12	150	150	7.5	880	w192266

Table 6f -- Major and minor oxide and trace element composition of the laboratory ash of 40 coal samples from Ohio

Sample number	Zr-S (ppm)
w189745	400
w189746	210
w189748	49
w189749	89
w189750	88
w189751	260
w189753	270
w189754	300
w189759	330
w189760	290
w189761	84
w189762	44
w189763	61
w190643	300
w190644	58
w190645	140
w190646	300
w190647	380
w190648	560
w190649	380
w190650	500
w190651	270
w191295	46
w191296	110
w191297	89
w191298	83
w191299	110
w191300	190
w191301	260
w191302	500
w191303	49
w191304	11
w191305	130
w191306	170
w191307	250
w192032	130
w192061	210
w192264	150
w192265	150
w192266	200

Table 6g -- Content of 22 trace elements in 40 coal samples from Ohio

[Analysis performed on whole coal. Values in parts-per-million (ppm). L, less than the value shown, B, not determined.]

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w189745	14	11	2.3	14	1.0	0.20	66	0.6	0.095	6	w189745
w189746	5.0	14	2.3	22	2.0	.26	130	.9	.20	8	w189746
w189748	2.0	14	2.9	15	.7	.34	130	.5	.17	6	w189748
w189749	6.0	26	4.5	36	2.1	.57	150	1.4	.48	11	w189749
w189750	3.0	20	3.3	18	1.8	.37	140	.8	.12	9	w189750
w189751	3.0	14	2.7	13	1.7	.30	130	.7	.090	7	w189751
w189753	3.0	19	2.7	14	.8	.36	110	.5	.12	9	w189753
w189754	3.0	47	7.2	47	2.4	.70	130	2.0	.20	28	w189754
w189759	7.0	9.0	2.5	8.5	.3	.14	42	.4	.090	4	w189759
w189760	5.0	13	3.7	15	1.2	.24	86	.7	.10	6	w189760
w189761	7.4	43L	10	6.8L	.4	1.7	46	.2	.16	32	w189761
w189762	16	43L	12	61	1.3	1.0L	86	.7	.16	21	w189762
w189763	14	63L	23	6.8L	.5	1.0L	74	.3L	.18	35	w189763
w190643	3.0	11	1.6	5.8	.4	.17	28	.2	.14	6	w190643
w190644	10	32	3.7	26	1.6	.53	76	.9	.28	17	w190644
w190645	4.0	6.0	1.0	3.3	.4	.13	22	.5	.30	2	w190645
w190646	1.0	7.0	1.1	12	.6	.24	48	.4	.070	4	w190646
w190647	15	40	8.1	36	2.9	.47	120	1.6	.21	20	w190647
w190648	2.0	13	3.1	16	1.8	.26	92	.7	.090	7	w190648
w190649	1.2	13	2.9	15	.8	.29	68	.5	.080	6	w190649
w190650	3.0	22	4.4	25	1.8	.34	200	1.0	.10	12	w190650
w190651	3.0	29	4.8	30	2.6	.49	120	1.6	.14	16	w190651
w191295	1.3	8.0	1.6	5.4	.1	.15	20L	.2	.26	4	w191295
w191296	1.0	4.0	.7	6.2	.3	.14	42	.1	.13	1	w191296
w191297	5.5	13	6.3	21	1.8	.34	26	.8	.48	7	w191297
w191298	2.1	6.0	2.4	9.1	.4	.17	28	.3	.14	2	w191298
w191299	2.0	8.0	1.2	7.2	.3	.15	50	.3	.17	3	w191299
w191300	2.0	6.0	1.5	9.5	.4	.18	150	.4	.18	3	w191300
w191301	2.6	12	3.1	13	.5	.38	35	1.0	.27	6	w191301
w191302	8.3	7.0	4.3	15	.5	.59	21	.6	.13	3	w191302
w191303	1.0L	3.0	1.0	2.5	.2L	.08	20L	.1	.21	2	w191303
w191304	1.1	2.0	.8	3.9	.4L	.08	20L	.1	.25	1	w191304
w191305	6.1	21	3.8	28	1.8	.33	160	1.1	.13	10	w191305
w191306	8.2	24	4.9	26	1.9	.37	120	1.3	.21	13	w191306
w191307	3.5	12	1.6	15	1.1	.29	94	.7	.24	6	w191307
w192032	76	9.0	8.4	10	.3	.25	24	.3	.24	5	w192032
w192061	92	11	5.5	14	.3	.25	20L	.5L	.35	5	w192061
w192264	41	16	5.2	23	1.0	.33	110	.7	.22	9	w192264
w192265	12	8.0	2.9	10	.4	.16	44	.5	.22	4	w192265
w192266	28	8.0	4.3	7.7	.2	.39	54	.3	.44	3	w192266

Table 6g -- Content of 22 trace elements in 40 coal samples from Ohio

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w189745	0.1L	240	72	18	0.50	2.3	1.0	1.1	0.2L	3.2	w189745
w189746	.1	1,100	400	26	.30	2.9	7.6	1.5	.2	3.0L	w189746
w189748	.1	550	62	36	.30	2.8	6.0	1.8	.2	3.0L	w189748
w189749	.3	1,600	330	47	.40	5.4	1.8	2.7	.4	4.7	w189749
w189750	.1	840	76L	28	.30	3.1	6.9	1.8	.2	3.7	w189750
w189751	.1L	520	53L	44	.20	2.4	7.5	1.4	.2	3.5	w189751
w189753	.1	650	49L	33	.20	16	5.1	1.8	.2	3.0L	w189753
w189754	.2	800	100L	45	.40	8.6	9.8	3.7	.5	6.7	w189754
w189759	.1L	270	32L	28	.20	1.0	1.0	.50	.5	3.0L	w189759
w189760	.1L	640	61L	35	.30	2.7	1.2	1.2	.1	3.0L	w189760
w189761	.1L	320	38L	30	.14	13	1.1	6.8L	.1	3.0L	w189761
w189762	.1L	340	120	38	.42	6.7	1.2	6.8L	.1	3.0L	w189762
w189763	.1L	320	45L	30	.20	11	1.1	6.8L	.6L	3.0L	w189763
w190643	.1L	410	81	15	.10	1.2	2.4	.80	.1	3.0L	w190643
w190644	.3	1,400	260	18	.30	6.1	4.8	2.4	.4	5.1	w190644
w190645	.1L	390	28	14	4.3	.50	3.6	B	.2	3.0L	w190645
w190646	.1	630	39	14	.20	2.3	2.2	1.0	.2	3.0L	w190646
w190647	.4	1,900	140	33	.30	8.4	3.1	2.5L	.5	4.0	w190647
w190648	.1	1,300	57	16	.20	2.9	6.9	1.3L	.2	3.0L	w190648
w190649	.1	840	25	12	.10	3.1	4.5	1.5	.2	3.0L	w190649
w190650	.1	1,700	160	17	.20	4.4	5.0	1.7	.3	3.4	w190650
w190651	.2	1,400	31	41	.20	5.4	9.2	2.2	.3	5.9	w190651
w191295	.1L	220	50	10L	.14	1.1	3.8	.70	.1	3.0L	w191295
w191296	.1L	220	6	11L	.12	.90	1.4	.70	.1L	3.0L	w191296
w191297	.2	280	300	24	.32	4.6	3.6	1.4	.5	4.0	w191297
w191298	.1	220	8L	13L	.38	22	3.6	.70	.2	3.0L	w191298
w191299	.1	160	140	6	.15	1.3	1.7	.80	.1	4.0	w191299
w191300	.1	B	22	2	.10	1.7	1.4	.90	.2	3.0L	w191300
w191301	.2	280	23	10	.30	2.6	2.2	1.8	.4	3.0L	w191301
w191302	.4	250	4	11	.30	2.0	1.0	2.7	.9	3.0L	w191302
w191303	.1L	220	27	9L	.11	.50	3.4	.30	.1L	3.0L	w191303
w191304	.1L	170	66	15L	.10	.70	1.5	.30	.3L	3.0L	w191304
w191305	.2	440	96	28	.48	6.1	6.5	2.0	.4	9.4	w191305
w191306	.2	350	170	31	.26	4.7	4.9	2.0	.3	6.3	w191306
w191307	.1	300	22	16	.12	3.3	2.6	1.3	.3	3.0L	w191307
w192032	.1	200	46	14L	1.0	1.9	3.1	1.1	.2	3.0L	w192032
w192061	.1	200	94	11L	.81	2.7	3.0	1.2	.2	4.5	w192061
w192264	.1	440	42	24	1.8	4.2	2.8	1.6	.3	3.0	w192264
w192265	.1	280		10	.80	2.0	3.2	.80	.1	3.0L	w192265
w192266	.2	260	260	3	.80	2.0	1.3	2.0	.4	3.0L	w192266

Table 6g — Content of 22 trace elements in 40 coal samples from Ohio

Sample number	U (ppm)	Yb (ppm)
w189745	0.43	0.4
w189746	.61	.5
w189748	.48	.8
w189749	1.0	.5
w189750	.81	.6
w189751	.48	.7
w189753	.53	.6
w189754	1.8	1.4
w189759	.20L	.3
w189760	.84	.4
w189761	.34	2.7
w189762	.92	2.5
w189763	.20	3.2
w190643	.35	.3
w190644	2.1	1.8
w190645	.20	.2
w190646	.52	.9
w190647	3.0	2.3
w190648	1.6	.7
w190649	.65	.7
w190650	.98	.9
w190651	1.3	.9
w191295	.30	.3
w191296	.30	.2
w191297	2.6	1.4
w191298	.80	.5
w191299	3.1	.4
w191300	.44	.5
w191301	.63	1.2
w191302	1.5	2.2
w191303	.20L	.1
w191304	.20L	.2
w191305	14	1.0
w191306	1.1	1.0
w191307	.76	.7
w192032	.50	.7
w192061	.86	.7
w192264	1.2	.8
w192265	1.7	.4
w192266	1.7	1.1

Table 6h -- Major, minor, and trace element composition of 40 coal samples from Ohio reported on whole coal basis.

[Values in percent of perts-per-million. 22 values are from direct determinations on whole coal; all other values calculated from analyses of ash, S means analysis by emission spectrography; L, less than the value shown; N, not detected; B, not determined.]

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w189745	2.3	1.1	0.41	0.050	0.024	0.097	2.1	0.058	0.06	14	w189745
w189746	2.5	1.5	1.5	.073	.11	.17	4.4	.085	.09L	5.0	w189746
w189748	1.3	1.1	.58	.040	.055	.11	3.8	.041	.12	2.0	w189748
w189749	3.7	2.4	1.2	.11	.16	.23	7.3	.17	.15	6.0	w189749
w189750	3.9	1.8	.71	.11	.084	.14	1.4	.093	.08L	3.0	w189750
w189751	2.7	1.3	.25	.072	.052	.10	1.4	.067	.06L	3.0	w189751
w189753	2.3	1.3	.36	.044	.065	.094	1.5	.060	.05L	3.0	w189753
w189754	5.3	3.3	.46	.11	.080	.19	2.1	.19	.11L	3.0	w189754
w189759	.90	.62	.15	.025	.027	.061	2.4	.025	.06	7.0	w189759
w189760	2.5	1.4	.20	.057	.064	.12	3.1	.067	.08	5.0	w189760
w189761	.80	.56	.16	.021	.032	.072	3.5	.022	.06	7.4	w189761
w189762	2.7	1.3	.23	.062	.034	.14	4.9	.066	.08L	16	w189762
w189763	1.3	.78	.26	.023	.032	.086	3.5	.038	.06	14	w189763
w190643	.36	.39	.074	.020	.041	.031	1.2	.016	.02	3.0	w190643
w190644	3.3	2.3	.085	.090	.14	.17	4.7	.11	.10	10	w190644
w190645	.27	.28	.070	.023	.040	.054	3.3	.016	.05	4.0	w190645
w190646	.86	.60	.064	.031	.063	.037	.70	.035	.02	1.0	w190646
w190647	6.8	4.1	.11	.17	.19	.26	4.8	.24	.19	15	w190647
w190648	2.9	1.7	.43	.10	.13	.11	1.3	.093	.01L	2.0	w190648
w190649	2.1	1.5	.27	.080	.084	.097	2.0	.069	.04	1.2	w190649
w190650	3.8	2.4	.40	.15	.17	.15	2.5	.13	.07	3.0	w190650
w190651	5.0	2.9	3.0	.20	.14	.20	3.0	.17	.02L	3.0	w190651
w191295	.72	.45	.081	.013	.022	.047	2.0	.024	.01	1.3	w191295
w191296	.35	.31	.066	.009	.022	.031	1.4	.016	.02	1.0	w191296
w191297	3.8	2.3	.066	.042	.028	.19	6.5	.11	.06	5.5	w191297
w191298	1.0	.67	.055	.013	.022	.081	4.0	.035	.05	2.1	w191298
w191299	1.5	.61	1.5	.020	.016	.087	1.4	.031	.01L	2.0	w191299
w191300	1.6	.69	.18	.015	B	.068	1.9	.044	.03	2.0	w191300
w191301	2.5	.84	.068	.014	.028	.088	2.1	.083	.05	2.6	w191301
w191302	1.4	.66	.071	.023	.025	.069	2.4	.035	.04	8.3	w191302
w191303	.23	.21	.15	.008	.022	.026	1.1	.009	.01	1.0L	w191303
w191304	.56	.24	.065	.041	.017	.13	8.8	.090	.06	1.1	w191304
w191305	5.0	2.2	1.1	.14	.044	.18	1.3	.13	.02L	6.1	w191305
w191306	3.7	2.4	.094	.11	.035	.16	3.6	.15	.04	8.2	w191306
w191307	1.8	1.1	.062	.046	.030	.10	3.2	.075	.03	3.5	w191307
w192032	.98	.72	.16	.040	.020	.087	3.9	.031	.05	76	w192032
w192061	1.6	1.0	.20	.017	.020	.089	2.8	.064	.06	92	w192061
w192264	2.2	1.2	.10	.038	.044	.080	1.2	.063	.10L	41	w192264
w192265	B			.043	.028	.054			.07L	12	w192265
w192266	1.1	.93	.20	.045	.026	.12	6.5	.026	.15	28	w192266

Table 6h — Major, minor, and trace element composition of 40 coal samples from Ohio reported on whole coal basis

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Sample number
w189745	54G	33	2.0	0.11	11	2.3	14	1.0	6.9	1.7L	w189745
w189746	94G	260	3.2	.15	14	2.3	22	2.0	9.7	3.0L	w189746
w189748	60G	34	.9	.04	14	2.9	15	.7	8.8	1.9L	w189748
w189749	130	96	1.5	.10	26	4.5	36	2.1	22	4.1L	w189749
w189750	81G	63	1.1	.10	20	3.3	18	1.8	9.9	2.6L	w189750
w189751	57G	41	1.3	.23	14	2.7	13	1.7	8.4	1.8L	w189751
w189753	52G	31	1.5	.04	19	2.7	14	.8	2.7	1.7L	w189753
w189754	110G	63	2.4	.09	47	7.2	47	2.4	23	3.4L	w189754
w189759	34G	12	.8	.06	9.0	2.5	8.5	.3	4.0	1.1L	w189759
w189760	57	33	1.1	.11	13	3.7	15	1.2	8.8	2.0L	w189760
w189761	40G	15	1.2	.08	43L	10	6.8L	.4	3.9	1.3L	w189761
w189762	54	31	1.8	.20	43L	12	61	1.3	7.1	2.5L	w189762
w189763	48G	16	.6	.08	63L	23	6.8L	.5	3.8	1.5L	w189763
w190643	37G	93	3.7	.03	11	1.6	5.8	.4	4.1	1.9	w190643
w190644	86	48	4.6	.22	32	3.7	26	1.6	28	6.4L	w190644
w190645	65G	12	3.8	.05	6.0	1.0	3.3	.4	3.6	2.1L	w190645
w190646	45G	44	3.0	.04	7.0	1.1	12	.6	7.7	1.4L	w190646
w190647	120	150	7.8	.26	40	8.1	36	2.9	34	10L	w190647
w190648	130G	51	2.2	.43	13	3.1	16	1.8	9.0	4.2L	w190648
w190649	120G	27	1.3	.05	13	2.9	15	.8	8.7	3.7L	w190649
w190650	190G	70	1.4	.10	22	4.4	25	1.8	15	5.9L	w190650
w190651	150	78	1.4	.14	29	4.8	30	2.6	16	7.5L	w190651
w191295	63G	22	1.1	.05	8.0	1.6	5.4	.1	4.2	2.1L	w191295
w191296	41G	6	1.1	.03	4.0	.7	6.2	.3	4.1	1.3L	w191296
w191297	97	32	2.3	.19	13	6.3	21	1.8	23	8.4L	w191297
w191298	110G	35	2.1	.07	6.0	2.4	9.1	.4	8.8	3.5L	w191298
w191299	120G	38	2.5	.07	8.0	1.2	7.2	.3	4.4	3.8L	w191299
w191300	90G	18	1.6	.06	6.0	1.5	9.5	.4	6.9	3.0L	w191300
w191301	120G	12	2.8	.09	12	3.1	13	.5	8.4	3.8L	w191301
w191302	91G	18	2.4	.22	7.0	4.3	15	.5	12	3.9	w191302
w191303	18	14	.5	.14	3.0	1.0	2.5	.2L	2.3	1.1L	w191303
w191304	82	7	.7	.06	2.0	.8	3.9	.4L	3.5	5.4L	w191304
w191305	84	77	3.1	.15	21	3.8	28	1.8	13	7.9L	w191305
w191306	150	49	2.1	.11	24	4.9	26	1.9	13	6.8L	w191306
w191307	140G	41	2.4	.08	12	1.6	15	1.1	10	4.5L	w191307
w192032	44	13	2.9	.14	9.0	8.4	10	.3	25	3.4L	w192032
w192061	41	250	1.8	.08	11	5.5	14	.3	16	3.4L	w192061
w192264	14	67	1.4	.23	16	5.2	23	1.0	13	9.6L	w192264
w192265	20	20	1.3	.06	8.0	2.9	10	.4	7.8	6.5L	w192265
w192266	44	220	2.9	.29	8.0	4.3	7.7	.2	18	15L	w192266

Table 6h -- Major, minor, and trace element composition of 40 coal samples from Ohio reported on whole coal basis

Sample number	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Li (ppm)	Sample number
w189745	0.9	0.20	66	3.7	2.5L	6.6	0.6	0.095	6	7.8	w189745
w189746	.9L	.26	130	4.7	4.4L	.64L	.9	.20	8	12	w189746
w189748	2.2	.34	130	5.9	2.8L	.41L	.5	.17	6	17	w189748
w189749	4.0	.57	150	15	4.1L	5.3	1.4	.48	11	28	w189749
w189750	.8L	.37	140	5.6	2.6L	.55L	.8	.12	9	12	w189750
w189751	1.8	.30	130	3.6	2.6L	.39L	.7	.090	7	5.5	w189751
w189753	1.1	.36	110	3.4	1.7L	.42	.5	.12	9	9.9	w189753
w189754	1.4	.70	130	7.7	5.0L	.74L	2.0	.20	28	35	w189754
w189759	.3L	.14	42	1.9	1.6L	.98	.4	.090	4	3.1	w189759
w189760	.6L	.24	86	4.0	3.0L	.45	.7	.10	6	14	w189760
w189761	.4L	1.7	46	2.7	1.9L	.95	.2	.16	32	3.2	w189761
w189762	.8L	1.0L	86	4.6	3.6L	5.4	.7	.16	21	9.6	w189762
w189763	1.0	1.0L	74	3.2	1.5L	.55	.3L	.18	35	7.1	w189763
w190643	1.0	.17	28	3.6	1.6	4.4	.2	.14	6	5.6	w190643
w190644	2.0L	.53	76	13	2.6	28	.9	.28	17	40	w190644
w190645	.7L	.13	22	2.9	.44L	1.6	.5	.30	2	3.6	w190645
w190646	1.0	.24	48	5.0	1.0	2.8	.4	.070	4	9.0	w190646
w190647	4.4	.47	120	15	2.1L	50	1.6	.21	20	68	w190647
w190648	1.3L	.26	92	6.8	2.5	1.6	.7	.090	7	11	w190648
w190649	1.4	.29	68	7.1	2.9	.75	.5	.080	6	11	w190649
w190650	1.9L	.34	200	9.4	3.0	1.1	1.0	.10	12	19	w190650
w190651	2.4L	.49	120	12	3.8	1.1L	1.6	.14	16	19	w190651
w191295	.6L	.15	20L	1.3	.44L	.30L	.2	.26	4	8.0	w191295
w191296	.4L	.14	42	1.9	.85	1.3	.1	.13	1	4.4	w191296
w191297	2.6L	.34	26	6.0	2.0	4.2	.8	.48	7	44	w191297
w191298	1.1L	.17	28	3.9	.76L	4.1	.3	.14	2	11	w191298
w191299	1.2L	.15	50	2.0	1.2	3.6	.3	.17	3	2.7	w191299
w191300	.9L	.18	150	2.4	.64L	.43L	.4	.18	3	5.4	w191300
w191301	1.2L	.38	35	3.4	1.8	.69	1.0	.27	6	9.4	w191301
w191302	2.5	.59	21	4.2	3.3	22	.6	.13	3	3.2	w191302
w191303	.3L	.08	20L	1.2	.24L	.23	.1	.21	2	3.1	w191303
w191304	1.7L	.08	20L	3.5	1.2L	.86	.1	.25	1	2.6	w191304
w191305	2.4L	.33	160	9.0	1.7L	14	1.1	.13	10	51	w191305
w191306	2.1L	.37	120	7.2	1.5L	1.4	1.3	.21	13	51	w191306
w191307	1.4L	.29	94	4.9	.98L	2.6	.7	.24	6	31	w191307
w192032	1.1L	.25	24	4.1	.74L	4.2	.3	.24	5	5.9	w192032
w192061	1.1L	.25	20L	5.2	1.9	7.2	.5L	.35	5	7.2	w192061
w192264	9.6L	.33	110	6.7	9.6L	4.8	.7	.22	9	11	w192264
w192265	6.5L	.16	44	4.6	6.5L	4.6	.5	.22	4	5.1	w192265
w192266	15L	.39	54	15	15L	22	.3	.44	3	6.6	w192266

Table 6h — Major, minor, and trace element composition of 40 coal samples from Ohio reported on whole coal basis

Sample number	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Sample number
w189745	0.1L	18	1.6	2.0	8.0L	6.4	72	3.0	1.8	18	w189745
w189746	.1	33	1.9	3.0L	14L	4.5	400	2.0L	2.8	26	w189746
w189748	.1	19	.64	1.9L	8.9L	3.5	62	1.4	1.8	36	w189748
w189749	.3	40	2.0	4.1L	19L	6.0	330	3.3	3.3	47	w189749
w189750	.1	31	1.5	2.6L	12L	8.2	76L	4.4	1.7L	28	w189750
w189751	.1L	16	2.8	1.8L	8.3L	6.9	53L	2.6	1.5	44	w189751
w189753	.1	14	1.1	1.7L	7.7L	5.7	49L	3.8	1.8	33	w189753
w189754	.2	23	1.6	3.4L	16L	16	100L	7.0	4.1	45	w189754
w189759	.1L	8.5	1.9	1.1L	5.0L	3.2	32L	.80	1.1	28	w189759
w189760	.1L	16	1.5	2.0L	9.5L	7.7	61L	2.4	1.8	35	w189760
w189761	.1L	11	1.4	1.3L	5.9L	3.8	38L	.87L	1.2	30	w189761
w189762	.1L	15	2.3	2.5L	12L	6.2	120	2.5	1.7	38	w189762
w189763	.1L	13	3.4	1.5L	7.0L	4.7	45L	1.1	1.5	30	w189763
w190643	.1L	28	4.1	.93	7.4	3.7	81	.89	2.5L	15	w190643
w190644	.3	66	2.2	1.0	9.4	13	260	7.0	14L	18	w190644
w190645	.1L	32	7.8	1.2	3.1	2.7	28	.65L	4.4L	14	w190645
w190646	.1	18	1.5	1.5	5.9	3.0	39	.95	3.1L	14	w190646
w190647	.4	65	3.4	8.4	29	29	140	16	21L	33	w190647
w190648	.1	51	5.2	4.7	12	6.9	57	2.3	8.8L	16	w190648
w190649	.1	36	1.4	2.9	9.7	6.4	25	2.7	7.9L	12	w190649
w190650	.1	50	1.0	6.3	15	9.4	160	3.9	13L	17	w190650
w190651	.2	75	2.1	4.7	22	15	31	6.1	16L	41	w190651
w191295	.1L	15	.86	.21	3.0L	1.9	50	1.3	4.4L	10L	w191295
w191296	.1L	6.3	.93	.36	H	1.3	6	.37	2.9L	11L	w191296
w191297	.2	20	3.0	1.5	12L	7.9	300	3.9	18L	24	w191297
w191298	.1	14	4.1	1.3	5.0L	4.1	8L	4.9	7.6L	13L	w191298
w191299	.1	60	5.9	1.2	6.1	3.4	140	1.1L	8.2L	6	w191299
w191300	.1	15	2.6	1.5	5.4	2.2	22	3.4	8.1	2	w191300
w191301	.2	13	1.8	2.5	5.5L	4.7	23	3.3	8.3L	10	w191301
w191302	.4	14	3.3	2.2	6.6	13	4	3.5	6.5L	11	w191302
w191303	.1L	3.1	.84	.15	1.8	1.3	27	.31L	2.4L	9L	w191303
w191304	.1L	15	5.1	.54L	7.9L	1.1	66	1.5L	12L	15L	w191304
w191305	.2	140	12	1.3	11L	13	96	6.2	17L	28	w191305
w191306	.2	7.6	2.1	2.5	15	7.6	170	3.6	15L	31	w191306
w191307	.1	15	2.9	2.3	8.5	3.8	22	2.1	9.8L	16	w191307
w192032	.1	97	H	2.0	23L	29	46	4.7	7.1L	14L	w192032
w192061	.1	12	7.5	2.0	5.8	12	94	9.3	7.3L	11L	w192061
w192264	.1	8.6	4.8	2.9	14L	9.6	42	9.3	19L	24	w192264
w192265	.1	8.5	4.6	2.0	9.8L	9.8		3.6	13L	10	w192265
w192266	.2	20	2.2	4.4	22L	44	260	23	29L	3	w192266

Table 6h -- Major, minor, and trace element composition of 40 coal samples from Ohio reported on whole coal basis

Sample number	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	U (ppm)	V-S (ppm)	Sample number
w189745	0.50	2.3	1.0	1.1	1.7L	30	0.2L	3.2	0.43	16	w189745
w189746	.30	2.9	7.6	1.5	3.0L	53	.2	3.0L	.61	14	w189746
w189748	.30	2.8	6.0	1.8	1.9L	32	.2	3.0L	.48	9.2	w189748
w189749	.40	5.4	1.8	2.7	4.1L	48	.4	4.7	1.0	35	w189749
w189750	.30	3.1	6.9	1.8	2.6L	51	.2	3.7	.81	20	w189750
w189751	.20	2.4	7.5	1.4	1.8L	46	.2	3.5	.48	16	w189751
w189753	.20	16	5.1	1.8	1.7L	45	.2	3.0L	.53	15	w189753
w189754	.40	8.6	9.8	3.7	3.4L	100	.5	6.7	1.8	38	w189754
w189759	.20	1.0	1.0	.50	1.1L	19	.5	3.0L	.20L	5.9	w189759
w189760	.30	2.7	1.2	1.2	2.0L	29	.1	3.0L	.84	15	w189760
w189761	.14	13	1.1	6.8L	1.3L	20	.1	3.0L	.34	4.2	w189761
w189762	.42	6.7	1.2	6.8L	2.5L	26	.1	3.0L	.92	7.1	w189762
w189763	.20	11	1.1	6.8L	1.5L	18	.6L	3.0L	.20	6.3	w189763
w190643	.10	1.2	2.4	.80	.52	59	.1	3.0L	.35	7.4	w190643
w190644	.30	6.1	4.8	2.4	1.4L	120	.4	5.1	2.1	24	w190644
w190645	4.3	.50	3.6	B	.44L	25	.2	3.0L	.20	3.6	w190645
w190646	.20	2.3	2.2	1.0	.59	19	.2	3.0L	.52	10	w190646
w190647	.30	8.4	3.1	2.5L	2.1L	110	.5	4.0	3.0	56	w190647
w190648	.20	2.9	6.9	1.3L	.88L	96	.2	3.0L	1.6	23	w190648
w190649	.10	3.1	4.5	1.5	.79L	64	.2	3.0L	.65	23	w190649
w190650	.20	4.4	5.0	1.7	1.3L	150	.3	3.4	.98	33	w190650
w190651	.20	5.4	9.2	2.2	1.6L	89	.3	5.9	1.3	45	w190651
w191295	.14	1.1	3.8	.70	.44L	20	.1	3.0L	.30	3.4	w191295
w191296	.12	.90	1.4	.70	.56	21	.1L	3.0L	.30	4.1	w191296
w191297	.32	4.6	3.6	1.4	1.8L	26	.5	4.0	2.6	19	w191297
w191298	.38	22	3.6	.70	1.1	22	.2	3.0L	.80	8.1	w191298
w191299	.15	1.3	1.7	.80	.82L	30	.1	4.0	3.1	8.7	w191299
w191300	.10	1.7	1.4	.90	.64L	14	.2	3.0L	.44	8.0	w191300
w191301	.30	2.6	2.2	1.8	.86	22	.4	3.0L	.63	12	w191301
w191302	.30	2.0	1.0	2.7	1.2	28	.9	3.0L	1.5	12	w191302
w191303	.11	.50	3.4	.30	.27	40	.1L	3.0L	.20L	1.5	w191303
w191304	.10	.70	1.5	.30	1.2L	20	.3L	3.0L	.20L	2.3	w191304
w191305	.48	6.1	6.5	2.0	1.7L	40	.4	9.4	14	31	w191305
w191306	.26	4.7	4.9	2.0	1.5L	79	.3	6.3	1.1	26	w191306
w191307	.12	3.3	2.6	1.3	1.1	21	.3	3.0L	.76	20	w191307
w192032	1.0	1.9	3.1	1.1	.95	29	.2	3.0L	.50	13	w192032
w192061	.81	2.7	3.0	1.2	1.3	150	.2	4.5	.86	16	w192061
w192264	1.8	4.2	2.8	1.6	1.9L	14	.3	3.0	1.2	29	w192264
w192265	.80	2.0	3.2	.80	1.3L	20	.1	3.0L	1.7	20	w192265
w192266	.80	2.0	1.3	2.0	2.9L	44	.4	3.0L	1.7	22	w192266

Table 6h -- Major, minor, and trace element composition of 40 coal samples from Ohio reported on whole coal basis

Sample number	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)
w189745	6.6	0.4	14	47
w189746	6.3	.5	20	42
w189748	4.8	.8	8.6	6.4
w189749	14	.5	22	25
w189750	6.1	.6	23	15
w189751	8.0	.7	35	31
w189753	9.1	.6	8.0	31
w189754	16	1.4	17	71
w139759	2.5	.3	8.8	24
w189760	4.5	.4	17	41
w189761	2.7	2.7	9.6	7.3
w189762	2.7	2.5	17	7.5
w189763	2.6	3.2	8.5	6.2
w190643	8.9	.3	11	11
w190644	7.8	1.8	40	12
w190645	7.8	.2	18	9.1
w190646	9.9	.9	11	14
w190647	28	2.3	50	120
w190648	10	.7	23	73
w190649	10	.7	9.3	44
w190650	12	.9	14	93
w190651	13	.9	16	63
w191295	1.3	.3	11	2.6
w191296	4.1	.2	6.3	4.1
w191297	9.0	1.4	46	21
w191298	4.8	.5	16	8.1
w191299	5.9	.4	22	12
w191300	5.3	.5	13	16
w191301	14	1.2	20	28
w191302	15	2.2	110	42
w191303	1.1	.1	20	1.5
w191304	1.5	.2	12	1.7
w191305	4.8	1.0	12	29
w191306	7.6	1.0	14	32
w191307	8.0	.7	23	31
w192032	8.5	.7	16	14
w192061	7.6	.7	10	22
w192264	6.7	.8	110	14
w192265	6.5	.4	10	9.8
w192266	22	1.1	130	29

Summary of analytical data from 252 West Virginia bituminous coal samples

Data on 49 West Virginia coal samples were reported by Swanson and others (1976). Distribution of the 252 coal samples is shown on figure 5. Descriptions and specific locations of the samples is given in table 7d. The 252 samples were collected from 45 different coal beds. The 23 samples from The Eagle bed is the largest number from a single bed. The statistical comparisons of the data are given in tables 7a, b, and c, the analytical data in tables 7e, f, g, and h.

In the following three paragraphs comparisons are made between the geometric means of analytical data on the West Virginia coal samples and the 617 samples of this report.

The geometric means for the proximate analysis indicate that the average rank of these coals is higher than that of all the coals of this report (table 7a). The means for sulfur and oxygen are much lower whereas carbon, Btu and the free swelling index are much higher in the West Virginia coals. Other parameters are about equal in the two sets of data.

Comparison of the geometric means fo the major oxides in the ash (table 7b) shows much higher CaO, SiO_2, and Al_2O_3 and lower Fe_2O_3 values in the West Virginia coal ash. This ash composition, high silica and alumina and low Fe_2O_3, is the reason for the higher average ash fusion temperatures for the West Virginia coal ash compared to that of all the samples.

Comparison of the geometric means for the trace elements (table 7c) shows only Sr as being significantly higher, whereas As, B, Cd, F, Ge, Hg, Mn, Mo, Ni, Pb, and Zn are significantly lower in the West Virginia coals. Other elements are equal or differ by small amounts in the two sets of data.

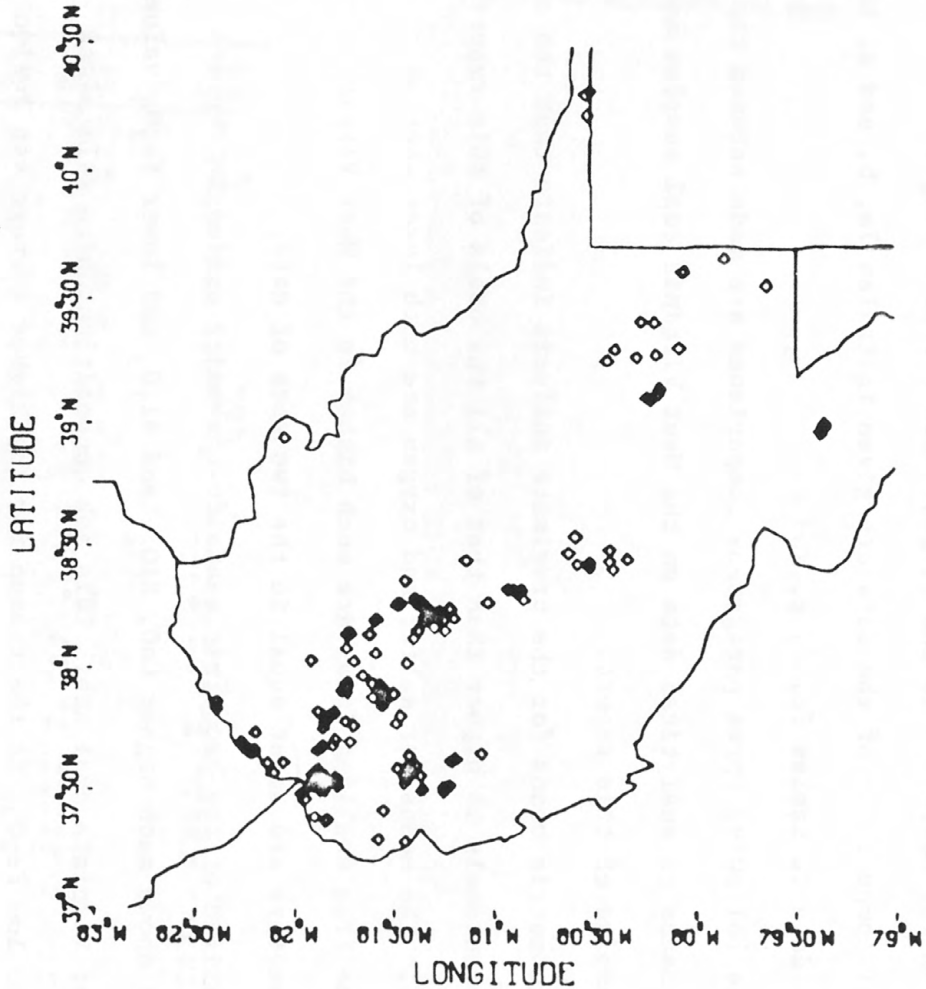

Figure 5.-- Distribution of West Virginia coal samples.

Table 7a.--Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, ash-fusion temperatures and free swelling index of 168 coal samples from West Virginia.

[All values are in percent except Btu/lb, ash-fusion temperatures, and free swelling index and are reported on the as-received basis. °F = 9/5°C + 32; Kcal/kg = 0.556 (Btu/lb). Leaders (---) indicate no data.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	2.7	.6	9.9	2.4	1.6	3.3
Volatile matter	30.5	12.8	51.5	29.7	1.3	31.9
Fixed carbon	57.2	34.4	78.3	56.6	1.2	52.2
Ash	9.6	1	40.5	8.1	1.8	8.8
Hydrogen	5.1	3.4	6.5	5.1	1.1	5.2
Carbon	75	48.2	85.9	74.7	1.1	70.5
Nitrogen	1.2	.6	1.7	1.2	1.2	1.3
Oxygen	8	3.3	16.5	7.7	1.4	9.3
Sulfur	1.1	.4	4.3	.96	1.7	1.5
Heat of combustion						
Btu/lb	13,300	8,470	14,950	13,260	1.1	12,590
Forms of sulfur						
Sulfate	.06	.02	.21	.04	2.1	.07
Pyritic	.87	.05	3.18	.46	3.5	.65
Organic	.53	.02	1.10	.45	2.1	.80
Ash fusion temperature °C						
Initial deformation	1,290	1,070	1,540	1,290	1.1	1,240
Softening temperature	1,340	1,110	1,590	1,340	1.1	1,290
Fluid temperature	1,400	1,140	1,600	1,400	1.1	1,350
Free Swelling Index	6.6	.5	9	5.8	1.9	4.3

Table 7b.--Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of eleven major and minor oxides in the laboratory ash of 253 coal samples from West Virginia.

[All samples were ashed at 525°C; all analyses except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
(Ash)	9.9	1.6	41.4	8.3	1.8	9.46
SiO_2	50	18	72	49	1.2	42
Al_2O_3	28	9.7	42	27	1.3	23
CaO	1.5	.1	6.9	1.1	2.3	1.3
MgO	.92	.23	3.3	.84	1.5	.78
MnO	.03	.01	.67	.02	2.3	.02
Na_2O	.73	.07	2.6	.57	2.1	.44
K_2O	2	.12	4.6	1.7	1.9	1.6
Fe_2O_3	10	.3	64	6.5	2.7	11
TiO_2	1.5	.40	3.8	1.4	1.5	1.13
P_2O_5	.3	.01	5.2	.13	3.2	.17
SO_3	2.3	.01	11	1.8	2.1	2.03

Table 7c.--Arithmetic mean, observed range, geometric mean, and geometric deviation of 36 elements in 252 coal samples from West Virginia.

[All analyses are in percent or parts per million and are reported on a whole-coal basis. Leaders (---) indicate means could not be calculated because an insufficient number of analyses were above the detection limit.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Ag	.05	.01	.2	.04	1.8	.05
As	12	.3	240	4.8	3.6	7.4
B	23	1.2	220	16	2.4	21
Ba	82	7	770	61	2.2	56
Be	3.3	.3	25	2.5	2.1	2.4
Cd	.06	.003	.41	.05	2	.08
Ce	18	3	70	16	1.7	15
Co	6.8	1.1	100	5.4	1.9	5.5
Cr	16	1.8	130	13	1.9	14
Cs	1	.1	15	.68	2.4	.75
Cu	17	.87	90	14	1.8	14
Eu	.33	.06	1.3	.30	1.6	.31
F	66	20	270	53	1.9	64
Ga	6.4	.46	41	5.2	2	5.1
Ge	3.1	.17	51	1.7	2.8	2.9
Hf	.82	.2	3.3	.67	1.9	.65
Hg	.11	.01	1.4	.07	2.7	.10
La	9.5	.5	49	7.9	1.9	7.8
Li	16	1.2	99	12	2.1	12
Lu	.15	.1	.5	.13	1.5	.14
Mn	20	1.1	540	10	2.8	14
Mo	1.6	.26	8.7	1.2	2	1.8
Nb	2.5	.18	15	1.7	2.4	1.9
Nd	11	1.6	51	9.1	1.9	9.8
Ni	12	3.2	70	10	1.7	12
Pb	6.2	1.1	29	5.1	1.8	5.9
Sb	.81	.1	5.6	.63	2.1	.69
Sc	3.4	.1	13	2.9	1.9	3.1
Se	3.9	.6	11	3.3	1.8	2.9
Sm	1.6	.1	7.1	1.4	1.7	1.5
Sr	85	15	1400	67	1.8	57
Tb	.28	.1	.9	.25	1.6	.26
U	1.4	.2	12	1.1	1.9	1.2
V	21	1.8	80	17	2	17
Y	8.4	.78	33	7.0	1.9	7.2
Yb	.82	.1	2.9	.71	1.7	.74
Zn	11	1.5	110	8	2.2	13
Zr	25	2.4	140	18	2.4	20

Table 7d Descriptions for 252 bituminous coal samples from West Virginia

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w189252	west virginia	logan	374941n	814511w	kanawha	winifrede	channel	50.0
w189253	west virginia	mingo	373404n	820615w	kanawha	alma	channel	42.0
w189254	west virginia	mingo	373404n	820615w	kanawha	alma	channel	29.0
w189255	west virginia	mingo	373406n	820619w	kanawha	cedar grove	channel	84.0
w189256	west virginia	mingo	373406n	820619w	kanawha	cedar grove	channel	31.0
w189257	west virginia	mingo	373406n	820619w	kanawha	cedar grove	channel	20.0
w189258	west virginia	mingo	373621n	820800w	kanawha	upper cedar grove	channel	33.0
w189260	west virginia	mingo	373635n	820313w	kanawha	alma	channel	72.0
w189261	west virginia	logan	374918n	815240w	kanawha	upper cedar grove	channel	53.0
w189280	west virginia	harrison	391652n	801701w	monongahela	redstone	channel	28.0
w189281	west virginia	harrison	391652n	801701w	monongahela	pittsburgh no. 8	channel	82.0
w189282	west virginia	kanawha	380840n	813705w	kanawha	no. 2 gas	channel	43.0
w189283	west virginia	mason	385630n	820247w	monongahela	redstone	channel	58.0
w189284	west virginia	barbour	390807n	801025w	monongahela	redstone	channel	61.0
w189285	west virginia	barbour	390927n	801019w	monongahela	redstone	channel	58.0
w189286	west virginia	preston	393430n	793824w	allegheny	upper freeport	channel	48.0
w189287	west virginia	monongalia	393730n	800329w	monongahela	waynesburg	channel	42.0
w189288	west virginia	monongalia	393730n	800329w	monongahela	waynesburg	channel	47.0
w189289	west virginia	kanawha	381617n	812829w	kanawha	winifrede	channel	72.0
w189290	west virginia	kanawha	381617n	812829w	kanawha	winifrede	channel	72.0
w189291	west virginia	logan	374916n	814755w	kanawha	winifrede	channel	48.0
w189292	west virginia	wyoming	374153n	814310w	kanawha	hernshaw	channel	45.0
w189293	west virginia	logan	374048n	814820w	kanawha	lower cedar grove	channel	39.0
w189294	west virginia	logan	374040n	815130w	kanawha	lower cedar grove	channel	49.0
w189295	west virginia	logan	374047n	815130w	kanawha	upper cedar grove	channel	56.0
w189296	west virginia	logan	374511n	815108w	kanawha	campbell creek	channel	42.0
w189297	west virginia	kanawha	380840n	813705w	kanawha	no. 2 gas	channel	43.0
w189336	west virginia	boone	380205n	815438w	kanawha	chilton	channel	23.0
w189337	west virginia	mingo	374359n	821137w	kanawha	upper cedar grove	channel	31.0
w189338	west virginia	mingo	374143n	821545w	kanawha	coalburg	channel	66.0
w189339	west virginia	raleigh	375350n	813003w	kanawha	winifrede	channel	36.0
w189340	west virginia	raleigh	375350n	813003w	kanawha	winifrede	channel	11.0
w189341	west virginia	raleigh	375350n	813003w	kanawha	winifrede	channel	5.0
w189342	west virginia	raleigh	375047n	813332w	kanawha	powellton	channel	8.0
w189343	west virginia	raleigh	375047n	813332w	kanawha	powellton	channel	35.0

Table 7d Descriptions for 252 bituminous coal samples from West Virginia Continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w189344	west virginia	mingo	373409n	815150w	kanawha	campbell creek	channel	23.0
w189345	west virginia	mingo	373409n	815150w	kanawha	campbell creek	channel	47.0
w189346	west virginia	mingo	373432n	815205w	kanawha	alma	channel	39.0
w189347	west virginia	mingo	373432n	815205w	kanawha	alma	channel	22.0
w189348	west virginia	mingo	373327n	815435w	kanawha	lower cedar grove	channel	48.0
w189349	west virginia	mingo	373203n	815417w	kanawha	lower war eagle	channel	35.0
w190604	west virginia	kanawha	382150n	812633w	kanawha	stockton	channel	64.0
w190605	west virginia	kanawha	380129n	812609w	kanawha	williamson	channel	19.0
w190606	west virginia	kanawha	381617n	812317w	kanawha	coalburg	channel	69.0
w190607	west virginia	kanawha	381728n	812331w	kanawha	coalburg	channel	65.0
w190608	west virginia	kanawha	381623n	812132w	kanawha	winifrede	channel	43.0
w190609	west virginia	kanawha	381559n	812207w	kanawha	winifrede	channel	44.0
w190610	west virginia	kanawha	381541n	812822w	kanawha	coalburg	channel	44.0
w190611	west virginia	kanawha	381611n	812758w	kanawha	coalburg	channel	45.0
w190612	west virginia	kanawha	381211n	813505w	kanawha	no 2 gas	channel	27.0
w190613	west virginia	kanawha	381152n	813531w	kanawha	no 2 gas	channel	37.0
w190614	west virginia	kanawha	381614n	812829w	kanawha	coalburg	channel	42.0
w190615	west virginia	kanawha	381538n	812848w	kanawha	winifrede	channel	45.0
w190616	west virginia	fayette	381231n	811146w	kanawha	eagle	channel	27.0
w190617	west virginia	fayette	381203n	811444w	kanawha	eagle	channel	59.0
w190618	west virginia	fayette	380928n	811425w	kanawha	eagle	channel	80.0
w190619	west virginia	fayette	381021n	811738w	kanawha	eagle	channel	71.0
w190620	west virginia	kanawha	380941n	812251w	kanawha	winifrede	channel	56.0
w190621	west virginia	kanawha	380919n	812219w	kanawha	coalburg	channel	56.0
w190622	west virginia	kanawha	380729n	812358w	kanawha	coalburg	channel	65.0
w190623	west virginia	fayette	381458n	811254w	kanawha	no 2 gas	channel	35.0
w190624	west virginia	fayette	381244n	811649w	kanawha	eagle	channel	33.0
w190625	west virginia	fayette	381244n	811649w	kanawha	eagle	channel	19.0
w190626	west virginia	kanawha	381413n	811620w	kanawha	eagle	channel	24.0
w190627	west virginia	kanawha	381413n	811620w	kanawha	eagle	channel	18.0
w190628	west virginia	kanawha	381420n	811854w	kanawha	powellton	channel	15.0
w190629	west virginia	kanawha	381420n	811854w	kanawha	powellton	channel	65.0
w190630	west virginia	kanawha	381441n	811921w	kanawha	powellton	channel	53.0
w190631	west virginia	kanawha	381345n	811952w	kanawha	powellton	channel	46.0
w190632	west virginia	kanawha	381139n	812056w	kanawha	coalburg	channel	16.0
w190633	west virginia	kanawha	381139n	812056w	kanawha	coalburg	channel	30.0
w190634	west virginia	kanawha	381139n	812056w	kanawha	coalburg	channel	12.0
w190635	west virginia	nicholas	381949n	805400w	kanawha	eagle	channel	49.0
w190636	west virginia	nicholas	351948n	805538w	kanawha	eagle	channel	42.0
w190637	west virginia	nicholas	381626n	810138w	kanawha	eagle	channel	16.0

Table 7d Descriptions for 252 bituminous coal samples from West Virginia Continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w190638	west virginia	nicholas	381626n	810152w	kanawha	eagle	channel	43.0
w190639	west virginia	nicholas	381933n	805141w	kanawha	no 2 gas	channel	61.0
w190640	west virginia	nicholas	381905n	805302w	kanawha	eagle	channel	38.0
w190641	west virginia	nicholas	381714n	805057w	kanawha	eagle	channel	45.0
w190642	west virginia	clay	382651n	810806w	allegheny	upper kittanning	channel	39.0
w190665	west virginia	webster	382457n	802405w	new river	sewell	channel	29.0
w190666	west virginia	webster	382527n	803103w	kanawha	peerless	channel	26.0
w190667	west virginia	webster	382632n	803106w	kanawha	peerless	channel	20.0
w190668	west virginia	webster	383254n	803527w	allegheny	lower kittanning	channel	46.0
w190669	west virginia	webster	382854n	803729w	allegheny	upper kittanning	channel	51.0
w190670	west virginia	webster	382606n	803456w	kanawha	eagle	channel	43.0
w190671	west virginia	webster	382651n	802510w	new river	fire creek	channel	70.0
w190672	west virginia	webster	382732n	801945w	new river	sewell	channel	37.0
w190673	west virginia	mingo	373907n	821222w	kanawha	upper cedar grove	channel	32.0
w190674	west virginia	mingo	373948n	821159w	kanawha	campbell creek	channel	48.0
w190675	west virginia	mingo	374026n	821433w	kanawha	alma	channel	40.0
w190676	west virginia	mingo	375148n	822305w	kanawha	campbell creek	channel	32.0
w190677	west virginia	mingo	373458n	815300w	kanawha	lower cedar grove	channel	45.0
w190678	west virginia	mingo	373458n	815300w	kanawha	lower cedar grove	channel	2.0
w190679	west virginia	mingo	373458n	815300w	kanawha	lower cedar grove	channel	6.0
w190680	west virginia	webster	382942n	802509w	new river	sewell	channel	19.0
w190681	west virginia	webster	382942n	802509w	new river	sewell	channel	29.0
w190682	west virginia	webster	382942n	802509w	new river	sewell	channel	20.0
w190683	west virginia	brooke	401905n	803300w	monongahela	pittsburgh	channel	31.0
w190684	west virginia	brooke	401950n	803138w	monongahela	pittsburgh	channel	49.0
w190685	west virginia	mingo	374026n	821433w	kanawha	alma	channel	29.0
w190686	west virginia	logan	374842n	814045w	kanawha	hernshaw	channel	20.0
w190687	west virginia	kanawha	381255n	812044w	kanawha	powellton	channel	40.0
w190922	west virginia	tucker	385900n	792220w	kanawha	coal a	channel	33.0
w190923	west virginia	tucker	385845n	792200w	kanawha	coal c	channel	17.0
w190924	west virginia	tucker	390010n	792115w	kanawha	coal b	channel	10.0
w190925	west virginia	tucker	390015n	792110w	kanawha	coal c	channel	14.0
w190926	west virginia	tucker	390115n	792100w	allegheny	kittanning	channel	8.0
w190927	west virginia	raleigh	373900n	810345w	new river	beckley	channel	29.0
w190928	west virginia	raleigh	373900n	810345w	new river	beckley	channel	31.0
w191107	west virginia	wyoming	373157n	814912w	kanawha	bens creek	channel	47.0
w191108	west virginia	mcdowell	372933n	815210w	kanawha	bens creek	channel	40.0
w191109	west virginia	mcdowell	372933n	815210w	kanawha	bens creek	channel	31.0
w191110	west virginia	mcdowell	373029n	815404w	kanawha	eagle	channel	59.0
w191111	west virginia	mcdowell	372933n	815059w	kanawha	douglas	channel	24.0

Table 7d Descriptions for 252 bituminous coal samples from West Virginia Continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w191112	west virginia	wyoming	373257n	814741w	kanawha	gilbert	channel	11.0
w191113	west virginia	wyoming	373257n	814741w	kanawha	gilbert	channel	32.0
w191114	west virginia	boone	375256n	813615w	kanawha	stockton	channel	48.0
w191115	west virginia	boone	375612n	813615w	kanawha	winifrede	channel	
w191116	west virginia	boone	375612n	813615w	kanawha	winifrede	channel	24.0
w191117	west virginia	raleigh	375503n	813321w	kanawha	campbell creek	channel	23.0
w191118	west virginia	raleigh	375503n	813321w	kanawha	campbell creek	channel	32.0
w191119	west virginia	mingo	373941n	815257w	kanawha	alma	channel	24.0
w191120	west virginia	mingo	373941n	815258w	kanawha	alma	channel	17.0
w191121	west virginia	raleigh	375143n	813254w	kanawha	peerless	channel	11.0
w191122	west virginia	raleigh	375143n	813254w	kanawha	peerless	channel	30.0
w191123	west virginia	raleigh	375057n	813325w	kanawha	campbell creek	channel	35.0
w191124	west virginia	raleigh	375057n	813325w	kanawha	campbell creek	channel	11.0
w191125	west virginia	logan	374229n	814740w	kanawha	cedar grove	channel	30.0
w191126	west virginia	boone	375356n	813340w	kanawha	stockton	channel	11.0
w191127	west virginia	monongalia	394049n	795058w	conemaugh	bakerstown	channel	39.0
w191128	west virginia	boone	375356n	813340w	kanawha	stockton	channel	36.0
w191129	west virginia	wyoming	373047n	814710w	kanawha	gilbert	channel	43.0
w191130	west virginia	mcdowell	373115n	815221w	kanawha	bens creek	channel	29.0
w191131	west virginia	wyoming	373149n	814724w	kanawha	douglas	channel	38.0
w191132	west virginia	brooke	401410n	803222w	dunkard	washington	channel	44.0
w191133	west virginia	boone	375612n	813615w	kanawha	winifrede	channel	24.0
w191178	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	6.0
w191179	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	4.0
w191180	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	4.0
w191181	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	6.0
w191182	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	6.0
w191183	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	6.0
w191184	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	12.0
w191185	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	4.0
w191186	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	5.0
w191187	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	6.0
w191188	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	18.0
w191189	west virginia	monongalia	393740n	800300w	dunkard	waynesburg	channel	18.0
w191522	west virginia	mcdowell	371700n	812650w	pocahontas	pocahontas no 4	channel	54.0
w191862	west virginia	raleigh	374318n	812802w	kanawha	eagle	channel	11.0
w191863	west virginia	raleigh	374318n	812802w	kanawha	eagle	channel	32.0
w191864	west virginia	raleigh	374318n	312802w	kanawha	eagle	channel	12.0
w191865	west virginia	boone	380346n	813527w	allegheny	no 5	channel	76.0
w191866	west virginia	boone	380346n	813527w	allegheny	no 5 block	channel	8.0

Table 7d Descriptions for 252 bituminous coal samples from West Virginia Continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w191867	west virginia	boone	380346n	813527w	allegheny	no 5 block	channel	32.0
w191868	west virginia	mingo	374003n	815208w	kanawha	cedar grove	channel	51.0
w191869	west virginia	mcdowell	372854n	815751w	kanawha	eagle	channel	18.0
w191870	west virginia	mcdowell	372854n	815751w	kanawha	eagle	channel	18.0
w191871	west virginia	mcdowell	372727n	815645w	kanawha	bens creek	channel	32.0
w191872	west virginia	mingo	374955n	822301w	kanawha	campbell creek	channel	50.0
w191873	west virginia	mingo	374012n	821437w	kanawha	campbell creek	channel	40.0
w191874	west virginia	mcdowell	372445n	813328w	new river	welch	channel	34.0
w191875	west virginia	boone	380826n	814354w	kanawha	lower cedar grove	channel	22.0
w191876	west virginia	boone	380826n	814354w	kanawha	lower cedar grove	channel	17.0
w191877	west virginia	boone	380826n	814354w	kanawha	upper cedar grove	channel	
w191878	west virginia	boone	380835n	814311w	kanawha	campbell creek	channel	33.0
w191879	west virginia	boone	380830n	814254w	kanawha	powellton	channel	29.0
w191880	west virginia	boone	375404n	814354w	allegheny	lower no 5 block	channel	96.0
w191881	west virginia	boone	375556n	813400w	allegheny	lower no 5 block	channel	55.0
w191882	west virginia	boone	375556n	814400w	allegheny	upper no 5 block	channel	9.0
w191883	west virginia	boone	375556n	814400w	allegheny	upper no 5 block	channel	77.0
w191884	west virginia	boone	375636n	814350w	allegheny	lower no 5 block	channel	60.0
w191885	west virginia	boone	375815n	813914w	kanawha	campbell creek	channel	27.0
w191886	west virginia	boone	375815n	813914w	kanawha	no 2 gas	channel	19.0
w191887	west virginia	logan	375431n	814540w	allegheny	lower no 5 block	channel	37.0
w191888	west virginia	logan	375431n	814540w	allegheny	lower no 5 block	channel	20.0
w191889	west virginia	wyoming	374623n	812925w	kanawha	eagle	channel	15.0
w191890	west virginia	wyoming	374623n	812925w	kanawha	eagle	channel	39.0
w191891	west virginia	boone	380825n	813714w	kanawha	campbell creek	channel	29.0
w191892	west virginia	boone	380825n	813714w	kanawha	campbell creek	channel	10.0
w191893	west virginia	boone	380825n	813714w	kanawha	campbell creek rider	channel	10.0
w191894	west virginia	boone	380148n	814200w	kanawha	coalburg	channel	14.0
w191895	west virginia	boone	380148n	814200w	kanawha	coalburg	channel	25.0
w191896	west virginia	boone	380148n	814200w	kanawha	coalburg	channel	36.0
w191897	west virginia	raleigh	375231n	813338w	allegheny	upper no 5 block	channel	28.0
w191898	west virginia	raleigh	375231n	813338w	allegheny	upper no 5 block	channel	14.0
w191899	west virginia	raleigh	375231n	813338w	allegheny	upper no 5 block	channel	20.0
w191900	west virginia	raleigh	375231n	813337w	allegheny	lower no 5 block	channel	8.0
w191901	west virginia	logan	374647n	815029w	allegheny	cedar grove	channel	48.0
w191902	west virginia	raleigh	374647n	815029w	allegheny	lower no 5 block	channel	16.0
w191903	west virginia	logan	374644n	815040w	kanawha	campbell creek	channel	27.0
w191904	west virginia	logan	374644n	815040w	kanawha	campbell creek	channel	34.0
w192710	west virginia	logan	374650n	814427w	kanawha	cedar grove	channel	28.0
w192711	west virginia	logan	374650n	814427w	kanawha	cedar grove	channel	42.0

Table 7d Descriptions for 252 bituminous coal samples from West Virginia Continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w192712	west virginia	mcdowell	372202n	815041w	kanawha	lower douglas	channel	34.0
w192713	west virginia	mcdowell	372305n	815402w	kanawha	douglas	channel	29.0
w192714	west virginia	mcdowell	372225n	815007w	kanawha	douglas	channel	30.0
w192715	west virginia	wyoming	373545n	812555w	new river	pocahontas no 8	channel	40.0
w192716	west virginia	wyoming	373356n	812555w	new river	beckley	channel	45.0
w192717	west virginia	wyoming	373824n	812529w	pocahontas	pocahontas no 3	channel	48.0
w192718	west virginia	wyoming	373302n	812533w	new river	beckley	channel	46.0
w192719	west virginia	wyoming	373307n	812650w	pocahontas	pocahontas no 3	channel	44.0
w192720	west virginia	wyoming	372942n	812200w	pocahontas	pocahontas no 3	channel	56.0
w192721	west virginia	wyoming	373609n	812331w	pocahontas	pocahontas no 3	channel	45.0
w192722	west virginia	wyoming	373003n	812125w	pocahontas	pocahontas no 6	channel	43.0
w192723	west virginia	wyoming	373515n	812902w	new river	sewell	channel	38.0
w192724	west virginia	wyoming	373356n	812555w	new river	beckley	channel	36.0
w192725	west virginia	wyoming	373324n	812206w	pocahontas	pocahontas no 3	channel	33.0
w192726	west virginia	wyoming	373324n	812206w	pocahontas	pocahontas no 3	channel	12.0
w192727	west virginia	wyoming	373324n	812206w	pocahontas	pocahontas no 3	channel	50.0
w192728	west virginia	mercer	372934n	811456w	pocahontas	pocahontas no 3	channel	14.0
w192729	west virginia	mercer	372934n	811456w	pocahontas	pocahontas no 3	channel	16.0
w192730	west virginia	mercer	372934n	811456w	pocahontas	pocahontas no 3	channel	4.0
w192731	west virginia	mercer	372934n	811456w	pocahontas	pocahontas no 3	channel	55.0
w192732	west virginia	mcdowell	371730n	813450w	pocahontas	pocahontas no 3	channel	43.0
w192733	west virginia	wyoming	373126n	812704w	pocahontas	pocahontas no 3	channel	36.0
w192734	west virginia	wyoming	373126n	812704w	pocahontas	pocahontas no 3	channel	21.0
w192735	west virginia	wyoming	373126n	812704w	pocahontas	pocahontas no 3	channel	59.0
w192736	west virginia	boone	380504n	814401w	kanawha	cedar grove	channel	33.0
w192737	west virginia	boone	380504n	814401w	kanawha	cedar grove	channel	22.0
w192738	west virginia	wyoming	374553n	814207w	kanawha	hernshaw	channel	26.0
w192739	west virginia	wyoming	374553n	814207w	kanawha	hernshaw	channel	13.0
w193126	west virginia	marion	392518n	801148w	no data entered	pittsburgh	channel	81.0
w193127	west virginia	taylor	391736n	801115w	no data entered	pittsburgh	channel	84.0
w193128	west virginia	taylor	391918n	800419w	no data entered	pittsburgh	channel	84.0
w193129	west virginia	harrison	392525n	801549w	no data entered	pittsburgh	channel	74.0
w193130	west virginia	harrison	391840n	802334w	no data entered	pittsburgh	channel	84.0
w193131	west virginia	harrison	391601n	802557w	no data entered	pittsburgh	channel	53.0
w193132	west virginia	barbour	390631n	801248w	no data entered	redstone	channel	67.0
w193133	west virginia	barbour	390700n	801350w	no data entered	pittsburgh	channel	54.0
w192647	west virginia	mercer	373100n	811320w	new river	sewell	channel	5.0
w192648	west virginia	mercer	373100n	811320w	new river	sewell	channel	4.0
w192649	west virginia	mercer	373100n	811320w	new river	sewell	channel	2.0
w192650	west virginia	mercer	373100n	811320w	new river	sewell	channel	3.0

Table 7d Descriptions for 252 bituminous coal samples from West Virginia Continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w192651	west virginia	mercer	373100n	811320w	new river	sewell	channel	4.0
w192652	west virginia	wyoming	373030n	811500w	new river	beckley	channel	9.0
w192653	west virginia	wyoming	373030n	811500w	new river	beckley	channel	10.0
w192654	west virginia	wyoming	373030n	811500w	new river	beckley	channel	6.0
w192655	west virginia	wyoming	373030n	811500w	new river	beckley	channel	5.0
w192656	west virginia	wyoming	373030n	811500w	new river	beckley	channel	1.0
w192657	west virginia	raleigh	373740n	811130w	new river	beckley	channel	3.0
w192658	west virginia	raleigh	373740n	811130w	new river	beckley	channel	4.0
w192659	west virginia	raleigh	373740n	811130w	new river	beckley	channel	7.0
w192660	west virginia	raleigh	373740n	811130w	new river	beckley	channel	12.0
w192661	west virginia	raleigh	373740n	811130w	new river	beckley	channel	2.0
w192662	west virginia	raleigh	373740n	811130w	new river	beckley	channel	2.0
w192663	west virginia	raleigh	373740n	811130w	new river	beckley	channel	8.0
w192664	west virginia	raleigh	373740n	811130w	new river	beckley	channel	5.0
w192665	west virginia	raleigh	373705n	811250w	pocahontas	no 3	channel	9.0
w192666	west virginia	raleigh	373705n	811250w	pocahontas	no 3	channel	10.0
w192667	west virginia	raleigh	373705n	811250w	pocahontas	no 3	channel	7.0

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in percent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section Department of Energy, Pittsburgh, Pa. B means not determined. 0 for ash fusion temperatures means greater than 1600°C.]

	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w189252	2.5	34.9	52.3	10.3	5.2	74.8	1.3	7.5	0.9	7,380	13,290
	---	35.8	53.6	10.6	5.0	76.7	1.3	5.4	.9	7,570	13,630
	---	40.0	60.0	---	5.6	85.8	1.5	6.1	1.0	8,470	15,240
w189253	1.6	42.1	40.6	15.7	4.8	69.7	1.3	7.0	1.5	6,860	12,340
	---	42.8	41.3	16.0	4.7	70.8	1.3	5.7	1.5	6,970	12,540
	---	50.9	49.1	---	5.6	84.3	1.6	6.7	1.8	8,290	14,920
w189254	1.5	35.5	57.6	5.4	5.3	79.9	1.4	6.5	1.5	7,900	14,220
	---	36.0	58.5	5.5	5.2	81.1	1.4	5.2	1.5	8,020	14,440
	---	38.1	61.9	---	5.5	85.8	1.5	5.5	1.6	8,490	15,270
w189255	5.7	32.2	55.1	7.0	4.9	72.7	1.3	13.2	.9	7,010	12,620
	---	34.1	58.4	7.4	4.5	77.1	1.4	8.6	1.0	7,430	13,380
	---	36.9	63.1	---	4.9	83.3	1.5	9.3	1.0	8,030	14,460
w189256	1.9	33.5	56.9	7.7	5.1	77.2	1.4	7.6	1.0	7,540	13,580
	---	34.1	58.0	7.8	5.0	78.7	1.4	6.0	1.0	7,690	13,840
	---	37.1	62.9	---	5.4	85.4	1.5	6.5	1.1	8,350	15,020
w189258	5.2	31.3	50.2	13.3	5.0	68.7	1.3	10.9	.8	6,770	12,180
	---	33.0	53.0	14.0	4.7	72.5	1.4	6.6	.8	7,140	12,850
	---	38.4	61.6	---	5.4	84.3	1.6	7.7	1.0	8,300	14,940
w189260	2.0	32.1	56.3	9.6	4.9	75.7	1.4	6.9	1.5	7,430	13,380
	---	32.8	57.4	9.8	4.8	77.2	1.4	5.2	1.5	7,590	13,650
	---	36.3	63.7	---	5.3	85.6	1.6	5.8	1.7	8,410	15,140
w189261	2.6	34.5	52.0	10.9	5.1	73.4	1.4	7.6	1.6	7,270	13,090
	---	35.4	53.4	11.2	4.9	75.4	1.4	5.4	1.6	7,470	13,440
	---	39.9	60.1	---	5.6	84.9	1.6	6.1	1.8	8,410	15,130
w189280	1.5	35.9	48.1	14.5	5.0	68.6	1.0	8.1	2.8	6,890	12,400
	---	36.4	48.8	14.7	4.9	69.6	1.0	6.9	2.8	6,990	12,590
	---	42.7	57.3	---	5.8	81.7	1.2	8.1	3.3	8,200	14,760
w189281	1.4	39.4	48.9	10.3	5.4	72.2	1.0	7.3	3.8	7,320	13,180
	---	40.0	49.6	10.4	5.3	73.2	1.0	6.1	3.9	7,430	13,370
	---	44.6	55.4	---	5.9	81.8	1.1	6.9	4.3	8,290	14,930
w189282	1.8	33.7	56.7	7.8	5.4	76.1	1.4	8.5	.8	7,510	13,510
	---	34.3	57.7	7.9	5.3	77.5	1.4	7.0	.8	7,640	13,760
	---	37.3	62.7	---	5.8	84.2	1.5	7.6	.9	8,300	14,940
w189283	3.6	34.3	41.4	20.7	4.6	57.9	.7	12.1	4.0	5,820	10,480
	---	35.6	42.9	21.5	4.4	60.1	.7	9.2	4.1	6,040	10,870
	---	45.3	54.7	---	5.5	76.5	.9	11.8	5.3	7,690	13,840

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w189252	0.0	0.00	0.00	0.00	7.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189253	.0	.00	.00	.00	7.0	1,470	1,525	1,600
	---	.00	.00	.00				
	---	.00	.00	.00				
w189254	.0	.00	.00	.00	8.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189255	.0	.00	.00	.00	1.5	1,230	1,260	1,295
	---	.00	.00	.00				
	---	.00	.00	.00				
w189256	.0	.00	.00	.00	7.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189258	.0	.00	.00	.00	6.0	1,445	1,470	1,600
	---	.00	.00	.00				
	---	.00	.00	.00				
w189260	.0	.00	.00	.00	7.5	1,230	1,290	1,355
	---	.00	.00	.00				
	---	.00	.00	.00				
w189261	.0	.00	.00	.00	6.0	1,445	1,470	1,600
	---	.00	.00	.00				
	---	.00	.00	.00				
w189280	.0	.02	1.75	.99	9.0	1,120	1,180	1,215
	---	.02	1.78	1.01				
	---	.02	2.08	1.18				
w189281	.0	.02	2.66	1.10	8.0	0	0	0
	---	.02	2.70	1.12				
	---	.02	3.01	1.25				
w189282	.0	.07	.50	.22	4.5	1,145	1,195	1,230
	---	.07	.51	.22				
	---	.08	.55	.24				
w189283	.0	.21	3.18	.63	1.0	1,150	1,200	1,230
	---	.22	3.30	.65				
	---	.28	4.20	.83				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w189284	1.2	37.9	53.1	7.8	5.4	75.7	1.1	7.8	2.2	7,590	13,660
	---	38.4	53.7	7.9	5.3	76.6	1.1	6.8	2.2	7,680	13,830
	---	41.6	58.4	---	5.8	83.2	1.2	7.4	2.4	8,340	15,010
w189285	1.3	36.3	53.6	8.8	5.4	74.5	1.0	7.9	2.4	7,490	13,490
	---	36.8	54.3	8.9	5.3	75.5	1.0	6.8	2.4	7,590	13,670
	---	40.4	59.6	---	5.8	82.9	1.1	7.5	2.7	8,340	15,010
w189286	.9	26.8	61.9	10.4	5.0	76.5	1.1	5.5	1.5	7,590	13,660
	---	27.0	62.5	10.5	4.9	77.2	1.1	4.7	1.5	7,660	13,780
	---	30.2	69.8	---	5.5	86.2	1.2	5.3	1.7	8,560	15,400
w189287	1.7	31.8	55.1	11.4	5.2	71.7	1.1	9.4	1.2	7,130	12,830
	---	32.3	56.1	11.6	5.1	72.9	1.1	8.0	1.2	7,250	13,050
	---	36.6	63.4	---	5.8	82.5	1.3	9.1	1.4	8,200	14,760
w189288	2.0	33.7	49.9	14.4	5.1	68.6	1.1	8.7	2.1	6,870	12,360
	---	34.4	50.9	14.7	5.0	70.0	1.1	7.1	2.1	7,010	12,610
	---	40.3	59.7	---	5.8	82.1	1.3	8.3	2.5	8,210	14,780
w189289	2.5	31.6	48.1	17.8	4.9	65.4	.9	10.2	.8	6,370	11,460
	---	32.4	49.3	18.3	4.7	67.1	.9	8.2	.8	6,530	11,750
	---	39.6	60.4	---	5.8	82.1	1.1	10.0	1.0	7,990	14,380
w189290	2.0	31.9	51.5	14.6	5.1	68.4	1.1	9.8	1.0	6,780	12,200
	---	32.6	52.6	14.9	5.0	69.8	1.1	8.2	1.0	6,920	12,450
	---	38.2	61.8	---	5.8	82.0	1.3	9.6	1.2	8,130	14,630
w189291	1.3	29.4	49.8	19.5	4.7	66.6	1.0	7.3	.9	6,580	11,840
	---	29.8	50.5	19.8	4.6	67.5	1.0	6.2	.9	6,660	12,000
	---	37.1	62.9	---	5.8	84.1	1.3	7.8	1.1	8,310	14,950
w189292	1.5	33.8	54.9	9.8	5.2	75.4	1.3	7.7	.6	7,480	13,470
	---	34.3	55.7	9.9	5.1	76.5	1.3	6.5	.6	7,600	13,680
	---	38.1	61.9	---	5.7	85.0	1.5	7.2	.7	8,440	15,190
w189293	1.8	33.2	60.9	4.1	5.4	80.3	1.4	8.3	.5	7,910	14,230
	---	33.8	62.0	4.2	5.3	81.8	1.4	6.8	.5	8,050	14,490
	---	35.3	64.7	---	5.5	85.3	1.5	7.1	.5	8,400	15,120
w189294	5.9	30.2	58.1	5.8	4.9	71.2	1.1	16.5	.5	6,770	12,180
	---	32.1	61.7	6.2	4.5	75.7	1.2	12.0	.5	7,190	12,940
	---	34.2	65.8	---	4.8	80.6	1.2	12.7	.6	7,660	13,790
w189295	1.9	33.7	55.9	8.5	5.2	75.1	1.1	8.4	1.7	7,430	13,380
	---	34.4	57.0	8.7	5.1	76.6	1.1	6.8	1.7	7,580	13,640
	---	37.6	62.4	---	5.6	83.8	1.2	7.5	1.9	8,300	14,930

Table 7c -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w189284	0.0	0.07	1.72	0.41	9.0	1,285	1,350	1,395
	---	.07	1.74	.41				
	---	.08	1.89	.45				
w189285	.0	.16	1.58	.68	9.0	1,240	1,305	1,345
	---	.16	1.60	.69				
	---	.18	1.76	.76				
w189286	.0	.05	1.06	.41	9.0	1,440	1,490	1,525
	---	.05	1.07	.41				
	---	.06	1.20	.46				
w189287	.0	.05	.73	.43	5.5	1,225	1,340	1,390
	---	.05	.74	.44				
	---	.06	.84	.49				
w189288	.0	.06	1.44	.61	8.0	1,390	1,430	1,470
	---	.06	1.47	.62				
	---	.07	1.72	.73				
w189289	.0	.02	.32	.49	1.0	1,515	1,540	0
	---	.02	.33	.50				
	---	.03	.40	.61				
w189290	.0	.05	.34	.59	3.0	1,540	0	0
	---	.05	.35	.60				
	---	.06	.41	.71				
w189291	.0	.05	.36	.51	5.5	1,540	0	0
	---	.05	.36	.52				
	---	.06	.45	.64				
w189292	.0	.02	.05	.52	8.5	1,540	0	0
	---	.02	.05	.53				
	---	.02	.06	.59				
w189293	.0	.02	.17	.36	7.5	1,430	1,480	1,525
	---	.02	.17	.37				
	---	.02	.18	.38				
w189294	.0	.05	.06	.35	.0	1,480	1,530	1,540
	---	.05	.06	.37				
	---	.06	.07	.40				
w189295	.0	.02	.83	.83	.0	1,325	1,375	1,425
	---	.02	.85	.85				
	---	.02	.93	.93				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w189296	1.4	32.4	57.6	8.6	5.2	76.6	1.1	7.9	0.6	7,590	13,670
	---	32.9	58.4	8.7	5.1	77.7	1.1	6.8	.6	7,700	13,860
	---	36.0	64.0	---	5.6	85.1	1.2	7.4	.7	8,440	15,190
w189297	2.2	32.1	55.6	10.1	5.2	73.3	1.1	9.4	.9	7,240	13,040
	---	32.8	56.9	10.3	5.1	74.9	1.1	7.6	.9	7,410	13,330
	---	36.6	63.4	---	5.7	83.6	1.3	8.5	1.0	8,260	14,870
w189336	1.2	51.5	38.3	9.0	6.5	74.8	1.5	7.2	1.0	7,830	14,100
	---	52.1	38.8	9.1	6.4	75.7	1.5	6.2	1.0	7,930	14,270
	---	57.3	42.7	---	7.1	83.3	1.7	6.8	1.1	8,720	15,700
w189337	3.0	35.6	52.1	9.3	5.2	73.1	1.4	9.9	1.1	7,280	13,110
	---	36.7	53.7	9.6	5.0	75.4	1.4	7.5	1.1	7,510	13,520
	---	40.6	59.4	---	5.5	83.4	1.6	8.2	1.3	8,300	14,950
w189338	4.0	34.5	50.5	11.0	5.1	70.8	1.4	10.9	.8	6,980	12,560
	---	35.9	52.6	11.5	4.8	73.7	1.5	7.7	.8	7,270	13,080
	---	40.6	59.4	---	5.5	83.3	1.6	8.6	.9	8,210	14,780
w189339	2.3	33.4	58.0	6.3	5.2	79.3	1.5	7.2	.5	7,820	14,080
	---	34.2	59.4	6.4	5.1	81.2	1.5	5.3	.5	8,010	14,410
	---	36.5	63.5	---	5.4	86.8	1.6	5.6	.5	8,560	15,400
w189340	2.2	28.6	52.1	17.1	4.6	70.3	1.3	6.2	.5	6,840	12,310
	---	29.2	53.3	17.5	4.5	71.9	1.3	4.3	.5	6,990	12,590
	---	35.4	64.6	---	5.4	87.1	1.6	5.3	.6	8,470	15,250
w189341	1.4	35.0	53.8	9.8	5.3	76.0	1.4	6.8	.7	7,570	13,630
	---	35.5	54.6	9.9	5.2	77.1	1.4	5.6	.7	7,680	13,820
	---	39.4	60.6	---	5.8	85.6	1.6	6.3	.8	8,530	15,350
w189342	2.6	30.1	57.2	10.1	5.1	75.8	1.2	7.2	.6	7,430	13,380
	---	30.9	58.7	10.4	4.9	77.8	1.2	5.0	.6	7,630	13,740
	---	34.5	65.5	---	5.5	86.8	1.4	5.6	.7	8,510	15,330
w189343	1.4	29.5	60.6	8.5	4.9	79.1	1.3	5.6	.6	7,710	13,880
	---	29.9	61.5	8.6	4.8	80.2	1.3	4.4	.6	7,820	14,080
	---	32.7	67.3	---	5.3	87.8	1.4	4.8	.7	8,560	15,410
w189344	2.9	32.1	58.3	6.7	5.2	77.9	1.4	8.0	.8	7,690	13,840
	---	33.1	60.0	6.9	5.0	80.2	1.4	5.6	.8	7,920	14,250
	---	35.5	64.5	---	5.4	86.2	1.5	6.0	.9	8,510	15,310
w189346	2.8	31.2	60.9	5.1	5.2	79.4	1.4	8.2	.7	7,860	14,140
	---	32.1	62.7	5.2	5.0	81.7	1.4	5.9	.7	8,080	14,550
	---	33.9	66.1	---	5.3	86.2	1.5	6.2	.8	8,530	15,350

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w189296	0.0	0.02	0.07	0.52	9.0	1,540	0	0
	---	.02	.07	.53				
	---	.02	.08	.58				
w189297	.0	.02	.31	.58	5.5	1,345	1,385	1,425
	---	.02	.32	.59				
	---	.02	.35	.66				
w189336	.0	.00	.00	.00	.50	1,140	1,165	1,195
	---	.00	.00	.00				
	---	.00	.00	.00				
w189337	.0	.00	.00	.00	4.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189338	.0	.00	.00	.00	2.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189339	.0	.00	.00	.00	6.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189340	.0	.00	.00	.00	3.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189341	.0	.00	.00	.00	7.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189342	.0	.00	.00	.00	7.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189343	.0	.00	.00	.00	6.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w189344	.0	.00	.00	.00	7.5	1,480	1,510	1,595
	---	.00	.00	.00				
	---	.00	.00	.00				
w189346	.0	.00	.00	.00	8.5	1,580	1,600	0
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w189347	1.4	35.3	59.4	3.9	5.3	81.6	1.5	7.0	0.7	8,100	14,580
	---	35.8	60.2	4.0	5.2	82.8	1.5	5.8	.7	8,220	14,790
	---	37.3	62.7	---	5.4	86.2	1.6	6.1	.7	8,550	15,400
w190604	2.7	34.5	53.3	9.5	5.1	74.5	1.3	8.1	1.5	7,360	13,250
	---	35.5	54.8	9.8	4.9	76.6	1.3	5.9	1.5	7,570	13,620
	---	39.3	60.7	---	5.5	84.9	1.5	6.5	1.7	8,380	15,090
w190605	1.1	35.7	51.0	12.2	5.0	73.5	1.4	7.0	.9	7,250	13,050
	---	36.1	51.6	12.3	4.9	74.3	1.4	6.1	.9	7,330	13,200
	---	41.2	58.8	---	5.6	84.8	1.6	6.9	1.0	8,360	15,050
w190606	3.1	33.4	50.4	13.1	5.0	70.5	1.3	9.4	.7	6,900	12,420
	---	34.5	52.0	13.5	4.8	72.8	1.3	6.9	.7	7,120	12,820
	---	39.9	60.1	---	5.6	84.1	1.6	7.9	.8	8,230	14,820
w190607	3.1	30.6	47.0	19.3	4.6	64.0	1.2	10.3	.6	6,310	11,350
	---	31.6	48.5	19.9	4.4	66.0	1.2	7.8	.6	6,510	11,710
	---	39.4	60.6	---	5.5	82.5	1.5	9.7	.8	8,130	14,630
w190608	2.4	35.4	51.7	10.5	5.1	73.8	1.3	8.7	.6	7,270	13,090
	---	36.3	53.0	10.8	5.0	75.6	1.3	6.7	.6	7,450	13,410
	---	40.6	59.4	---	5.5	84.7	1.5	7.5	.7	8,350	15,030
w190609	2.8	33.0	52.0	12.2	4.9	72.1	1.3	8.8	.7	7,060	12,710
	---	34.0	53.5	12.6	4.7	74.2	1.3	6.5	.7	7,260	13,080
	---	38.8	61.2	---	5.4	84.8	1.5	7.4	.8	8,310	14,950
w190610	3.5	37.2	53.2	6.1	5.4	76.3	1.4	9.8	1.0	7,580	13,650
	---	38.5	55.1	6.3	5.2	79.1	1.5	6.9	1.0	7,860	14,150
	---	41.2	58.8	---	5.5	84.4	1.5	7.4	1.1	8,390	15,100
w190611	3.8	35.8	51.0	9.4	5.1	72.7	1.4	10.5	.9	7,170	12,910
	---	37.2	53.0	9.8	4.9	75.6	1.5	7.4	.9	7,460	13,420
	---	41.2	58.8	---	5.4	83.8	1.6	8.2	1.0	8,260	14,870
w190612	3.1	33.5	50.3	13.1	4.9	69.3	1.2	8.9	2.6	6,910	12,430
	---	34.6	51.9	13.5	4.7	71.5	1.2	6.3	2.7	7,130	12,830
	---	40.0	60.0	---	5.4	82.7	1.4	7.3	3.1	8,240	14,830
w190614	2.6	39.2	53.0	5.2	5.4	77.5	1.6	9.6	.7	7,670	13,810
	---	40.2	54.4	5.3	5.2	79.6	1.6	7.5	.7	7,880	14,180
	---	42.5	57.5	---	5.5	84.1	1.7	7.9	.8	8,320	14,980
w190615	3.4	35.2	52.6	8.8	5.1	73.4	1.5	10.2	1.0	7,260	13,060
	---	36.4	54.5	9.1	4.9	76.0	1.6	7.4	1.0	7,510	13,520
	---	40.1	59.9	---	5.4	83.6	1.7	8.2	1.1	8,260	14,870

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w189347	0.0	0.00	0.00	0.00	8.5	1,410	1,440	1,495
	---	.00	.00	.00				
	---	.00	.00	.00				
w190604	.0	.00	.00	.00	6.5	1,540	1,590	1,600
	---	.00	.00	.00				
	---	.00	.00	.00				
w190605	.0	.00	.00	.00	7.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190606	.0	.00	.00	.00	5.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190607	.0	.00	.00	.00	3.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190608	.0	.00	.00	.00	5.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190609	.0	.00	.00	.00	5.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190610	.0	.00	.00	.00	6.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190611	.0	.00	.00	.00	5.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190612	.0	.00	.00	.00	5.5	1,290	1,345	1,420
	---	.00	.00	.00				
	---	.00	.00	.00				
w190614	.0	.00	.00	.00	5.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190615	.0	.00	.00	.00	4.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190616	1.8	33.0	49.4	15.8	4.9	69.8	1.4	7.1	1.0	6,930	12,470
	---	33.6	50.3	16.1	4.8	71.1	1.4	5.6	1.0	7,050	12,700
	---	40.0	60.0	---	5.7	84.7	1.7	6.7	1.2	8,410	15,130
w190617	2.8	34.2	62.0	1.0	5.5	82.5	1.7	8.6	.7	8,130	14,640
	---	35.2	63.8	1.0	5.3	84.9	1.7	6.3	.7	8,370	15,060
	---	35.6	64.4	---	5.4	85.8	1.8	6.4	.7	8,450	15,220
w190618	2.4	31.1	60.7	5.8	5.2	78.4	1.6	8.3	.7	7,730	13,920
	---	31.9	62.2	5.9	5.1	80.3	1.6	6.3	.7	7,920	14,260
	---	33.9	66.1	---	5.4	85.4	1.7	6.7	.8	8,420	15,160
w190619	2.0	34.4	54.6	9.0	5.3	76.0	1.5	6.5	1.7	7,560	13,610
	---	35.1	55.7	9.2	5.2	77.6	1.5	4.8	1.7	7,720	13,890
	---	38.7	61.3	---	5.7	85.4	1.7	5.3	1.9	8,500	15,290
w190620	2.8	36.2	57.1	3.9	5.5	79.4	1.6	8.9	.7	7,900	14,220
	---	37.2	58.7	4.0	5.3	81.7	1.6	6.6	.7	8,130	14,630
	---	38.8	61.2	---	5.6	85.1	1.7	6.9	.8	8,470	15,240
w190621	3.4	33.4	53.2	10.0	5.1	73.8	1.3	9.2	.6	7,290	13,130
	---	34.6	55.1	10.4	4.9	76.4	1.3	6.4	.6	7,550	13,590
	---	38.6	61.4	---	5.5	85.2	1.5	7.1	.7	8,420	15,160
w190623	2.5	34.8	54.8	7.9	5.3	76.2	1.6	8.2	.8	7,570	13,630
	---	35.7	56.2	8.1	5.2	78.2	1.6	6.1	.8	7,770	13,980
	---	38.8	61.2	---	5.6	85.0	1.8	6.7	.9	8,450	15,210
w190624	2.3	33.6	54.9	9.2	5.1	76.1	1.5	7.4	.7	7,500	13,500
	---	34.4	56.2	9.4	5.0	77.9	1.5	5.5	.7	7,680	13,820
	---	38.0	62.0	---	5.5	86.0	1.7	6.1	.8	8,470	15,250
w190625	2.3	35.5	60.2	2.0	5.5	81.8	1.7	8.3	.7	8,110	14,590
	---	36.3	61.6	2.0	5.4	83.7	1.7	6.4	.7	8,300	14,930
	---	37.1	62.9	---	5.5	85.5	1.8	6.5	.7	8,470	15,250
w190626	1.7	37.5	56.0	4.8	5.4	80.3	1.6	6.8	1.1	7,980	14,370
	---	38.1	57.0	4.9	5.3	81.7	1.6	5.4	1.1	8,120	14,620
	---	40.1	59.9	---	5.6	85.9	1.7	5.7	1.2	8,540	15,370
w190627	1.5	33.6	54.4	10.5	5.0	74.9	1.6	7.2	.8	7,390	13,310
	---	34.1	55.2	10.7	4.9	76.0	1.6	6.0	.8	7,510	13,510
	---	38.2	61.8	---	5.5	85.1	1.8	6.7	.9	8,400	15,120
w190628	2.0	37.9	51.5	8.6	5.3	76.3	1.5	7.6	.7	7,580	13,640
	---	38.7	52.6	8.8	5.2	77.9	1.5	5.9	.7	7,730	13,920
	---	42.4	57.6	---	5.7	85.3	1.7	6.5	.8	8,480	15,260

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w190616	0.0	0.00	0.00	0.00	7.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190617	.0	.00	.00	.00	8.0	1,205	1,230	1,260
	---	.00	.00	.00				
	---	.00	.00	.00				
w190618	.0	.00	.00	.00	8.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190619	.0	.00	.00	.00	8.0	1,300	1,360	1,460
	---	.00	.00	.00				
	---	.00	.00	.00				
w190620	.0	.00	.00	.00	7.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190621	.0	.00	.00	.00	6.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190623	.0	.00	.00	.00	8.0	1,560	1,600	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190624	.0	.00	.00	.00	6.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190625	.0	.00	.00	.00	8.0	1,340	1,390	1,445
	---	.00	.00	.00				
	---	.00	.00	.00				
w190626	.0	.00	.00	.00	7.5	1,415	1,465	1,590
	---	.00	.00	.00				
	---	.00	.00	.00				
w190627	.0	.00	.00	.00	7.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190628	.0	.00	.00	.00	5.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190629	2.5	36.6	55.9	5.0	5.4	78.9	1.6	8.2	0.9	7,840	14,110
	---	37.5	57.3	5.1	5.3	80.9	1.6	6.1	.9	8,040	14,470
	---	39.6	60.4	---	5.5	85.3	1.7	6.5	1.0	8,470	15,250
w190630	2.5	35.0	54.6	7.9	5.3	76.7	1.5	7.6	1.0	7,580	13,650
	---	35.9	56.0	8.1	5.2	78.7	1.5	5.5	1.0	7,780	14,000
	---	39.1	60.9	---	5.6	85.6	1.7	6.0	1.1	8,460	15,230
w190631	3.0	35.4	56.0	5.6	5.4	77.5	1.6	8.8	1.1	7,670	13,810
	---	36.5	57.7	5.8	5.2	79.9	1.6	6.3	1.1	7,910	14,240
	---	38.7	61.3	---	5.5	84.8	1.8	6.7	1.2	8,390	15,110
w190632	2.1	36.1	52.3	9.5	5.2	75.1	1.3	8.1	.8	7,410	13,330
	---	36.9	53.4	9.7	5.1	76.7	1.3	6.4	.8	7,560	13,620
	---	40.8	59.2	---	5.6	85.0	1.5	7.1	.9	8,380	15,080
w190633	2.1	32.6	51.7	13.6	4.6	71.7	1.3	8.2	.6	6,980	12,560
	---	33.3	52.8	13.9	4.5	73.2	1.3	6.5	.6	7,130	12,830
	---	38.7	61.3	---	5.2	85.1	1.5	7.5	.7	8,280	14,900
w190634	3.8	35.2	57.0	4.0	5.5	78.7	1.4	9.7	.7	7,720	13,900
	---	36.6	59.3	4.2	5.3	81.8	1.5	6.6	.7	8,030	14,450
	---	38.2	61.8	---	5.5	85.4	1.5	6.9	.8	8,380	15,080
w190635	3.5	32.1	56.9	7.5	5.2	76.8	1.4	8.6	.5	7,520	13,540
	---	33.3	59.0	7.8	5.0	79.6	1.5	5.7	.5	7,800	14,030
	---	36.1	63.9	---	5.4	86.3	1.6	6.2	.6	8,450	15,210
w190636	3.2	35.5	54.5	6.8	5.4	76.7	1.5	8.1	1.5	7,590	13,670
	---	36.7	56.3	7.0	5.2	79.2	1.5	5.4	1.5	7,850	14,120
	---	39.4	60.6	---	5.6	85.2	1.7	5.8	1.7	8,440	15,190
w190637	2.5	29.4	56.6	11.5	4.9	73.7	1.5	4.6	3.8	7,180	12,930
	---	30.2	58.1	11.8	4.7	75.6	1.5	2.4	3.9	7,370	13,260
	---	34.2	65.8	---	5.4	85.7	1.7	2.8	4.4	8,350	15,030
w190638	3.7	30.0	57.6	8.7	5.0	75.6	1.5	7.7	1.5	7,380	13,280
	---	31.2	59.8	9.0	4.8	78.5	1.6	4.6	1.6	7,660	13,790
	---	34.2	65.8	---	5.2	86.3	1.7	5.0	1.7	8,420	15,160
w190639	2.1	33.1	54.2	10.6	5.0	74.5	1.5	6.3	2.1	7,360	13,240
	---	33.8	55.4	10.8	4.9	76.1	1.5	4.5	2.1	7,510	13,520
	---	37.9	62.1	---	5.5	85.3	1.7	5.1	2.4	8,430	15,170
w190640	2.2	33.8	55.8	8.2	4.9	76.2	1.3	8.2	1.2	7,420	13,360
	---	34.6	57.1	8.4	4.8	77.9	1.3	6.4	1.2	7,590	13,660
	---	37.7	62.3	---	5.2	85.0	1.5	7.0	1.3	8,280	14,910

Table 7c -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w190629	0.0	0.00	0.00	0.00	7.5	1,320	1,350	1,410
	---	.00	.00	.00				
	---	.00	.00	.00				
w190630	.0	.00	.00	.00	7.5	1,315	1,345	1,455
	---	.00	.00	.00				
	---	.00	.00	.00				
w190631	.0	.00	.00	.00	7.5	1,470	1,500	1,590
	---	.00	.00	.00				
	---	.00	.00	.00				
w190632	.0	.00	.00	.00	7.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190633	.0	.00	.00	.00	.50	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190634	.0	.00	.00	.00	7.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190635	.0	.00	.00	.00	8.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190636	.0	.00	.00	.00	8.5	1,230	1,345	1,380
	---	.00	.00	.00				
	---	.00	.00	.00				
w190637	.0	.00	.00	.00	8.0	1,320	1,350	1,420
	---	.00	.00	.00				
	---	.00	.00	.00				
w190638	.0	.00	.00	.00	8.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190639	.0	.00	.00	.00	8.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190640	.0	.00	.00	.00	8.0	1,175	1,205	1,260
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7c -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190641	4.2	30.1	57.4	8.3	5.0	74.5	1.5	9.3	1.4	7,340	13,210
	---	31.4	59.9	8.7	4.7	77.8	1.6	5.8	1.5	7,660	13,790
	---	34.4	65.6	---	5.2	85.1	1.7	6.4	1.6	8,390	15,100
w190642	3.9	36.4	46.6	13.1	5.2	67.9	1.2	9.0	3.6	6,790	12,230
	---	37.9	48.5	13.6	5.0	70.7	1.2	5.8	3.7	7,070	12,730
	---	43.9	56.1	---	5.7	81.8	1.4	6.7	4.3	8,190	14,730
w190665	2.9	34.2	49.1	13.8	5.2	68.1	1.4	9.6	1.9	6,800	12,240
	---	35.2	50.6	14.2	5.0	70.1	1.4	7.2	2.0	7,000	12,610
	---	41.1	58.9	---	5.9	81.8	1.7	8.4	2.3	8,160	14,690
w190677	3.9	32.6	60.4	3.1	5.2	78.9	1.0	11.1	.7	7,670	13,810
	---	33.9	62.9	3.2	5.0	82.1	1.0	7.9	.7	7,980	14,370
	---	35.1	64.9	---	5.1	84.8	1.1	8.2	.8	8,250	14,850
w190678	1.0	21.9	36.6	40.5	3.7	49.2	.6	5.6	.4	4,860	8,750
	---	22.1	37.0	40.9	3.6	49.7	.6	4.8	.4	4,910	8,840
	---	37.4	62.6	---	6.1	84.1	1.0	8.1	.7	8,310	14,960
w190679	.6	27.5	45.9	26.0	4.5	62.8	.8	5.5	.4	6,240	11,230
	---	27.7	46.2	26.2	4.5	63.2	.8	5.0	.4	6,280	11,300
	---	37.5	62.5	---	6.0	85.6	1.1	6.8	.5	8,500	15,300
w190683	6.1	35.5	51.8	6.6	5.4	71.3	1.4	13.8	1.5	7,060	12,700
	---	37.8	55.2	7.0	5.0	75.9	1.5	8.9	1.6	7,510	13,530
	---	40.7	59.3	---	5.4	81.7	1.6	9.6	1.7	8,080	14,550
w190684	4.8	36.3	50.7	8.2	5.4	71.4	1.3	11.4	2.3	7,020	12,630
	---	38.1	53.3	8.6	5.1	75.0	1.4	7.5	2.4	7,370	13,270
	---	41.7	58.3	---	5.6	82.1	1.5	8.2	2.6	8,070	14,520
w190685	4.8	28.3	58.6	8.3	5.2	74.0	.9	10.8	.8	7,180	12,930
	---	29.7	61.6	8.7	4.9	77.7	.9	6.9	.8	7,550	13,580
	---	32.6	67.4	---	5.4	85.2	1.0	7.5	.9	8,270	14,880
w190927	1.3	17.4	78.3	3.0	4.7	85.9	1.5	4.2	.7	8,280	14,910
	---	17.6	79.3	3.0	4.6	87.0	1.5	3.1	.7	8,390	15,110
	---	18.2	81.8	---	4.8	89.8	1.6	3.2	.7	8,660	15,580
w190928	1.5	16.6	73.3	8.6	4.5	80.6	1.5	4.3	.5	7,770	13,980
	---	16.9	74.4	8.7	4.4	81.8	1.5	3.0	.5	7,880	14,190
	---	18.5	81.5	---	4.8	89.7	1.7	3.3	.6	8,640	15,550
w191107	2.5	31.2	60.6	5.7	5.3	78.6	1.4	7.9	1.1	7,840	14,110
	---	32.0	62.2	5.8	5.2	80.6	1.4	5.8	1.1	8,040	14,470
	---	34.0	66.0	---	5.5	85.6	1.5	6.2	1.2	8,540	15,370

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w190641	0.0	0.00	0.00	0.00	7.5	1,110	1,140	1,200
	---	.00	.00	.00				
	---	.00	.00	.00				
w190642	.0	.00	.00	.00	6.5	1,145	1,200	1,310
	---	.00	.00	.00				
	---	.00	.00	.00				
w190665	.0	.03	1.31	.52	5.0	1,380	1,435	1,470
	---	.03	1.35	.54				
	---	.04	1.57	.62				
w190677	.0	.00	.00	.00	4.5	1,390	1,415	1,470
	---	.00	.00	.00				
	---	.00	.00	.00				
w190678	.0	.00	.00	.00	1.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190679	.0	.00	.00	.00	1.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w190683	.0	.00	.00	.00	7.0	1,230	1,290	1,360
	---	.00	.00	.00				
	---	.00	.00	.00				
w190684	.0	.00	.00	.00	6.5	1,145	1,170	1,240
	---	.00	.00	.00				
	---	.00	.00	.00				
w190685	.0	.00	.00	.00	7.0	1,410	1,475	1,520
	---	.00	.00	.00				
	---	.00	.00	.00				
w190927	.0	.13	.21	.39	1.0	1,430	1,480	1,540
	---	.13	.21	.40				
	---	.14	.22	.41				
w190928	.0	.11	.42	.02	.50	1,540	0	0
	---	.11	.43	.02				
	---	.12	.47	.02				
w191107	.0	.00	.00	.00	9.0	1,225	1,340	1,405
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191108	3.6	29.1	58.2	9.1	5.4	75.2	1.1	7.9	1.3	7,420	13,360
	---	30.2	60.4	9.4	5.2	78.0	1.1	4.9	1.3	7,700	13,860
	---	33.3	66.7	---	5.7	86.1	1.3	5.4	1.5	8,500	15,300
w191109	2.5	30.2	61.2	6.1	5.4	79.4	1.2	7.1	.8	7,790	14,030
	---	31.0	62.8	6.3	5.3	81.4	1.2	5.0	.8	7,990	14,390
	---	33.0	67.0	---	5.6	86.9	1.3	5.3	.9	8,530	15,350
w191110	2.6	30.5	63.1	3.8	5.4	80.5	.7	8.6	1.0	7,840	14,110
	---	31.3	64.8	3.9	5.2	82.6	.7	6.5	1.0	8,050	14,490
	---	32.6	67.4	---	5.5	86.0	.7	6.7	1.1	8,370	15,070
w191111	2.7	28.7	63.9	4.7	5.2	80.8	1.6	5.8	1.9	7,990	14,380
	---	29.5	65.7	4.8	5.0	83.0	1.6	3.5	2.0	8,210	14,780
	---	31.0	69.0	---	5.3	87.3	1.7	3.7	2.1	8,630	15,530
w191112	3.0	27.5	54.8	14.7	4.8	70.4	1.4	4.4	4.3	7,080	12,750
	---	28.4	56.5	15.2	4.6	72.6	1.4	1.8	4.4	7,300	13,140
	---	33.4	66.6	---	5.4	85.5	1.7	2.1	5.2	8,610	15,490
w191113	2.7	26.8	58.4	12.1	4.9	74.4	1.2	6.7	.7	7,300	13,140
	---	27.5	60.0	12.4	4.7	76.5	1.2	4.4	.7	7,500	13,500
	---	31.5	68.5	---	5.4	87.3	1.4	5.0	.8	8,570	15,420
w191114	1.7	25.6	48.1	24.6	4.4	62.1	1.0	7.3	.6	6,110	11,000
	---	26.0	48.9	25.0	4.3	63.2	1.0	5.9	.6	6,220	11,190
	---	34.7	65.3	---	5.7	84.3	1.4	7.9	.8	8,290	14,930
w191115	2.2	34.7	59.3	3.8	5.5	80.8	1.3	8.0	.6	7,940	14,300
	---	35.5	60.6	3.9	5.4	82.6	1.3	6.2	.6	8,120	14,620
	---	36.9	63.1	---	5.6	86.0	1.4	6.4	.6	8,450	15,210
w191116	1.8	32.8	56.2	9.2	5.4	76.7	.7	7.3	.7	7,560	13,610
	---	33.4	57.2	9.4	5.3	78.1	.7	5.8	.7	7,700	13,860
	---	36.9	63.1	---	5.8	86.2	.8	6.4	.8	8,500	15,290
w191117	1.5	32.6	63.6	2.3	5.4	83.5	1.4	6.7	.7	8,230	14,810
	---	33.1	64.6	2.3	5.3	84.8	1.4	5.4	.7	8,350	15,040
	---	33.9	66.1	---	5.4	86.8	1.5	5.6	.7	8,550	15,400
w191118	2.1	30.0	54.5	13.4	4.8	72.6	1.1	7.3	.8	7,170	12,910
	---	30.6	55.7	13.7	4.7	74.2	1.1	5.5	.8	7,330	13,190
	---	35.5	64.5	---	5.4	85.9	1.3	6.4	.9	8,490	15,280
w191119	2.9	34.2	59.8	3.1	5.4	80.9	1.3	8.6	.7	7,990	14,390
	---	35.2	61.6	3.2	5.2	83.3	1.3	6.2	.7	8,230	14,820
	---	36.4	63.6	---	5.4	86.1	1.4	6.4	.7	8,500	15,310

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Pyritic	Organic	Free swelling	Ash fusion temperature C°: Initial deform.	soften.	fluid
w191108	0.0	0.00	0.00	0.00	8.5	1,445	1,500	1,540
	---	.00	.00	.00				
	---	.00	.00	.00				
w191109	.0	.00	.00	.00	8.5	1,525	1,540	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191110	.0	.00	.00	.00	8.5	1,365	1,415	1,480
	---	.00	.00	.00				
	---	.00	.00	.00				
w191111	.0	.00	.00	.00	9.0	1,165	1,200	1,240
	---	.00	.00	.00				
	---	.00	.00	.00				
w191112	.0	.00	.00	.00	9.0	1,105	1,170	1,240
	---	.00	.00	.00				
	---	.00	.00	.00				
w191113	.0	.00	.00	.00	8.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191114	.0	.00	.00	.00	3.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191115	.0	.00	.00	.00	8.5	1,410	1,440	1,495
	---	.00	.00	.00				
	---	.00	.00	.00				
w191116	.0	.00	.00	.00	8.5	1,445	1,470	1,540
	---	.00	.00	.00				
	---	.00	.00	.00				
w191117	.0	.00	.00	.00	9.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191118	.0	.00	.00	.00	7.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191119	.0	.00	.00	.00	8.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191120	3.2	33.9	60.7	2.2	5.5	80.7	1.3	9.7	0.6	8,040	14,470
	---	35.0	62.7	2.3	5.3	83.4	1.3	7.1	.6	8,300	14,950
	---	35.8	64.2	---	5.4	85.3	1.4	7.2	.6	8,500	15,300
w191121	3.6	31.4	56.5	8.5	5.2	76.2	1.2	6.7	2.2	7,590	13,660
	---	32.6	58.6	8.8	5.0	79.0	1.2	3.6	2.3	7,870	14,170
	---	35.7	64.3	---	5.5	86.7	1.4	4.0	2.5	8,630	15,540
w191122	2.5	30.4	55.2	11.9	5.0	72.9	1.0	6.6	2.6	7,260	13,070
	---	31.2	56.6	12.2	4.8	74.8	1.0	4.5	2.7	7,450	13,410
	---	35.5	64.5	---	5.5	85.2	1.2	5.1	3.0	8,480	15,270
w191123	2.1	30.4	58.4	9.1	5.2	77.0	1.0	7.0	.7	7,620	13,710
	---	31.1	59.7	9.3	5.1	78.7	1.0	5.2	.7	7,780	14,000
	---	34.2	65.8	---	5.6	86.7	1.1	5.8	.8	8,580	15,440
w191124	1.4	30.6	61.7	6.3	5.2	79.8	1.1	6.9	.7	7,900	14,220
	---	31.0	62.6	6.4	5.1	80.9	1.1	5.7	.7	8,010	14,420
	---	33.2	66.8	---	5.5	86.5	1.2	6.1	.8	8,560	15,410
w191125	2.9	32.2	55.5	9.4	5.1	74.6	1.4	8.8	.7	7,360	13,250
	---	33.2	57.2	9.7	4.9	76.8	1.4	6.4	.7	7,580	13,650
	---	36.7	63.3	---	5.4	85.1	1.6	7.1	.8	8,390	15,110
w191126	9.9	26.4	51.9	11.8	5.3	66.9	1.0	14.5	.5	6,580	11,850
	---	29.3	57.6	13.1	4.7	74.3	1.1	6.3	.6	7,310	13,150
	---	33.7	66.3	---	5.4	85.4	1.3	7.3	.6	8,410	15,130
w191128	2.1	27.0	48.8	22.1	4.5	64.2	1.0	7.6	.6	6,350	11,430
	---	27.6	49.8	22.6	4.4	65.6	1.0	5.9	.6	6,490	11,680
	---	35.6	64.4	---	5.6	84.7	1.3	7.6	.8	8,380	15,080
w191129	1.2	22.8	56.9	19.1	4.4	67.9	.7	5.8	2.1	6,670	12,000
	---	23.1	57.6	19.3	4.3	68.7	.7	4.8	2.1	6,750	12,150
	---	28.6	71.4	---	5.4	85.2	.9	5.9	2.6	8,360	15,060
w191130	2.0	30.9	64.4	2.7	5.6	82.5	1.0	7.4	.8	8,070	14,530
	---	31.5	65.7	2.8	5.5	84.2	1.0	5.7	.8	8,240	14,830
	---	32.4	67.6	---	5.6	86.6	1.0	5.9	.8	8,470	15,250
w191131	1.2	25.4	67.0	6.4	5.1	80.8	.9	5.1	1.7	7,920	14,260
	---	25.7	67.8	6.5	5.0	81.8	.9	4.1	1.7	8,020	14,430
	---	27.5	72.5	---	5.4	87.4	1.0	4.4	1.8	8,570	15,430
w191133	1.9	30.5	58.3	9.3	5.0	76.2	1.2	7.8	.5	7,420	13,350
	---	31.1	59.4	9.5	4.9	77.7	1.2	6.2	.5	7,560	13,610
	---	34.3	65.7	---	5.4	85.8	1.4	6.9	.6	8,350	15,030

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Pyritic	Organic	Free swelling	Ash fusion temperature C°: Initial deform.	soften.	fluid
w191120	0.0	0.00	0.00	0.00	8.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191121	.0	.00	.00	.00	8.5	1,130	1,175	1,295
	---	.00	.00	.00				
	---	.00	.00	.00				
w191122	.0	.00	.00	.00	9.0	1,180	1,230	1,345
	---	.00	.00	.00				
	---	.00	.00	.00				
w191123	.0	.00	.00	.00	9.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191124	.0	.00	.00	.00	9.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191125	.0	.00	.00	.00	7.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191126	.0	.00	.00	.00	7.5	1,525	1,540	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191128	.0	.00	.00	.00	5.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191129	.0	.00	.00	.00	9.0	1,415	1,445	1,505
	---	.00	.00	.00				
	---	.00	.00	.00				
w191130	.0	.00	.00	.00	9.0	1,180	1,295	1,360
	---	.00	.00	.00				
	---	.00	.00	.00				
w191131	.0	.00	.00	.00	9.0	1,200	1,310	1,370
	---	.00	.00	.00				
	---	.00	.00	.00				
w191133	.0	.00	.00	.00	4.5	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7c -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191522	6.2	22.5	59.9	11.4	4.5	70.8	1.0	11.7	0.6	6,740	12,130
	---	24.0	63.9	12.2	4.1	75.5	1.1	6.6	.6	7,180	12,930
	---	27.3	72.7	---	4.6	85.9	1.2	7.5	.7	8,180	14,720
w191862	4.6	26.1	66.1	3.2	5.3	81.4	1.3	6.9	1.9	8,030	14,460
	---	27.4	69.3	3.4	5.0	85.3	1.4	2.9	2.0	8,420	15,160
	---	28.3	71.7	---	5.2	88.3	1.4	3.0	2.1	8,710	15,680
w191863	4.0	25.0	61.1	9.9	4.9	74.9	1.3	6.7	2.3	7,410	13,330
	---	26.0	63.6	10.3	4.6	78.0	1.4	3.3	2.4	7,710	13,890
	---	29.0	71.0	---	5.2	87.0	1.5	3.7	2.7	8,600	15,480
w191864	4.2	23.5	44.8	27.5	4.1	56.4	.9	7.7	3.4	5,630	10,140
	---	24.5	46.8	28.7	3.8	58.9	.9	4.1	3.5	5,880	10,580
	---	34.4	65.6	---	5.3	82.6	1.3	5.8	5.0	8,250	14,850
w191865	3.2	33.6	51.9	11.3	5.0	72.3	1.3	9.5	.6	7,080	12,740
	---	34.7	53.6	11.7	4.8	74.7	1.3	6.9	.6	7,310	13,160
	---	39.3	60.7	---	5.4	84.6	1.5	7.8	.7	8,280	14,900
w191866	2.9	31.9	46.6	18.6	4.7	65.0	1.1	9.4	1.2	6,440	11,590
	---	32.9	48.0	19.2	4.5	66.9	1.1	7.0	1.2	6,630	11,940
	---	40.6	59.4	---	5.6	82.8	1.4	8.7	1.5	8,200	14,760
w191867	3.0	36.4	54.8	5.8	5.3	77.0	1.3	9.5	1.1	7,560	13,610
	---	37.5	56.5	6.0	5.1	79.4	1.3	7.0	1.1	7,790	14,030
	---	39.9	60.1	---	5.4	84.4	1.4	7.5	1.2	8,290	14,920
w191868	2.7	34.2	56.5	6.6	5.3	76.8	1.1	8.7	1.5	7,660	13,790
	---	35.1	58.1	6.8	5.1	78.9	1.1	6.5	1.5	7,870	14,170
	---	37.7	62.3	---	5.5	84.7	1.2	6.9	1.7	8,450	15,200
w191869	3.2	30.2	51.9	14.7	4.8	66.2	1.2	8.8	4.3	6,790	12,230
	---	31.2	53.6	15.2	4.6	68.4	1.2	6.2	4.4	7,020	12,630
	---	36.8	63.2	---	5.4	80.6	1.5	7.3	5.2	8,280	14,900
w191870	2.0	32.6	62.1	3.3	5.4	80.8	1.5	8.0	1.0	8,080	14,540
	---	33.3	63.4	3.4	5.3	82.4	1.5	6.3	1.0	8,240	14,840
	---	34.4	65.6	---	5.5	85.3	1.6	6.6	1.1	8,530	15,350
w191871	3.2	31.6	62.6	2.6	5.3	80.7	1.5	8.9	1.0	7,980	14,370
	---	32.6	64.7	2.7	5.1	83.4	1.5	6.3	1.0	8,250	14,850
	---	33.5	66.5	---	5.2	85.7	1.6	6.4	1.1	8,470	15,250
w191872	3.1	37.5	53.1	6.3	5.4	75.6	1.3	10.6	.8	7,520	13,530
	---	38.7	54.8	6.5	5.2	78.0	1.3	8.1	.8	7,760	13,960
	---	41.4	58.6	---	5.6	83.4	1.4	8.7	.9	8,300	14,930

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191522	0.0	0.04	0.05	0.49	1.5	1,350	1,405	1,495
	---	.04	.05	.52				
	---	.05	.06	.59				
w191862	.0	.00	.00	.00	9.0	1,165	1,200	1,280
	---	.00	.00	.00				
	---	.00	.00	.00				
w191863	.0	.00	.00	.00	9.0	1,150	1,175	1,330
	---	.00	.00	.00				
	---	.00	.00	.00				
w191864	.0	.00	.00	.00	8.0	1,145	1,180	1,295
	---	.00	.00	.00				
	---	.00	.00	.00				
w191865	.0	.00	.00	.00	2.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191866	.0	.00	.00	.00	4.0	1,600	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191867	.0	.00	.00	.00	5.5	1,420	1,450	1,515
	---	.00	.00	.00				
	---	.00	.00	.00				
w191868	.0	.00	.00	.00	8.0	1,380	1,415	1,470
	---	.00	.00	.00				
	---	.00	.00	.00				
w191869	.0	.00	.00	.00	8.5	1,180	1,215	1,305
	---	.00	.00	.00				
	---	.00	.00	.00				
w191870	.0	.00	.00	.00	9.0	1,180	1,215	1,380
	---	.00	.00	.00				
	---	.00	.00	.00				
w191871	.0	.00	.00	.00	9.0	1,200	1,225	1,350
	---	.00	.00	.00				
	---	.00	.00	.00				
w191872	.0	.00	.00	.00	3.5	1,490	1,600	0
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191873	3.2	32.8	53.8	10.2	5.1	73.4	1.3	9.5	0.5	7,210	12,970
	---	33.9	55.6	10.5	4.9	75.8	1.3	6.9	.5	7,440	13,400
	---	37.9	62.1	---	5.5	84.8	1.5	7.7	.6	8,320	14,980
w191878	4.4	35.5	52.7	7.4	5.2	72.4	1.2	11.2	2.6	7,290	13,130
	---	37.1	55.1	7.7	4.9	75.7	1.3	7.6	2.7	7,630	13,730
	---	40.2	59.8	---	5.3	82.1	1.4	8.3	2.9	8,270	14,890
w191880	4.3	32.8	54.9	8.0	5.4	74.0	1.1	10.7	.8	7,320	13,170
	---	34.3	57.4	8.4	5.1	77.3	1.1	7.2	.8	7,650	13,760
	---	37.4	62.6	---	5.6	84.4	1.3	7.8	.9	8,340	15,020
w191881	3.4	32.5	52.7	11.4	5.1	72.6	1.0	9.0	.9	7,160	12,890
	---	33.6	54.6	11.8	4.9	75.2	1.0	6.2	.9	7,410	13,340
	---	38.1	61.9	---	5.5	85.2	1.2	7.0	1.1	8,410	15,130
w191882	3.5	33.7	53.1	9.7	5.3	73.8	1.2	9.1	.9	7,290	13,120
	---	34.9	55.0	10.1	5.1	76.5	1.2	6.2	.9	7,550	13,600
	---	38.8	61.2	---	5.7	85.0	1.4	6.9	1.0	8,400	15,120
w191883	3.1	36.3	55.1	5.5	5.6	77.7	1.0	9.5	.7	7,670	13,810
	---	37.5	56.9	5.7	5.4	80.2	1.0	7.0	.7	7,920	14,250
	---	39.7	60.3	---	5.8	85.0	1.1	7.4	.8	8,390	15,110
w191884	2.8	29.7	50.1	17.4	4.7	66.8	1.0	9.4	.7	6,580	11,850
	---	30.6	51.5	17.9	4.5	68.7	1.0	7.1	.7	6,770	12,190
	---	37.2	62.8	---	5.5	83.7	1.3	8.7	.9	8,250	14,850
w191885	1.8	37.3	54.1	6.8	5.7	77.8	1.1	7.8	.8	7,780	14,000
	---	38.0	55.1	6.9	5.6	79.2	1.1	6.3	.8	7,920	14,260
	---	40.8	59.2	---	6.0	85.1	1.2	6.8	.9	8,510	15,320
w191886	2.4	33.4	55.2	9.0	5.3	74.9	1.1	8.9	.8	7,490	13,480
	---	34.2	56.6	9.2	5.2	76.7	1.1	6.9	.8	7,670	13,810
	---	37.7	62.3	---	5.7	84.5	1.2	7.6	.9	8,450	15,210
w191887	3.6	35.7	55.7	5.0	5.4	77.0	1.1	10.4	1.1	7,640	13,760
	---	37.0	57.8	5.2	5.2	79.9	1.1	7.5	1.1	7,930	14,270
	---	39.1	60.9	---	5.5	84.2	1.2	7.9	1.2	8,360	15,050
w191888	3.1	30.1	48.6	18.2	4.7	66.1	.8	9.5	.7	6,490	11,690
	---	31.1	50.2	18.8	4.5	68.2	.8	7.0	.7	6,700	12,060
	---	38.2	61.8	---	5.5	84.0	1.0	8.6	.9	8,250	14,850
w191889	4.7	30.2	61.0	4.1	5.6	79.1	1.0	7.7	2.5	7,840	14,120
	---	31.7	64.0	4.3	5.3	83.0	1.0	3.7	2.6	8,230	14,820
	---	33.1	66.9	---	5.6	86.7	1.1	3.9	2.7	8,600	15,480

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191873	0.0	0.00	0.00	0.00	5.0	1,495	1,545	1,600
	---	.00	.00	.00				
	---	.00	.00	.00				
w191878	.0	.00	.00	.00	4.5	1,140	1,250	1,370
	---	.00	.00	.00				
	---	.00	.00	.00				
w191880	.0	.00	.00	.00	7.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191881	.0	.00	.00	.00	7.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191882	.0	.00	.00	.00	7.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191883	.0	.00	.00	.00	7.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191884	.0	.00	.00	.00	6.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191885	.0	.00	.00	.00	9.0	1,465	1,525	1,540
	---	.00	.00	.00				
	---	.00	.00	.00				
w191886	.0	.00	.00	.00	9.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191887	.0	.00	.00	.00	7.0	1,470	1,530	1,540
	---	.00	.00	.00				
	---	.00	.00	.00				
w191888	.0	.00	.00	.00	1.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191889	.0	.00	.00	.00	9.0	1,165	1,220	1,250
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191890	2.6	28.1	61.0	8.3	5.2	77.6	1.2	6.6	1.1	7,670	13,800
	---	28.9	62.6	8.5	5.0	79.7	1.2	4.4	1.1	7,870	14,170
	---	31.5	68.5	---	5.5	87.1	1.3	4.8	1.2	8,600	15,490
w191894	3.9	33.9	56.8	5.4	5.7	76.4	1.3	10.4	.8	7,560	13,600
	---	35.3	59.1	5.6	5.5	79.5	1.4	7.2	.8	7,860	14,150
	---	37.4	62.6	---	5.8	84.2	1.4	7.6	.9	8,330	14,990
w191895	3.4	24.3	34.4	37.9	4.0	48.2	.8	8.4	.7	4,710	8,470
	---	25.2	35.6	39.2	3.7	49.9	.8	5.6	.7	4,870	8,770
	---	41.4	58.6	---	6.2	82.1	1.4	9.2	1.2	8,020	14,430
w191897	6.6	30.3	57.0	6.1	5.3	72.9	1.0	14.1	.6	7,080	12,750
	---	32.4	61.0	6.5	4.9	78.1	1.1	8.8	.6	7,580	13,650
	---	34.7	65.3	---	5.2	83.5	1.1	9.4	.7	8,110	14,600
w191898	5.5	28.3	54.0	12.2	5.0	68.3	1.0	12.9	.6	6,650	11,970
	---	29.9	57.1	12.9	4.6	72.3	1.1	8.5	.6	7,040	12,670
	---	34.4	65.6	---	5.3	83.0	1.2	9.7	.7	8,080	14,540
w191899	4.3	31.8	52.1	11.8	5.4	71.3	1.0	9.8	.7	7,030	12,660
	---	33.2	54.4	12.3	5.1	74.5	1.0	6.2	.7	7,350	13,230
	---	37.9	62.1	---	5.9	85.0	1.2	7.1	.8	8,380	15,090
w191900	4.3	31.1	55.4	9.2	5.3	74.3	1.1	9.4	.7	7,320	13,170
	---	32.5	57.9	9.6	5.0	77.6	1.1	5.8	.7	7,650	13,760
	---	36.0	64.0	---	5.6	85.9	1.3	6.4	.8	8,460	15,230
w191901	2.3	34.1	55.5	8.1	5.3	75.9	1.1	7.8	1.8	7,550	13,590
	---	34.9	56.8	8.3	5.2	77.7	1.1	5.9	1.8	7,730	13,910
	---	38.1	61.9	---	5.6	84.7	1.2	6.4	2.0	8,430	15,170
w191902	6.6	30.3	60.6	2.5	5.8	78.2	1.0	11.8	.7	7,710	13,870
	---	32.4	64.9	2.7	5.4	83.7	1.1	6.4	.7	8,250	14,850
	---	33.3	66.7	---	5.6	86.0	1.1	6.5	.8	8,480	15,260
w192710	1.7	31.7	55.8	10.8	5.2	75.1	1.1	7.1	.7	7,430	13,370
	---	32.2	56.8	11.0	5.1	76.4	1.1	5.7	.7	7,560	13,600
	---	36.2	63.8	---	5.7	85.8	1.3	6.4	.8	8,490	15,280
w192711	2.6	32.5	60.6	4.3	5.7	80.3	1.0	8.0	.7	7,910	14,240
	---	33.4	62.2	4.4	5.6	82.4	1.0	5.8	.7	8,120	14,620
	---	34.9	65.1	---	5.8	86.3	1.1	6.1	.8	8,500	15,300
w192712	1.5	24.5	70.4	3.6	4.8	84.2	1.4	5.4	.6	8,240	14,830
	---	24.9	71.5	3.7	4.7	85.5	1.4	4.1	.6	8,360	15,060
	---	25.8	74.2	---	4.9	88.7	1.5	4.3	.6	8,680	15,630

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Forms of sulfur: Pyritic	Forms of sulfur: Organic	Free swelling	Ash fusion temperature C°: Initial deform.	Ash fusion temperature C°: soften.	Ash fusion temperature C°: fluid
w191890	0.0	0.00	0.00	0.00	8.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191894	.0	.00	.00	.00	6.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191895	.0	.00	.00	.00	1.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191897	.0	.00	.00	.00	1.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191898	.0	.00	.00	.00	1.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191899	.0	.00	.00	.00	9.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191900	.0	.00	.00	.00	5.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w191901	.0	.00	.00	.00	9.0	1,340	1,395	1,440
	---	.00	.00	.00				
	---	.00	.00	.00				
w191902	.0	.00	.00	.00	8.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192710	.0	.00	.00	.00	8.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192711	.0	.00	.00	.00	9.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192712	.0	.00	.00	.00	8.5	1,095	1,140	1,155
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w192713	1.4	26.9	67.2	4.5	5.3	82.0	1.6	5.8	0.8	8,120	14,620
	---	27.3	68.2	4.6	5.2	83.2	1.6	4.6	.8	8,240	14,830
	---	28.6	71.4	---	5.5	87.1	1.7	4.8	.9	8,630	15,540
w192714	1.5	25.1	67.3	6.1	5.0	80.8	1.6	5.2	1.3	7,980	14,370
	---	25.5	68.3	6.2	4.9	82.0	1.6	3.9	1.3	8,100	14,590
	---	27.2	72.8	---	5.2	87.4	1.7	4.2	1.4	8,640	15,550
w192715	1.5	18.3	73.8	6.4	4.6	82.0	1.4	4.1	1.5	7,990	14,390
	---	18.6	74.9	6.5	4.5	83.2	1.4	2.8	1.5	8,120	14,610
	---	19.9	80.1	---	4.8	89.0	1.5	3.0	1.6	8,680	15,620
w192716	9.5	19.3	68.2	3.0	5.4	78.0	1.4	11.0	1.2	7,610	13,690
	---	21.3	75.4	3.3	4.8	86.2	1.5	2.8	1.3	8,400	15,130
	---	22.1	77.9	---	5.0	89.1	1.6	2.9	1.4	8,690	15,650
w192717	1.2	16.4	66.5	15.9	4.2	73.7	1.0	4.5	.7	7,090	12,770
	---	16.6	67.3	16.1	4.1	74.6	1.0	3.5	.7	7,180	12,930
	---	19.8	80.2	---	4.9	88.9	1.2	4.1	.8	8,560	15,400
w192718	2.5	18.8	71.3	7.4	4.7	79.6	1.3	5.5	1.5	7,790	14,020
	---	19.3	73.1	7.6	4.5	81.6	1.3	3.4	1.5	7,990	14,380
	---	20.9	79.1	---	4.9	88.3	1.4	3.6	1.7	8,640	15,560
w192719	1.6	16.8	71.0	10.6	4.4	78.5	1.1	4.3	1.1	7,580	13,650
	---	17.1	72.2	10.8	4.3	79.8	1.1	2.9	1.1	7,710	13,870
	---	19.1	80.9	---	4.8	89.4	1.3	3.3	1.3	8,640	15,550
w192721	1.7	17.8	71.3	9.2	4.4	80.0	1.1	4.4	.9	7,670	13,800
	---	18.1	72.5	9.4	4.3	81.4	1.1	2.9	.9	7,800	14,040
	---	20.0	80.0	---	4.7	89.8	1.2	3.2	1.0	8,600	15,490
w192722	1.7	18.9	74.8	4.6	4.7	85.2	1.3	3.7	.5	8,180	14,730
	---	19.2	76.1	4.7	4.6	86.7	1.3	2.2	.5	8,320	14,980
	---	20.2	79.8	---	4.8	90.9	1.4	2.3	.5	8,730	15,720
w192723	1.9	23.1	71.7	3.3	5.0	84.8	1.5	4.5	.9	8,290	14,920
	---	23.5	73.1	3.4	4.9	86.4	1.5	2.9	.9	8,450	15,210
	---	24.4	75.6	---	5.1	89.5	1.6	3.0	.9	8,740	15,740
w192724	1.6	20.0	75.3	3.1	5.0	85.3	1.4	4.4	.8	8,310	14,950
	---	20.3	76.5	3.2	4.9	86.7	1.4	3.0	.8	8,440	15,190
	---	21.0	79.0	---	5.1	89.5	1.5	3.1	.8	8,720	15,690
w192725	2.7	14.8	71.7	10.8	4.3	78.4	1.1	4.9	.5	7,500	13,500
	---	15.2	73.7	11.1	4.1	80.6	1.1	2.6	.5	7,710	13,870
	---	17.1	82.9	---	4.6	90.6	1.3	2.9	.6	8,670	15,610

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w192713	0.0	0.00	0.00	0.00	9.0	1,380	1,430	1,495
	---	.00	.00	.00				
	---	.00	.00	.00				
w192714	.0	.00	.00	.00	9.0	1,170	1,215	1,270
	---	.00	.00	.00				
	---	.00	.00	.00				
w192715	.0	.00	.00	.00	9.0	1,115	1,200	1,260
	---	.00	.00	.00				
	---	.00	.00	.00				
w192716	.0	.00	.00	.00	9.0	1,320	1,365	1,415
	---	.00	.00	.00				
	---	.00	.00	.00				
w192717	.0	.00	.00	.00	6.5	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192718	.0	.00	.00	.00	9.0	1,230	1,320	1,380
	---	.00	.00	.00				
	---	.00	.00	.00				
w192719	.0	.00	.00	.00	7.0	1,340	1,405	1,475
	---	.00	.00	.00				
	---	.00	.00	.00				
w192721	.0	.00	.00	.00	5.5	1,430	1,500	1,540
	---	.00	.00	.00				
	---	.00	.00	.00				
w192722	.0	.00	.00	.00	7.0	1,360	1,420	1,490
	---	.00	.00	.00				
	---	.00	.00	.00				
w192723	.0	.00	.00	.00	9.0	1,175	1,235	1,285
	---	.00	.00	.00				
	---	.00	.00	.00				
w192724	.0	.00	.00	.00	9.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192725	.0	.00	.00	.00	4.0	1,440	1,490	1,535
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w192726	1.8	15.3	76.0	6.9	4.5	82.9	1.1	4.0	0.6	7,910	14,230
	---	15.6	77.4	7.0	4.4	84.4	1.1	2.4	.6	8,050	14,490
	---	16.8	83.2	---	4.7	90.8	1.2	2.6	.7	8,660	15,590
w192727	1.7	16.1	75.0	7.2	4.3	82.8	1.2	4.0	.5	7,910	14,240
	---	16.4	76.3	7.3	4.2	84.2	1.2	2.5	.5	8,050	14,490
	---	17.7	82.3	---	4.5	90.9	1.3	2.7	.5	8,680	15,630
w192728	1.5	16.8	71.1	10.6	4.2	79.2	1.2	4.3	.5	7,670	13,800
	---	17.1	72.2	10.8	4.1	80.4	1.2	3.0	.5	7,780	14,010
	---	19.1	80.9	---	4.6	90.1	1.4	3.4	.6	8,720	15,700
w192729	2.0	17.2	77.0	3.8	4.7	85.4	1.3	4.1	.6	8,290	14,920
	---	17.6	78.6	3.9	4.6	87.1	1.3	2.4	.6	8,460	15,220
	---	18.3	81.7	---	4.8	90.7	1.4	2.5	.6	8,800	15,840
w192730	.9	12.8	60.3	26.0	3.4	66.1	.8	3.3	.4	6,250	11,260
	---	12.9	60.8	26.2	3.3	66.7	.8	2.5	.4	6,310	11,360
	---	17.5	82.5	---	4.5	90.4	1.1	3.4	.5	8,560	15,400
w192731	1.6	17.4	75.2	5.8	4.5	83.2	1.2	4.8	.5	8,090	14,570
	---	17.7	76.4	5.9	4.4	84.6	1.2	3.4	.5	8,230	14,810
	---	18.8	81.2	---	4.7	89.8	1.3	3.6	.5	8,740	15,730
w192733	1.5	17.3	74.4	6.8	4.4	82.6	1.2	4.5	.5	7,960	14,330
	---	17.6	75.5	6.9	4.3	83.9	1.2	3.2	.5	8,080	14,550
	---	18.9	81.1	---	4.6	90.1	1.3	3.5	.5	8,680	15,630
w192734	2.0	17.0	76.5	4.5	4.5	84.8	1.3	4.4	.5	8,180	14,720
	---	17.3	78.1	4.6	4.4	86.5	1.3	2.7	.5	8,340	15,020
	---	18.2	81.8	---	4.6	90.7	1.4	2.8	.5	8,750	15,740
w192735	1.9	17.1	75.1	5.9	4.5	83.3	1.2	4.6	.5	8,040	14,470
	---	17.4	76.6	6.0	4.4	84.9	1.2	3.0	.5	8,190	14,750
	---	18.5	81.5	---	4.7	90.3	1.3	3.2	.5	8,720	15,690
w192736	2.5	36.0	55.3	6.2	5.5	75.7	1.1	8.3	3.2	7,640	13,760
	---	36.9	56.7	6.4	5.4	77.6	1.1	6.2	3.3	7,840	14,110
	---	39.4	60.6	---	5.7	82.9	1.2	6.7	3.5	8,370	15,070
w192737	2.3	33.1	48.4	16.2	5.2	67.4	1.0	8.4	1.8	6,760	12,160
	---	33.9	49.5	16.6	5.1	69.0	1.0	6.5	1.8	6,910	12,450
	---	40.6	59.4	---	6.1	82.7	1.2	7.8	2.2	8,290	14,920

Table 7e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 167 coal samples from West Virginia.

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w192726	0.0	0.00	0.00	0.00	4.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192727	.0	.00	.00	.00	3.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192728	.0	.00	.00	.00	8.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192729	.0	.00	.00	.00	9.0	1,465	1,520	1,540
	---	.00	.00	.00				
	---	.00	.00	.00				
w192730	.0	.00	.00	.00	1.0	1,540	1,540	1,540
	---	.00	.00	.00				
	---	.00	.00	.00				
w192731	.0	.00	.00	.00	9.0	1,540	0	0
	---	.00	.00	.00				
	---	.00	.00	.00				
w192733	.0	.00	.00	.00	7.0	1,255	1,320	1,365
	---	.00	.00	.00				
	---	.00	.00	.00				
w192734	.0	.00	.00	.00	9.0	1,190	1,245	1,315
	---	.00	.00	.00				
	---	.00	.00	.00				
w192735	.0	.00	.00	.00	7.5	1,315	1,370	1,435
	---	.00	.00	.00				
	---	.00	.00	.00				
w192736	.0	.00	.00	.00	6.5	1,100	1,140	1,170
	---	.00	.00	.00				
	---	.00	.00	.00				
w192737	.0	.00	.00	.00	6.0	1,430	1,480	1,535
	---	.00	.00	.00				
	---	.00	.00	.00				

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.
[Values in percent or parts-per-million. Coal ashed at 525°C. L. means less than the value shown; N, not detected; B, not determined; S after element title indicates determinations by automatic plate reading computer assisted, emission spectrographic analyses. The standard deviation of any single answer should be taken as plus 50% and minus 35%. Methods of analyses for other elements as shown in figure.]

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w189252	9.4	55	26	0.63	0.53	0.71	2.2	4.5	1.4	1.0L	w189252
w189253	15.4	54	25	.39	.71	.38	2.5	6.0	1.1	1.0L	w189253
w189254	4.8	48	34	1.2	.58	1.2	1.2	2.6	1.6	1.0L	w189254
w189255	6.8	47	23	4.6	1.1	1.4	.89	2.2	1.6	1.0L	w189255
w189256	7.0	51	30	.44	.55	1.5	3.0	2.2	1.1	1.0L	w189256
w189257	4.0	38	25	.99	.51	1.3	.96	2.2	1.4	1.0L	w189257
w189258	12.4	56	25	.60	.94	.85	3.2	4.4	1.2	1.0L	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	8.8	36	18	.70	.91	.40	2.1	12	.94	1.0L	w189260
w189261	9.6	51	25	.92	.51	.54	2.1	7.8	1.3	1.0L	w189261
w189280	16.2	49	24	1.9	1.2	.77	2.4	18	1.0	.20	w189280
w189281	11.1	32	19	1.9	1.0	.92	1.6	40	.90	.50	w189281
w189282	8.2	48	23	3.0	1.6	1.0	2.4	16	1.2	.04	w189282
w189283	22.4	45	24	3.1	1.1	1.5	1.2	19	1.1	.60	w189283
w189284	8.8	48	26	2.2	1.1	1.1	1.7	17	1.2	.20	w189284
w189285	9.2	41	24	5.3	.93	.89	1.2	15	1.2	.80	w189285
w189286	10.6	45	31	1.7	.81	1.1	1.9	16	1.1	.50	w189286
w189287	10.7	52	26	1.4	1.5	1.3	3.1	12	1.4	.05	w189287
w189288	15.1	52	26	.50	1.0	1.1	2.7	14	1.3	.10	w189288
w189289	17.3	56	28	.90	2.0	1.1	4.0	5.5	1.3	.04	w189289
w189290	16.4	65	25	.50	.61	.78	1.5	3.3	1.4	.04	w189290
w189291	19.6	58	28	.50	1.3	.98	3.9	4.6	1.8	.03	w189291
w189292	10.0	57	30	.80	1.5	1.9	2.1	4.1	1.9	.05	w189292
w189293	4.2	49	27	3.2	2.0	2.4	2.2	6.7	1.5	.05	w189293
w189294	5.5	50	29	1.7	1.1	2.4	3.3	6.0	1.3	.09	w189294
w189295	9.0	46	26	1.2	1.2	1.2	1.7	18	1.3	.05	w189295
w189296	19.0	51	36	.80	1.6	2.0	3.0	3.2	1.4	.05	w189296
w189297	9.7	52	25	1.5	1.4	1.0	3.0	10	1.4	.08	w189297
w189336	7.7	40	22	6.0	1.6	2.6	2.3	6.4	.95	1.0L	w189336
w189337	9.6	49	25	.92	.68	.93	1.5	6.6	1.7	1.0L	w189337
w189338	9.5	60	26	.58	.55	1.2	1.4	2.7	1.6	1.0L	w189338
w189339	6.6	59	28	.69	.75	1.3	1.6	2.8	1.3	1.0L	w189339
w189340	18.4	68	19	.21	.86	1.0	3.1	1.9	1.1	1.0L	w189340
w189341	9.4	50	32	.67	1.0	.93	3.3	1.8	1.2	1.0L	w189341
w189342	8.4	50	40	.62	.37	.36	.83	1.3	.65	1.0L	w189342
w189343	7.2	52	31	.60	.66	1.6	3.0	2.0	1.5	1.0L	w189343
w189344	5.8	55	25	.86	.60	2.0	1.1	4.9	2.9	1.0L	w189344
w189345	16.0	57	27	.34	1.1	.79	3.7	2.5	1.4	1.0L	w189345
w189346	4.8	47	29	1.2	.94	1.6	2.4	5.7	1.6	1.0L	w189346
w189347	3.8	52	26	1.8	.63	1.8	1.1	4.6	2.2	1.0L	w189347

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w189252	0.79	1.0	170	840	80	5L	0.48	190	83	160	w189252
w189253	.63	1.1	150	890	20	5L	.74	190	100	160	w189253
w189254	1.6	1.3	270	1,700	68	5L	.92	380	300	280	w189254
w189255	7.6	.46L	280	1,700	14	5L	.12	210	24	160	w189255
w189256	.49	.61	320	1,600	21	5L	.64	290	84	170	w189256
w189257	1.1	.66	260	1,500	72	5L	.72	400	660	190	w189257
w189258	1.2	.46L	190	2,100G	45	5L	.48	170	60	120	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w139260	1.1	.84	180	960	23	7	.52	220	57	180	w189260
w189261	1.4	.57	290	860	37	5L	.16	150	24	130	w189261
w189280	2.6	.38	270	890	16	40L	.56	130	22	120	w189280
w189281	3.6	.46	800	1,000	8.9	40L	.42	90	18	99	w189281
w189282	3.8	.18L	350	760	47	40L	.26	130	82	120	w189282
w189283	2.9	.29	360	1,000	24	40L	.42	130	23	140	w189283
w189284	2.6	.42	550	1,300	24	40L	.74	140	34	160	w189284
w189285	5.7	.35	580	1,500	11	40L	.68	130	27	140	w189285
w189286	2.1	.51	130	580	17	40L	.50	310	58	180	w189286
w189287	2.4	.18L	350	800	40	40L	.54	150	52	140	w189287
w189288	1.2	.35	350	820	14	40L	.60	150	30	150	w189288
w189289	1.9	.44	250	1,000	35	40L	.54	140	33	120	w189289
w189290	1.1	.40	240	510	31	40L	.44	160	87	160	w189290
w189291	1.2	.36	140	890	35	40L	.44	180	37	160	w189291
w189292	1.7	.42	160	1,600	27	40L	.22	210	46	150	w189292
w189293	5.4	.67	270	2,000	160	40L	.54	210	98	450	w189293
w189294	4.5	.86	270	3,500	130	40L	.34	240	89	150	w189294
w189295	3.0	.58	240	840	46	40L	.49	89	26	73	w189295
w189296	1.7	.36	250	800	27	40L	.36	84	25	71	w189296
w189297	2.4	.18L	380	860	46	40L	.34	160	57	150	w189297
w189336	8.8	2.2	340	1,600	17	5L	2.7	140	240	220	w189336
w189337	1.0	.62	240	480	30	5L	.70	230	64	1,400	w189337
w189338	.58	.50	290	380	74	5L	1.7	230	74	220	w189338
w189339	.70	.50	85	510	82	5L	.72	170	120	160	w189339
w189340	.20L	.46L	64	640	19	5L	.30	140	23	110	w189340
w189341	.57	.86	100	1,200	260	5L	.82	140	200	220	w189341
w189342	.51	.46L	59	400	60	5L	.48	130	74	240	w189342
w189343	.51	.55	110	870	96	5L	.74	210	39	170	w189343
w189344	1.4	.52	190	2,100G	45	5L	.74	310	180	240	w189344
w189345	.27	.46L	100	1,500	11	5L	.12	140	25	150	w189345
w189346	1.6	.91	210	2,000	48	5L	1.1	250	130	210	w189346
w189347	2.5	1.3	230	2,300	71	5L	1.2	290	120	250	w189347

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w189252	9.6	220	39	21	3.7	100	22L	17	9.6	10	w189252
w189253	12	300	15L	14	3.4	62	22L	26	7.1	15L	w189253
w189254	6.3	530	51	34	8.8	110	22L	73	13	14	w189254
w189255	4.4	84	20	13	3.7	51	22L	3.2L	8.8	7.4	w189255
w189256	10	180	34	23	6.0	98	22L	7.5	7.1	9.6	w189256
w189257	15L	390	53	31	8.0	240	22L	220	13	13	w189257
w189258	10	160	46L	18	3.2	94	22L	34	7.3	11	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	9.1	220	15L	16	3.2	75	22L	14	6.8	32L	w189260
w189261	10	110	51	18	2.2	92	22L	31	7.3	12	w189261
w189280	8.0	59	58L	18L	2.2	42	17	16	6.2	12L	w189280
w189281	7.2	45	58L	18L	1.7	36	22	29	5.4	12L	w189281
w189282	11	150	58L	18L	3.0	67	20	17	6.1	12L	w189282
w189283	7.1	91	58L	18L	2.4	49	20	14	5.8	12L	w189283
w189284	9.1	88	58L	18L	2.2	60	12L	18	6.8	12L	w189284
w189285	5.4	70	58L	18L	1.8	51	12L	11	6.5	12L	w189285
w189286	8.5	90	58L	18L	4.3	55	20	8.4L	6.6	12L	w189286
w189287	16	120	58L	18L	3.0	66	12L	8.4L	7.5	12L	w189287
w189288	12	72	58L	18L	2.2	60	12L	8.4L	6.6	12L	w189288
w189289	12	120	58L	18L	2.2	64	12L	8.4L	5.2	12L	w189289
w189290	3.0	150	58L	18L	3.7	71	12L	8.4L	7.3	12L	w189290
w189291	12	120	58L	18L	2.4	60	12L	8.4L	8.7	12L	w189291
w189292	9.0	150	58L	18L	3.1	56	12L	24	10	12L	w189292
w189293	9.5	240	58L	18L	4.0	100	22	18	7.1	12L	w189293
w189294	9.1	170	58L	18L	4.9	98	22	8.4L	7.3	12L	w189294
w189295	4.4	120	58L	18L	2.9	51	20	8.4L	3.3	12L	w189295
w189296	6.3	130	58L	18L	1.8	86	12L	8.4L	2.6	12L	w189296
w189297	19	120	58L	18L	2.9	66	13	8.4L	7.2	12L	w189297
w189336	5.2	300	15L	7.4	3.2	53	15L	4.0	5.2	15L	w189336
w189337	4.2	200	15L	5.4	3.5	75	22L	31	10	3.2L	w189337
w189338	11	140	22	7.7	4.5	56	22L	19	9.5	7.7	w189338
w189339	7.6	400	18	13	3.5	38	22L	15	7.6	4.9	w189339
w189340	15	74	15L	7.2	2.6	31	22L	3.2L	5.4	15L	w189340
w189341	15	250	50	35	5.9	420	22L	320	5.3	15	w189341
w189342	3.6	320	23	23	5.2	94	22L	160	4.8	8.0	w189342
w189343	5.6	240	24	12	4.3	120	22L	23	9.7	6.7	w189343
w189344	6.9	270	15L	12	5.3	45	22L	7.0	19	3.2L	w189344
w189345	19	100	17	6.9	2.5	33	22L	3.8	6.3	5.7	w189345
w189346	10	340	15L	8.9	4.0	94	22L	30	15	3.2L	w189346
w189347	5.3	340	15L	16	5.3	95	22L	100	13	11	w189347

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Sample number
w189252	6.8L	110	160	2	130	14	21	100L	200	84	w189252
w189253	6.8L	91	150	1	170	9.1	15	100L	220	86	w189253
w189254	6.8L	170	190	4	86	13	31	160	460	160	w189254
w189255	6.8L	120	160	1	280	4.5	15	76	67	49	w189255
w189256	6.8L	130	190	3	79	22	19	160	310	73	w189256
w189257	6.8L	180	170	3	79	16	39	190	760	150	w189257
w189258	6.8L	81	93	2	250	12	17	100L	150	67	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	6.8L	80	120	1	180	16	18	100L	210	69	w189260
w189261	6.8L	73	130	1	150	12	50	100L	72	46	w189261
w189280	27L	68	100	1	620	24	24	120	76	30	w189280
w189281	580L	45	82	.9	220	35	20	110	58	26	w189281
w189282	27L	73	120	1	3,500	20	20	84L	160	50	w189282
w189283	27L	67	300	.9	400	13	15	120	67	36	w189283
w189284	27L	68	140	1	290	9.1	17	130	76	33	w189284
w189285	27L	65	130	1	290	11	11	84L	60	35	w189285
w189286	27L	160	160	.9	110	16	15	120	100	44	w189286
w189287	27L	75	110	.9	1,700	15	17	100	110	36	w189287
w189288	27L	73	110	.7	180	10	20	84L	87	29	w189288
w189289	27L	87	110	1	460	7.5	12	130	89	51	w189289
w189290	27L	73	160	2	86	17	24	96	150	65	w189290
w189291	27L	97	180	2	78	6.0	22	100	93	51	w189291
w189292	27L	120	130	2	150	4.0L	18	120	98	71	w189292
w189293	27L	95	95	2	380	8.7	24	130	150	48	w189293
w189294	27L	110	130	2	250	8.0	15	240	160	45	w189294
w189295	27L	11	160	1	200	15	22	130	110	38	w189295
w189296	27L	42	120	1	250	20	20	110	100	37	w189296
w189297	27L	82	120	1	1,500	16	13	110	130	33	w189297
w189336	6.8L	78	85	1	160	15	15L	68L	250	59	w189336
w189337	6.8L	130	230	1	74	5.6	15L	68L	150	100	w189337
w189338	6.8L	130	100	1	53	7.4	20	68L	140	59	w189338
w189339	6.8L	110	160	2	47	2.2L	15L	68L	170	56	w189339
w189340	6.8L	76	100	1	64	2.2L	15L	68L	47	46	w189340
w189341	6.8L	74	160	4	73	3.0	18	100	360	100	w189341
w189342	6.8L	48	450	4	57	2.2L	15L	68L	76	71	w189342
w189343	6.8L	140	160	1	50	2.2L	15L	68L	79	69	w189343
w189344	6.8L	190	120	2	74	6.7	24	68L	180	69	w189344
w189345	6.8L	81	170	1	56	2.2L	15L	68L	59	63	w189345
w189346	6.8L	170	150	2	89	6.5	15L	68L	150	88	w189346
w189347	6.8L	180	110	3	90	14	21	68L	140	100	w189347

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Sample number
w189252	16	310L	10L	37	17	15L	630	2.1	45	4.6L	w189252
w189253	16	230	10L	36	17	15L	560	1.9	56	25	w189253
w189254	30	630L	10L	67	38	15L	4,200	4.2	110	4.6L	w189254
w189255	19	460L	10L	32	16	15L	1,500	1.5	44L	4.6L	w189255
w189256	21	430L	10L	49	27	15L	1,600	4.3	63	4.6L	w189256
w189257	35	630L	22L	73	35	15L	3,300	5.0	75L	4.6L	w189257
w189258	19	190	10L	33	15	15L	1,200	2.4	24L	4.6L	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	18	310L	10L	30	13	15L	930	6.8L	90	68	w189260
w189261	20	340L	10L	29	11	15L	860	2.1	110	4.6L	w189261
w189280	120L	200	18L	23	11	14	800	1.6	25	18L	w189280
w189281	120L	210	18L	19	7.2	14	1,300	1.8	27L	18L	w189281
w189282	120L	230	18L	28	13	13	1,100	2.4	46	18L	w189282
w189283	120L	160	18L	25	10	14	1,500	2.2	23	18L	w189283
w189284	120L	190	18L	40	11	12L	1,200	1.1	34L	18L	w189284
w189285	120L	170	18L	27	11	20	2,200	2.2	33L	18L	w189285
w189286	120L	130	18L	37	20	12L	1,100	2.8	28L	18L	w189286
w189287	120L	260	18L	28	11	12L	760	1.9	28L	18L	w189287
w189288	120L	200	18L	32	9.9	12L	580	1.3	20L	18L	w189288
w189289	120L	170	18L	25	13	12L	550	1.7	17L	18L	w189289
w189290	120L	130	18L	38	16	12L	600	3.0	18L	18L	w189290
w189291	120L	150	18L	34	14	12L	530	2.0	40	18L	w189291
w189292	120L	210	18L	30	17	15	1,100	2.0	30L	18L	w189292
w189293	120L	430	18L	48	19	18	2,900	4.8	71L	18L	w189293
w189294	120L	350	18L	36	25	16	1,800	3.6	55L	18L	w189294
w189295	120L	22	18L	14	1.1	12L	1,300	2.2	33L	18L	w189295
w189296	120L	130	18L	16	9.5	12L	1,100	1.1	21L	18L	w189296
w189297	120L	260	18L	30	14	12L	870	1.0	31	18L	w189297
w189336	13	640L	10L	39	16	15L	1,500	2.6	39L	4.6L	w189336
w189337	12	390L	10L	45	18	15L	450	3.1	44	4.6L	w189337
w189338	16	350L	10L	42	20	15L	370	3.2	47	4.6L	w189338
w189339	11	480L	10L	30	18	15L	500	3.0	45L	4.6L	w189339
w189340	10L	290L	10L	23	14	15L	150	1.6	27	4.6L	w189340
w189341	13	360L	10L	55	22	15L	510	6.4	42	4.6L	w189341
w189342	10L	300L	10L	65	25	15L	320	6.0	36L	4.6L	w189342
w189343	14	440L	10L	36	21	15L	420	2.8	42L	4.6L	w189343
w189344	15	590L	10L	43	28	15L	610	3.4	59	4.6L	w189344
w189345	10L	190	10L	30	14	15L	280	1.9	30	4.6L	w189345
w189346	13	650L	10L	42	25	15L	2,000	4.2	63L	4.6L	w189346
w189347	19	680L	10L	58	26	15L	2,100L	5.3	79L	4.6L	w189347

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Tm (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w189252	3.2L	16	310	140	9.6	140	420	w189252
w189253	3.2L	16	350	100	7.1	300	320	w189253
w189254	4.7	29	470	240	19	270	700	w189254
w189255	3.7	14	180	83	4.4	25	310	w189255
w189256	4.9	22	370	170	13	310	460	w189256
w189257	5.3	27	280	220	18	350	790	w189257
w189258	3.2L	13	310	150	9.7	100	420	w189258
w189259	B	B	B	B	B	B	B	w189259
w189260	4.4	13	240	98	4.5	170	360	w189260
w189261	3.2L	6.7	240	160	7.3	43	840	w189261
w189280	8.4L	11	200	67	5.6	130	350	w189280
w189281	8.4L	5.7	130	49	3.6	120	220	w189281
w189282	8.4L	7.7	180	110	9.8	130	240	w189282
w189283	8.4L	8.9	170	56	5.8	57	160	w189283
w189284	8.4L	7.0	200	60	8.0	140	160	w189284
w189285	8.4L	6.2	150	33	5.4	180	120	w189285
w189286	8.4L	6.9	240	53	7.5	96	170	w189286
w189287	8.4L	6.8	170	60	8.4	120	130	w189287
w189288	8.4L	7.4	200	36	6.0	160	240	w189288
w189289	8.4L	11	220	49	6.4	140	130	w189289
w189290	8.4L	16	240	93	12	54	290	w189290
w189291	8.4L	12	240	78	9.2	54	240	w189291
w189292	8.4L	13	170	75	10	46	180	w189292
w189293	8.4L	13	240	170	17	60	290	w189293
w189294	8.4L	10	240	150	13	96	180	w189294
w189295	8.4L	8.3	180	62	4.4	77	220	w189295
w189296	8.4L	6.3	250	95	4.2	91	140	w189296
w189297	8.4L	8.2	170	60	9.3	130	110	w189297
w189336	3.2L	11	190	58	6.5	1,400	85	w189336
w189337	3.2L	18	190	52	7.3	64	92	w189337
w189338	3.2L	12	190	82	6.3	40	420	w189338
w189339	3.2L	8.0	140	73	6.1	100	180	w189339
w189340	3.2L	5.9	110	41	4.3	130	130	w189340
w189341	6.7	14	570	240	24	180	440	w189341
w189342	3.2L	16	390	160	17	53	130	w189342
w189343	3.2L	11	150	81	8.3	82	98	w189343
w189344	3.2L	17	130	110	12	240	290	w189344
w189345	3.2L	13	150	56	5.6	44	200	w189345
w189346	3.2L	15	200	80	10	160	120	w189346
w189347	3.2L	27	220	140	11	140	380	w189347

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w189348	7.7	56	24	2.6	1.1	1.4	2.1	3.0	1.5	1.0L	w189348
w189349	16.0	55	23	2.7	1.4	.90	2.1	2.9	1.5	1.0L	w189349
w190604	11.4	61	28	.60	.66	.20	1.4	4.6	1.5	.03	w190604
w190605	9.9	62	29	.60	.45	.54	.80	3.8	1.9	.06	w190605
w190606	8.3	52	36	2.5	.96	.77	2.9	2.2	1.7	.60	w190606
w190607	24.1	54	36	1.2	.76	.28	2.0	1.8	2.1	.70	w190607
w190608	11.5	58	34	.70	.56	.90	1.4	1.4	2.3	.30	w190608
w190609	11.8	60	33	.70	.58	.20	1.5	1.2	2.4	.09	w190609
w190610	8.5	56	35	1.1	.68	.77	1.2	3.0	2.2	.09	w190610
w190611	13.4	56	34	.70	.65	.61	1.5	2.5	2.5	.10	w190611
w190612	12.9	43	29	1.2	.66	.70	1.6	21	2.2	.10	w190612
w190613	7.6	54	34	1.3	.90	.71	1.5	4.0	3.4	.10	w190613
w190614	25.8	45	42	2.1	1.1	1.0	1.8	3.4	1.7	1.6	w190614
w190615	10.9	59	32	.80	1.0	.96	2.8	2.7	1.7	.20	w190615
w190616	9.0	52	37	.70	.78	.50	2.5	3.8	1.3	.10	w190616
w190617	3.3	51	34	1.3	.55	2.0	.60	6.3	3.2	.10	w190617
w190618	8.9	58	33	.70	.94	1.3	2.1	2.9	1.8	.10	w190618
w190619	4.5	50	27	1.6	.66	1.2	.80	15	2.5	.30	w190619
w190620	7.1	51	37	1.5	.80	.88	2.1	4.2	1.8	.50	w190620
w190621	7.2	55	35	.80	.61	.74	1.4	2.8	2.5	1.4	w190621
w190622	7.3	57	28	3.7	1.7	.58	1.0	2.8	1.4	.05	w190622
w190623	5.6	52	32	1.4	1.2	.63	2.7	2.3	1.2	.06	w190623
w190624	10.1	60	31	1.5	.73	.90	1.0	1.9	2.4	.20	w190624
w190625	3.2	52	29	3.3	1.4	1.5	1.7	7.2	1.4	.10	w190625
w190626	5.6	49	28	1.0	.56	1.3	.75	9.5	2.1	.07	w190626
w190627	13.9	55	27	.30	.46	.61	.90	.6	2.2	.10	w190627
w190628	8.5	52	33	1.7	.50	.34	1.2	4.2	1.8	.09	w190628
w190629	5.3	48	30	4.0	1.2	1.1	1.3	8.8	1.5	.10	w190629
w190630	7.2	48	29	4.8	.85	.69	1.6	6.8	1.5	.10	w190630
w190631	26.4	48	34	1.8	.66	.62	1.1	11	1.4	.30	w190631
w190632	9.2	56	34	.70	.91	.89	1.7	4.6	1.1	.20	w190632
w190633	13.8	65	31	.30	.35	.26	1.1	.8	2.6	.06	w190633
w190634	3.9	41	34	2.2	1.3	1.0	2.1	10	1.0	.10	w190634
w190635	9.0	53	33	1.5	1.1	.54	2.5	3.6	1.6	1.6	w190635
w190636	7.3	38	25	2.0	.93	.63	1.8	21	.90	.05	w190636
w190637	11.3	56	30	.70	1.1	.54	3.3	4.1	1.7	.10	w190637
w190638	11.9	54	29	.80	1.3	.73	3.2	4.7	1.6	.20	w190638
w190639	7.8	53	32	1.6	1.3	1.3	2.4	6.8	1.3	.07	w190639
w190640	13.5	57	31	.80	3.3	2.4	3.1	5.0	1.8	.07	w190640
w190641	9.9	56	29	.80	.50	.66	2.7	8.0	1.7	.07	w190641

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w189348	3.4	0.49	160	2,100G	32	5L	0.48	180	73	160	w189348
w189349	3.5	.60	110	1,000	8.1	5L	.82	88	21	100	w189349
w190604	1.0	.63	100	560	27	31L	.60	160	45	120	w190604
w190605	1.2	.46	130	330	29	31L	.54	200	65	170	w190605
w190606	1.9	.31	210	730	19	31L	.54	400	120	380	w190606
w190607	1.0	.26	170	600	14	31L	.14	160	18	200	w190607
w190608	1.4	.40	240	430	40	31L	.32	210	72	200	w190608
w190609	1.3	.40	190	470	23	31L	.24	210	130	190	w190609
w190610	1.9	.46	410	570	20	31L	.46	210	75	190	w190610
w190611	.01	.34	290	540	12	31L	.44	200	31	190	w190611
w190612	2.6	.41	260	400	24	31L	.50	220	30	160	w190612
w190613	1.1	.34	330	530	54	31L	.58	280	86	200	w190613
w190614	2.5	.49	840	1,400	16	31L	1.0	70	41	60	w190614
w190615	1.5	.53	310	790	30	31L	.95	180	44	160	w190615
w190616	1.5	.69	140	820	47	31L	1.4	220	130	190	w190616
w190617	2.6	.77	490	840	73	31L	1.2	300	64	240	w190617
w190618	1.4	.57	210	690	29	31L	.56	210	60	190	w190618
w190619	3.1	.54	510	840	41	31L	.76	330	49	290	w190619
w190620	1.7	.36	270	600	14	31L	.95	280	58	190	w190620
w190621	1.6	.54	190	470	31	31L	.68	280	120	210	w190621
w190622	3.6	.51	310	930	41	31L	.30	180	180	180	w190622
w190623	2.6	.60	390	1,200	47	31L	1.1	180	130	180	w190623
w190624	1.9	.46	220	800	35	31L	.62	210	18	170	w190624
w190625	4.9	.69	490	1,200	100	31L	.84	310	100	210	w190625
w190626	B	.59	290	800	31	31L	.98	250	25	160	w190626
w190627	1.0	.29	150	480	14	31L	.70	210	16	190	w190627
w190628	2.0	.50	200	670	56	31L	.60	240	47	270	w190628
w190629	5.9	.90	390	870	29	31L	1.1	170	43	130	w190629
w190630	5.7	.63	270	760	56	31L	.76	150	56	160	w190630
w190631	3.2	.60	310	760	31	31L	.76	53	11	41	w190631
w190632	1.7	.57	250	660	22	31L	1.0	240	130	190	w190632
w190633	.70	.22	140	410	13	31L	.40	170	46	140	w190633
w190634	4.0	.99	480	1,100	120	31L	1.8	230	590	230	w190634
w190635	2.6	.14L	220	800	24	31L	.32	78	70	140	w190635
w190636	2.5	.66	340	730	78	31L	.90	190	64	130	w190636
w190637	1.2	.20	310	700	7.6	31L	.12	180	42	180	w190637
w190638	1.4	.14L	320	670	7.8	31L	.22	150	48	160	w190638
w190639	2.9	.39	270	950	36	31L	.60	150	73	140	w190639
w190640	1.6	.14L	150	500	8.5	31L	.24	150	32	140	w190640
w190641	1.6	.14L	200	640	7.0	31L	.28	160	37	160	w190641

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w189348	6.5	150	15L	10	3.1	40	22L	12	9.1	3.2L	w189348
w189349	6.9	130	15L	4.6L	1.9	54	22L	4.5	3.1	3.2L	w189349
w190604	6.1	160	46L	14L	2.5	47	10	6.6L	7.0	9.7L	w190604
w190605	3.0	150	46L	14L	2.9	69	9.7L	16	8.1	9.7L	w190605
w190606	18	110	46L	14L	6.3	63	9.7L	6.6L	16	9.7L	w190606
w190607	7.5	100	46L	14L	2.0	50	9.7L	6.6L	8.7	9.7L	w190607
w190608	5.2	160	46L	14L	3.4	69	9.7L	11	9.6	9.7L	w190608
w190609	5.1	150	46L	14L	3.5	57	9.7L	6.6L	10	9.7L	w190609
w190610	3.5	190	46L	14L	3.1	57	11	6.6L	11	9.7L	w190610
w190611	3.7	130	46L	14L	3.4	51	9.7L	6.6L	12	9.7L	w190611
w190612	6.2	240	46L	14L	3.4	66	9.7L	6.6L	9.3	9.7L	w190612
w190613	5.3	260	46L	19	4.3	83	17	26	16	9.7L	w190613
w190614	1.9	190	46L	14L	1.1	160	11	17	2.3	9.7L	w190614
w190615	8.3	190	46L	14L	2.8	51	9.7L	14	8.3	9.7L	w190615
w190616	5.6	280	46L	14L	4.2	99	13	39	6.7	9.7L	w190616
w190617	15L	300	46L	14L	5.2	92	11	6.6L	15	9.7L	w190617
w190618	11	160	46L	14L	3.6	76	9.7L	6.6L	10	9.7L	w190618
w190619	4.4	240	46L	14	6.2	63	14	7.7	16	9.7L	w190619
w190620	4.2	200	46L	14L	4.6	67	9.7L	6.6L	9.9	9.7L	w190620
w190621	5.6	190	46L	14L	4.4	49	9.7L	6.6L	11	9.7L	w190621
w190622	4.1	160	46L	14L	4.1	73	9.7L	6.6L	6.8	9.7L	w190622
w190623	11	250	40	19	4.6	130	20	16	5.4	9.7L	w190623
w190624	5.0	180	45L	14L	3.4	64	17	17	11	9.5L	w190624
w190625	16L	240	45L	14L	5.6	110	15	31	9.4	9.5L	w190625
w190626	8.9L	260	45L	14L	3.9	57	14	8.8	8.9	9.5L	w190626
w190627	3.6	170	45L	14L	3.0	56	9.5L	6.4L	12	9.5L	w190627
w190628	3.5	340	45L	20	4.8	83	28	59	11	9.5L	w190628
w190629	3.8	280	45L	14L	2.6	66	14	29	5.7	9.5L	w190629
w190630	2.8	290	45L	15	2.6	88	18	8.1	8.3	9.5L	w190630
w190631	.8	340	45L	14L	.95	90	13	42	1.5	9.5L	w190631
w190632	15	180	45L	14L	5.4	63	17	17	17	9.5L	w190632
w190633	5.8	140	45L	14L	2.3	45	9.5L	6.4L	9.4	9.5L	w190633
w190634	7.7	320	45L	14L	6.2	130	20	49	38	9.5L	w190634
w190635	8.9	140	45L	14L	3.4	76	15	6.4L	21	9.5L	w190635
w190636	8.2	160	45L	14L	3.7	140	9.5L	8.1	26	9.5L	w190636
w190637	18	90	45L	14L	2.9	55	9.5L	6.4L	14	9.5L	w190637
w190638	14	88	45L	14L	2.6	60	9.5L	8.8	14	9.5L	w190638
w190639	7.7	200	45L	14	3.3	84	9.5L	46	21	9.5L	w190639
w190640	12	100	45L	14L	2.8	60	11	6.4L	14	9.5L	w190640
w190641	10	110	45L	14L	2.6	53	10	6.4L	19	9.5L	w190641

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Sample number
w189348	6.8L	100	110	1	100	2.2L	15L	68L	150	60	w189348
w189349	6.8L	50	140	1	150	8.4	15L	68L	61	42	w189349
w190604	21L	88	180	.9	50	12	21	120	89	61	w190604
w190605	21L	100	160	1	59	7.4	30	74	130	88	w190605
w190606	21L	240	210	2	110	8.2	14	110	100	66	w190606
w190607	21L	100	320	.8	110	3.9	43	79	61	79	w190607
w190608	21L	130	160	2	100	6.7	21	84	89	76	w190608
w190609	21L	130	140	2	67	6.0	34	120	160	83	w190609
w190610	21L	120	190	1	160	17	37	110	170	60	w190610
w190611	21L	120	220	1	61	12	51	140	80	66	w190611
w190612	21L	130	310	2	86	11	23	90	66	73	w190612
w190613	21L	170	230	3	50	12	83	190	110	84	w190613
w190614	21L	47	160	.4	73	20	21	120	270	96	w190614
w190615	21L	100	130	2	57	14	33	110	84	76	w190615
w190616	21L	120	240	2	70	16	27	120	200	100	w190616
w190617	21L	180	160	3	63	14	30	66L	97	95	w190617
w190618	21L	120	190	2	160	6.7	23	110	130	57	w190618
w190619	21L	180	220	2	160	19	29	110	70	68	w190619
w190620	21L	180	180	1	100	14	10	89	120	120	w190620
w190621	21L	150	210	1	73	9.3	36	110	170	65	w190621
w190622	21L	96	150	1	64	13	17	66L	230	66	w190622
w190623	21L	89	230	2	160	34	29	140	190	110	w190623
w190624	21L	120	230	2	81	4.6	34	140	57	75	w190624
w190625	21L	160	200	3	290	18	21	80	140	92	w190625
w190626	21L	130	200	2	85	12	31	110	67	65	w190626
w190627	21L	130	190	1	63	6.2	59	97	42	76	w190627
w190628	21L	120	280	2	73	8.7	46	150	100	140	w190628
w190629	21L	94	150	2	250	22	15	64L	110	76	w190629
w190630	21L	97	200	1	200	22	36	64L	130	81	w190630
w190631	21L	34	240	.4	64	21	21	130	110	110	w190631
w190632	21L	120	150	1	570	25	13	120	180	54	w190632
w190633	21L	120	130	1	66	5.2	43	110	81	74	w190633
w190634	21L	77	220	3	1,200	94	27	170	560	160	w190634
w190635	21L	89	240	1	800	8.1	27	130	130	51	w190635
w190636	21L	7	190	1	170	12	7	110	97	42	w190636
w190637	21L	71	260	.9	390	3.6	18	100	63	43	w190637
w190638	21L	67	230	.8	480	4.5	15	84	64	39	w190638
w190639	21L	64	160	1	130	14	10	100	150	62	w190639
w190640	21L	59	220	.7	1,200	3.1L	24	97	59	42	w190640
w190641	21L	81	160	1	850	6.3	34	110	74	43	w190641

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Sample number
w189348	11	440L	10L	32	17	15L	840	2.6	39	4.6L	w189348
w189349	10L	230L	10L	20	10	15L	240	1.9	32	4.6L	w189349
w190604	97L	140L	14L	27	17	9.7L	530	2.6	37	14L	w190604
w190605	97L	150L	14L	36	17	9.7L	400	3.0	42	14L	w190605
w190606	97L	280	14L	81	35	9.7L	1,100	3.6	76	14L	w190606
w190607	97L	110	14L	34	12	9.7L	920	1.7	31	14L	w190607
w190608	97L	140L	14L	43	18	13	490	2.6	60	14L	w190608
w190609	97L	140L	14L	36	19	9.7L	440	1.7	25L	14L	w190609
w190610	97L	180L	14L	38	19	9.7L	830	2.4	35	14L	w190610
w190611	97L	130L	14L	40	17	9.7L	510	2.2	30	14L	w190611
w190612	97L	140L	14L	38	19	9.7L	410	2.3	41	14L	w190612
w190613	97	200L	14L	49	24	14	610	3.9	53	14L	w190613
w190614	97L	62L	14L	13	6.2	9.7L	5,600	1.2	12L	14L	w190614
w190615	97L	120	14L	38	17	9.7L	660	2.8	28	14L	w190615
w190616	97L	78	14L	5.6	24	9.7L	830	3.3	44	14L	w190616
w190617	97L	420L	14L	52	27	16	1,600	6.1	91L	19	w190617
w190618	97L	120	14L	1.1	20	9.7L	800	3.4	34	14L	w190618
w190619	97L	330L	14L	67	29	14	2,000	4.4	67L	14L	w190619
w190620	97L	210L	14L	45	25	9.7L	1,200	2.8	56	14L	w190620
w190621	97L	190L	14L	40	22	9.7L	460	2.8	62	14L	w190621
w190622	97L	180L	14L	42	19	9.7L	890	2.7	41L	14L	w190622
w190623	97L	270L	14L	54	21	9.7L	1,400	3.6	84	14L	w190623
w190624	95L	170L	14L	36	18	9.5L	760	3.0	30L	14L	w190624
w190625	95L	410L	14L	47	22	9.5L	2,400	3.1	94L	14L	w190625
w190626	95L	270L	14L	34	21	9.5L	1,300	3.6	54L	28	w190626
w190627	95L	120L	14L	37	16	9.5L	560	2.9	51	14L	w190627
w190628	95L	160L	14L	72	26	20	1,100	4.7	35L	14L	w190628
w190629	95L	230L	14L	36	15	9.5L	1,700	5.7	57L	14L	w190629
w190630	95L	170L	14L	35	14	9.5L	1,300	2.8	42L	15	w190630
w190631	95L	45L	14L	10	5.3	9.5L	1,700	.76	11L	14L	w190631
w190632	95L	510L	14L	50	24	9.5L	1,200	3.3	33L	14L	w190632
w190633	95L	370L	14L	31	17	9.5L	350	1.4	29	14L	w190633
w190634	95L	970L	14L	92	23	21	2,400	7.7	100	14L	w190634
w190635	95L	630L	14L	36	16	9.5L	1,100	2.2	42	14L	w190635
w190636	95L	710L	14L	34	15	9.5L	1,200	2.7	41L	29	w190636
w190637	95L	520L	14L	35	12	9.5L	870	2.7	35	14L	w190637
w190638	95L	480L	14L	32	13	13	910	1.7	25	14L	w190638
w190639	95L	770L	14L	38	14	9.5L	1,300	2.6	38L	14L	w190639
w190640	95L	320L	14L	30	11	9.5L	520	2.2	27	14L	w190640
w190641	95L	390L	14L	29	11	9.5L	830	2.0	30L	14L	w190641

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Tm (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w189348	3.2L	21	130	59	7.8	100	160	w189348
w189349	3.2L	18	120	17	3.8	140	57	w189349
w190604	6.6L	9.9	170	86	6.1	85	330	w190604
w190605	6.6L	14	160	64	6.1	140	310	w190605
w190606	6.6L	16	200	64	9.6	170	210	w190606
w190607	6.6L	10	190	60	4.6	54	410	w190607
w190608	6.6L	12	190	56	7.0	38	140	w190608
w190609	6.6L	12	230	83	7.6	62	300	w190609
w190610	6.6L	12	260	83	8.2	40	360	w190610
w190611	6.6L	11	210	92	7.5	32	570	w190611
w190612	6.6L	14	120	50	7.8	43	160	w190612
w190613	6.6L	18	230	160	11	51	800	w190613
w190614	6.6L	3.8	230	57	2.3	77	290	w190614
w190615	6.6L	12	200	94	6.4	85	330	w190615
w190616	6.6L	18	300	170	12	140	300	w190616
w190617	6.6L	20	170	73	9.1	70	240	w190617
w190618	6.6L	11	200	110	9.0	74	330	w190618
w190619	6.6L	29	190	97	13	100	170	w190619
w190620	6.6L	15	230	51	8.5	86	110	w190620
w190621	6.6L	11	200	77	6.9	46	310	w190621
w190622	6.6L	11	240	83	9.6	38	170	w190622
w190623	6.6L	15	340	190	11	180	300	w190623
w190624	6.4L	15	210	100	7.9	35	340	w190624
w190625	6.4L	17	130	130	9.4	100	340	w190625
w190626	7.0L	11	170	91	8.9	43	350	w190626
w190627	6.4L	11	170	62	6.5	29	880	w190627
w190628	6.4L	39	420	210	14	54	670	w190628
w190629	6.4L	18	200	74	3.8	140	150	w190629
w190630	6.4L	22	250	120	5.6	69	450	w190630
w190631	6.4L	6.4	270	90	1.9	64	210	w190631
w190632	6.4L	18	310	97	9.8	67	250	w190632
w190633	6.4L	13	180	52	5.1	40	530	w190633
w190634	6.4L	24	360	270	18	250	290	w190634
w190635	6.4L	6.7	220	88	7.8	75	280	w190635
w190636	6.4L	4.1	170	52	5.5	62	110	w190636
w190637	6.4L	8.4	210	49	5.3	67	150	w190637
w190638	6.4L	8.0	200	36	5.0	58	120	w190638
w190639	6.4L	17	220	49	6.4	200	97	w190639
w190640	6.4L	7.2	200	46	4.4	46	210	w190640
w190641	6.4L	8.6	200	49	3.0	50	250	w190641

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w190642	11.0	36	23	1.1	0.51	0.40	1.1	31	0.80	0.04	w190642
w190665	3.7	44	34	2.9	1.4	1.3	1.8	8.7	.85	.09	w190665
w190666	2.4	41	26	6.6	2.3	1.6	1.6	14	1.4	.07L	w190666
w190667	2.7	46	9.7	5.5	2.3	1.6	1.8	9.5	.80	.10	w190667
w190668	16.1	62	25	2.4	.68	.46	.80	1.7	3.0	.20	w190668
w190669	5.1	52	35	2.8	1.1	.45	.50	2.0	2.8	.05	w190669
w190670	17.6	52	22	.70	1.1	.40	3.0	17	.90	.09	w190670
w190671	8.5	58	33	1.0	.76	.54	.40	2.6	2.2	.80	w190671
w190672	4.3	48	31	2.2	.80	1.5	1.1	9.1	1.1	.09	w190672
w190673	10.3	54	27	1.1	.98	.76	1.5	9.4	2.0	.20	w190673
w190674	10.3	39	23	1.9	1.3	.84	2.2	25	1.0	.20	w190674
w190675	8.6	53	31	1.3	1.4	.90	2.2	6.5	1.5	.08	w190675
w190676	4.4	31	24	3.7	1.6	1.0	.80	28	1.1	.30	w190676
w190677	6.7	51	26	3.8	1.8	1.3	1.0	4.4	1.8	.08	w190677
w190678	41.4	62	26	.10	1.7	.49	4.3	2.9	1.4	.09	w190678
w190679	27.4	59	30	.20	1.7	.57	3.3	3.1	1.4	.10	w190679
w190680	15.6	53	37	1.3	.83	.69	1.1	4.0	1.0	.30	w190680
w190681	19.3	53	36	.60	1.1	.93	3.1	2.9	1.3	.40	w190681
w190682	9.4	54	34	1.6	.91	.67	1.1	2.7	1.6	1.7	w190682
w190683	7.5	50	24	1.4	1.3	.89	2.0	17	1.1	.30	w190683
w190684	9.6	43	20	1.2	.85	.61	1.6	30	.90	.10	w190684
w190685	7.4	60	25	1.3	1.0	.79	1.4	6.9	2.4	.10	w190685
w190686	8.8	46	25	6.8	2.0	1.8	1.6	7.3	1.4	.20	w190686
w190687	9.1	53	29	4.5	.93	1.3	1.5	3.5	1.9	.70	w190687
w190922	32.0	55	34	.20	1.1	.23	3.6	3.1	1.1	.30	w190922
w190923	2.9	34	36	4.3	.93	.86	.27	3.1	.63	B	w190923
w190924	20.0	48	35	2.0	1.3	.21	2.8	7.1	1.2	.10	w190924
w190925	9.2	53	26	.70	.88	.29	4.6	10	1.0	.10	w190925
w190926	13.2	25	19	1.5	.33	.15	1.1	49	.80	.10	w190926
w190927	3.4	49B	28B	1.1B	1.2	1.2	2.4B	9.3B	1.3B	.09B	w190927
w190928	9.3	57	32	.50	1.0	.50	3.6	4.6	1.5	.10	w190928
w191107	4.9	43	30	1.3	1.5	1.1	3.6	15	1.0	B	w191107
w191108	7.1	43	26	.90	.50	.23	1.0	22	.90	2.3	w191108
w191109	6.3	56	30	.80	.68	1.7	1.8	5.8	1.9	B	w191109
w191110	3.7	41	33	1.9	.73	1.1	1.5	18	1.1	B	w191110
w191111	5.6	26	20	1.3	.71	.84	2.0	47	.60	B	w191111
w191112	18.8	51	12	.30	.60	.84	1.8	32	.40	B	w191112
w191113	11.5	51	39	.70	.61	.37	1.3	2.4	1.8	.30	w191113
w191114	21.6	60	29	.30	.88	.23	2.7	2.1	1.5	B	w191114
w191115	3.9	51	30	4.2	.76	1.2	.40	5.6	1.5	1.8	w191115

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w190642	1.8	0.29	490	270	18	31L	1.3	120	120	180	w190642
w190665	B	.70	370	1,200	42	34L	1.0	270	160	240	w190665
w190666	B	1.5	510	1,400	68	34L	2.4	170	280	170	w190666
w190667	9.7	.91	470	1,400	98	34L	1.8	190	420	410	w190667
w190668	1.2	.31	220	590	20	34L	.68	250	27	190	w190668
w190669	3.2	.60	480	250	48	34L	.90	310	220	220	w190669
w190670	1.5	.65	230	640	7.1	34L	1.4	110	20	150	w190670
w190671	1.7	1.9	170	330	45	34L	.88	410	100	190	w190671
w190672	3.1	1.9	360	820	59	34L	3.8	260	330	200	w190672
w190673	2.3	.59	280	870	33	34L	.84	180	55	140	w190673
w190674	4.3	.34	230	600	16	34L	.30	110	62	100	w190674
w190675	2.4	.45	370	930	39	34L	.44	160	99	130	w190675
w190676	6.5	.45	1,000	500	43	34L	.30	160	82	110	w190676
w190677	2.2	.35	250	1,100	25	31L	.80	130	63	87	w190677
w190678	.90	.42	110	1,600	9.8	34L	.56	140	26	100	w190678
w190679	.90	.74	110	740	26	34L	1.5	150	62	110	w190679
w190680	2.4	1.1	110	780	45	34L	.70	240	180	180	w190680
w190681	1.2	.42	120	1,100	25	34L	.44	250	64	190	w190681
w190682	1.7	.82	200	710	81	34L	.44	170	160	160	w190682
w190683	2.9	.47	1,000	420	29	34L	.90	130	47	180	w190683
w190684	2.6	.47	780	540	17	34L	.92	100	34	110	w190684
w190685	2.8	.31	330	580	28	22L	.34	220	47	190	w190685
w190686	11	1.3	230	1,000	5.0	22L	1.8	160	45	110	w190686
w190687	5.5	.26	300	980	9.8	22L	.48	250	32	210	w190687
w190922	.90	.22	88	560	8.0	22L	.10L	220	26	160	w190922
w190923	B	.72	54	360	120	22L	.84	450	590	220	w190923
w190924	2.6	.38	89	600	30	22L	.26	150	9.0	130	w190924
w190925	1.9	.57	88	860	33	22L	.56	160	100	210	w190925
w190926	2.8	.33	18	170	25	22L	.60	68	25	140	w190926
w190927	1.4	1.6	140	360	14	22L	.90	240	50	160	w190927
w190928	1.2	.67	80	660	82	22L	.60	260	90	180	w190928
w191107	3.7	.48	170	2,700	34	31L	.94	200	130	140	w191107
w191108	2.3	.81	39	1,000	84	31L	1.7	240	140	220	w191108
w191109	2.0	.43	250	1,200	28	31L	.74	220	22	200	w191109
w191110	3.5	.59	290	1,000	52	31L	.94	190	62	120	w191110
w191111	2.4	.85	70	520	76	31L	1.9	140	57	93	w191111
w191112	1.5	.32	24	420	27	31L	.58	69	15	49	w191112
w191113	1.4	.74	74	490	21	31L	.88	310	49	270	w191113
w191114	1.3	.14	83	530	17	31L	.18	150	37	150	w191114
w191115	2.6	1.4	450	1,300	32	31L	.66	360	100	190	w191115

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w190642	9.1	65	45L	14L	3.4	52	9.5L	25	12	9.5L	w190642
w190665	16	170	50L	16L	5.1	81	19	25	19	11L	w190665
w190666	4.2	240	50L	16L	4.2	170	19	200	13	11L	w190666
w190667	3.7	300	50L	33	5.9	230	23	360	11	11L	w190667
w190668	3.7	110	50L	22	3.8	37	17	7.1L	15	11L	w190668
w190669	9.8	200	50L	20	5.5	70	23	29	14	11L	w190669
w190670	10	220	50L	16L	2.3	40	11L	7.1L	6.8	11L	w190670
w190671	7.1L	350	50L	23	6.0	70	22	54	15	11L	w190671
w190672	4.7	440	50L	17	4.4	100	22	16	9.3	11L	w190672
w190673	4.9	180	50L	16L	2.9	65	13	11	11	11L	w190673
w190674	11	100	50L	16L	1.9	71	11L	12	4.9	11L	w190674
w190675	8.1	200	50L	16L	2.8	76	15	26	8.1	11L	w190675
w190676	4.5	170	50L	16L	3.0	120	11L	140	6.8	11L	w190676
w190677	3.0	240	45L	14L	2.2	42	11	6.4L	6.0	9.5L	w190677
w190678	15	72	50L	16L	2.1	45	11L	7.1L	8.0	11L	w190678
w190679	11	120	50L	16L	2.8	48	16	7.1L	8.0	11L	w190679
w190680	3.2	250	50L	16L	4.7	110	14	330	6.4	11L	w190680
w190681	12	180	50L	16L	3.8	88	13	60	7.3	11L	w190681
w190682	2.1	300	50L	20	3.7	120	20	100	7.4	11L	w190682
w190683	8.0	69	50L	16L	2.8	56	11L	120	6.7	11L	w190683
w190684	6.3	46	50L	16L	2.4	36	11L	79	5.2	11L	w190684
w190685	5.4	210	32L	15	3.9	43	20	9.0	12	6.8L	w190685
w190686	4.5	290	32L	10L	2.8	35	10	4.6L	6.8	6.8L	w190686
w190687	3.3	210	32L	12	3.8	45	13	4.6L	9.9	6.8L	w190687
w190922	18	110	32L	12	4.0	44	15	4.6L	6.6	6.8L	w190922
w190923	17L	210	69	55	17	64	83	6.9	10L	15	w190923
w190924	16	180	32L	13	3.8	80	15	41	5.5	6.8L	w190924
w190925	8.7	450	33	17	4.0	58	15	13	7.6	7.1	w190925
w190926	6.1	82	32L	12	3.3	34	24	5.9	3.8	6.8L	w190926
w190927	18	240	32L	10L	5.3	60	6.8L	6.6	8.8	6.8L	w190927
w190928	24	280	32L	13	5.9	78	15	49	7.5	6.8L	w190928
w191107	16	240	45L	14L	3.7	99	9.5L	110	6.1	9.5L	w191107
w191108	5.6	240	45L	20	5.5	80	32	10	7.0	14L	w191108
w191109	6.3	180	45L	15	3.3	53	9.5L	12	13	9.5L	w191109
w191110	5.4	250	45L	17	4.6	64	25	18	8.1	9.5L	w191110
w191111	8.9	190	45L	14L	3.2	94	28	170	3.6	9.5L	w191111
w191112	5.9	110	45L	14L	1.5	27	9.5L	17	2.1	14L	w191112
w191113	4.3	240	45L	14L	3.7	67	9.5L	9.1	11	9.5L	w191113
w191114	11	60	45L	14L	2.6	42	9.5L	6.4L	7.4	9.5L	w191114
w191115	2.6	260	45L	15	5.9	88	15	6.4L	10	9.5L	w191115

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Sample number
w190642	21L	55	90	2	110	27	9	64L	250	44	w190642
w190665	23L	140	82	3	160	37	14	190	170	42	w190665
w190666	23L	83	50	4	160	40	15	91	430	64	w190666
w190667	23L	74	57	4	700	48	12	98	480	42	w190667
w190668	23L	140	140	2	89	9.6	91	140	81	70	w190668
w190669	23L	160	140	2	26	28	65	170	200	90	w190669
w190670	23L	68	91	1	81	20	14	90	100	32	w190670
w190671	23L	250	170	2	33	31	56	200	170	80	w190671
w190672	23L	140	87	2	56	87	19	220	590	80	w190672
w190673	23L	110	230	2	68	12	48	130	110	50	w190673
w190674	23L	58	140	1	5,200	4.8	10	84	120	28	w190674
w190675	23L	93	160	1	220	8.4	37	110	230	86	w190675
w190676	23L	91	190	2	2,600	13	12	96	150	72	w190676
w190677	21L	75	100	1	240	3.9	25	64L	210	50	w190677
w190678	23L	75	100	1	120	3.4L	20	100	54	41	w190678
w190679	23L	73	160	2	120	3.4L	17	110	140	66	w190679
w190680	23L	110	130	1	720	37	8	160	230	94	w190680
w190681	23L	140	170	2	150	17	14	170	120	82	w190681
w190682	23L	96	86	1	57	25	25	220	390	83	w190682
w190683	23L	67	90	1	100	22	23	140	160	62	w190683
w190684	23L	52	86	1	130	12	9	71L	96	32	w190684
w190685	15L	120	140	3	56	11	54	140	75	76	w190685
w190686	15L	91	79	1	320	7.1	18	67	99	54	w190686
w190687	15L	180	220	1	100	14	32	100	68	66	w190687
w190922	15L	120	310	1	50	3.5	22	160	51	50	w190922
w190923	15L	170	100	3	70	180	13	340	370	100	w190923
w190924	15L	80	130	2	70	31	16	120	48	54	w190924
w190925	15L	76	55	2	70	45	25	150	170	130	w190925
w190926	15L	30	72	2	65	64	24	73	68	10L	w190926
w190927	15L	120	150	3L	130	46	11	48	160	54	w190927
w190928	15L	130	210	2	83	7.0	19	180	160	72	w190928
w191107	21L	100	170	2	110	21	8	64L	180	51	w191107
w191108	21L	99	210	3	110	18	27	120	210	72	w191108
w191109	21L	140	140	2	48	11	34	130	77	64	w191109
w191110	21L	110	130	3	66	31	29	200	140L	70	w191110
w191111	21L	71	84	2	50	21	8	84	110	27	w191111
w191112	21L	260	64	8	36	46	6	64L	46	18	w191112
w191113	21L	170	380	.9	32	8.5	35	110	94	110	w191113
w191114	21L	83	150	.9	82	5.3	31	71	69	29	w191114
w191115	21L	230	93	3	160	36	24	120	250	90	w191115

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Sample number
w190642	95L	290L	14L	38	13	9.5L	430	3.6L	36	14L	w190642
w190665	110L	590L	16L	32	27	11L	1,100	2.7	81L	16L	w190665
w190666	110L	830L	16L	54	21	12	2,000	4.2	130L	16L	w190666
w190667	110L	740L	16L	100	26	13	2,500	3.7	110L	16L	w190667
w190668	110L	140L	16L	40	19	11L	530	3.1	51	16L	w190668
w190669	110L	310L	16L	53	29	15	1,100	5.9	59L	16L	w190669
w190670	110L	150	16L	22	12	11L	370	1.7	17L	16L	w190670
w190671	110L	220L	16L	56	33	11L	640	5.9	35L	16L	w190671
w190672	110L	400L	16L	37	26	11L	1,100	2.3	70L	45	w190672
w190673	110L	170L	16L	32	16	15	1,700	1.9	40	16L	w190673
w190674	110L	150	16L	24	11	14	740	1.9	29L	16L	w190674
w190675	110L	190L	16L	31	15	19	1,000	2.3	35L	16L	w190675
w190676	110L	320L	16L	27	14	14	820	6.8L	68L	16L	w190676
w190677	95L	190L	14L	21	10	9.5L	1,500	1.5	60	14L	w190677
w190678	110L	190	16L	23	11	11L	140	1.4	23	16L	w190678
w190679	110L	160	16L	27	16	11L	190	2.6	18	16L	w190679
w190680	110L	130L	16L	76	24	11L	730	3.8	47	16L	w190680
w190681	110L	180L	16L	56	24	13	980	3.1	37	16L	w190681
w190682	110L	160L	16L	39	17	11L	880	3.2	52	16L	w190682
w190683	110L	130	16L	35	13	14	560	1.3	40L	16L	w190683
w190684	110L	170L	16L	22	9.4	11L	310	1.0	31L	16L	w190684
w190685	68L	190L	10L	38	19	12	1,100	4.1	80	10L	w190685
w190686	68L	190L	10L	24	14	6.8L	2,600	2.3	34L	10L	w190686
w190687	68L	200L	10L	37	19	13	2,200	2.2	33L	10L	w190687
w190922	68L	220	10L	41	22	6.8L	320	2.5	34	10L	w190922
w190923	68L	660L	10L	59	66	42	1,400	10	100L	10L	w190923
w190924	68L	240	10L	39	15	13	200	2.0	15L	10L	w190924
w190925	68L	170	10L	48	20	14	510	2.2	33L	10L	w190925
w190926	68L	170L	10L	27	12	11	250	2.3	23	10L	w190926
w190927	H	470L	10L	35	24	6.8L	480	15L	88L	36	w190927
w190928	68L	220	10L	48	25	6.8L	290	3.2	32L	10L	w190928
w191107	95L	240	14L	45	18	9.5L	950	4.1	61L	14L	w191107
w191108	95L	210L	14L	82	38	11	640	8.5	42L	38	w191108
w191109	95L	480L	14L	37	19	14	1,200	3.2	48L	14L	w191109
w191110	95L	490L	14L	30	22	15	2,200	2.7	81L	14L	w191110
w191111	95L	270L	14L	21	16	9.5L	910	1.8	54L	94	w191111
w191112	95L	B	14L	11	B	9.5L	320	1.1	16L	52	w191112
w191113	95L	210L	14L	67	22	9.5L	1,200	2.6	73	14L	w191113
w191114	95L	200	14L	28	13	9.5L	310	1.4	14L	14L	w191114
w191115	95L	510L	14L	51	33	15	3,400	5.1	77L	14L	w191115

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Tm (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w190642	6.4L	18	200	49	6.4	170	95	w190642
w190665	7.1L	11	200	130	11	100	290	w190665
w190666	7.1L	13	170	150	13	200	540	w190666
w190667	7.1L	25	280	260	19	200	360	w190667
w190668	7.1L	14	200	130	12	98	900	w190668
w190669	7.1L	20	250	190	18	60	560	w190669
w190670	7.1L	27	190	54	5.1	210	220	w190670
w190671	7.1L	18	340	160	15	54	670	w190671
w190672	7.1L	22	370	130	9.3	950	280	w190672
w190673	7.1L	14	230	110	9.7	43	450	w190673
w190674	7.1L	9.9	160	42	4.9	51	130	w190674
w190675	7.1L	12	230	110	7.0	100	290	w190675
w190676	7.1L	6.8	200	48	6.8	84	130	w190676
w190677	6.4L	11	140	66	6.0	150	210	w190677
w190678	7.1L	6.2	160	65	5.6	84	250	w190678
w190679	7.1L	13	170	100	10	400	200	w190679
w190680	7.1L	11	360	130	9.0	160	150	w190680
w190681	7.1L	13	340	93	9.3	130	190	w190681
w190682	7.1L	11	340	200	8.5	54	500	w190682
w190683	7.1L	9.9	280	78	5.3	120	360	w190683
w190684	7.1L	5.8	120	33	5.2	100	120	w190684
w190685	4.6L	19	170	120	12	51	440	w190685
w190686	4.6L	5.6	63	47	5.7	600	140	w190686
w190687	4.6L	18	180	77	6.6	56	390	w190687
w190922	4.6L	11	250	79	9.1	56	190	w190922
w190923	5.3	25	480	290	34	140	260	w190923
w190924	4.6L	12	240	89	8.0	120	140	w190924
w190925	4.6L	23	480	140	12	110	380	w190925
w190926	4.6L	4.8	130	110	8.3	80	200	w190926
w190927	4.6L	45	210	23	12	89	75	w190927
w190928	4.6L	29	230	110	13	260	140	w190928
w191107	6.4L	21	220	56	10	180	76	w191107
w191108	6.4L	21	280	180	20	84	200	w191108
w191109	6.4L	22	210	88	7.9	62	310	w191109
w191110	6.4L	27	270	170	11	200	250	w191110
w191111	6.4L	5.4	110	77	8.9	350	63	w191111
w191112	6.4L	9.9	130	38	3.2	92	97	w191112
w191113	6.4L	23	380	73	7.8	53	250	w191113
w191114	6.4L	7.4	200	57	6.5	49	220	w191114
w191115	6.4L	13	220	120	13	280	170	w191115

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w191116	4.7	48	29	2.1	1.2	1.1	2.2	8.9	0.80	0.60	w191116
w191117	2.6	49	36	1.5	.71	1.4	1.5	3.7	1.6	.20	w191117
w191118	12.6	60	32	.30	.70	.31	2.7	2.0	2.0		w191118
w191119	3.5	48	40	1.4	.60	.72	.60	3.3	1.8	B	w191119
w191120	3.7	51	35	1.9	.86	.61	1.1	3.2	.90	.60	w191120
w191121	10.4	43	26	.50	.58	.38	1.9	23	1.6	.01	w191121
w191122	11.1	43	24	.60	.86	.28	2.3	25	1.3	.05	w191122
w191123	9.9	54	32	.50	.73	.52	2.9	3.3	1.5	B	w191123
w191124	7.3	54	34	.50	.86	.39	3.7	3.3	1.7	.07	w191124
w191125	9.9	52	35	.40	.73	.50	2.9	2.2	1.6	.04	w191125
w191126	14.2	64	28	.30	.68	.20	2.6	.6	1.4	.05	w191126
w191127	9.7	33	16	1.1	.50	.26	.50	44	1.0	.30	w191127
w191128	18.6	68	27	.10	.58	.22	1.6	.9	1.4	.06	w191128
w191129	13.8	48	30	.50	1.0	.47	2.3	14	1.5	.20	w191129
w191130	2.6	45	27	2.0	1.5	1.5	2.8	15	1.0	.10	w191130
w191131	4.6	30	20	1.0	.78	1.3	2.0	36	.80	5.2	w191131
w191132	29.8	56	28	.40	1.0	.25	2.4	8.3	1.3	.10	w191132
w191133	8.7	71	23	.30	.23	.50	.20	.3	1.4	2.1	w191133
w191178	13.5	56	24	1.1	.70	.31	2.5	9.5	1.5	1.2	w191178
w191179	11.2	55	26	.80	.86	.36	2.8	9.6	1.4	1.7	w191179
w191180	7.2	45	27	2.1	1.0	.57	2.6	15	1.1	1.9	w191180
w191181	11.1	57	28	.80	1.1	.39	3.2	5.6	1.5	.50	w191181
w191182	14.6	55	28	.60	.86	.41	2.7	6.3	1.6	1.8	w191182
w191183	10.1	51	31	.80	.76	.60	2.6	8.5	1.5	1.7	w191183
w191184	13.7	48	25	.40	.86	.40	2.2	20	1.2	.70	w191184
w191185	18.6	54	29	.50	.76	.27	2.9	7.4	1.5	.60	w191185
w191186	11.8	36	20	.80	.46	.28	1.0	39	1.0	.06	w191186
w191187	12.7	38	20	.50	.51	.29	1.4	36	1.2	.10	w191187
w191188	17.4	53	28	.30	.90	.26	2.6	13	1.5	.04	w191188
w191189	12.7	51	27	.30	.68	.28	2.5	16	1.2	.30	w191189
w191522	10.8	52	23	1.6	.96	.19	2.1	6.6	1.5	.01	w191522
w191862	2.8	24	18	1.4	.65	1.5	1.0	49	.50	.10	w191862
w191863	11.5	43	23	.30	1.7	.71	1.0	49	.50	.10	w191863
w191864	25.5	49	24	.20	1.4	.31	3.8	20	.90	.02	w191864
w191865	11.2	62	28	.30	.58	.15	1.1	2.8	2.7	.30	w191865
w191866	19.8	54	37	.10	.60	.16	2.1	2.5	1.9	.10	w191866
w191867	6.0	51	31	1.2	.83	.29	2.6	7.7	1.4	.06	w191867
w191868	6.8	47	30	1.3	.58	.50	1.4	13	1.6	B	w191868
w191869	16.6	36	21	.40	1.1	.26	2.5	33	.60	B	w191869
w191870	4.1	42	27	1.7	1.4	1.4	2.8	11	.90	.05	w191870

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w191116	3.9	0.31	520	1,700	28	31L	0.62	300	110	170	w191116
w191117	3.0	.91	390	950	180	31L	.66	380	110	170	w191117
w191118	1.1	.27	130	660	36	31L	.80	220	46	170	w191118
w191119	3.1	.80	290	1,500	340	31L	.56	310	160	250	w191119
w191120	3.7	.42	310	880	43	31L	.80	300	220	130	w191120
w191121	3.2	.52	73	7,400	39	31L	.52	130	58	140	w191121
w191122	2.1	.34	78	560	35	31L	.42	130	35	130	w191122
w191123	1.2	.32	120	690	55	31L	.66	160	42	160	w191123
w191124	1.5	.42	140	990	25	31L	.30	230	78	150	w191124
w191125	1.3	.34	120	970	46	31L	.26	200	56	170	w191125
w191126	1.0	.14L	69	560	49	31L	.10L	150	58	130	w191126
w191127	2.3	.64	48	280	26	44L	.10	120	58	120	w191127
w191128	.70	.28	68	480	11	44L	.30	160	28	140	w191128
w191129	2.2	.68	90	1,800	44	44L	.76	270	57	190	w191129
w191130	4.5	.90	280	1,600	130	44L	.12	270	130	160	w191130
w191131	2.6	.76	150	580	44	44L	1.4	590	140	600	w191131
w191132	1.8	.20L	260	460	10	44L	.34	91	21	93	w191132
w191133	1.2	.24	180	920	14	44L	.34	530	66	540	w191133
w191178	1.9	.38	230	1,100	16	25L	.38	150	31	250	w191178
w191179	1.9	.29	380	990	8.2	25L	.32	130	24	170	w191179
w191180		.16	680	1,200	7.9	25L	.37	180	39	150	w191180
w191181	1.7	.66	510	990	7.0	25L	.28	140	17	160	w191181
w191182	1.4	.19	410	960	7.0	25L	.34	170	25	170	w191182
w191183	1.7	.17	660	1,400	8.8	25L	.28	190	30	190	w191183
w191184	1.3	.15	440	890	14	25L	.36	120	21	200	w191184
w191185	1.3	.23	320	520	23	25L	.52	140	31	200	w191185
w191186	1.7	.32	440	710	20	25L	.10	110	85	150	w191186
w191187	1.5	.37	430	820	6.0	25L	.38	110	24	110	w191187
w191188	1.1	.28	260	580	6.0	25L	.52	130	27	150	w191188
w191189	.90	.18	360	660	8.8	25L	.52	150	27	120	w191189
w191522	1.0	.43	54	1,100	29	40L	.52	190	46	120	w191522
w191862	3.3	2.5	130	1,000	83	50L	3.1	180	250	160	w191862
w191863	3.3	.50	120	840	12	50L	.50	100	35	110	w191863
w191864	2.3	.40	89	1,100	14	50L	.26	110	23	89	w191864
w191865	1.0	.26	200	970	28	50L	.44	200	77	180	w191865
w191866	1.0	.86	160	2,500	7.6	50L	.68	120	46	190	w191866
w191867	3.0	.74	480	1,700	71	50L	.82	220	90	150	w191867
w191868	3.0	.79	210	1,600	71	50L	.54	180	65	140	w191868
w191869	2.4	.71	120	590	21	50L	.92	110	33	100	w191869
w191870	2.4	1.2	450	2,000	54	50L	1.2	170	66	120	w191870

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w191116	8.5	160	45L	14L	5.7	76	12	6.4L	6.4	9.5L	w191116
w191117	7.7	320	45L	27	8.1	110	28	6.6	7.7	9.5L	w191117
w191118	13	210	45L	15	3.7	78	13	6.4L	12	9.5L	w191118
w191119	11L	360	45L	25	7.7	240	20	48	11	9.5L	w191119
w191120	5.4	270	45L	14L	6.2	60	14	6.4L	5.4	9.5L	w191120
w191121	13	190	45L	14L	2.4	130	9.5L	64	8.7	9.5L	w191121
w191122	12	110	45L	14L	2.7	62	9.5L	39	6.3	9.5L	w191122
w191123	6.1	200	45L	14L	3.2	88	9.5L	18	7.1	9.5L	w191123
w191124	15	170	45L	14L	4.5	87	12	24	11	9.5L	w191124
w191125	11	200	45L	14L	3.3	97	9.5L	14	9.1	9.5L	w191125
w191126	13	78	45L	14L	2.8	60	9.5L	13	6.3	9.5L	w191126
w191127	2.1	58	64L	20L	2.7	52	19	150	5.2	14L	w191127
w191128	7.5	72	64L	20L	2.2	46	14L	9.2L	7.0	14L	w191128
w191129	10	200	64L	20L	3.3	74	14L	30	7.2	14L	w191129
w191130	15	330	64L	26	5.8	140	34	76	15	14L	w191130
w191131	54	190	64L	20L	10	68	30	26	26	14L	w191131
w191132	8.1	55	64L	20L	1.4	46	14L	9.2L	4.0	14L	w191132
w191133	170	120	64L	20L	7.0	22	14L	9.2L	36	14L	w191133
w191178	13	55	36L	11L	2.4	92	11L	97	8.9	7.7L	w191178
w191179	15	37	36L	11L	2.5	41	12	8.2	8.0	7.7L	w191179
w191180	9.7	39	36L	11L	3.3	32	7.7L	11	6.9	7.7L	w191180
w191181	14	90	36L	11L	2.4	32	18	5.2L	8.1	7.7L	w191181
w191182	17	53	36L	11L	2.5	35	7.7L	5.2L	8.2	7.7L	w191182
w191183	15	60	36L	11L	2.7	49	14	5.2L	6.9	7.7L	w191183
w191184	16	64	36L	11L	3.1	57	10	5.2L	8.0	7.7L	w191184
w191185	8.1	68	36L	11L	3.7	63	18	15	6.5	7.7L	w191185
w191186	3.4	74	36L	11L	3.6	80	7.7L	24	5.1	7.7L	w191186
w191187	6.3	78	36L	11L	2.0	33	7.7L	5.2L	4.7	7.7L	w191187
w191188	13	98	36L	11L	2.1	45	11	5.2L	7.5	7.7L	w191188
w191189	13	55	36L	11L	2.3	34	7.7L	5.2L	6.3	7.7L	w191189
w191522	13	300	58L	18L	3.3	29	12L	8.3L	10	12L	w191522
w191862	7.1	31	73L	35	7.1	210	48	41	21	16L	w191862
w191863	9.6	110	73L	23L	2.0	54	16L	11L	4.3	16L	w191863
w191864	11	96	73L	23L	2.1	54	16L	13	3.1	16L	w191864
w191865	3.6	120	73L	23L	3.0	66	16L	11L	13	16L	w191865
w191866	12	230	73L	23L	2.4	110	16L	11L	8.1	16L	w191866
w191867	8.3	170	73L	23L	4.3	84	17	12	6.7	16L	w191867
w191868	5.9	200	73L	23L	2.8	64	16L	11L	8.8	16L	w191868
w191869	11	170	73L	23L	2.2	53	21	11L	3.0	16L	w191869
w191870	15	250	73L	23L	5.1	89	16L	11L	7.3	16L	w191870

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Sample number
w191116	21L	170	110	2	390	48	9	170	170	42	w191116
w191117	21L	190	180	4	48	28	34	240	200	83	w191117
w191118	21L	130	130	2	38	8.8	36	140	110	64	w191118
w191119	21L	170	230	3	32	18	32	220	350	110	w191119
w191120	21L	140	170	3	82	9.9	15	130	270	81	w191120
w191121	450L	67	110	2	45	12	18	64L	130	42	w191121
w191122	450L	63	120	2	140	13	32	77	73	49	w191122
w191123	21L	91	140	1	64	10	18	100	120	44	w191123
w191124	21L	110	140	1	52	6.4	31	120	76	60	w191124
w191125	21L	110	170	2	29	3.1L	22	92	92	81	w191125
w191126	21L	70	120	1	38	3.1L	25	64L	76	38	w191126
w191127	30L	62	92	1	200	66	12	92L	130	60	w191127
w191128	30L	86	170	1	16	5.6	24	110	74	33	w191128
w191129	30L	140	230	1	88	13	12	96	150	66	w191129
w191130	30L	120	110	4	190	44	14	260	380	55	w191130
w191131	30L	87	110	2	63	46	13	130	140	38	w191131
w191132	30L	74	330	.7	86	6.0	15	92L	90	27	w191132
w191133	30L	92	72	1	23	8.0	38	110	120	53	w191133
w191178	17L	89	160	1	150	7.5	41	120	50	47	w191178
w191179	17L	80	120	.9	150	7.9	25	90	47	42	w191179
w191180	17L	97	77	1	280	25	28	100	52	51	w191180
w191181	17L	81	110	1	130	9.7	26	85	41	25	w191181
w191182	17L	96	120	1	88	6.8	17	85	58	29	w191182
w191183	17L	99	130	1	110	8.9	26	120	58	29	w191183
w191184	17L	66	100	1	95	7.0	26	95	59	27	w191184
w191185	17L	70	100	2	100	28	25	75	79	29	w191185
w191186	17L	51	84	2	160	27	40	52L	140	27	w191186
w191187	17L	63	78	.8	82	18	33	52L	62	25	w191187
w191188	17L	75	190	.6	68	6.2	32	64	54	42	w191188
w191189	17L	79	93	.8	32	11	32	87	69	20	w191189
w191522	27L	100	120	.9	85	16	17	83L	74	58	w191522
w191862	35L	71	120	7	130	87	25	150	640	160	w191862
w191863	35L	61	130	.9	180	20	7L	110L	100	24	w191863
w191864	35L	63	120	.8	180	11	7L	110L	58	32	w191864
w191865	35L	120	74	2	28	5.0L	54	110L	150	74	w191865
w191866	35L	66	150	1	36	10	21	110L	120	65	w191866
w191867	35L	120	100	2	65.	43	23	180	180	62	w191867
w191868	35L	88	160	1	100	17	48	110L	180	51	w191868
w191869	35L	60	80	1	160	35	10	110L	120	24	w191869
w191870	35L	73	76	2	160	41	13	130	140	74	w191870

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Sample number
w191116	95L	430L	14L	43	30	9.5L	5,700	4.3	64L	14L	w191116
w191117	95L	620L	14L	50	38	9.5L	1,500	7.7	120L	14L	w191117
w191118	95L	140	14L	39	20	9.5L	420	3.2	40	14L	w191118
w191119	95L	430L	14L	71	37	9.5L	1,400	5.7	86L	14L	w191119
w191120	95L	410L	14L	38	32	9.5L	1,400	5.4	81L	14L	w191120
w191121	95L	190	14L	45	13	11	730	1.9	38	34	w191121
w191122	95L	230	14L	33	14	10	640	2.7	45	14L	w191122
w191123	95L	200	14L	36	16	9.5L	560	2.0	30L	14L	w191123
w191124	95L	230	14L	38	25	14	800	4.1	41L	14L	w191124
w191125	95L	170	14L	40	18	13	730	3.0	51	14L	w191125
w191126	95L	230	14L	34	15	9.5L	320	2.1	21L	14L	w191126
w191127	140L	180L	20L	23	14	16	400	2.1	68	20L	w191127
w191128	140L	120	20L	26	13	14L	320	1.6	22	20L	w191128
w191129	140L	180	20L	48	22	15	940	2.9	43	20L	w191129
w191130	140L	540L	20L	46	31	16	2,400	3.8	120L	20L	w191130
w191131	170	390	20L	110	20	14L	1,400	11	110	52	w191131
w191132	140L	250	20L	17	12	14L	240	1.3	26	20L	w191132
w191133	140L	160L	20L	110	17	14L	680	6.9	59	20L	w191133
w191178	77L	160	11L	47	13	9.2	2,500	2.2	30	34	w191178
w191179	77L	240	11L	30	13	8.1	1,100	1.8	27	11L	w191179
w191180	77L	130	11L	26	14	15	2,700	2.8	42L	11L	w191180
w191181	77L	220	11L	28	13	7.7L	1,100	1.8	27L	11L	w191181
w191182	77L	190	11L	29	14	7.7L	1,100	2.1	29	11L	w191182
w191183	77L	230	11L	30	14	18	1,700	2.0	48	11L	w191183
w191184	77L	220	11L	42	13	7.7L	660	2.2	22L	11L	w191184
w191185	77L	130	11L	55	15	7.7L	500	2.7	16L	11L	w191185
w191186	77L	110L	11L	31	14	8.0	690	2.5	25L	11L	w191186
w191187	110L	87	11L	20	8.7	9.3	670	1.6	24L	11L	w191187
w191188	77L	180	11L	28	10	7.7L	470	1.7	29	11L	w191188
w191189	77L	190	11L	24	12	7.7L	610	1.6	24L	11L	w191189
w191522	120L	140	18L	24	18	12L	1,400	2.8	28L	18L	w191522
w191862	160L	640L	23L	100	32	16L	1,500	7.1L	110L	64	w191862
w191863	160L	170	23L	28	10	16L	590	1.7	26L	23L	w191863
w191864	160L	170	23L	21	11	16L	430	1.6L	22	23L	w191864
w191865	160L	130L	23L	34	16	16L	640	1.8	56	23L	w191865
w191866	160L	160	23L	36	12	16L	310	2.5	39	23L	w191866
w191867	160L	180	23L	33	18	16L	1,100	8.3L	50L	35L	w191867
w191868	160L	210L	23L	31	15	16L	1,800	7.4L	44L	23L	w191868
w191869	160L	140	23L	23	11	16L	500	2.4	40	23L	w191869
w191870	160L	370L	23L	39	24	16L	2,300	4.9	73L	23L	w191870

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Tm (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w191116	6.4L	8.5	250	88	11	69	100	w191116
w191117	6.4L	19	280	250	23	120	270	w191117
w191118	6.4L	15	220	95	9.5	140	410	w191118
w191119	6.6	8.6	390	220	23	98	290	w191119
w191120	6.4L	11	200	120	14	86	210	w191120
w191121	6.4L	12	130	38	8.7	260	87	w191121
w191122	6.4L	9.2	220	87	8.1	68	210	w191122
w191123	6.4L	13	210	97	8.1	320	210	w191123
w191124	6.4L	12	250	92	11	69	270	w191124
w191125	6.4L	16	240	90	10	40	170	w191125
w191126	6.4L	8.7	170	64	9.9	38	220	w191126
w191127	9.2L	9.7	120	74	7.2	340	130	w191127
w191128	9.2L	6.8	200	66	5.4	45	340	w191128
w191129	9.2L	20	300	62	8.0	180	130	w191129
w191130	9.2L	7.7L	320	260	15	240	190	w191130
w191131	9.2L	13	260	120	24	200	170	w191131
w191132	9.2L	5.0	220	32	3.7	53	130	w191132
w191133	9.2L	2.3L	160	100	20	28	480	w191133
w191178	5.2L	12	520	94	8.1	70	540	w191178
w191179	5.2L	5.4	210	68	6.3	74	400	w191179
w191180	5.2L	7.4	160	59	5.6	85	370	w191180
w191181	5.2L	5.8	170	67	5.4	68	470	w191181
w191182	5.2L	7.6	190	44	5.5	42	190	w191182
w191183	5.2L	5.0	230	64	5.9	45	330	w191183
w191184	5.2L	19	240	80	6.6	40	360	w191184
w191185	5.2L	16	240	110	9.1	74	400	w191185
w191186	5.2L	34	180	99	7.6	85	440	w191186
w191187	5.2L	6.5	150	43	3.1	72	350	w191187
w191188	5.2L	6.3	180	45	4.6	100	360	w191188
w191189	5.2L	4.5	160	60	4.7	110	440	w191189
w191522	8.3L	15	160	60	8.3	57	160	w191522
w191862	11L	74	460	350	29	760	99	w191862
w191863	11L	8.9	200	40	5.2	140	89	w191863
w191864	11L	15	140	26	4.3	110	66	w191864
w191865	11L	8.8	200	79	8.0	47	450	w191865
w191866	11L	12	350	31	5.1	120	180	w191866
w191867	11L	11	300	200	10	72	230	w191867
w191868	11L	8.8	250	130	7.4	70	430	w191868
w191869	11L	14	230	84	5.4	64	140	w191869
w191870	11L	23	310	160	12	310	180	w191870

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w191871	3.2	39	27	1.7	0.86	1.5	2.2	18	0.90	0.10	w191871
w191872	7.6	50	30	1.4	.83	.76	1.9	4.8	1.8		w191872
w191873	13.2	50	28	.80	.96	.30	2.8	1.1	1.5	.07	w191873
w191874	9.5	50	26	1.1	.68	.39	.90	7.5	1.8	.40	w191874
w191875	3.0	44	33	2.9	.96	.84	.80	8.3	1.3	.50	w191875
w191876	4.6	59	20	1.2	1.0	.55	2.6	7.8	1.5	.06	w191876
w191877	30.5	48	27	1.9	1.2	.22	2.1	10	1.5	.05	w191877
w191878	7.5	36	24	1.5	.73	.28	1.5	31	1.3	.60	w191878
w191879	6.7	53	31	1.3	.81	.29	1.8	7.3	1.4	.06	w191879
w191880	8.8	56	36	.40	.68	.36	2.2	2.0	2.0	B	w191880
w191881	10.5	52	36	.40	.66	.21	2.4	3.6	2.4	B	w191881
w191882	10.5	51	33	.50	.65	.42	4.0	2.5	1.3	B	w191882
w191883	7.7	62	31	.50	.35	.29	1.0	.7	2.4	.03	w191883
w191884	16.4	65	27	.30	.43	.22	1.2	.7	2.4	B	w191884
w191885	6.5	53	32	1.6	1.0	.62	3.2	5.1	1.0	.06	w191885
w191886	10.1	52	33	.60	1.1	.49	4.3	5.3	1.4	B	w191886
w191887	4.9	50	34	.90	.66	.73	2.4	8.2	1.6	B	w191887
w191888	21.0	60	32	.20	.53	.17	2.0	.7	2.1	B	w191888
w191889	5.3	18	12	1.9	.46	.73	.60	64	.40	.03	w191889
w191890	8.2	49	31	.70	.56	.62	1.8	7.9	2.0	.05	w191890
w191891	6.5	33	18	3.6	1.1	.30	.90	33	1.2	.06	w191891
w191892	13.9	42	21	.60	.83	.20	2.7	31	1.0	B	w191892
w191893	15.8	63	28	.30	.66	.19	1.1	2.5	2.5	.20	w191893
w191894	3.3	46	39	1.6	.86	.33	1.8	6.0	.70		w191894
w191895	39.8	58	32	.20	.90	.21	3.6	2.6	1.6	.02	w191895
w191896	16.3	57	31	.30	.83	.21	2.8	1.4	1.6	B	w191896
w191897	5.9	58	28	1.5	.70	.54	.54	3.4	1.5	.10	w191897
w191898	12.0	55	35	.60	.63	.21	1.5	2.1	1.5	.06	w191898
w191899	9.5	49	33	.50	.90	.37	3.6	2.8	.90	.06	w191899
w191900	9.3	60	29	.30	.35	.62	.90	.9	2.5	B	w191900
w191901	8.1	46	28	1.0	.63	.42	1.8	19	1.5	.01	w191901
w191902	3.7	49	34	1.8	.90	.54	1.8	2.0	.90	.06	w191902
w191903	8.2	50	35	1.2	.83	.64	3.0	2.5	1.7	.30	w191903
w191904	6.3	47	35	1.1	.88	.84	3.9	4.6	2.1	.05	w191904
w192710	9.3	67	23	.89	.45	.46	.95	3.4	2.1	.19	w192710
w192711	5.5	47	36	1.2	.85	.96	2.4	4.3	2.1	.08	w192711
w192712	3.2	25	15	2.4	.85	1.1	.45	38	.94	.15	w192712
w192713	6.4	47	23	.99	1.4	.75	4.5	13	1.2	.08	w192713
w192714	4.3	42	30	1.9	1.1	1.2	1.6	12	1.4	.95	w192714
w192715	5.6	38	27	1.6	.98	1.1	2.8	18	1.0	.11	w192715

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w191871	3.8	0.74	330	3,100	97	50L	2.1	190	130	100	w191871
w191872	2.4	.43	690	1,000	36	50L	.24	140	21	150	w191872
w191873	1.5	.33	200	1,200	33	50L	.60	140	41	140	w191873
w191874	.70	.23	120	1,100	17	50L	.36	240	35	140	w191874
w191875	5.8	1.0	1,400	1,600	58	50L	.48	200	210	150	w191875
w191876	3.0	.51	960	1,300	61	50L	.18	200	52	180	w191876
w191877	4.4	.28	160	1,300	20	50L	.10L	150	19	110	w191877
w191878	3.9	.30	380	690	50	50L	.50	160	120	120	w191878
w191879	2.8	.58	540	510	140	50L	.14	180	79	140	w191879
w191880	1.5	.56	300	890	31	50L	.58	190	65	190	w191880
w191881	1.1	.54	130	480	63	50L	.54	230	80	220	w191881
w191882	1.4	.69	260	1,400	79	43L	1.4	150	210	280	w191882
w191883	1.5	.44	310	830	26	43L	1.6	230	1,300	300	w191883
w191884	.90	.21	170	530	21	43L	.22	150	43	160	w191884
w191885	2.8	.77	400	790	82	43L	1.6	170	140	160	w191885
w191886	1.6	.41	300	1,000	34	43L	.36	200	66	160	w191886
w191887	1.9	.84	400	940	39	43L	1.0	200	110	170	w191887
w191888	.70	.36	85	520	26	49L	.22	200	31	190	w191888
w191889	2.6	.72	54	1,400	43	43L	.78	110	45	53	w191889
w191890	1.9	.66	160	1,100	37	43L	1.3	260	60	200	w191890
w191891	5.5	.20	390	690	34	43L	.18	150	88	110	w191891
w191892	1.4	.29	190	340	39	43L	.54	94	31	110	w191892
w191893	1.0	.33	170	530	56	43L	1.1	190	85	89	w191893
w191894	3.4	.33	690	940	110	43L	1.1	270	420	220	w191894
w191895	.90	.20L	110	690	7.4	43L	.10	130	21	150	w191895
w191896	1.0	.20L	200	790	27	43L	.28	160	51	160	w191896
w191897	3.7	.57	140	1,200	49	49L	.72	290	90	170	w191897
w191898	1.9	.44	90	590	23	43L	.60	190	59	200	w191898
w191899	1.7	.51	170	920	60	43L	.54	130	110	160	w191899
w191900	.90	.30	230	930	19	43L	.52	180	32	140	w191900
w191901	2.4	.60	190	740	47	43L	.48	170	36	130	w191901
w191902	3.8	1.4	260	1,500	140	50L	1.2	190	300	150	w191902
w191903	2.1	.25	300	1,200	17	50L	.36	210	50	180	w191903
w191904	2.5	.78	280	1,200	54	50L	.76	220	110	220	w191904
w192710	.72	.30	210	380	40	22L	.57	180	43	150	w192710
w192711	1.6	.50	380	660	44	22L	1.2	200	120	140	w192711
w192712	3.8	.60	83	340	120	22L	.78	160	130	130	w192712
w192713	1.4	.30	110	420	28	22L	.97	160	70	120	w192713
w192714	.37	.70	150	620	36	22L	1.4	210	56	150	w192714
w192715	2.4	.80	140	470	30	22L	.90	300	88	170	w192715

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w191871	13	390	73L	26	5.0	92	28	110	13	16L	w191871
w191872	7.9	96	73L	23L	2.5	78	16L	26	9.2	16L	w191872
w191873	12	120	73L	23L	2.0	78	16L	15	7.6	16L	w191873
w191874	4.2	170	73L	23L	2.9	33	25	11L	8.4	16L	w191874
w191875	10L	400	73L	23L	3.0	130	18	83	6.7	16L	w191875
w191876	8.7	110	73L	23L	4.1	91	16L	41	11	16L	w191876
w191877	4.6	66	73L	23L	2.4	40	16L	11L	10	16L	w191877
w191878	8.0	190	73L	23L	2.5	83	16L	97	6.7	16L	w191878
w191879	7.5	170	73L	23L	4.0	91	16L	33	7.5	16L	w191879
w191880	8.0	180	73L	23L	3.6	81	18	11L	11	16L	w191880
w191881	10	160	73L	23L	3.7	78	16L	11L	13	16L	w191881
w191882	12	230	63L	21	4.7	160	14L	19	6.7	14L	w191882
w191883	2.6	170	63L	20L	4.9	56	17	9.3L	14	14L	w191883
w191884	4.9	100	63L	20L	2.6	41	14L	9.3L	9.8	14L	w191884
w191885	11	300	63L	20L	6.0	170	16	100	4.6	14L	w191885
w191886	11	220	63L	20L	3.9	67	14	9.3L	6.9	14L	w191886
w191887	8.2	220	63L	20L	3.7	64	14L	9.3L	8.2	14L	w191887
w191888	7.1	150	72L	23L	3.7	64	16L	11L	9.5	16L	w191888
w191889	1.9	190	63L	20L	3.2	72	20L	10	11	14L	w191889
w191890	12	340	63L	20L	4.3	97	14	27	13	14L	w191890
w191891	6.2	200	63L	20L	2.8	53	14L	9.3L	6.2	14L	w191891
w191892	12	90	63L	20L	2.4	47	14L	9.3L	4.3	14L	w191892
w191893	5.7	210	63L	29	5.4	110	30	46	5.1	14L	w191893
w191894	9.1	210	63L	20L	10	90	14L	17	6.1	14L	w191894
w191895	13	46	63L	20L	2.6	36	14L	9.3L	6.8	14L	w191895
w191896	12	80	63L	20L	2.8	53	14L	9.3L	7.4	14L	w191896
w191897	5.1	130	72L	23L	5.9	89	18	11L	8.5	16L	w191897
w191898	6.7	130	63L	20L	3.7	110	14L	9.3L	6.7	14L	w191898
w191899	9.5	150	63L	20L	4.0	130	14L	16	4.2	14L	w191899
w191900	4.3	140	63L	20L	2.5	47	14L	9.3L	12	14L	w191900
w191901	4.9	140	63L	20L	2.5	69	14L	26	7.4	14L	w191901
w191902	5.4	260	73L	23L	7.0	100	25	11L	5.4	16L	w191902
w191903	13	92	73L	23L	3.8	110	16L	35	9.8	16L	w191903
w191904	9.5	310	73L	23L	3.8	120	16L	38	11	16L	w191904
w192710	3.2	170	32L	14	2.9	38	8.0	5.0L	13	7.0L	w192710
w192711	7.3	370	32L	11	4.2	85	10	29	7.3	7.0L	w192711
w192712	3.1	260	32L	10L	4.1	32L	16	82	6.3	7.0L	w192712
w192713	22	170	32L	10L	3.0	40	7.0L	6.0	6.3	7.0L	w192713
w192714	12	270	32L	15	4.7	67	13	12	7.0	7.0L	w192714
w192715	8.9	460	32L	10L	5.0	47	21	21	7.1	7.0L	w192715

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Sample number
w191871	35L	94	100	3	110	63	36	210	260	83	w191871
w191872	35L	79	250	1	47	5.0L	36	110L	110	46	w191872
w191873	35L	83	180	.8	94	5.0L	45	120	130	62	w191873
w191874	35L	150	220	1	110	20	61	150	97	53	w191874
w191875	35L	100	210	3	150	26	33	110	450	86	w191875
w191876	35L	110	120	2	120	15	51	150	140	86	w191876
w191877	35L	92	110	1	200	5.0L	26	110L	53	40	w191877
w191878	35L	93	260	1	160	26	17	110L	200	74	w191878
w191879	35L	100	150	1	110	11	15	120	160	65	w191879
w191880	35L	110	160	1	29	18	41	110	170	78	w191880
w191881	35L	140	190	2	29	10	30	110L	140	68	w191881
w191882	30L	76	95	3	39	24	8	140	240	120	w191882
w191883	30L	140	140	1	27	24	63	170	170	92	w191883
w191884	30L	91	220	1	35	8.3	29	93L	84	63	w191884
w191885	30L	77	110	3	120	41	9	110	230	100	w191885
w191886	30L	110	130	2	120	12	7	120	130	90	w191886
w191887	30L	120	140	2	35	37	26	120	290	70	w191887
w191888	34L	110	160	2	25	4.9L	30	150	87	84	w191888
w191889	630L	38	40	2	310	49	6L	94	76	20	w191889
w191890	30L	160	210	2	44	27	33	130	130	93	w191890
w191891	30L	92	120	2	310	13	23	140	140	61	w191891
w191892	30L	50	80	1	400	27	6L	93L	64	58	w191892
w191893	630L	82	92	3	170	30	11	110	170	74	w191893
w191894	30L	120	240	3	350	83	7	130	340	90	w191894
w191895	30L	73	100	.8	23	4.3L	19	93L	37	38	w191895
w191896	30L	98	120	1	47	4.7	27	93L	90	42	w191896
w191897	34L	170	110	2	310	18	12	160	180	52	w191897
w191898	30L	110	140	.8	160	9.0	19	110	160	62	w191898
w191899	30L	74	110	3	70	16	12	130	210	90	w191899
w191900	30L	120	91	1	63	9.7	66	99	120	60	w191900
w191901	30L	99	160	1	100	13	23	99	84	39	w191901
w191902	35L	81	160	3	98	46	11	180	400	210	w191902
w191903	35L	120	250	1	79	13	30	140	120	48	w191903
w191904	35L	130	190	2	140	8.3	14	110L	160	120	w191904
w192710	15L	110	190	1	70	7.0	39	89	83	86	w192710
w192711	15L	110	220	2	96	12	19	100	190	130	w192711
w192712	15	94	68	3L	3,900	11	8	46L	160	37	w192712
w192713	15L	78	180	2	140	9.0	6	46L	71	45	w192713
w192714	15L	120	160	2	94	21	15	130	130	70	w192714
w192715	15	160	240	2	72	27	20	160	180	70	w192715

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Sample number
w191871	160L	410L	23L	34	22	16	3,300	3.1	94L	23L	w191871
w191872	160L	170	23L	37	12	16L	1,500	1.3	39L	23L	w191872
w191873	160L	200	23L	33	12	16L	860	2.3	31	23L	w191873
w191874	160L	170L	23L	31	20	16L	1,500	4.2	32	23L	w191874
w191875	160L	330L	23L	43	20	16L	4,000	13L	100L	23L	w191875
w191876	160L	170	23L	65	20	16L	2,100	2.2	65L	23	w191876
w191877	160L	150	23L	27	13	16L	590	2.6	34	23L	w191877
w191878	160L	170L	23L	31	15	16L	1,400	6.7L	40L	23L	w191878
w191879	160L	210L	23L	33	21	16L	910	3.0	45L	23L	w191879
w191880	160L	91	23L	41	17	17	1,000	3.4	34L	23L	w191880
w191881	160L	120	23L	46	21	16L	310	2.9	44	23L	w191881
w191882	140L	150	20L	85	20	14L	820	4.8	50	20L	w191882
w191883	140L	170L	20L	44	23	16	1,100	3.9	39L	20L	w191883
w191884	140L	98L	20L	32	13	14L	560	2.4	57	20L	w191884
w191885	140L	250	20L	58	26	14L	920	6.2	46L	20L	w191885
w191886	140L	180	20L	35	22	14L	660	3.0	48	20L	w191886
w191887	140L	220L	20L	35	18	14L	1,300	4.1	61L	20L	w191887
w191888	160L	90	23L	45	19	16L	250	3.3	45	23L	w191888
w191889	140L	250L	20L	15	13	14L	1,600	3.8	57L	20L	w191889
w191890	140L	180L	20L	46	23	14L	1,600	3.7	37L	20L	w191890
w191891	140L	180L	20L	23	12	21	1,100	1.5	46L	20L	w191891
w191892	140L	150	20L	27	11	14L	360	2.2	22L	41	w191892
w191893	170	82	20L	46	23	14L	640	5.7	19L	59	w191893
w191894	140L	300L	20L	61	45	23	1,700	9.1	91L	20L	w191894
w191895	140L	200	20L	26	11	14L	230	1.3	28	20L	w191895
w191896	140L	170	20L	31	13	17	510	1.8	35	20L	w191896
w191897	160L	220L	23L	47	29	16L	970	5.1	51L	23L	w191897
w191898	140L	75	20L	37	19	17	540	3.3	25L	20L	w191898
w191899	140L	220	20L	58	17	14L	740	3.2	32L	20L	w191899
w191900	140L	150L	20L	27	13	20	1,100	2.2	32L	20L	w191900
w191901	140L	170L	20L	28	14	20	1,000	2.5	37L	30L	w191901
w191902	160L	270L	23L	51	30	79	2,000	8.1	81	23L	w191902
w191903	160L	210	23L	39	20	16L	2,100	2.4	37L	23L	w191903
w191904	160L	250L	23L	48	21	16L	910	3.2	48L	23L	w191904
w192710	68L	75L	10L	31	15	10	730	2.2	54	10L	w192710
w192711	68L	91	10L	42	20	12	1,200	3.6	55L	10L	w192711
w192712	68L	380L	10L	25	9.4	7.0L	670	3.1	94L	10L	w192712
w192713	68L	250	10L	30	13	7.0L	460	3.1	47L	17	w192713
w192714	68L	190	10L	37	21	7.0L	970	4.7	70L	10L	w192714
w192715	68L	500L	10L	38	25	14	970	3.6	71	10L	w192715

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Tm (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w191871	11L	17	400	280	13	370	450	w191871
w191872	11L	8.7	260	91	7.9	36	260	w191872
w191873	11L	8.1	260	92	6.8	140	400	w191873
w191874	11L	16	250	150	7.4	72	710	w191874
w191875	11L	6.7	310	200	10	140	430	w191875
w191876	11L	15	310	200	17	98	380	w191876
w191877	11L	8.9	160	69	7.2	58	260	w191877
w191878	11L	11	150	76	6.7	180	200	w191878
w191879	11L	12	230	140	12	69	150	w191879
w191880	11L	14	350	120	8.0	47	300	w191880
w191881	11L	14	260	64	12	62	140	w191881
w191882	9.3L	24	530	200	18	470	140	w191882
w191883	9.3L	18	330	130	12	50	500	w191883
w191884	9.3L	9.4	190	49	6.7	23	210	w191884
w191885	9.3L	24	330	170	18	340	89	w191885
w191886	9.3L	15	310	89	8.9	95	110	w191886
w191887	9.3L	13	300	110	10	110	210	w191887
w191888	11L	14	280	100	10	76	300	w191888
w191889	9.3L	11	110	84	7.5	130	67	w191889
w191890	9.3L	21	310	120	12	160	240	w191890
w191891	9.3L	12	100	89	6.2	98	210	w191891
w191892	9.3L	11	130	50	9.4	95	83	w191892
w191893	9.3L	19	240	210	18	260	86	w191893
w191894	9.3L	14	330	170	24	310	96	w191894
w191895	9.3L	5.8	190	36	4.5	53	190	w191895
w191896	9.3L	7.3	240	63	5.5	69	200	w191896
w191897	11L	11	210	120	12	97	200	w191897
w191898	9.3L	16	310	74	6.7	76	170	w191898
w191899	9.3L	15	360	190	16	160	190	w191899
w191900	9.3L	11	210	82	7.5	31	490	w191900
w191901	9.3L	16	200	89	7.4	72	200	w191901
w191902	11L	14	310	310	19	130	120	w191902
w191903	11L	17	280	120	9.8	130	260	w191903
w191904	11L	23	280	59	9.5	110	200	w191904
w192710	5.0L	22	130	73	8.6	32	360	w192710
w192711	5.0L	20	190	93	13	230	130	w192711
w192712	5.0L	6.3	75	53	9.4	81	110	w192712
w192713	5.0L	14	140	23	6.3	98	58	w192713
w192714	5.0L	21	210	85	12	120	120	w192714
w192715	5.0L	13	230	95	11	55	190	w192715

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w192716	4.5	46	26	1.3	0.70	0.71	3.3	9.8	2.0	0.10	w192716
w192717	15.0	55	25	2.0	.56	.30	1.7	5.8	2.0	.22	w192717
w192718	7.5	41	25	1.4	.83	.68	3.8	17	1.0	.12	w192718
w192719	12.3	53	22	3.6	.51	.30	.69	6.4	2.6	.21	w192719
w192720	5.4	45	26	5.4	1.2	.80	.37	.7	1.4	.05	w192720
w192721	8.1	59	23	.77	.36	.36	.42	6.1	3.1	.02	w192721
w192722	6.2	43	32	1.5	1.1	.93	1.7	9.9	1.1	.18	w192722
w192723	4.1	39	26	2.0	1.1	.84	2.1	17	1.1	.04	w192723
w192724	3.2	45	33	1.8	.38	.69	.90	7.7	1.2	.02	w192724
w192725	15.6	61	23	.70	.80	.40	2.0	5.0	2.1	.03	w192725
w192726	7.4	51	33	.60	.70	.28	1.2	6.1	.95	.09	w192726
w192727	7.1	55	27	.88	.70	.64	1.3	7.8	1.7	.08	w192727
w192728	12.1	68	18	.68	1.6	.49	1.7	4.6	2.2	.08	w192728
w192729	3.6	44	28	1.3	1.6	1.3	1.2	13	1.1	.04	w192729
w192730	22.4	69	19	.40	.68	.40	1.9	3.0	1.6	.07	w192730
w192731	5.0	55	27	.98	.98	.30	2.1	6.4	1.1	.07	w192731
w192732	3.1	37	22	3.7	1.7	1.0	.53	16	1.9	.07	w192732
w192733	7.4	46	24	6.9	.98	.93	.32	8.3	3.1	.14	w192733
w192734	3.8	47	20	5.6	1.1	1.3	.12	11	2.2	.02	w192734
w192735	6.2	46	25	5.2	.93	.96	.22	9.2	2.7	.13	w192735
w192736	6.0	38	26	2.0	.98	.70	3.1	22	1.1	.11	w192736
w192737	21.6	72	16	.60	.53	.17	2.0	5.1	3.8	.10	w192737
w192738	3.8	49	28	2.0	.91	.80	.87	8.5	1.3	.04	w192738
w192739	11.8	50	27	.89	.91	.39	2.8	9.4	1.6	.08	w192739
w193126	7.0	42	19	1.8	.66	.70	1.2	22	1.1	.14	w193126
w193127	7.3	35	18	2.2	.56	.94	.82	30	1.1	.12	w193127
w193128	6.7	37	19	2.4	.41	.46	.98	26	1.1	.82	w193128
w193129	11.8	54	19	1.1	.45	.59	1.2	15	1.2	.17	w193129
w193130	15.7	40	15	3.3	.60	.27	1.9	26	.85	.64	w193130
w193131	8.4	31	17	2.4	.76	.70	.91	35	.95	.05	w193131
w193132	6.5	39	22	2.0	.61	.95	1.5	20	1.2	.81	w193132
w193133	9.9	24	14	4.4	.38	.20	.79	40	.72	.07	w193133
w192647	1.6	B	B	B	1.4	.46	B	B	B	B	w192647
w192648	1.6	B	B	B	1.1	.70	B	B	B	B	w192648
w192649	5.4	B	B	B	1.0	.22	B	B	B	B	w192649
w192650	4.7	B	B	B	.75	.13	B	B	B	B	w192650
w192651	6.1	51	33	1.2	.73	.10	4.4	6.3	1.4	.05	w192651
w192652	10.3	62	19	.74	1.8	.07	4.1	9.2	.77	.23	w192652
w192653	5.2	47	21	4.8	1.3	.17	2.6	12	.77	.16	w192653
w192654	9.5	54	28	2.0	1.0	.10	2.9	4.4	1.6	.09	w192654

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w192716	1.9	0.90	95	250	37	22L	1.3	200	89	150	w192716
w192717	.93	.50	77	320	23	22L	.75	210	79	150	w192717
w192718	1.4	.50	110	420	28	22L	1.1	240	53	150	w192718
w192719	.33	.40	64	230	28	22L	.80	200	85	140	w192719
w192720	2.7	.30	100	570	37	22L	.95	220	180	120	w192720
w192721	.86	.80	63	170	46	22L	1.0	220	100	160	w192721
w192722	2.2	.70	130	460	24	22L	1.9	240	200	190	w192722
w192723	2.8	.70	100	410	52	22L	1.2	220	120	140	w192723
w192724	1.9	.90	66	360	120	22L	1.3	220	94	180	w192724
w192725	.52	.30	86	390	17	22L	.56	120	51	69	w192725
w192726	.66	.50	51	220	41	22L	.36	240	95	140	w192726
w192727	.93	.50	88	320	25	22L	.50	210	99	130	w192727
w192728	.61	.40	110	330	18	22L	.61	190	41	110	w192728
w192729	1.4	.50	130	560	16	22L	.10L	220	120	120	w192729
w192730	.18	.30	73	350	8.0	22L	.77	190	21	110	w192730
w192731	1.0	.80	47	420	57	22L	.86	160	170	130	w192731
w192732	6.0	.40	110	1,400	20	22L	1.1	260	160	130	w192732
w192733	3.4	.30	180	370	26	22L	.29	270	130	180	w192733
w192734	4.2	.40	140	310	60	22L	.43	210	110	130	w192734
w192735	2.4	.30	140	310	34	22L	.77	310	150	180	w192735
w192736	3.4	.40	720	520	18	22L	.96	130	48	120	w192736
w192737	.69	.20	310	240	11	22L	.21	130	17	130	w192737
w192738	2.9	.40	220	720	54	22L	.72	210	63	130	w192738
w192739	1.4	.50	120	500	49	22L	.74	170	71	130	w192739
w193126	2.6	.20	1,000G	560	8.0	22L	.66	110	20	110	w193126
w193127	3.7	.20	670	790	7.0	22L	.62	110	26	110	w193127
w193128	3.2	.40	620	870	10	22L	.86	120	34	130	w193128
w193129	1.5	.20	660	660	7.0	22L	.58	110	26	130	w193129
w193130	4.1	.20	400	410	5.0	22L	.51	76	26	89	w193130
w193131	3.6	.20	630	700	5.0	22L	.86	110	44	130	w193131
w193132	2.5	.30	650	1,000	25	22L	.86	120	37	120	w193132
w193133	5.5	.30	H	520	7.0	22L	.80	91	32	96	w193133
w192647	B	2.3	73	970	700	22L	1.3	380	1,200	170	w192647
w192648	B	2.8	110	740	36	22L	1.6	190	360	110	w192648
w192649	B	1.2	82	540	20	22L	.76	190	140	57	w192649
w192650	B	1.3	65	400	39	22L	.40	430	150	160	w192650
w192651	1.7	.10L	55	620	140	22L	.27	230	260	210	w192651
w192652	1.1	.20	80	380	100	22L	.90	120	25	94	w192652
w192653	7.5	.10L	100	1,200	29	22L	.55	170	44	120	w192653
w192654	2.2	.10L	64	690	13	22L	1.1	200	38	140	w192654

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w192716	6.7	740	32L	10L	4.2	69	7.0	48	6.7	7.0L	w192716
w192717	10	220	32L	12	3.3	42	11	5.0	11	7.0L	w192717
w192718	17	340	32L	10L	6.1	67	15	11	5.3	10L	w192718
w192719	2.4	270	32L	16	3.5	38	15	8.0	13	7.0L	w192719
w192720	1.9	220	32L	10L	4.1	45	16	12	7.4	10L	w192720
w192721	4.9L	310	32L	10L	3.8	54	7.0L	24	14	7.0L	w192721
w192722	8.1	460	32L	10L	4.5	37	7.0L	15L	4.8	7.0L	w192722
w192723	7.3	280	32L	10L	4.4	53	12	5.0	7.3	7.0L	w192723
w192724	3.1	370	32L	25	5.9	68	24	100	6.3	8.0	w192724
w192725	5.1	140	32L	10	1.9	30	9.0	5.0L	5.8	7.0L	w192725
w192726	2.7	220	32L	11	4.5	45	15	24	5.4	7.0L	w192726
w192727	5.6	180	32L	10L	3.8	41	8.0	6.0	8.5	7.0L	w192727
w192728	7.4	170	32L	10L	2.3	41	8.0	6.0	8.3	7.0L	w192728
w192729	2.8	250	32L	10L	4.7	44	11	5.0L	5.6	7.0L	w192729
w192730	7.6	120	32L	10L	2.9	24	7.0L	5.0L	12	7.0L	w192730
w192731	4.0	240	32L	13	4.6	62	14	85	6.0	7.0L	w192731
w192732	9.7L	220	32L	10L	4.8	26	13	5.0L	9.7	7.0L	w192732
w192733	5.4L	290	32L	10L	4.2	47	10	7.0	14	7.0L	w192733
w192734	7.9L	270	32L	10L	3.7	46	10	22	11	7.0L	w192734
w192735	6.5L	340	32L	10L	4.7	54	15	10	15	7.0L	w192735
w192736	5.0	260	32L	10L	2.8	63	9.0	10	5.0	7.0L	w192736
w192737	4.2	93	32L	11	2.0	27	8.0	5.0L	15	7.0L	w192737
w192738	2.6	220	32L	10L	4.7	46	12	14	5.3	7.0L	w192738
w192739	8.5	330	32L	14	3.5	56	17	35	5.9	7.0L	w192739
w193126	5.7	72	32L	10L	2.0	37	7.0L	27	4.3	7.0L	w193126
w193127	5.5L	71	32L	10L	1.9	36	12	33	5.5	7.0L	w193127
w193128	4.5	76	32L	10L	2.1	38	7.0L	17	6.0	7.0L	w193128
w193129	4.2	68	32L	10L	2.0	31	7.0L	5.0L	7.6	7.0L	w193129
w193130	5.7	59	32L	10L	1.7	28	11	11	4.5	7.0L	w193130
w193131	3.6	60	32L	10L	2.5	37	10	32	4.8	7.0L	w193131
w193132	6.2	81	32L	10L	2.2	62	10	37	4.6	7.0L	w193132
w193133	3.0	47	32L	10L	1.8	34	20	20	4.0	7.0L	w193133
w192647	25L	410	86	70	8.1	140	65	220	44	22	w192647
w192648	19L	360	32L	13	3.8	36	24	25	13	7.0L	w192648
w192649	7.4L	420	32L	16	3.7	29	18	13	3.7	7.0L	w192649
w192650	8.5L	480	32L	20	7.2	23	20	12	11	10L	w192650
w192651	21	470	32L	14	5.6	81	21	23	6.6	7.0L	w192651
w192652	18	180	32L	15	2.8	49	10	12	2.9	7.0L	w192652
w192653	21	130	32L	10L	3.5	41	13	5.0L	5.8	7.0L	w192653
w192654	37	250	32L	13	4.7	33	14	5.0L	7.4	7.0L	w192654

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Sample number
w192716	15L	89	200	2	69	51	4	57	130	87	w192716
w192717	15L	120	240	1	140	17	44	130	140	75	w192717
w192718	15L	120	180	1	110	35	10	110	120	73	w192718
w192719	15L	120	230	2	420	23	71	80	100	77	w192719
w192720	15	110	150	2	410	36	26	97	200	83	w192720
w192721	15L	120	140	1	60	19	32	73	150	96	w192721
w192722	15L	130	220	2	310	31	6	72	120	55	w192722
w192723	15L	120	150	2	110	19	7	75	150	58	w192723
w192724	15L	94	130	3	66	32	18	120	130	110	w192724
w192725	15L	58	130	.6	100	7.0	26	74	80	83	w192725
w192726	15L	110	240	1	85	16	15	110	140	77	w192726
w192727	15L	110	150	1	97	15	31	110	140	66	w192727
w192728	15L	110	150	.8	230	10	28	77	110	97	w192728
w192729	15L	110	160	3L	310	32	8	52	140	61	w192729
w192730	15L	98	130	.9	90	2.0L	23	55	37	58	w192730
w192731	15L	80	120	2	160	9.0	13	65	140	110	w192731
w192732	15L	160	140	3	290	20	22	59	280	53	w192732
w192733	15L	150	240	1	680	22	44	95	120	80	w192733
w192734	15L	130	150	3	490	34	32	46L	160	64	w192734
w192735	15L	190	250	2	460	28	40	110	150	100	w192735
w192736	15L	67	200	2	110	9.0	9	64	94	83	w192736
w192737	15L	74	160	1	61	8.0	62	56	33	52	w192737
w192738	15L	110	140	3	100	13	17	89	120	71	w192738
w192739	15L	93	130	2	67	10	18	90	120	110	w192739
w193126	46L	57	140	1	110	29	8	46L	60	32	w193126
w193127	15L	55	120	1	180	7.0	9	46L	51	35	w193127
w193128	15L	60	90	1	130	8.0	16	71	67	44	w193128
w193129	15L	59	160	.8	180	7.0	11	46L	62	35	w193129
w193130	15L	38	64	.6	260	11	3L	46L	45	38	w193130
w193131	15L	48	140	1	220	7.0	6	46L	60	32	w193131
w193132	15L	62	87	2	130	11	11	60	74	38	w193132
w193133	15L	40	90	1	290	23	9	46L	42	16	w193133
w192647	15L	130	120	6	380	94	30	210	710	180	w192647
w192648	15L	63	140	6L	320	61	23	110	570	89	w192648
w192649	15L	74	290	2L	450	25	16	160	380	87	w192649
w192650	15L	150	230	2	220	8.0	37	200	170	130	w192650
w192651	15L	82	430	2	130	8.0	27	140	200	170	w192651
w192652	15L	39	140	2	200	34	15	46L	80	40	w192652
w192653	15L	58	120	2	720	40	14	50	100	56	w192653
w192654	15L	63	240	1	340	11	27	79	67	50	w192654

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Sample number
w192716	68L	490L	10L	40	22	11	330	4.4	67L	23	w192716
w192717	68	130	10L	35	15	11	520	2.7	40	11	w192717
w192718	68L	280	10L	36	25	7.0L	450	4.0	67	10L	w192718
w192719	68L	200L	10L	32	15	11	550	3.3	24L	10L	w192719
w192720	68L	410L	10L	33	20	9.0	960	3.7	56L	10L	w192720
w192721	68	270L	10	32	17	11	420	3.7	49	13	w192721
w192722	68L	150	10L	34	23	8.0	760	3.2	48L	10L	w192722
w192723	68L	170	10L	29	22	7.0L	920	2.4	73L	10L	w192723
w192724	68L	530L	10L	66	28	13	790	6.3	94L	10L	w192724
w192725	68L	160L	10L	16	8.3	11	270	1.3	19L	10L	w192725
w192726	68L	260L	10L	32	22	7.0L	330	4.1	41L	10L	w192726
w192727	68L	310L	10L	31	18	11	450	2.8	42	10L	w192727
w192728	68L	210L	10L	23	17	16	350	2.5	33	10L	w192728
w192729	68L	580L	10L	25	22	7.0L	790	5.6L	83L	10L	w192729
w192730	68L	130	10L	21	15	7.0L	230	2.2	31	10L	w192730
w192731	68L	300L	10L	36	20	9.0	450	4.0	60L	10L	w192731
w192732	68L	420L	10L	29	23	7.0L	1,900	3.2	97L	22	w192732
w192733	68L	320L	10L	38	20	12	850	4.1	54	10L	w192733
w192734	68L	530L	10L	37	18	10	1,000	5.3	79L	10L	w192734
w192735	68L	350L	10L	42	23	11	780	3.2	65	10L	w192735
w192736	68L	270L	10L	30	13	7.0L	1,000	1.7	50L	10L	w192736
w192737	68L	83L	10L	26	11	11	370	1.9	60	10L	w192737
w192738	68L	340L	10L	29	21	11	1,600	2.6	79L	17	w192738
w192739	68L	130	10L	30	18	11	690	3.4	42	11	w192739
w193126	68L	86	10L	21	8.6	7.0L	620	2.9	43L	10L	w193126
w193127	68L	68	10L	22	8.2	7.0L	670	4.1L	55	10L	w193127
w193128	68L	90	10L	25	9.0	7.0L	1,300	3.0	45L	10L	w193128
w193129	68L	68	10L	25	9.3	7.0L	800	1.7	25L	10L	w193129
w193130	68L	100	10L	17	7.0	7.0L	610	1.3	19L	10L	w193130
w193131	68L	110L	10L	25	13	7.0L	580	2.4	48	10L	w193131
w193132	68L	92	10L	31	9.2	7.0L	970	3.1	46L	10L	w193132
w193133	68L	61	10L	18	8.1	7.0L	390	2.0	30L	10L	w193133
w192647	68L	810L	10L	81	25	7.0L	1,700	31L	190L	10L	w192647
w192648	100L	810L	10L	19	13	7.0L	1,400	25L	190L	50	w192648
w192649	68L	240L	10L	15	11	7.0L	1,200	1.9	56L	10L	w192649
w192650	68L	280L	10L	43	28	7.0L	820	6.4	64L	10L	w192650
w192651	68L	230	10L	44	18	7.0L	640	3.3	49L	10L	w192651
w192652	68L	160	10L	27	11	8.0	260	2.9	29L	10L	w192652
w192653	68L	190	10L	25	12	7.0L	710	3.8	58L	10L	w192653
w192654	68L	170	10L	28	16	7.0L	440	5.3	32L	10L	w192654

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Tm (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w192716	5.0L	56	220	38	16	180	58	w192716
w192717	5.0L	17	170	70	8.0	83	210	w192717
w192718	5.0L	45	240	67	11	140	76	w192718
w192719	5.0L	16	170	90	8.1	54	450	w192719
w192720	5.0L	13	160	110	11	97	230	w192720
w192721	5.0L	19	160	49	8.6	24	190	w192721
w192722	5.0L	13	150	48	9.7	500	64	w192722
w192723	5.0L	24	140	46	9.8	98	75	w192723
w192724	5.0L	44	240	190	28	140	120	w192724
w192725	5.0L	7.7	120	57	5.1	50	210	w192725
w192726	5.0L	26	200	100	11	41	120	w192726
w192727	5.0L	13	160	79	8.5	41	210	w192727
w192728	5.0L	7.4	150	61	7.4	75	210	w192728
w192729	5.0L	14	110	33	8.3	46	67	w192729
w192730	5.0L	7.1	100	31	6.7	110	320	w192730
w192731	5.0L	14	160	130	18	240	120	w192731
w192732	5.0L	16	110	78	13	72	280	w192732
w192733	5.0L	16	140	86	12	32	370	w192733
w192734	5.0L	21	140	79	11	47	200	w192734
w192735	5.0L	19	150	93	11	39	310	w192735
w192736	5.0L	12	140	35	6.7	170	78	w192736
w192737	5.0L	17	130	54	9.3	48	440	w192737
w192738	5.0L	11	150	100	11	47	180	w192738
w192739	5.0	14	200	120	8.5	98	210	w192739
w193126	5.0L	4.3	94	18	5.7	78	77	w193126
w193127	5.0L	11	61	23	5.5	63	74	w193127
w193128	5.0L	4.5	110	37	6.0	96	110	w193128
w193129	5.0L	13	130	28	5.1	60	140	w193129
w193130	5.0L	11	59	18	3.8	120	53	w193130
w193131	5.0L	87	89	25	4.8	130	59	w193131
w193132	5.0L	7.7	110	28	4.6	180	98	w193132
w193133	5.0L	5.1	75	31	4.0	130	81	w193133
w192647	9.0	44	250	620	44	210	310	w192647
w192648	5.0L	13L	110	80	6.3	160	290	w192648
w192649	5.0L	5.6	130	98	3.7	260	140	w192649
w192650	5.0L	15	170	120	13	150	420	w192650
w192651	5.0L	18	280	140	11	80	220	w192651
w192652	5.0L	77	210	98	9.7	160	130	w192652
w192653	5.0L	37	140	95	7.7	96	160	w192653
w192654	5.0L	14	150	81	7.4	86	180	w192654

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w192655	8.8	B	B	B	0.55	0.08	B	B	B	B	w192655
w192656	9.0	55	30	.86	1.3	.10	4.4	3.5	1.3	.11	w192656
w192657	25.1	60	26	.34	1.1	.09	4.1	4.9	1.7	.09	w192657
w192658	5.6	64	23	.96	.50	.20	1.5	4.3	2.7	.05	w192658
w192659	2.0	B	B	B	.68	.55	B	B	B	B	w192659
w192660	1.6	B	B	B	1.3	.97	B	B	B	B	w192660
w192661	3.2	B	B	B	1.0	.45	B	B	B	B	w192661
w192662	2.8	B	B	B	.90	.44	B	B	B	B	w192662
w192663	2.8	B	B	B	.90	.75	B	B	B	B	w192663
w192664	5.3	B	B	B	.38	.25	B	B	B	B	w192664
w192665	8.2	46	28	1.8	.78	.10	3.8	12	.96	.06	w192665
w192666	4.5	B	B	B	.61	.31	B	B	B	B	w192666
w192667	9.7	B	B	B	.35	.09	B	B	B	B	w192667

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w192655	B	0.30	31	720	34	22L	1.1	190	55	120	w192655
w192656	1.0	1.3	74	620	47	22L	2.9	160	71	230	w192656
w192657	.31	.40	88	460	85	22L	.72	210	25	130	w192657
w192658	.88	.40	100	290	200	22L	.78	290	75	150	w192658
w192659	B	.60	200	350	30	22L	.92	350	70	180	w192659
w192660	B	.70	330	470	19	22L	.72	310	69	160	w192660
w192661	B	.60	230	360	30	22L	.59	470	130	130	w192661
w192662	B	.70	150	380	24	22L	.31	500	260	150	w192662
w192663	B	.70	130	430	23	22L	.32	540	490	110	w192663
w192664	B	2.1	61	440	50	22L	.56	430	370	220	w192664
w192665	2.7	.10	55	650	16	22L	.38	290	72	140	w192665
w192666	B	.50	92	700	15	22L	.17	440	62	180	w192666
w192667	B	1.6	47	460	52	22L	1.0	250	38	230	w192667

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w192655	22	340	32L	17	4.4	23	22	5.0L	5.7	7.0L	w192655
w192656	28	840	32L	21	3.6	86	12	8.0	5.6	7.0L	w192656
w192657	16	160	32L	10	3.5	86	8.0	30	6.8	7.0L	w192657
w192658	5.4	230	32L	16	4.8	36	19	12	13	7.0L	w192658
w192659	15L	490	32L	12	7.0	23	16	5.0L	15	7.0L	w192659
w192660	19L	380	37	13	7.5	29	16	5.0L	13	7.0L	w192660
w192661	3.1	450	32L	14	8.8	30	28	6.0	6.3	7.0L	w192661
w192662	14L	470	33	12	8.2	32	23	6.0	7.1	7.0L	w192662
w192663	14L	550	32L	15	10	31	26	12	7.1	7.0L	w192663
w192664	9.4L	710	39	20	7.2	64	37	72	5.7	8.0	w192664
w192665	6.1	140	32L	10L	5.5	37	13	7.0	4.9	7.0L	w192665
w192666	8.9	200	32L	13	8.4	41	18	5.0	6.7	7.0L	w192666
w192667	4.1	530	32L	23	5.7	52	25	19	9.3	7.0L	w192667

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Sample number
w192655	15L	57	150	2	190	11	28	110	63	41	w192655
w192656	15L	44	510	2	220	12	33	92	120	180	w192656
w192657	15L	72	140	1	62	5.0	22	80	62	79	w192657
w192658	15L	110	110	2	61	8.0	37	120	110	120	w192658
w192659	15L	150	160	5L	62	22	39	110	180	120	w192659
w192660	15L	130	140	6L	120	47	40	160	320	78	w192660
w192661	320L	190	270	3	110	30	14	190	280	99	w192661
w192662	15L	180	290	4L	89	45	11	190	400	150	w192662
w192663	15L	180	270	4L	110	33	10	220	370	140	w192663
w192664	15L	130	260	2	55	11	23	240	250	180	w192664
w192665	15L	98	240	1	250	18	13	120	130	57	w192665
w192666	15L	160	180	2	150	51	8	160	180	45	w192666
w192667	15L	82	180	3	58	21	32	140	200	78	w192667

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Sample number
w192655	68L	130	10L	26	16	7.0L	470	3.4	45	10L	w192655
w192656	68L	220	10L	69	16	14	320	5.6	89	10L	w192656
w192657	68L	170	10L	25	12	7.0L	240	2.4	48	10L	w192657
w192658	68L	250L	10L	30	18	19	570	5.4	140	10L	w192658
w192659	68L	600L	10L	35	20	12	1,100	20L	150L	10L	w192659
w192660	68L	690L	10L	31	19	7.0L	1,200	25L	190L	10L	w192660
w192661	68L	440L	10L	25	31	7.0L	860	6.3	94L	10L	w192661
w192662	68L	460L	10L	29	36	7.0L	900	7.1	110L	10L	w192662
w192663	68L	500L	10L	29	36	7.0L	760	7.1	110L	10L	w192663
w192664	68L	280L	10L	43	32	7.0L	430	5.7	57L	10L	w192664
w192665	68L	120	10L	30	22	7.0L	420	3.7	37L	10L	w192665
w192666	68L	310L	10L	31	29	7.0L	430	6.7	89	10L	w192666
w192667	68L	130L	10L	43	20	12	260	7.2	52	10L	w192667

Table 7f -- Major and minor oxide and trace element composition of the laboratory ash of 252 coal samples from West Virginia.

Sample number	Tm (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w192655	5.0L	17	210	160	10	69	470	w192655
w192656	5.0L	130	500	160	18	110	170	w192656
w192657	5.0L	24	200	59	8.4	110	160	w192657
w192658	5.0L	21	160	110	13	58	280	w192658
w192659	5.0L	15	130	110	10	73	370	w192659
w192660	5.0L	13L	130	110	6.3	100	530	w192660
w192661	5.0L	13	150	110	13	96	180	w192661
w192662	5.0L	11	170	120	11	79	160	w192662
w192663	5.0L	7.1	160	120	11	120	120	w192663
w192664	5.0L	62	230	220	11	230	320	w192664
w192665	5.0L	12	180	71	8.5	95	92	w192665
w192666	5.0L	20	220	110	16	86	100	w192666
w192667	5.0L	24	310	190	16	32	290	w192667

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

[Analysis performed on whole coal. Values in parts-per-million (ppm). L, less than the value shown, B, not determined.]

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w189252	5.0	18	7.8	15	0.9	0.35	46	0.9	0.13	10	w189252
w189253	38	29	16	24	1.8	.52	86	1.1	.32	14	w189253
w189254	2.0	18	14	13	.3	.42	20	.6	.050	8	w189254
w189255	1.0	14	1.6	11	.3	.25	20L	.6	.035	8	w189255
w189256	2.0	20	5.9	12	.7	.42	46	.5	.022	9	w189256
w189257	1.0	16	26	7.4	.6L	.32	20L	.5	.010	7	w189257
w189258	7.0	21	7.4	15	1.3	.40	89	.9	.11	10	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	70	19	5.0	16	.8	.28	39	.6	.38	7	w189260
w189261	20	14	2.3	13	1.0	.21	44	.7	.090	7	w189261
w189280	8.7	21	3.6	20	1.3	.35	86	1.0	.088	11	w189280
w189281	13	10	2.0	11	.8	.19	66	.6	.21	5	w189281
w189282	2.6	11	6.7	9.6	.9	.25	56	.5	.043	6	w189282
w189283	20	30	5.2	31	1.6	.53	100	1.3	.17	15	w189283
w189284	4.2	12	3.0	14	.8	.19	46	.6	.080	6	w189284
w189285	2.7	12	2.5	13	.5	.17	66	.6	.10	6	w189285
w189286	9.6	33	6.1	19	.9	.46	82	.7	.27	17	w189286
w189287	12	16	5.6	15	1.7	.32	66	.8	.13	8	w189287
w189288	7.0	22	4.6	22	1.8	.33	46	1.0	.13	11	w189288
w189289	2.9	24	5.7	20	2.0	.38	78	.9	.10	15	w189289
w189290	4.6	26	14	26	.5	.60	45	1.2	.080	12	w189290
w189291	7.5	35	7.2	31	2.4	.48	70	1.7	.073	19	w189291
w189292	1.5	21	4.6	15	.9	.31	44	1.0	.020	12	w189292
w189293	1.4	9.0	4.1	19	.4	.17	31	.3	.015	4	w189293
w189294	1.9	13	4.9	8.3	.5	.27	21	.4	.073	6	w189294
w189295	2.1	8.0	2.3	6.6	.4	.26	38	.3	.17	1	w189295
w189296	1.9	16	4.8	13	1.2	.34	44	.5	.036	8	w189296
w189297	11	16	5.5	15	1.8	.28	62	.7	.12	8	w189297
w189336	3.0	11	19	17	.4	.25	32	.4	.060	6	w189336
w189337	13	22	6.1	130	.4	.34	23	1.0	.080	12	w189337
w189338	6.0	22	7.0	21	1.0	.43	44	.9	.070	12	w189338
w189339	.4	11	8.1	11	.5	.23	33	.5	.010L	7	w189339
w189340	1.0	25	4.3	21	2.8	.48	40	1.0	.010L	14	w189340
w189341	.3	13	19	21	1.4	.55	23	.5	.010L	7	w189341
w189342	1.0	11	6.2	21	.3	.44	33	.4	.040	4	w189342
w189343	1.0	15	2.8	13	.4	.31	31	.7	.010L	10	w189343
w189344	3.0	18	11	14	.4	.31	25	1.1	.020	11	w189344
w189345	7.0	23	4.0	23	3.0	.40	96	1.0	.020	13	w189345
w189346	6.0	12	6.1	10	.5	.19	44	.7	.060	8	w189346
w189347	2.0	11	4.4	9.6	.2	.20	20L	.5	.20	7	w189347

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w189252	0.2	490	410L	29L	0.90	3.5	5.5	1.6	0.2	4.3	w189252
w189253	.2	430	670L	35	2.2	5.5	8.7	2.6	.3	8.7	w189253
w189254	.2	440	210L	30L	3.8	3.2	4.0	1.8	.2	5.2	w189254
w189255	.1	680	300L	31L	.20	2.2	3.7	1.1	.1	3.0L	w189255
w189256	.2	770	310L	30L	.70	3.4	5.4	1.9	.3	4.4	w189256
w189257	.1	390	170L	25L	1.0	2.9	2.7	1.4	.2	3.0L	w189257
w189258	.2	780	540L	24	1.5	4.1	5.0	1.9	.3	3.0L	w189258
w189259	B	B	B	B	B	B	.1B	B	B	B	w189259
w189260	.1	260	380L	27L	1.0	2.6	1.8L	1.1	.6L	7.9	w189260
w189261	.1	380	420L	33L	.60	2.8	4.1	1.1	.2	11	w189261
w189280	.2	920	140	32	.39	3.7	1.7	1.8	.3	4.0	w189280
w189281	.1	760	240	23	.29	2.1	.9	.80	.2	3.0L	w189281
w189282	.1	620	14	19	.85	2.3	2.8	1.1	.2	3.8	w189282
w189283	.2	2,500	590	36	.71	5.6	6.9	2.3	.5	5.1	w189283
w189284	.1	710	77	17	.51	3.5	1.9	1.0	.1	3.0L	w189284
w189285	.1	610	320	16	.21	2.5	2.2	1.0	.2	3.0L	w189285
w189286	.1	870	230	14	.34	3.9	2.7	2.1	.3	3.0L	w189286
w189287	.1	1,000	23	28	.66	3.0	3.7	1.2	.2	3.0L	w189287
w189288	.1	1,200	66	30	.46	4.9	2.0	1.5	.2	3.0L	w189288
w189289	.2	1,300	30	30	.51	4.3	2.5	2.3	.3	3.0L	w189289
w189290	.3	950	29	21	1.4	6.3	5.3	2.7	.5	3.0L	w189290
w189291	.3	1,400	26	30	1.1	6.6	5.6	2.7	.4	7.9	w189291
w189292	.2	1,400	22	21	.48	3.0	3.5	1.7	.2	3.0L	w189292
w189293	.1	760	9	18	.88	2.0	3.4	.80	.2	3.0L	w189293
w189294	.1	990	22	19	.66	2.0	2.5	1.4	.2	3.0L	w189294
w189295	.1	770	20	2	.24	1.3	3.5	.10	.2	3.0L	w189295
w189296	.2	2,800	42	25	.90	3.1	2.6	1.8	.2	4.0L	w189296
w189297	.1	730	34	25	.62	2.9	3.9	1.4	.1	3.0	w189297
w189336	.1	1,500	340L	49L	.40	3.0	9.1	1.2	.2	3.0L	w189336
w189337	.1	660	420L	37L	1.0	4.3	4.9	1.7	.3	4.2	w189337
w189338	.1	840	420L	33L	1.0	4.0	6.1	1.9	.3	4.4	w189338
w189339	.1	640	290L	32L	.40	2.0	3.8	1.2	.2	3.0L	w189339
w189340	.2	1,400	800L	53L	.50	4.2	6.6	2.5	.3	5.0	w189340
w189341	.4	650	410L	34L	3.0	5.2	2.0	2.1	.6	4.0	w189341
w189342	.3	220	370L	25L	1.8	5.5	6.3	2.1	.5	3.0L	w189342
w189343	.1	860	310L	32L	.60	2.6	3.5	1.5	.2	3.0L	w189343
w189344	.1	870	250L	34L	.80	2.5	3.7	1.6	.2	3.4	w189344
w189345	.2	940	700L	31	.50	4.8	4.2	2.2	.3	4.8	w189345
w189346	.1	580	210L	31L	1.0	2.0	3.0	1.2	.2	3.0L	w189346
w189347	.1	490	170L	26L	1.6	2.2	3.3	1.0	.2	3.0L	w189347

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	U (ppm)	Yb (ppm)
w189252	1.5	0.9
w189253	2.5	1.1
w189254	1.4	.9
w189255	.94	.3
w189256	1.5	.9
w189257	1.1	.7
w189258	1.6	1.2
w189259	.20L	B
w189260	1.2	.4
w189261	.64	.7
w189280	1.9	.9
w189281	.63	.4
w189282	.63	.8
w189283	2.0	1.3
w189284	.62	.7
w189285	.57	.5
w189286	.73	.8
w189287	.73	.9
w189288	1.1	.9
w189289	1.9	1.1
w189290	2.6	1.9
w189291	2.4	1.8
w189292	1.3	1.0
w189293	.53	.7
w189294	.56	.7
w189295	.75	.4
w189296	1.2	.8
w189297	.80	.9
w189336	.83	.5
w189337	1.7	.7
w189338	1.1	.6
w189339	.53	.4
w189340	1.1	.8
w189341	1.4	2.3
w189342	1.4	1.4
w189343	.81	.6
w189344	.96	.7
w189345	2.0	.9
w189346	.73	.5
w189347	1.0	.4

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w189348	1.0	14	5.6	12	0.5	0.24	88	0.7	0.040	8	w189348
w189349	46	14	3.4	16	1.1	.30	33	.5	.23	8	w189349
w190604	13	18	5.1	14	.7	.29	30	.8	.065	10	w190604
w190605	3.0	20	6.4	17	.3	.29	21	.8	.17	10	w190605
w190606	2.0	33	9.7	32	1.5	.52	130	1.3	.033	20	w190606
w190607	1.0	38	4.4	47	1.8	.48	220	2.1	.033	24	w190607
w190608	2.0	24	8.3	23	.6	.39	26	1.1	.023	15	w190608
w190609	2.0	25	16	22	.6	.41	54	1.2	.010L	15	w190609
w190610	2.0	18	6.4	16	.3	.26	34	.9	.020	10	w190610
w190611	8.0	27	4.2	25	.5	.45	38	1.6	.065	16	w190611
w190612	12	29	3.9	21	.8	.44	42	1.2	.27	17	w190612
w190613	6.0	21	6.5	15	.4	.33	21	1.2	.055	13	w190613
w190614	1.0	18	11	15	.5	.28	98	.6	.020	12	w190614
w190615	6.0	20	4.8	17	.9	.31	70	.9	.28	11	w190615
w190616	8.0	20	12	17	.5	.38	38	.6	.080	11	w190616
w190617	8.0	10	2.1	8.0	.5L	.17	22	.5	.018	6	w190617
w190618	6.0	19	5.3	17	1.0	.32	54	.9	.010	11	w190618
w190619	15	15	2.2	13	.2	.28	21	.7	.11	8	w190619
w190620	2.0	20	4.1	13	.3	.33	59	.7	.030	13	w190620
w190621	1.0	20	8.3	15	.4	.32	20L	.8	.010L	11	w190621
w190622	1.0	13	13	13	.3	.30	78	.5	.010	7	w190622
w190623	4.0	10	7.1	10	.6	.26	54	.3	.013	5	w190623
w190624	2.0	21	1.8	17	.5	.34	46	1.1	.017	12	w190624
w190625	3.0	10	3.2	6.6	.5L	.18	21	.3	.010	5	w190625
w190626	25	14	1.4	9.2	.5L	.22	21	.5	.15	7	w190626
w190627	3.0	29	2.2	27	.5	.42	34	1.7	.018	18	w190627
w190628	4.0	20	4.0	23	.3	.41	20L	.9	.068	10	w190628
w190629	5.0	9.0	2.3	6.9	.2	.14	20	.3	.085	5	w190629
w190630	15	11	4.0	12	.2	.19	23	.6	.060	7	w190630
w190631	18	14	2.8	11	.2	.25	32	.4	.095	9	w190631
w190632	2.0	22	12	18	1.4	.50	64	1.6	.042	11	w190632
w190633	2.0	24	6.3	20	.8	.32	23	1.3	.052	17	w190633
w190634	3.0	9.0	23	9.0	.3	.24	20	1.5	.052	3	w190634
w190635	1.0	7.0	6.3	13	.8	.31	48	1.9	.030	8	w190635
w190636	19	14	4.7	9.7	.6	.27	20	1.9	.13	1	w190636
w190637	1.0	20	4.8	21	2.0	.33	64	1.6	.017	8	w190637
w190638	2.0	18	5.7	19	1.7	.31	58	1.7	.017	8	w190638
w190639	8.0	12	5.7	11	.6	.26	28	1.6	.042	5	w190639
w190640	3.0	20	4.3	19	1.6	.38	40	1.9	.030	8	w190640
w190641	2.0	16	3.7	16	1.0	.26	44	1.9	.042	8	w190641

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w189348	0.1	770	340L	34L	0.70	2.5	4.1	1.3	0.2	3.0	w189348
w189349	.2	1,100	700L	36L	1.7	3.2	4.0	1.6	.3	5.2	w189349
w190604	.1	170	15	16L	.70	3.1	3.2	1.9	.3	4.3	w190604
w190605	.1	400	26	15L	.80	3.6	3.6	1.7	.3	4.2	w190605
w190606	.2	470	220	23	.60	6.7	4.2	2.9	.3	6.3	w190606
w190607	.2	500	740	26	.60	8.1	8.7	3.0	.4	7.5	w190607
w190608	.2	770	150	16L	.80	5.0	5.7	2.1	.3	6.9	w190608
w190609	.2	170	46	17L	.50	4.3	4.5	2.2	.2	3.0L	w190609
w190610	.1	480	33	15L	.30	3.2	4.4	1.6	.2	3.0	w190610
w190611	.2	610	59	18L	.60	5.3	6.2	2.3	.3	4.0	w190611
w190612	.2	670	56	18L	.60	4.9	6.1	2.5	.3	5.2	w190612
w190613	.2	400	33	15L	.60	3.7	3.6	1.8	.3	4.0	w190613
w190614	.1	1,900	1,800	16L	.60	3.4	4.3	1.6	.3	3.0L	w190614
w190615	.2	780	95	13	.90	4.1	4.6	1.8	.3	3.0	w190615
w190616	.2	330	39	7	.88	.50	3.5	2.2	.3	4.0	w190616
w190617	.1	490	14	14L	.40	1.7	2.8	.90	.2	3.0L	w190617
w190618	.2	870	39	11	.50	.10	3.1	1.8	.3	3.0	w190618
w190619	.1	400	59	15L	.50	3.0	3.9	1.3	.2	3.0L	w190619
w190620	.1	460	160	15L	.60	3.2	4.1	1.8	.2	4.0	w190620
w190621	.1	390	440	14L	.40	2.9	6.4	1.6	.2	4.4	w190621
w190622	.1	310	16	13L	.70	3.1	4.4	1.4	.2	3.0L	w190622
w190623	.1	260	15	15L	.90	3.0	2.8	1.2	.2	4.7	w190623
w190624	.2	670	88	17L	.50	3.6	3.9	1.8	.3	3.0L	w190624
w190625	.1	350	14	13L	.60	1.5	2.3	.70	.1	3.0L	w190625
w190626	.1	530	17	15L	.20	1.9	5.3	1.2	.2	3.0L	w190626
w190627	.2	630	61	17L	.40	5.2	6.2	2.2	.4	7.1	w190627
w190628	.2	210	33	14L	.70	6.1	.9	2.2	.4	3.0L	w190628
w190629	.1	430	23	12L	.50	1.9	3.4	.80	.3	3.0L	w190629
w190630	.1	370	31	12L	.70	2.5	4.4	1.0	.2	3.0L	w190630
w190631	.1	1,200	350	12L	.60	2.7	3.7	1.4	.2	3.0L	w190631
w190632	.1	610	80	47L	.70	4.6	6.3	2.2	.3	3.0L	w190632
w190633	.2	270	36	51L	.60	4.3	2.8	2.4	.2	4.0	w190633
w190634	.1	290	17	38L	1.3	3.6	4.9	.90	.3	4.0	w190634
w190635	.1	360	630	57L	.40	3.2	3.5	1.4	.2	3.8	w190635
w190636	.1	340	16	52L	.40	2.5	4.5	1.1	.2	3.0L	w190636
w190637	.1	450	49	59L	.30	3.9	3.6	1.4	.3	4.0	w190637
w190638	.1	640	100	57L	.30	3.8	4.4	1.5	.2	3.0	w190638
w190639	.1	770	24	60L	1.0	3.0	3.1	1.1	.2	3.0L	w190639
w190640	.1	2,400	41	43L	.30	4.1	4.1	1.5	.3	3.6	w190640
w190641	.1	480	30	39L	.20	2.9	4.1	1.1	.2	3.0L	w190641

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	U (ppm)	Yb (ppm)
w189348	1.7	0.6
w189349	2.8	.6
w190604	1.1	.7
w190605	1.4	.6
w190606	1.3	.8
w190607	2.4	1.1
w190608	1.3	.8
w190609	1.5	.9
w190610	1.0	.7
w190611	1.5	1.0
w190612	1.8	1.0
w190613	1.4	.8
w190614	.98	.6
w190615	1.3	.7
w190616	1.7	1.1
w190617	.67	.3
w190618	1.0	.8
w190619	1.3	.6
w190620	1.0	.6
w190621	.78	.5
w190622	.77	.7
w190623	.83	.6
w190624	1.5	.8
w190625	.55	.3
w190626	.62	.5
w190627	1.6	.9
w190628	3.3	1.2
w190629	.94	.2
w190630	1.6	.4
w190631	1.7	.5
w190632	1.7	.9
w190633	1.8	.7
w190634	.95	.7
w190635	.60	.7
w190636	.30	.4
w190637	.95	.6
w190638	.95	.6
w190639	1.3	.5
w190640	.97	.6
w190641	.85	.3

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w190642	32	13	13	20	1.0	0.37	20	1.3	0.50	6	w190642
w190665	2.0	10	5.8	8.9	.6	.19	35	.7	.020	5	w190665
w190666	5.0	4.0	6.7	4.1	.1	.10	34	.3	.020	2	w190666
w190667	1.0	5.0	11	11	.1	.16	46	.3	.014	2	w190667
w190668	1.0	41	4.4	31	.6	.61	35	2.4	.025	23	w190668
w190669	1.0	16	11	11	.5	.28	26	.7	.063	8	w190669
w190670	36	20	3.6	26	1.8	.41	50	1.2	.28	12	w190670
w190671	2.0	35	8.9	17	.6L	.51	42	1.3	.025	21	w190671
w190672	19	11	14	8.8	.2	.19	26	.4	.26	6	w190672
w190673	7.0	19	5.7	15	.5	.30	35	1.1	.063	11	w190673
w190674	1.0	11	6.4	10	1.1	.20	54	.5	.010	6	w190674
w190675	7.0	14	8.5	11	.7	.24	58	.7	.050	8	w190675
w190676	1.0	7.0	3.6	4.7	.2	.13	46	.3	.014	4	w190676
w190677	1.0	9.0	4.2	5.8	.2	.15	26	.4	.025	5	w190677
w190678	2.0	56	11	42	6.4	.88	210	3.3	.023	31	w190678
w190679	2.0	42	17	30	3.0	.77	270	2.2	.042	20	w190679
w190680	7.0	37	29	28	.5	.74	130	1.0	.045	17	w190680
w190681	5.0	48	12	37	2.3	.74	150	1.4	.070	27	w190681
w190682	2.0	16	15	15	.2	.35	82	.7	.014	9	w190682
w190683	20	10	3.5	13	.6	.21	78	.5	.070	5	w190683
w190684	59	10	3.3	11	.6	.23	32	.5	.15	5	w190684
w190685	10	16	3.5	14	.4	.29	26	.9	.060	9	w190685
w190686	2.0	14	4.0	10	.4	.25	42	.6	.025	8	w190686
w190687	8.0	23	2.9	19	.3	.35	46	.9	.045	16	w190687
w190922	4.9	70	8.3	52	5.8	1.3	28	2.1	.11	38	w190922
w190923	1.0	13	17	6.5	.5L	.49	20L	.3L	.18	5	w190923
w190924	78	30	1.8	26	3.1	.76	150	1.1	.68	16	w190924
w190925	3.4	15	9.4	19	.8	.37	68	.7	.040	7	w190925
w190926	38	9.0	3.3	19	.8	.43	92	.5	1.4	4	w190926
w190927	36	8.0	1.7	5.4	.6	.18	39	.3	.15	4	w190927
w190928	4.0	24	8.4	16	2.2	.55	64	.7	.026	12	w190928
w191107	6.0	10	6.4	7.1	.8	.18	71	.3	.038	5	w191107
w191108	46	17	10	16	.4	.39	52	.5	.29	7	w191108
w191109	3.0	14	1.4	13	.4	.21	84	.8	.015	9	w191109
w191110	14	7.0	2.3	4.6	.2	.17	88	.3	.15	4	w191110
w191111	100	8.0	3.2	5.2	.5	.18	24	.2	.62	4	w191111
w191112	200	13	2.9	9.3	1.1	.28	52	.4	.95	49	w191112
w191113	2.0	36	5.6	31	.5	.43	120	1.3	.065	20	w191113
w191114	6.0	32	8.0	32	2.4	.56	130	1.6	.12	18	w191114
w191115	1.0	14	3.9	7.5	.1	.23	140	.4	.070	9	w191115

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w190642	0.2	330	19	32L	1.3	4.2	4.1	1.4	0.4L	4.0	w190642
w190665	.1	340	15	22L	.40	1.2	1.4	1.0	.1	3.0L	w190665
w190666	.1	290	7L	20L	.90	1.3	1.8	.50	.1	3.0L	w190666
w190667	.1	320	12	20L	1.0	2.7	1.4	.70	.1	3.0L	w190667
w190668	.3	550	140	23L	.50	6.5	6.5	3.1	.5	8.2	w190668
w190669	.1	170	11	16L	.50	2.7	7.4	1.5	.3	3.0L	w190669
w190670	.2	520	69	26	.80	3.8	6.7	2.1	.3	3.0L	w190670
w190671	.2	340	300	19L	1.3	4.8	3.8	2.8	.5	3.0L	w190671
w190672	.1	470	17	17L	.70	1.6	2.5	1.1	.1	3.0L	w190672
w190673	.2	580	90	17L	.70	3.3	3.5	1.6	.2	4.1	w190673
w190674	.1	640	90	15	.80	2.5	3.4	1.1	.2	3.0L	w190674
w190675	.1	570	30	16L	.60	2.7	3.5	1.3	.2	3.0L	w190675
w190676	.1	340	58	14L	.50	1.2	3.1	.60	.3L	3.0L	w190676
w190677	.1	620	23	13L	.30	1.4	2.9	.70	.1	4.0	w190677
w190678	.4	1,500	160	77	.90	9.4	7.1	4.7	.6	9.6	w190678
w190679	.5	1,200	120	45	1.4	7.5	7.8	4.4	.7	5.0	w190679
w190680	.2	800	200	20L	5.6	12	4.8	3.7	.6	7.4	w190680
w190681	.3	1,300	340	34L	3.0	11	2.6	4.7	.6	7.1	w190681
w190682	.1	470	700	15L	2.0	3.7	1.9	1.6	.3	4.9	w190682
w190683	.1	490	98	10	.70	2.6	1.1	1.0	.1	3.0L	w190683
w190684	.1	430	42	16L	1.2	2.1	1.4	.90	.1	3.0L	w190684
w190685	.2	430	32	14L	.90	2.8	3.5	1.4	.3	5.9	w190685
w190686	.1	1,100	77	17L	.30	2.1	9.4	1.2	.2	3.0L	w190686
w190687	.1	860	280	18L	.60	3.4	4.0	1.7	.2	3.0L	w190687
w190922	.4	550	420	71	1.3	13	2.6	7.1	.8	11	w190922
w190923	.1	180	B	19L	.54	1.7	1.7	1.9	.3	3.0L	w190923
w190924	.3	310	87	48	2.3	7.7	4.0	3.0	.4	3.0L	w190924
w190925	.2	200	40	16	1.4	4.4	5.1	1.8	.2	3.0L	w190925
w190926	.2	150	58	22L	.49	3.5	4.2	1.6	.3	3.0	w190926
w190927	.1L	290	138	16L	.60	1.2	2.3	.80	.5L	3.0L	w190927
w190928	.2	340	41	20	.60	4.5	1.2	2.3	.3	3.0L	w190928
w191107	.1	380	B	12	1.1	2.2	2.0	.90	.2	3.0L	w191107
w191108	.2	120	710	15L	1.7	5.8	4.2	2.7	.6	3.0L	w191108
w191109	.1	790	B	30L	.40	2.3	2.3	1.2	.2	3.0L	w191109
w191110	.1	310	B	18L	.70	1.1	4.8	.80	.1	3.0L	w191110
w191111	.1	350	B	15L	1.3	1.2	2.1	.90	.1	3.0L	w191111
w191112	B	1,200	B	B	1.7	2.1	7.8	B	.2	3.0L	w191112
w191113	.1	320	150	24L	.60	7.7	5.7	2.5	.3	8.4	w191113
w191114	.2	370	B	44	.40	6.0	4.3	2.9	.3	3.0L	w191114
w191115	.1	360	310	20L	.40	2.0	3.6	1.3	.2	3.0L	w191115

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	U (ppm)	Yb (ppm)
w190642	2.0	0.7
w190665	.40	.4
w190666	.30	.3
w190667	.68	.5
w190668	2.2	2.0
w190669	1.0	.9
w190670	4.7	.9
w190671	1.5	1.3
w190672	.93	.4
w190673	1.4	1.0
w190674	1.0	.5
w190675	1.0	.6
w190676	.30	.3
w190677	.74	.4
w190678	2.6	2.3
w190679	3.7	2.8
w190680	1.7	1.4
w190681	2.6	1.8
w190682	1.1	.8
w190683	.74	.4
w190684	.56	.5
w190685	1.4	.9
w190686	.49	.5
w190687	1.6	.6
w190922	3.6	2.9
w190923	.72	1.0
w190924	2.4	1.6
w190925	2.1	1.1
w190926	.64	1.1
w190927	1.5	.4
w190928	2.7	1.2
w191107	1.1	.5
w191108	1.5	1.4
w191109	1.4	.5
w191110	.99	.4
w191111	.30	.5
w191112	1.9	.6
w191113	2.7	.9
w191114	1.6	1.4
w191115	.50	.5

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w191116	2.0	14	5.2	8.2	0.4	0.27	120	0.3	0.045	8	w191116
w191117	2.0	10	2.8	4.3	.2	.21	140	.2	.020	5	w191117
w191118	2.0	28	5.8	22	1.6	.47	100	1.5	.026	16	w191118
w191119	1.0	11	5.7	8.8	.4L	.27	96	.4	.010L	6	w191119
w191120	1.0	11	8.1	4.9	.2	.23	72	.2	.010	5	w191120
w191121	18	13	6.0	15	1.3	.25	100	.9	.29	7	w191121
w191122	53	14	3.9	15	1.3	.30	160	.7	.27	7	w191122
w191123	2.0	16	4.2	16	.6	.32	140	.7	.033	9	w191123
w191124	2.0	17	5.7	11	1.1	.33	60	.8	.030	8	w191124
w191125	2.0	20	5.5	17	1.1	.33	140	.9	.026	11	w191125
w191126	1.0	21	8.3	19	1.9	.40	96	.9	.020	10	w191126
w191127	73	12	5.6	12	.2	.26	40	.5	.57	6	w191127
w191128	1.0	30	5.3	26	1.4	.41	88	1.3	.043	16	w191128
w191129	57	37	7.9	27	1.4	.45	110	1.0	.21	20	w191129
w191130	3.0	7.0	3.4	4.2	.4	.15	50	.4	.039	3	w191130
w191131	39	27	6.5	28	2.5	.47	60	1.2	.21	4	w191131
w191132	8.0	27	6.4	28	2.4	.43	180	1.2	.13	22	w191132
w191133	1.0	46	5.7	47	15	.61	60	3.1	.038	8	w191133
w191178	10	20	4.2	34	1.7	.33	250	1.2	.58	12	w191178
w191179	7.8	14	2.7	19	1.7	.28	200	.9	.21	9	w191179
w191180	7.8	13	2.8	11	.7	.24	260	.5	.090	7	w191180
w191181	2.8	16	1.9	18	1.5	.27	150	.9	.050	9	w191181
w191182	4.1	25	3.6	25	2.5	.37	150	1.2	.078	14	w191182
w191183	3.5	19	3.0	19	1.5	.27	160	.7	.17	10	w191183
w191184	2.7	16	2.9	27	2.2	.42	100	1.1	.13	9	w191184
w191185	27	26	5.8	37	1.5	.68	110	1.2	.24	13	w191185
w191186	14	13	10	18	.4	.43	88	.6	.35	6	w191186
w191187	30	14	3.0	15	.8	.25	180	.6	.13	8	w191187
w191188	7.6	23	4.7	26	2.3	.36	110	1.3	.14	13	w191188
w191189	12	19	3.4	15	1.6	.29	80	.8	.060	10	w191189
w191522	39	20	5.0	13	1.4	.36	28	1.1	.090	11	w191522
w191862	17	5.0	7.0	4.5	.2	.20	20L	.6	.023	2	w191862
w191863	11	12	4.0	13	1.1	.23	80	.5	.073	7	w191863
w191864	48	28	5.8	23	2.7	.53	140	.8	.23	16	w191864
w191865	1.4	22	8.6	21	.4	.34	32	1.4	.16	13	w191865
w191866	4.0	24	9.1	37	2.4	.48	64	1.6	.13	13	w191866
w191867	8.9	13	5.4	8.8	.5	.26	48	.4	.18	7	w191867
w191868	11	12	4.4	9.5	.4	.19	34	.6	.14	6	w191868
w191869	240	18	5.5	17	1.9	.36	76	.5	.19	10	w191869
w191870	32	7.0	2.7	5.1	.6	.21	20L	.3	.050	3	w191870

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w191116	0.1	380	120	20L	0.40	2.0	3.1	1.4	0.2	3.0L	w191116
w191117	.1	280	23	16L	.40	1.3	2.1	1.0	.2	3.0L	w191117
w191118	.2	290		18	1.3	4.9	4.4	2.5	.4	5.0	w191118
w191119	.1	190	B	15L	.70	2.5	4.1	1.3	.2	3.0L	w191119
w191120	.1	170	97	15L	.30	1.4	3.4	1.2	.2	3.0L	w191120
w191121	.2	290	5	20	2.6	4.7	3.6	1.3	.2	4.0	w191121
w191122	.2	230	24	26	1.3	3.7	5.5	1.5	.3	5.0	w191122
w191123	.1	380	B	20	1.0	3.6	4.3	1.6	.2	3.0L	w191123
w191124	.1	210	22	17	.90	2.8	1.6	1.8	.3	3.0L	w191124
w191125	.2	370	17	17	1.1	4.0	3.8	1.8	.3	5.0	w191125
w191126	.2	210	31	32	.90	4.8	3.6	2.1	.3	3.0L	w191126
w191127	.1	190	130	17L	1.1	2.2	5.6	1.4	.2	6.6	w191127
w191128	.2	300	49	23	.40	4.9	6.3	2.4	.3	4.0	w191128
w191129	.2	480	120	25	2.2	6.6	4.4	3.1	.4	6.0	w191129
w191130	.1	280	11	14L	1.1	1.2	1.9	.80	.1	3.0L	w191130
w191131	.1	450	1,000	18	.90	5.1	11	.90	.5	5.0	w191131
w191132	.2	550	130	74	.70	5.1	4.0	3.5	.4	7.9	w191132
w191133	.1	320	800	14L	.30	9.9	9.2	1.5	.6	5.2	w191133
w191178	.2	310	710	21	1.8	6.4	6.6	1.7	.3	4.0	w191178
w191179	.1	300	830	27	.30	3.4	2.2	1.4	.2	3.0	w191179
w191180	.1	300	600	9	.28	1.9	2.0	1.0	.2	3.0L	w191180
w191181	.1	320	240	24	.28	3.1	1.0	1.4	.2	3.0L	w191181
w191182	.1	440	1,100	28	.38	4.3	1.8	2.0	.3	4.3	w191182
w191183	.1	450	750	23	.32	3.0	2.8	1.4	.2	4.9	w191183
w191184	.2	410	420	30	.46	5.7	2.1	1.8	.3	3.0L	w191184
w191185	.3	370	490	24	1.0	10	6.1	2.8	.5	3.0L	w191185
w191186	.2	240	31	13L	1.5	3.6	7.1	1.7	.3	3.0L	w191186
w191187	.1	270	55	11	.34	2.5	4.1	1.1	.2	3.0L	w191187
w191188	.1	340	30	32	.37	4.9	3.2	1.8	.3	5.1	w191188
w191189	.1	260	170	24	.24	3.0	2.2	1.5	.2	3.0L	w191189
w191522	.1	150	5	15	.86	2.6	2.5	1.9	.3	3.0L	w191522
w191862	.2	320	12	15L	1.4	2.9	2.0	.90	.2L	3.0L	w191862
w191863	.1	610	50	20	.70	3.2	3.5	1.2	.2	3.0L	w191863
w191864	.2	590	22	43	.80	5.3	6.1	2.7	.4L	5.5	w191864
w191865	.2	120	150	14L	.29	3.8	5.3	1.8	.2	6.3	w191865
w191866	.2	230	87	31	.64	7.2	8.5	2.4	.5	7.8	w191866
w191867	.1	130	16	11	.59	2.0	3.8	1.1	.5L	3.0L	w191867
w191868	.1	250	B	14L	.40	2.1	4.6	1.0	.5L	3.0L	w191868
w191869	.2	320	B	24	1.7	3.8	4.4	1.9	.4	6.6	w191869
w191870	.1	430	9	15L	.84	1.6	3.8	1.0	.2	3.0L	w191870

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	U (ppm)	Yb (ppm)
w191116	0.40	0.5
w191117	.50	.6
w191118	1.9	1.2
w191119	.30	.8
w191120	.40	.5
w191121	1.3	.9
w191122	1.0	.9
w191123	1.3	.8
w191124	.84	.8
w191125	1.6	1.0
w191126	1.2	1.4
w191127	.94	.7
w191128	1.3	1.0
w191129	2.8	1.1
w191130	.20L	.4
w191131	.60	1.1
w191132	1.5	1.1
w191133	.20L	1.7
w191178	1.6	1.1
w191179	.61	.7
w191180	.53	.4
w191181	.64	.6
w191182	1.1	.8
w191183	.51	.6
w191184	2.6	.9
w191185	2.9	1.7
w191186	4.0	.9
w191187	.82	.4
w191188	1.1	.8
w191189	.57	.6
w191522	1.6	.9
w191862	2.1	.8
w191863	1.0	.6
w191864	3.9	1.1
w191865	.98	.9
w191866	2.5	1.0
w191867	.67	.6
w191868	.60	.5
w191869	2.4	.9
w191870	.93	.5

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w191871	14	6.0	4.0	3.2	0.4	0.16	20L	0.4	0.050	3	w191871
w191872	3.3	11	1.6	12	.6	.19	27	.7	.070	6	w191872
w191873	1.0	18	5.4	19	1.6	.26	30	1.0	.020	11	w191873
w191874	40	23	3.3	13	.4	.28	88	.8	.077	14	w191874
w191875	3.3	6.0	6.3	4.4	.3L	.09	20L	.2	.026	3	w191875
w191876	4.1	9.0	2.4	8.1	.4	.19	34	.5	.11	5	w191876
w191877	15	47	5.9	34	1.4	.73	140	3.1	.11	28	w191877
w191878	12	12	8.7	9.3	.6	.19	20L	.5	.11	7	w191878
w191879	7.0	12	5.3	9.5	.5	.27	42	.5	.034	7	w191879
w191880	4.8	17	5.7	17	.7	.32	34	1.0	.085	10	w191880
w191881	11	24	8.4	23	1.1	.39	46	1.4	.15	15	w191881
w191882	8.9	16	22	30	1.3	.49	140	.7	.18	8	w191882
w191883	1.0	18	100	23	.2	.38	56	1.1	.031	11	w191883
w191884	2.0	25	7.1	26	.8	.42	26	1.6	.087	15	w191884
w191885	2.9	11	9.4	10	.7	.39	40	.3	.040	5	w191885
w191886	4.7	20	6.7	16	1.1	.39	61	.7	.034	11	w191886
w191887	5.1	10	5.2	8.1	.4	.18	20L	.4	.055	6	w191887
w191888	.9	43	6.5	39	1.5	.77	86	2.0	.023	23	w191888
w191889	41	6.0	2.4	2.8	.1	.17	20L	.6	.55	2	w191889
w191890	3.6	21	4.9	17	1.0	.35	28	1.1	.10	13	w191890
w191891	1.6	10	5.7	7.0	.4	.18	20L	.4	.019	6	w191891
w191892	55	13	4.3	15	1.7	.34	48	.6	.48	7	w191892
w191893	56	30	14	14	.9	.85	48	.8	.38	13	w191893
w191894	1.4	9.0	14	7.1	.3	.33	20L	.2	.043	4	w191894
w191895	42	50	8.4	59	5.3	1.1	82	2.7	.15	29	w191895
w191896	1.9	26	8.3	26	1.9	.45	190	1.2	.019	16	w191896
w191897	.8	17	5.3	9.9	.3	.35	20L	.5	.016	10	w191897
w191898	1.0	23	7.1	24	.8	.44	52	.8	.031	13	w191898
w191899	1.9	12	11	16	.9	.38	34	.4	.031	7	w191899
w191900	1.3	17	3.0	13	.4	.23	86	1.1	.048	11	w191900
w191901	75	14	2.9	11	.4	.20	28	.6	.32	8	w191901
w191902	.9	7.0	11	5.7	.2	.26	61	.2	.023	3	w191902
w191903	.7	17	4.1	15	1.1	.31	36	.8	.012	10	w191903
w191904	1.5	14	7.0	14	.6	.24	20L	.7	.019	8	w191904
w192710	2.0	17	4.0	14	.3	.27	27	1.2	.030	10	w192710
w192711	1.0	11	6.6	7.7	.4	.23	20L	.4	.010L	6	w192711
w192712	3.0	5.0	4.2	4.0	.1	.13	20L	.2	.010L	3	w192712
w192713	24	10	4.5	7.9	1.4	.19	38	.4	.050	5	w192713
w192714	8.0	9.0	2.4	6.4	.5	.20	21	.3	.010	5	w192714
w192715	21	17	4.9	9.5	.5	.28	54	.4	.050	9	w192715

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w191871	0.1	350	14	13L	1.9	1.1	3.3	0.70	0.1	3.0L	w191871
w191872	.1	430		13	.30	2.8	4.6	.90	.1	3.0L	w191872
w191873	.1	290	40	27	1.0	4.3	4.9	1.6	.3	4.2	w191873
w191874	.1	270	170	16L	.52	2.9	1.8	1.9	.4	3.0	w191874
w191875	.1	190	66	10L	.61	1.3	2.8	.60	.4L	3.0L	w191875
w191876	.1	190	12	8	.29	3.0	5.5	.90	.1	3.0L	w191876
w191877	.4	500	67	46	1.0	8.2	6.2	4.0	.8	11	w191877
w191878	.1	160	200	13L	.77	2.3	4.3	1.1	.5L	3.0L	w191878
w191879	.1	140	18	14L	.73	2.2	3.6	1.4	.2	3.0L	w191879
w191880	.1	230	B	8	.64	3.6	8.3	1.5	.3	3.0L	w191880
w191881	.2	160	B	13	.43	4.8	11	2.2	.3	4.6	w191881
w191882	.3	330	B	16	1.3	8.9	5.9	2.1	.5	5.2	w191882
w191883	.1	170	10	13L	.35	3.4	6.4	1.8	.3	3.0L	w191883
w191884	.2	270	B	16L	.48	5.2	6.4	2.1	.4	9.3	w191884
w191885	.2	300	17	16	2.7	3.8	2.5	1.7	.4	3.0L	w191885
w191886	.2	370	B	18	.76	3.5	6.2	2.2	.3	4.9	w191886
w191887	.1	270	B	11L	.36	1.7	8.3	.90	.2	3.0L	w191887
w191888	.4	260	B	19	.84	9.5	10	3.9	.7	9.5	w191888
w191889	.1	290	7	13L	.48	.80	4.3	.70	.2	3.0L	w191889
w191890	.2	380	18	15L	1.0	3.8	4.5	1.9	.3	3.0L	w191890
w191891	.1	140	17	12L	.58	1.5	2.9	.80	.1	3.0L	w191891
w191892	.2	210	B	21	2.0	3.7	7.9	1.5	.3	3.0L	w191892
w191893	.5	220	140	13	2.6	7.3	3.0	3.6	.9	3.0L	w191893
w191894	.1	81		10L	.80	2.0	2.9	1.5	.3	3.0L	w191894
w191895	.3	620	35	80	.75	10	9.5	4.5	.5	11	w191895
w191896	.2	250	B	27	.42	5.0	5.1	2.2	.3	5.7	w191896
w191897	.1	240	26	13L	.37	2.8	3.7	1.7	.3	3.0L	w191897
w191898	.1	190	31	9	.42	4.4	4.9	2.3	.4	3.0L	w191898
w191899	.3	260	25	21	.94	5.5	2.2	1.6	.3	3.0L	w191899
w191900	.1	430	B	14L	.18	2.5	7.1	1.2	.2	3.0L	w191900
w191901	.1	250	4	14L	.81	2.3	4.9	1.1	.2	3.0L	w191901
w191902	.1	150	10	10L	.58	1.9	2.4	1.1	.3	3.0	w191902
w191903	.1	390	110	17	1.1	3.2	2.8	1.6	.2	3.0L	w191903
w191904	.1	390	14	16L	.82	3.0	3.6	1.3	.2	3.0L	w191904
w192710	.1	320	77	7L	.60	2.9	4.5	1.4	.2	5.0	w192710
w192711	.1	390	19	5	1.8	2.3	4.4	1.1	.2	3.0L	w192711
w192712	.1L	270	21	12L	.40	.80	1.2	.30	.1	3.0L	w192712
w192713	.1	360	22	16	.70	1.9	1.6	.80	.2	3.0L	w192713
w192714	.1	370	180	8	.70	1.6	1.2	.90	.2	3.0L	w192714
w192715	.1	440	27	28L	1.0	2.1	2.0	1.4	.2	4.0	w192715

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	U (ppm)	Yb (ppm)
w191871	0.54	0.4
w191872	.66	.6
w191873	1.1	.9
w191874	1.5	.7
w191875	.20	.3
w191876	.68	.8
w191877	2.7	2.2
w191878	.83	.5
w191879	.79	.8
w191880	1.3	.7
w191881	1.5	1.3
w191882	2.5	1.9
w191883	1.4	.9
w191884	1.5	1.1
w191885	1.5	1.2
w191886	1.5	.9
w191887	.64	.5
w191888	3.0	2.2
w191889	.57	.4
w191890	1.7	1.0
w191891	.75	.4
w191892	1.5	1.3
w191893	3.1	2.9
w191894	.47	.8
w191895	2.3	1.8
w191896	1.2	.9
w191897	.64	.7
w191898	1.9	.8
w191899	1.4	1.5
w191900	1.0	.7
w191901	1.3	.6
w191902	.50	.7
w191903	1.4	.8
w191904	1.4	.6
w192710	2.0	.8
w192711	1.1	.7
w192712	.20	.3
w192713	.90	.4
w192714	.90	.5
w192715	.70	.6

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w192716	17	9.0	4.0	6.9	0.3	0.19	20L	0.3	0.050	4	w192716
w192717	18	31	12	23	1.5	.50	58	1.6	.11	18	w192717
w192718	9.0	18	4.0	11	1.3	.46	44	.4	.10	9	w192718
w192719	7.0	25	11	17	.3	.43	26	1.6	.10	15	w192719
w192720	1.0	12	9.8	6.5	.1	.22	20L	.4	.010L	6	w192720
w192721	12	18	8.4	13	.4L	.31	20L	1.1	.14	10	w192721
w192722	4.0	15	13	12	.5	.28	32	.3	.050	8	w192722
w192723	10	9.0	4.9	5.9	.3	.18	20	.3	.030	5	w192723
w192724	10	7.0	3.0	5.7	.1	.19	20L	.2	.030	3	w192724
w192725	1.0	18	8.0	11	.8	.29	55	.9	.050	9	w192725
w192726	3.0	18	7.0	10	.2	.33	24	.4	.090	8	w192726
w192727	2.0	15	7.0	9.0	.4	.27	33	.6	.070	8	w192727
w192728	1.0	23	5.0	14	.9	.28	43	1.0	.050	13	w192728
w192729	1.0	8.0	4.4	4.3	.1	.17	20L	.2	.13	4	w192729
w192730	2.0	43	4.6	24	1.7	.64	75	2.6	.080	22	w192730
w192731	1.0L	8.0	8.4	6.3	.2	.23	20L	.3	.050	4	w192731
w192732	6.0	8.0	5.1	4.0	.3L	.15	20L	.3	.12	5	w192732
w192733	2.0	20	9.7	13	.4L	.31	20L	1.0	.060	11	w192733
w192734	3.0	8.0	4.0	5.1	.3L	.14	20L	.4	.11	5	w192734
w192735	2.0	19	9.4	11	.4L	.29	20L	.9	.10	12	w192735
w192736	11	8.0	2.9	7.3	.3	.17	29	.3	.14	4	w192736
w192737	5.0	28	3.7	27	.9	.44	63	3.3	.16	16	w192737
w192738	8.0	8.0	2.4	5.1	.1	.18	20L	.2	.12	4	w192738
w192739	19	20	8.4	15	1.0	.41	55	.7	.16	11	w192739
w193126	10	8.0	1.4	7.9	.4	.14	37	.3	.090	4	w193126
w193127	10	8.0	1.9	7.7	.4L	.14	28	.4	.040	4	w193127
w193128	7.0	8.0	2.3	8.4	.3	.14	54	.4	.030	4	w193128
w193129	12	13	3.1	15	.5	.24	37	.9	.080	7	w193129
w193130	18	12	4.1	14	.9	.26	140	.7	.13	6	w193130
w193131	10	9.0	3.7	11	.3	.21	34	.4	.10	4	w193131
w193132	10	8.0	2.4	8.1	.4	.14	67	.3	.010L	4	w193132
w193133	21	9.0	3.2	9.5	.3	.18	42	.4	.070	4	w193133
w192647	1.0L	6.0	20	2.7	.4L	.13	20L	.7	.010L	2	w192647
w192648	14	3.0	5.7	1.8	.3L	.06	20L	.2	.030	1	w192648
w192649	4.0	10	7.7	3.1	.4L	.20	27	.2	.020	4	w192649
w192650	1.0	20	7.1	7.7	.4L	.34	39	.5	.010L	7	w192650
w192651	1.0	14	16	13	1.3	.34	37	.4	.010L	5	w192651
w192652	11	12	2.6	9.7	1.9	.29	80	.3	.060	4	w192652
w192653	4.0	9.0	2.3	6.0	1.1	.18	32	.3	.040	3	w192653
w192654	2.0	19	3.6	13	3.5	.45	57	.7	.010	6	w192654

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w192716	0.1	240	20	22L	2.1	1.8	1.5	1.0	0.2	3.0L	w192716
w192717	.2	330	140	19	.80	5.3	8.2	2.3	.4	6.0	w192717
w192718	.1	380	39	21	1.6	2.7	.8	1.9	.3	5.0	w192718
w192719	.2	270	110	25L	.70	3.9	4.7	1.9	.4	3.0L	w192719
w192720	.1	320	12	22L	.30	1.8	1.8	1.1	.2	3.0L	w192720
w192721	.1	220	7	22L	1.1	2.6	7.9	1.4	.3	4.0	w192721
w192722	.1	430	49	9	.40	2.1	1.7	1.4	.2	3.0L	w192722
w192723	.1	260	7	7	.40	1.2	2.5	.90	.1	3.0L	w192723
w192724	.1	160	3	17L	1.5	2.1	.8	.90	.2	3.0L	w192724
w192725	.1	460	20	25L	.40	2.5	2.5	1.3	.2	3.0L	w192725
w192726	.1	150	29	19L	2.0	2.4	1.8	1.6	.3	3.0L	w192726
w192727	.1	340	25	22L	.50	2.2	2.6	1.3	.2	3.0	w192727
w192728	.1	440	42	25L	.30	2.8	3.6	2.0	.3	4.0	w192728
w192729	.1L	360	6	21L	.10	.90	2.0	.80	.2L	3.0L	w192729
w192730	.2	660	69	28	.30	4.7	5.7	3.3	.5	7.0	w192730
w192731	.1	110	15	15L	1.5	1.8	1.8	1.0	.2	3.0L	w192731
w192732	.1	230	9	13L	.30	.90	2.1	.70	.1	3.0L	w192732
w192733	.1	510	45	24L	.40	2.8	4.3	1.5	.3	4.0	w192733
w192734	.1	370	3	20L	.80	1.4	2.6	.70	.2	3.0L	w192734
w192735	.1	440	35	22L	.70	2.6	4.1	1.4	.2	4.0	w192735
w192736	.1	310	29	16L	.40	1.8	3.5	.80	.1	3.0L	w192736
w192737	.3	270	94	18L	1.0	5.6	5.6	2.4	.4	13	w192737
w192738	.1	230	7	13L	.80	1.1	2.4	.80	.1	3.0L	w192738
w192739	.2	340	41	15	1.6	3.5	4.6	2.1	.4	5.0	w192739
w193126	.1	360	43	6	.20	1.5	1.1	.60	.2	3.0L	w193126
w193127	.1	510	38	5	.20	1.6	1.5	.60	.3L	4.0	w193127
w193128	.1	230	240	6	.20	1.7	1.2	.60	.2	3.0L	w193128
w193129	.1	520	88	8	.30	3.0	2.3	1.1	.2	3.0L	w193129
w193130	.1	310	440	16	.40	2.6	1.0	1.1	.2	3.0L	w193130
w193131	.1	440	18	9L	.20	2.1	1.4L	1.1	.2	4.0	w193131
w193132	.1	460	230	6	.30	2.0	2.1	.60	.2	3.0L	w193132
w193133	.1	150	30	6	.20	1.8	1.5L	.80	.2	3.0L	w193133
w192647	.1	55	B	13L	.20	1.3	1.4L	.40	.5L	3.0L	w192647
w192648	.1L	83	B	13L	.50	.30	1.6	.20	.4L	3.0L	w192648
w192649	.1L	88	B	13L	.10	.80	.9	.60	.1	3.0L	w192649
w192650	.1	45	B	13L	.10	2.0	.9	1.3	.3	3.0L	w192650
w192651	.1	45	13	14	.20	2.7	1.2	1.1	.2	3.0L	w192651
w192652	.2	53	100	16	1.9	2.8	1.7L	1.1	.3	3.0L	w192652
w192653	.1	66	36	10	.70	1.3	1.3L	.60	.2	3.0L	w192653
w192654	.1	70	37	16	.20	2.7	.6	1.5	.5	3.0L	w192654

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia.

Sample number	U (ppm)	Yb (ppm)
w192716	2.5	0.7
w192717	2.5	1.2
w192718	3.4	.8
w192719	2.0	1.0
w192720	.70	.6
w192721	1.5	.7
w192722	.80	.6
w192723	1.0	.4
w192724	1.4	.9
w192725	1.2	.8
w192726	1.9	.8
w192727	.90	.6
w192728	.90	.9
w192729	.50	.3
w192730	1.6	1.5
w192731	.70	.9
w192732	.50	.4
w192733	1.2	.9
w192734	.80	.4
w192735	1.2	.7
w192736	.70	.4
w192737	3.6	2.0
w192738	.40	.4
w192739	1.7	1.0
w193126	.30	.4
w193127	.80	.4
w193128	.30	.4
w193129	1.5	.6
w193130	1.7	.6
w193131	7.3	.4
w193132	.50	.3
w193133	.50	.4
w192647	.70	.7
w192648	.20L	.1
w192649	.30	.2
w192650	.70	.6
w192651	1.1	.7
w192652	7.9	1.0
w192653	1.9	.4
w192654	1.3	.7

Table 7g -- Content of 22 trace edements in 252 coal samples from West Virginia.

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w192655	1.0	17	4.8	11	1.9	0.39	34	0.5	0.010L	5	w192655
w192656	1.0L	14	6.4	20	2.5	.32	82	.5	.10	4	w192656
w192657	6.0	52	6.2	33	3.9	.87	140	1.7	.060	18	w192657
w192658	1.0L	16	4.2	8.4	.3	.27	20L	.7	.010L	6	w192658
w192659	1.0L	7.0	1.4	3.5	.3L	.14	20L	.3	.010L	3	w192659
w192660	1.0L	5.0	1.1	2.5	.3L	.12	20L	.2	.010L	2	w192660
w192661	1.0	15	4.2	4.2	.1	.28	20L	.2	.010L	6	w192661
w192662	1.0	14	7.2	4.1	.4L	.23	20L	.2	.010L	5	w192662
w192663	1.0	15	14	3.2	.4L	.29	20L	.2	.010L	5	w192663
w192664	1.0	23	20	11	.5L	.38	20L	.3	.010L	7	w192664
w192665	4.0	24	5.9	11	.5	.45	29	.4	.010	8	w192665
w192666	6.0	20	2.8	7.9	.4	.38	20L	.3	.050	7	w192666
w192667	6.0	24	3.7	23	.4	.55	28	.9	.47	8	w192667

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w192655	0.2	52	B	11	0.40	2.3	0.7	1.4	0.3	4.0	w192655
w192656	.2	67	43	20	.40	6.2	1.4	1.4	.5	8.0	w192656
w192657	.3	170	99	42	3.5	6.4	5.7	3.0	.6	12	w192657
w192658	.1	83	12	14L	.70	1.7	.9	1.0	.3	8.0	w192658
w192659	.1L	82	B	12L	.10	.70	1.0	.40	.4L	3.0L	w192659
w192660	.1L	120	B	11L	.10	.50	.8	.30	.4L	3.0L	w192660
w192661	.1	110	B	14L	.10	.80	1.3	1.0	.2	3.0L	w192661
w192662	.1L	91	B	13L	.10	.80	1.3	1.0	.2	3.0L	w192662
w192663	.1L	160	B	14L	.20	.80	.9	1.0	.2	3.0L	w192663
w192664	.1	98	B	15L	.80	2.3	2.0	1.7	.3	3.0L	w192664
w192665	.1	61	22	10	.30	2.5	1.0	1.8	.3	3.0L	w192665
w192666	.1	100	B	14L	.40	1.4	1.5	1.3	.3	4.0	w192666
w192667	.3	65	B	13L	1.1	4.2	5.2	1.9	.7	5.0	w192667

Table 7g -- Content of 22 trace elements in 252 coal samples from West Virginia

Sample number	U (ppm)	Yb (ppm)
w192655	1.5	0.9
w192656	12	1.6
w192657	6.0	2.1
w192658	1.2	.7
w192659	.30	.2
w192660	.20L	.1
w192661	.40	.4
w192662	.30	.3
w192663	.20	.3
w192664	3.3	.6
w192665	1.0	.7
w192666	.90	.7
w192667	2.3	1.6

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

[Values in percent or parts-per-million. 22 values are from direct determinations on whole coal; all other values calculated from analyses of ash, S means analysis by emission spectrography; L, less than the value shown; N, not detected; B, not determined.]

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w189252	2.4	1.3	0.042	0.030	0.049	0.078	0.30	0.078	0.10	5.0	w189252
w189253	3.9	2.1	.043	.066	.043	.13	.64	.10	.16	38	w189253
w189254	1.1	.85	.041	.017	.044	.040	.088	.045	.06	2.0	w189254
w189255	1.5	.84	.22	.043	.068	.057	.10	.066	.03L	1.0	w189255
w189256	1.7	1.1	.022	.023	.077	.058	.11	.046	.04	2.0	w189256
w189257	.71	.53	.028	.012	.039	.033	.061	.035	.03	1.0	w189257
w189258	3.3	1.6	.053	.070	.078	.10	.38	.092	.06L	7.0	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	1.5	.85	.044	.048	.026	.073	.72	.050	.07	70	w189260
w189261	2.3	1.2	.063	.029	.038	.080	.52	.075	.05	20	w189261
w189280	3.7	2.1	.22	.12	.092	.13	2.0	.097	.06	8.7	w189280
w189281	1.7	1.1	.15	.069	.076	.092	3.1	.060	.05	13	w189281
w189282	1.8	1.0	.18	.077	.062	.068	.90	.059	.01L	2.6	w189282
w189283	4.7	2.8	.50	.14	.25	.19	2.9	.15	.06	20	w189283
w189284	2.0	1.2	.14	.060	.071	.073	1.1	.063	.04	4.2	w189284
w189285	1.8	1.2	.35	.052	.061	.077	.97	.066	.03	2.7	w189285
w189286	2.2	1.7	.13	.052	.087	.088	1.2	.070	.05	9.6	w189286
w189287	2.6	1.5	.11	.099	.10	.089	.86	.090	.02L	12	w189287
w189288	3.7	2.1	.054	.091	.12	.13	1.5	.12	.05	7.0	w189288
w189289	4.5	2.6	.11	.21	.13	.14	.67	.13	.08	2.9	w189289
w189290	5.0	2.2	.059	.060	.095	.14	.38	.14	.07	4.6	w189290
w189291	5.3	2.9	.070	.15	.14	.16	.63	.21	.07	7.5	w189291
w189292	2.7	1.6	.057	.090	.14	.083	.29	.11	.04	1.5	w189292
w189293	.96	.60	.096	.050	.076	.035	.20	.038	.03	1.4	w189293
w189294	1.3	.84	.067	.035	.099	.046	.23	.043	.05	1.9	w189294
w189295	1.9	1.2	.077	.067	.077	.075	1.2	.070	.05	2.1	w189295
w189296	4.5	3.6	.11	.18	.28	.16	.42	.16	.07	1.9	w189296
w189297	2.4	1.3	.10	.084	.073	.081	.71	.081	.02L	11	w189297
w189336	1.4	.88	.33	.075	.15	.064	.34	.044	.17	3.0	w189336
w189337	2.2	1.3	.063	.039	.066	.080	.44	.099	.06	13	w189337
w189338	2.7	1.3	.039	.031	.084	.079	.18	.093	.05	6.0	w189338
w189339	1.8	.98	.033	.030	.064	.055	.13	.050	.03	.4	w189339
w189340	5.8	1.9	.028	.095	.14	.15	.24	.12	.08L	1.0	w189340
w189341	2.2	1.6	.045	.057	.065	.078	.12	.069	.08	.3	w189341
w189342	1.9	1.8	.037	.019	.022	.070	.079	.033	.04L	1.0	w189342
w189343	1.7	1.2	.031	.029	.086	.060	.10	.063	.04	1.0	w189343
w189344	1.5	.76	.036	.021	.087	.048	.20	.099	.03	3.0	w189344
w189345	4.3	2.3	.039	.10	.094	.13	.28	.13	.07L	7.0	w189345
w189346	1.0	.74	.041	.027	.058	.040	.19	.047	.04	6.0	w189346
w189347	.92	.52	.050	.014	.049	.032	.12	.050	.05	2.0	w189347

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w189252	16	79	7.5	0.4L	0.05	18	7.8	15	0.9	21	w189252
w189253	23	140	3.1	.7L	.11	29	16	24	1.8	46	w189253
w189254	13	84	3.3	.2L	.04	18	14	13	.3	25	w189254
w189255	19	120	1.0	.3L	.01	14	1.6	11	.3	5.7	w189255
w189256	23	110	1.5	.3L	.04	20	5.9	12	.7	13	w189256
w189257	10	60	2.9	.2L	.03	16	26	7.4	.6L	16	w189257
w189258	24	270G	5.5	.6L	.06	21	7.4	15	1.3	20	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	16	85	2.0	.7	.05	19	5.0	16	.8	19	w189260
w189261	28	83	3.6	.4L	.02	14	2.3	13	1.0	11	w189261
w189280	44	140	2.6	6.5L	.09	21	3.6	20	1.3	9.6	w189280
w189281	89	110	1.0	4.4L	.05	10	2.0	11	.8	5.0	w189281
w189282	29	62	3.9	3.3L	.02	11	6.7	9.6	.9	12	w189282
w189283	81	220	5.4	9.0L	.09	30	5.2	31	1.6	20	w189283
w189284	48	110	2.1	3.5L	.07	12	3.0	14	.8	7.7	w189284
w189285	53	140	1.0	3.7L	.06	12	2.5	13	.5	6.4	w189285
w189286	14	61	1.8	4.2L	.05	33	6.1	19	.9	9.5	w189286
w189287	37	86	4.3	4.3L	.06	16	5.6	15	1.7	13	w189287
w189288	53	120	2.1	6.0L	.09	22	4.6	22	1.8	11	w189288
w189289	43	170	6.1	6.9L	.09	24	5.7	20	2.0	21	w189289
w189290	39	84	5.1	6.6L	.07	26	14	26	.5	25	w189290
w189291	27	170	6.9	7.8L	.09	35	7.2	31	2.4	24	w189291
w189292	16	160	2.7	4.0L	.02	21	4.6	15	.9	15	w189292
w189293	11	84	6.7	1.7L	.02	9.0	4.1	19	.4	10	w189293
w189294	15	190	7.2	2.2L	.02	13	4.9	8.3	.5	9.4	w189294
w189295	22	76	4.1	3.6L	.04	8.0	2.3	6.6	.4	11	w189295
w189296	48	150	5.1	7.6L	.07	16	4.8	13	1.2	25	w189296
w189297	37	83	4.5	3.9L	.03	16	5.5	15	1.8	12	w189297
w189336	26	120	1.3	.4L	.21	11	19	17	.4	23	w189336
w189337	23	46	2.9	.4L	.07	22	6.1	130	.4	19	w189337
w189338	27	36	7.0	.4L	.16	22	7.0	21	1.0	13	w189338
w189339	5.6	34	5.4	.3L	.05	11	8.1	11	.5	26	w189339
w189340	12	120	3.5	.9L	.06	25	4.3	21	2.8	14	w189340
w189341	9.5	110	25	.4L	.08	13	19	21	1.4	24	w189341
w189342	4.9	33	5.1	.4L	.04	11	6.2	21	.3	27	w189342
w189343	7.7	62	6.9	.3L	.05	15	2.8	13	.4	17	w189343
w189344	11	120G	2.6	.3L	.04	18	11	14	.4	16	w189344
w189345	16	240	1.8	.7L	.02	23	4.0	23	3.0	16	w189345
w189346	10	98	2.3	.2L	.05	12	6.1	10	.5	16	w189346
w189347	8.7	89	2.7	.2L	.05	11	4.4	9.6	.2	13	w189347

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w189252	3.7	1.9	0.35	46	9.7	2.0L	1.6	0.9	0.13	0.94	w189252
w189253	2.3L	2.1	.52	86	9.5	3.3L	4.0	1.1	.32	2.3L	w189253
w189254	2.4	1.6	.42	20	5.4	1.0L	3.5	.6	.050	.67	w189254
w189255	1.4	.9	.25	20L	3.5	1.5L	.21L	.6	.035	.50	w189255
w189256	2.4	1.6	.42	46	6.8	1.5L	.53	.5	.022	.67	w189256
w189257	2.1	1.2	.32	20L	9.5	.86L	8.7	.5	.010	.52	w189257
w189258	5.8L	2.3	.40	89	12	2.7L	4.3	.9	.11	1.3	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	1.3L	1.4	.28	39	6.6	1.9L	1.2	.6	.38	2.8L	w189260
w189261	4.8	1.7	.21	44	8.8	2.1L	3.0	.7	.090	1.1	w189261
w189280	9.4L	2.9L	.35	86	6.8	2.8	2.6	1.0	.088	1.9L	w189280
w189281	6.4L	2.0L	.19	66	4.0	2.4	3.2	.6	.21	1.3L	w189281
w189282	4.8L	1.5L	.25	56	5.5	1.6	1.4	.5	.043	.98L	w189282
w189283	13L	4.0L	.53	100	11	4.5	3.1	1.3	.17	2.7L	w189283
w189284	5.1L	1.6L	.19	46	5.3	1.1L	1.6	.6	.080	1.1L	w189284
w189285	5.3L	1.7L	.17	66	4.7	1.1L	1.0	.6	.10	1.1L	w189285
w189286	6.1L	1.9L	.46	82	5.8	2.1	.89L	.7	.27	1.3L	w189286
w189287	6.2L	1.9L	.32	66	7.1	1.3L	.90L	.8	.13	1.3L	w189287
w189288	8.8L	2.7L	.33	46	9.1	1.8L	1.3L	1.0	.13	1.8L	w189288
w189289	10L	3.1L	.38	78	11	2.1L	1.5L	.9	.10	2.1L	w189289
w189290	9.5L	3.0L	.60	45	12	2.0L	1.4L	1.2	.080	2.0L	w189290
w189291	11L	3.5L	.48	70	12	2.4L	1.6L	1.7	.073	2.4L	w189291
w189292	5.8L	1.8L	.31	44	5.6	1.2L	2.4	1.0	.020	1.2L	w189292
w189293	2.4L	.8L	.17	31	4.2	.92	.76	.3	.015	.50L	w189293
w189294	3.2L	1.0L	.27	21	5.4	1.2	.46L	.4	.073	.66L	w189294
w189295	5.2L	1.6L	.26	38	4.6	1.8	.76L	.3	.17	1.1L	w189295
w189296	11L	3.4L	.34	44	16	2.3L	1.6L	.5	.036	2.3L	w189296
w189297	5.6L	1.7L	.28	62	6.4	1.3	.81L	.7	.12	1.2L	w189297
w189336	1.1L	.6	.25	32	4.1	1.1L	.31	.4	.060	1.1L	w189336
w189337	1.4L	.5	.34	23	7.2	2.1L	3.0	1.0	.080	.30L	w189337
w189338	2.1	.7	.43	44	5.3	2.0L	1.8	.9	.070	.73	w189338
w189339	1.2	.9	.23	33	2.5	1.4L	.96	.5	.010L	.32	w189339
w189340	2.7L	1.3	.48	40	5.8	4.0L	.58L	1.0	.010L	2.7L	w189340
w189341	4.7	3.3	.55	23	40	2.0L	30	.5	.010L	1.4	w189341
w189342	1.9	1.9	.44	33	7.9	1.8L	14	.4	.040	.67	w189342
w189343	1.7	.8	.31	31	8.4	1.5L	1.6	.7	.010L	.48	w189343
w189344	.9L	.7	.31	25	2.6	1.2L	.41	1.1	.020	.18L	w189344
w189345	2.6	1.1	.40	96	5.3	3.4L	.60	1.0	.020	.92	w189345
w189346	.7L	.4	.19	44	4.5	1.0L	1.4	.7	.060	.15L	w189346
w189347	.6L	.6	.20	20L	3.6	.82L	3.9	.5	.20	.43	w189347

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Sample number
w189252	0.64L	10	15	0.2	13	1.3	2.0	9.4L	19	410L	w189252
w189253	1.0L	14	23	.2	26	1.4	2.3	15L	34	670L	w189253
w189254	.33L	8	9.1	.2	4.1	.61	1.5	7.5	22	210L	w189254
w189255	.46L	8	11	.1	19	.31	1.0	5.2	4.5	300L	w189255
w189256	.48L	9	13	.2	5.5	1.6	1.3	11	22	310L	w189256
w189257	.27L	7	6.8	.1	3.2	.62	1.6	7.5	30	170L	w189257
w189258	.84L	10	12	.2	31	1.5	2.1	12L	18	540L	w189258
w189259	B	B	B	B	B	B	B	B	B	B	w189259
w189260	.60L	7	11	.1	15	1.4	1.5	8.8L	18	380L	w189260
w189261	.65L	7	12	.1	14	1.1	4.8	9.6L	6.9	420L	w189261
w189280	4.4L	11	16	.2	100	3.9	3.9	19	12	140	w189280
w189281	64L	5	9.1	.1	24	3.9	2.2	12	6.4	240	w189281
w189282	2.2L	6	9.8	.1	290	1.6	1.6	6.9L	13	14	w189282
w189283	6.0L	15	67	.2	90	2.9	3.4	27	15	590	w189283
w189284	2.4L	6	12	.1	26	.80	1.5	11	6.7	77	w189284
w189285	2.5L	6	12	.1	27	1.0	1.0	7.7L	5.5	320	w189285
w189286	2.9L	17	17	.1	12	1.7	1.6	13	11	230	w189286
w189287	2.9L	8	12	.1	180	1.6	1.8	11	12	23	w189287
w189288	4.1L	11	17	.1	27	1.5	3.0	13L	13	66	w189288
w189289	4.7L	15	19	.2	80	1.3	2.1	22	15	30	w189289
w189290	4.4L	12	26	.3	14	2.8	3.9	16	25	29	w189290
w189291	5.3L	19	35	.3	15	1.2	4.3	20	18	26	w189291
w189292	2.7L	12	13	.2	15	.40L	1.8	12	9.8	22	w189292
w189293	1.1L	4	4.0	.1	16	.37	1.0	5.5	6.3	9	w189293
w189294	1.5L	6	7.2	.1	14	.44	.83	13	8.8	22	w189294
w189295	2.4L	1	14	.1	18	1.4	2.0	12	9.9	20	w189295
w189296	5.1L	8	23	.2	48	3.8	3.8	21	19	42	w189296
w189297	2.6L	8	12	.1	150	1.6	1.3	11	13	34	w189297
w189336	.52L	6	6.5	.1	12	1.2	1.1L	5.2L	19	340L	w189336
w189337	.65L	12	22	.1	7.1	.53	1.4L	6.5L	14	420L	w189337
w189338	.65L	12	9.5	.1	5.1	.70	1.9	6.5L	13	420L	w189338
w189339	.45L	7	11	.1	3.1	.14L	.97L	4.5L	11	290L	w189339
w189340	1.3L	14	18	.2	12	.40L	2.7L	13L	8.7	800L	w189340
w189341	.64L	7	15	.4	6.8	.28	1.7	9.7	34	410L	w189341
w189342	.57L	4	38	.3	4.8	.18L	1.2L	5.7L	6.4	370L	w189342
w189343	.49L	10	12	.1	3.6	.15L	1.1L	4.9L	5.7	310L	w189343
w189344	.39L	11	7.0	.1	4.3	.39	1.4	3.9L	10	250L	w189344
w189345	1.1L	13	27	.2	9.0	.34L	2.4L	11L	9.5	700L	w189345
w189346	.33L	8	7.2	.1	4.3	.31	.71L	3.3L	7.3	210L	w189346
w189347	.26L	7	4.2	.1	3.4	.54	.79	2.6L	5.4	170L	w189347

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Sample number
w189252	7.9	1.5	29L	0.94L	0.90	3.5	5.5	1.6	1.4L	59	w189252
w189253	13	2.5	35	1.5L	2.2	5.5	8.7	2.6	2.3L	86	w189253
w189254	7.7	1.5	30L	.48L	3.8	3.2	4.0	1.8	.71L	200	w189254
w189255	3.3	1.3	31L	.68L	.20	2.2	3.7	1.1	1.0L	100	w189255
w189256	5.1	1.5	30L	.70L	.70	3.4	5.4	1.9	1.0L	110	w189256
w189257	6.0	1.4	25L	.86L	1.0	2.9	2.7	1.4	.59L	130	w189257
w189258	8.3	2.4	24	1.2L	1.5	4.1	5.0	1.9	1.8L	150	w189258
w189259	B	B	B	B	B	B	.1B	B	B	B	w189259
w189260	6.1	1.6	27L	.88L	1.0	2.6	1.8L	1.1	1.3L	82	w189260
w189261	4.4	1.9	33L	.96L	.60	2.8	4.1	1.1	1.4L	83	w189261
w189280	4.9	19L	32	2.9L	.39	3.7	1.7	1.8	2.3	130	w189280
w189281	2.9	13L	23	2.0L	.29	2.1	.9	.80	1.6	140	w189281
w189282	4.1	9.8L	19	1.5L	.85	2.3	2.8	1.1	1.1	90	w189282
w189283	8.1	27L	36	4.0L	.71	5.6	6.9	2.3	3.1	340	w189283
w189284	2.9	11L	17	1.6L	.51	3.5	1.9	1.0	1.1L	110	w189284
w189285	3.2	11L	16	1.7L	.21	2.5	2.2	1.0	1.8	200	w189285
w189286	4.7	13L	14	1.9L	.34	3.9	2.7	2.1	1.3L	120	w189286
w189287	3.9	13L	28	1.9L	.66	3.0	3.7	1.2	1.3L	81	w189287
w189288	4.4	18L	30	2.7L	.46	4.9	2.0	1.5	1.8L	88	w189288
w189289	8.8	21L	30	3.1L	.51	4.3	2.5	2.3	2.1L	95	w189289
w189290	11	20L	21	3.0L	1.4	6.3	5.3	2.7	2.0L	98	w189290
w189291	10	24L	30	3.5L	1.1	6.6	5.6	2.7	2.4L	100	w189291
w189292	7.1	12L	21	1.8L	.48	3.0	3.5	1.7	1.5	110	w189292
w189293	2.0	5.0L	18	.76L	.88	2.0	3.4	.80	.76	120	w189293
w189294	2.5	6.6L	19	.99L	.66	2.0	2.5	1.4	.88	99	w189294
w189295	3.4	11L	2	1.6L	.24	1.3	3.5	.10	1.1L	120	w189295
w189296	7.0	23L	25	3.4L	.90	3.1	2.6	1.8	2.3L	210	w189296
w189297	3.2	12L	25	1.7L	.62	2.9	3.9	1.4	1.2L	84	w189297
w189336	4.5	1.0	49L	.77L	.40	3.0	9.1	1.2	1.1L	110	w189336
w189337	9.6	1.2	37L	.96L	1.0	4.3	4.9	1.7	1.4L	44	w189337
w189338	5.6	1.5	33L	.95L	1.0	4.0	6.1	1.9	1.4L	35	w189338
w189339	3.7	.7	32L	.66L	.40	2.0	3.8	1.2	.97L	33	w189339
w189340	8.5	1.8L	53L	1.8L	.50	4.2	6.6	2.5	2.7L	27	w189340
w189341	9.4	1.3	34L	.94L	3.0	5.2	2.0	2.1	1.4L	48	w189341
w189342	6.0	.8L	25L	.84L	1.8	5.5	6.3	2.1	1.2L	27	w189342
w189343	5.0	1.0	32L	.72L	.60	2.6	3.5	1.5	1.1L	30	w189343
w189344	4.0	.8	34L	.58L	.80	2.5	3.7	1.6	.85L	35	w189344
w189345	10	1.6L	31	1.6L	.50	4.8	4.2	2.2	2.4L	45	w189345
w189346	4.2	.6	31L	.48L	1.0	2.0	3.0	1.2	.71L	96	w189346
w189347	3.8	.7	26L	.38L	1.6	2.2	3.3	1.0	.56L	82L	w189347

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w189252	0.2	4.3	0.44L	0.30L	1.5	30	14	0.9	13	40	w189252
w189253	.3	8.7	3.9	.49L	2.5	54	15	1.1	46	49	w189253
w189254	.2	5.2	.22L	.23	1.4	22	11	.9	13	33	w189254
w189255	.1	3.0L	.32L	.25	.94	12	5.6	.3	1.7	21	w189255
w189256	.3	4.4	.32L	.34	1.5	26	12	.9	22	32	w189256
w189257	.2	3.0L	.19L	.21	1.1	11	8.8	.7	14	31	w189257
w189258	.3	3.0L	.58L	.39L	1.6	39	19	1.2	12	52	w189258
w189259	B	B	B	B	.20L	B	B	B	B	B	w189259
w189260	.6L	7.9	6.0	.38	1.2	21	8.6	.4	15	32	w189260
w189261	.2	11	.45L	.30L	.64	23	15	.7	4.1	81	w189261
w189280	.3	4.0	2.9L	1.4L	1.9	32	11	.9	21	57	w189280
w189281	.2	3.0L	2.0L	.93L	.63	14	5.4	.4	13	24	w189281
w189282	.2	3.8	1.5L	.69L	.63	15	9.0	.8	11	20	w189282
w189283	.5	5.1	4.0L	1.9L	2.0	38	13	1.3	13	36	w189283
w189284	.1	3.0L	1.6L	.74L	.62	18	5.3	.7	12	14	w189284
w189285	.2	3.0L	1.7L	.77L	.57	14	3.0	.5	17	11	w189285
w189286	.3	3.0L	1.9L	.89L	.73	25	5.6	.8	10	18	w189286
w189287	.2	3.0L	1.9L	.90L	.73	18	6.4	.9	13	14	w189287
w189288	.2	3.0L	2.7L	1.3L	1.1	30	5.4	.9	24	36	w189288
w189289	.3	3.0L	3.1L	1.5L	1.9	38	8.5	1.1	24	22	w189289
w189290	.5	3.0L	3.0L	1.4L	2.6	39	15	1.9	8.9	48	w189290
w189291	.4	7.9	3.5L	1.6L	2.4	47	15	1.8	11	47	w189291
w189292	.2	3.0L	1.8L	.84L	1.3	17	7.5	1.0	4.6	18	w189292
w189293	.2	3.0L	.76L	.35L	.53	10	7.1	.7	2.5	12	w189293
w189294	.2	3.0L	.99L	.46L	.56	13	8.3	.7	5.3	9.9	w189294
w189295	.2	3.0L	1.6L	.76L	.75	16	5.6	.4	6.9	20	w189295
w189296	.2	4.0L	3.4L	1.6L	1.2	48	18	.8	17	27	w189296
w189297	.1	3.0	1.7L	.81L	.80	16	5.8	.9	13	11	w189297
w189336	.2	3.0L	.36L	.24L	.83	15	4.4	.5	110	6.5	w189336
w189337	.3	4.2	.45L	.30L	1.7	18	5.0	.7	6.1	8.9	w189337
w189338	.3	4.4	.44L	.30L	1.1	18	7.8	.6	3.8	40	w189338
w189339	.2	3.0L	.31L	.21L	.53	9.5	4.8	.4	6.6	12	w189339
w189340	.3	5.0	.85L	.58L	1.1	20	7.5	.8	24	23	w189340
w189341	.6	4.0	.44L	.63	1.4	54	22	2.3	17	42	w189341
w189342	.5	3.0L	.39L	.27L	1.4	32	13	1.4	4.5	11	w189342
w189343	.2	3.0L	.33L	.23L	.81	11	5.8	.6	5.9	7.1	w189343
w189344	.2	3.4	.27L	.18L	.96	7.7	6.6	.7	14	17	w189344
w189345	.3	4.8	.74L	.51L	2.0	24	9.0	.9	7.0	32	w189345
w189346	.2	3.0L	.22L	.15L	.73	9.8	3.8	.5	7.7	5.6	w189346
w189347	.2	3.0L	.18L	.12L	1.0	8.2	5.4	.4	5.3	15	w189347

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w189348	2.0	0.99	0.14	0.051	0.077	0.064	0.16	0.069	0.04	1.0	w189348
w189349	4.1	2.0	.30	.14	.11	.13	.33	.14	.10	46	w189349
w190604	3.2	1.7	.049	.045	.017	.095	.37	.10	.07	13	w190604
w190605	2.9	1.5	.042	.027	.040	.082	.26	.11	.05	3.0	w190605
w190606	2.0	1.6	.15	.048	.047	.069	.13	.085	.03	2.0	w190606
w190607	6.1	4.6	.21	.11	.050	.20	.30	.30	.06	1.0	w190607
w190608	3.1	2.1	.057	.039	.077	.096	.11	.16	.05	2.0	w190608
w190609	3.3	2.1	.059	.041	.017	.098	.099	.17	.05	2.0	w190609
w190610	2.2	1.6	.067	.035	.049	.071	.18	.11	.04	2.0	w190610
w190611	3.5	2.4	.067	.052	.061	.11	.23	.20	.05	8.0	w190611
w190612	2.6	2.0	.11	.051	.067	.11	1.9	.17	.05	12	w190612
w190613	1.9	1.4	.071	.041	.040	.063	.21	.15	.03	6.0	w190613
w190614	5.4	5.7	.39	.16	.19	.21	.61	.26	.13	1.0	w190614
w190615	3.0	1.8	.062	.066	.078	.091	.21	.11	.06	6.0	w190615
w190616	2.2	1.8	.045	.042	.033	.075	.24	.070	.06	8.0	w190616
w190617	.79	.59	.031	.011	.049	.027	.15	.063	.03	8.0	w190617
w190618	2.4	1.6	.044	.050	.087	.074	.18	.096	.05	6.0	w190618
w190619	1.1	.64	.051	.018	.040	.037	.47	.067	.02	15	w190619
w190620	1.7	1.4	.076	.034	.046	.059	.21	.077	.03	2.0	w190620
w190621	1.8	1.3	.041	.026	.039	.060	.14	.11	.04	1.0	w190621
w190622	1.9	1.1	.19	.073	.031	.061	.14	.061	.04	1.0	w190622
w190623	1.4	.95	.056	.040	.026	.047	.090	.040	.03	4.0	w190623
w190624	2.8	1.7	.11	.044	.067	.084	.13	.15	.05	2.0	w190624
w190625	.78	.49	.075	.028	.035	.027	.16	.027	.02	3.0	w190625
w190626	1.3	.83	.040	.019	.053	.047	.37	.070	.03	25	w190626
w190627	3.6	2.0	.030	.038	.063	.12	.058	.18	.04	3.0	w190627
w190628	2.1	1.5	.10	.026	.021	.071	.25	.092	.04	4.0	w190628
w190629	1.2	.84	.15	.039	.043	.044	.33	.048	.05	5.0	w190629
w190630	1.6	1.1	.25	.037	.037	.060	.34	.065	.05	15	w190630
w190631	5.9	4.7	.34	.10	.12	.22	2.0	.22	.16	18	w190631
w190632	2.4	1.7	.046	.050	.061	.077	.30	.061	.05	2.0	w190632
w190633	4.2	2.3	.030	.029	.027	.11	.077	.21	.03	2.0	w190633
w190634	.75	.70	.061	.031	.029	.032	.27	.023	.04	3.0	w190634
w190635	2.2	1.6	.096	.062	.036	.075	.23	.086	.01L	1.0	w190635
w190636	1.3	.97	.10	.041	.034	.061	1.1	.039	.05	19	w190636
w190637	3.0	1.8	.056	.072	.045	.094	.32	.12	.02	1.0	w190637
w190638	3.0	1.8	.068	.092	.064	.099	.39	.11	.02L	2.0	w190638
w190639	1.9	1.3	.089	.062	.077	.065	.37	.061	.03	8.0	w190639
w190640	3.6	2.2	.077	.27	.24	.11	.47	.15	.02L	3.0	w190640
w190641	2.6	1.5	.057	.030	.048	.082	.55	.10	.01L	2.0	w190641

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w189348	12	170G	2.5	0.4L	0.04	14	5.6	12	0.5	12	w189348
w189349	17	160	1.3	.7L	.13	14	3.4	16	1.1	21	w189349
w190604	11	64	3.1	3.5L	.07	18	5.1	14	.7	18	w190604
w190605	13	33	2.9	3.1L	.05	20	6.4	17	.3	15	w190605
w190606	17	61	1.6	2.6L	.04	33	9.7	32	1.5	9.1	w190606
w190607	41	140	3.4	7.5L	.03	38	4.4	47	1.8	24	w190607
w190608	28	49	4.6	3.6L	.04	24	8.3	23	.6	18	w190608
w190609	22	55	2.7	3.7L	.03	25	16	22	.6	18	w190609
w190610	35	48	1.7	2.6L	.04	18	6.4	16	.3	16	w190610
w190611	39	72	1.6	4.2L	.06	27	4.2	25	.5	17	w190611
w190612	34	52	3.1	4.0L	.06	29	3.9	21	.8	31	w190612
w190613	25	40	4.1	2.4L	.04	21	6.5	15	.4	20	w190613
w190614	220	360	4.1	8.0L	.26	18	11	15	.5	49	w190614
w190615	34	86	3.3	3.4L	.10	20	4.8	17	.9	21	w190615
w190616	13	74	4.2	2.8L	.13	20	12	17	.5	25	w190616
w190617	16	28	2.4	1.0L	.04	10	2.1	8.0	.5L	9.9	w190617
w190618	19	61	2.6	2.8L	.05	19	5.3	17	1.0	14	w190618
w190619	23	38	1.8	1.4L	.03	15	2.2	13	.2	11	w190619
w190620	19	43	1.0	2.2L	.07	20	4.1	13	.3	14	w190620
w190621	14	34	2.2	2.2L	.05	20	8.3	15	.4	14	w190621
w190622	23	68	3.0	2.3L	.02	13	13	13	.3	12	w190622
w190623	22	67	2.6	1.7L	.06	10	7.1	10	.6	14	w190623
w190624	22	81	3.5	3.1L	.06	21	1.8	17	.5	18	w190624
w190625	16	38	3.2	1.0L	.03	10	3.2	6.6	.5L	7.7	w190625
w190626	16	45	1.7	1.7L	.05	14	1.4	9.2	.5L	15	w190626
w190627	21	67	1.9	4.3L	.10	29	2.2	27	.5	24	w190627
w190628	17	57	4.8	2.6L	.05	20	4.0	23	.3	29	w190628
w190629	21	46	1.5	1.6L	.06	9.0	2.3	6.9	.2	15	w190629
w190630	19	55	4.0	2.2L	.05	11	4.0	12	.2	21	w190630
w190631	82	200	8.2	8.2L	.20	14	2.8	11	.2	90	w190631
w190632	23	61	2.0	2.9L	.09	22	12	18	1.4	17	w190632
w190633	19	57	1.8	4.3L	.06	24	6.3	20	.8	19	w190633
w190634	19	43	4.7	1.2L	.07	9.0	23	9.0	.3	12	w190634
w190635	20	72	2.2	2.8L	.03	7.0	6.3	13	.8	13	w190635
w190636	25	53	5.7	2.3L	.07	14	4.7	9.7	.6	12	w190636
w190637	35	79	.9	3.5L	.01	20	4.8	21	2.0	10	w190637
w190638	38	80	.9	3.7L	.03	18	5.7	19	1.7	10	w190638
w190639	21	74	2.8	2.4L	.05	12	5.7	11	.6	16	w190639
w190640	20	68	1.1	4.2L	.03	20	4.3	19	1.6	14	w190640
w190641	20	63	.7	3.1L	.03	16	3.7	16	1.0	11	w190641

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w189348	1.1L	0.8	0.24	88	3.1	1.7L	0.93	0.7	0.040	0.24L	w189348
w189349	2.4L	.7L	.30	33	8.7	3.4L	.72	.5	.23	.51L	w189349
w190604	5.2L	1.6L	.29	30	5.4	1.1	.75L	.8	.065	1.1L	w190604
w190605	4.6L	1.4L	.29	21	6.8	.96L	1.6	.8	.17	.96L	w190605
w190606	3.8L	1.2L	.52	130	5.2	.81L	.55L	1.3	.033	.81L	w190606
w190607	11L	3.4L	.48	220	12	2.3L	1.6L	2.1	.033	2.3L	w190607
w190608	5.3L	1.6L	.39	26	7.9	1.1L	1.3	1.1	.023	1.1L	w190608
w190609	5.4L	1.7L	.41	54	6.7	1.1L	.78L	1.2	.010L	1.1L	w190609
w190610	3.9L	1.2L	.26	34	4.8	.94	.56L	.9	.020	.82L	w190610
w190611	6.2L	1.9L	.45	38	6.8	1.3L	.88L	1.6	.065	1.3L	w190611
w190612	5.9L	1.8L	.44	42	8.5	1.3L	.85L	1.2	.27	1.3L	w190612
w190613	3.5L	1.4	.33	21	6.3	1.3	2.0	1.2	.055	.74L	w190613
w190614	12L	3.6L	.28	98	41	2.8	4.4	.6	.020	2.5L	w190614
w190615	5.0L	1.5L	.31	70	5.6	1.1L	1.5	.9	.28	1.1L	w190615
w190616	4.1L	1.3L	.38	38	8.9	1.2	3.5	.6	.080	.87L	w190616
w190617	1.5L	.5L	.17	22	3.0	.36	.22L	.5	.018	.32L	w190617
w190618	4.1L	1.2L	.32	54	6.8	.86L	.59L	.9	.010	.86L	w190618
w190619	2.1L	.6	.28	21	2.8	.63	.35	.7	.11	.44L	w190619
w190620	3.3L	1.0L	.33	59	4.8	.69L	.47L	.7	.030	.69L	w190620
w190621	3.3L	1.0L	.32	20L	3.5	.70L	.48L	.8	.010L	.70L	w190621
w190622	3.4L	1.0L	.30	78	5.3	.71L	.48L	.5	.010	.71L	w190622
w190623	2.2	1.1	.26	54	7.3	1.1	.90	.3	.013	.54L	w190623
w190624	4.5L	1.4L	.34	46	6.5	1.7	1.7	1.1	.017	.96L	w190624
w190625	1.4L	.4L	.18	21	3.5	.48	.99	.3	.010	.30L	w190625
w190626	2.5L	.8L	.22	21	3.2	.78	.49	.5	.15	.53L	w190626
w190627	6.3L	1.9L	.42	34	7.8	1.3L	.89L	1.7	.018	1.3L	w190627
w190628	3.8L	1.7	.41	20L	7.1	2.4	5.0	.9	.068	.81L	w190628
w190629	2.4L	.7L	.14	20	3.5	.74	1.5	.3	.085	.50L	w190629
w190630	3.2L	1.1	.19	23	6.3	1.3	.58	.6	.060	.68L	w190630
w190631	12L	3.7L	.25	32	24	3.4	11	.4	.095	2.5L	w190631
w190632	4.1L	1.3L	.50	64	5.8	1.6	1.6	1.6	.042	.87L	w190632
w190633	6.2L	1.9L	.32	23	6.2	1.3L	.88L	1.3	.052	1.3L	w190633
w190634	1.8L	.5L	.24	20	5.1	.78	1.9	1.5	.052	.37L	w190634
w190635	4.1L	1.3L	.31	48	6.8	1.4	.58L	1.9	.030	.86L	w190635
w190636	3.3L	1.0L	.27	20	10	.69L	.59	1.9	.13	.69L	w190636
w190637	5.1L	1.6L	.33	64	6.2	1.1L	.72L	1.6	.017	1.1L	w190637
w190638	5.4L	1.7L	.31	58	7.1	1.1L	1.0	1.7	.017	1.1L	w190638
w190639	3.5L	1.1	.26	28	6.6	.74L	3.6	1.6	.042	.74L	w190639
w190640	6.1L	1.9L	.38	40	8.1	1.5	.86L	1.9	.030	1.3L	w190640
w190641	4.5L	1.4L	.26	44	5.2	.99	.63L	1.9	.042	.94L	w190641

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Sample number
w189348	0.52L	8	8.5	0.1	7.9	0.17L	1.1L	5.2L	12	340L	w189348
w189349	1.1L	8	22	.2	24	1.3	2.4L	11L	9.8	700L	w189349
w190604	2.4L	10	21	.1	5.7	1.4	2.4	14	10	15	w190604
w190605	2.1L	10	16	.1	5.8	.73	3.0	7.3	13	26	w190605
w190606	1.7L	20	17	.2	9.1	.68	1.2	9.1	8.3	220	w190606
w190607	5.1L	24	77	.2	27	.94	10	19	15	740	w190607
w190608	2.4L	15	18	.2	12	.77	2.4	9.7	10	150	w190608
w190609	2.5L	15	17	.2	7.9	.71	4.0	14	19	46	w190609
w190610	1.8L	10	16	.1	14	1.4	3.1	9.4	14	33	w190610
w190611	2.8L	16	29	.2	8.2	1.6	6.8	19	11	59	w190611
w190612	2.7L	17	40	.2	11	1.4	3.0	12	8.5	56	w190612
w190613	1.6L	13	17	.2	3.8	.91	6.3	14	8.4	33	w190613
w190614	5.4L	12	41	.1	19	5.2	5.4	31	70	1,800	w190614
w190615	2.3L	11	14	.2	6.2	1.5	3.6	12	9.2	95	w190615
w190616	1.9L	11	22	.2	6.3	1.4	2.4	11	18	39	w190616
w190617	.69L	6	5.3	.1	2.1	.46	.99	2.2L	3.2	14	w190617
w190618	1.9L	11	17	.2	14	.60	2.0	9.8	12	39	w190618
w190619	.95L	8	9.9	.1	7.2	.86	1.3	5.0	3.2	59	w190619
w190620	1.5L	13	13	.1	7.1	.99	.71	6.3	8.5	160	w190620
w190621	1.5L	11	15	.1	5.3	.67	2.6	7.9	12	440	w190621
w190622	1.5L	7	11	.1	4.7	.95	1.2	4.8L	17	16	w190622
w190623	1.2L	5	13	.1	9.0	1.9	1.6	7.8	11	15	w190623
w190624	2.1L	12	23	.2	8.2	.46	3.4	14	5.8	88	w190624
w190625	.67L	5	6.4	.1	9.3	.58	.67	2.6	4.5	14	w190625
w190626	1.2L	7	11	.1	4.8	.67	1.7	6.2	3.8	17	w190626
w190627	2.9L	18	26	.2	8.8	.86	8.2	13	5.8	61	w190627
w190628	1.8L	10	24	.2	6.2	.74	3.9	13	8.5	33	w190628
w190629	1.1L	5	8.0	.1	13	1.2	.80	3.4L	5.8	23	w190629
w190630	1.5L	7	14	.1	14	1.6	2.6	4.6L	9.4	31	w190630
w190631	5.5L	9	63	.1	17	5.5	5.5	34	29	350	w190631
w190632	1.9L	11	14	.1	52	2.3	1.2	11	17	80	w190632
w190633	2.9L	17	18	.2	9.1	.72	5.9	15	11	36	w190633
w190634	.82L	3	8.6	.1	47	3.7	1.1	6.6	22	17	w190634
w190635	1.9L	8	22	.1	72	.73	2.4	12	12	630	w190635
w190636	1.5L	1	14	.1	12	.88	.50	8.0	7.1	16	w190636
w190637	2.4L	8	29	.1	44	.41	2.0	11	7.1	49	w190637
w190638	2.5L	8	27	.1	57	.54	1.8	10	7.6	100	w190638
w190639	1.6L	5	12	.1	10	1.1	.76	7.8	12	24	w190639
w190640	2.8L	8	30	.1	160	.42L	3.2	13	8.0	41	w190640
w190641	2.1L	8	16	.1	84	.62	3.4	11	7.3	30	w190641

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Sample number
w189348	4.6	0.9	34L	0.77L	0.70	2.5	4.1	1.3	1.1L	65	w189348
w189349	6.7	1.6L	36L	1.6L	1.7	3.2	4.0	1.6	2.4L	39	w189349
w190604	7.0	11L	16L	1.6L	.70	3.1	3.2	1.9	1.1L	60	w190604
w190605	8.7	9.6L	15L	1.4L	.80	3.6	3.6	1.7	.96L	40	w190605
w190606	5.5	8.1L	23	1.2L	.60	6.7	4.2	2.9	.81L	91	w190606
w190607	19	23L	26	3.4L	.60	8.1	8.7	3.0	2.3L	220	w190607
w190608	8.7	11L	16L	1.6L	.80	5.0	5.7	2.1	1.5	56	w190608
w190609	9.8	11L	17L	1.7L	.50	4.3	4.5	2.2	1.1L	52	w190609
w190610	5.1	8.2L	15L	1.2L	.30	3.2	4.4	1.6	.82L	71	w190610
w190611	8.8	13L	18L	1.9L	.60	5.3	6.2	2.3	1.3L	68	w190611
w190612	9.4	13L	18L	1.8L	.60	4.9	6.1	2.5	1.3L	53	w190612
w190613	6.4	7.4	15L	1.1L	.60	3.7	3.6	1.8	1.1	46	w190613
w190614	25	25L	16L	3.6L	.60	3.4	4.3	1.6	2.5L	1,400	w190614
w190615	8.3	11L	13	1.5L	.90	4.1	4.6	1.8	1.1L	72	w190615
w190616	9.0	8.7L	7	1.3L	.88	.50	3.5	2.2	.87L	75	w190616
w190617	3.1	3.2L	14L	.46L	.40	1.7	2.8	.90	.53	53	w190617
w190618	5.1	8.6L	11	1.2L	.50	.10	3.1	1.8	.86L	71	w190618
w190619	3.1	4.4L	15L	.63L	.50	3.0	3.9	1.3	.63	90	w190619
w190620	8.5	6.9L	15L	.99L	.60	3.2	4.1	1.8	.69L	85	w190620
w190621	4.7	7.0L	14L	1.0L	.40	2.9	6.4	1.6	.70L	33	w190621
w190622	4.8	7.1L	13L	1.0L	.70	3.1	4.4	1.4	.71L	65	w190622
w190623	6.2	5.4L	15L	.78L	.90	3.0	2.8	1.2	.54L	78	w190623
w190624	7.6	9.6L	17L	1.4L	.50	3.6	3.9	1.8	.96L	77	w190624
w190625	2.9	3.0L	13L	.45L	.60	1.5	2.3	.70	.30L	77	w190625
w190626	3.6	5.3L	15L	.78L	.20	1.9	5.3	1.2	.53L	73	w190626
w190627	11	13L	17L	1.9L	.40	5.2	6.2	2.2	1.3L	78	w190627
w190628	12	8.1L	14L	1.2L	.70	6.1	.9	2.2	1.7	94	w190628
w190629	4.0	5.0L	12L	.74L	.50	1.9	3.4	.80	.50L	90	w190629
w190630	5.8	6.8L	12L	1.0L	.70	2.5	4.4	1.0	.68L	94	w190630
w190631	29	25L	12L	3.7L	.60	2.7	3.7	1.4	2.5L	450	w190631
w190632	5.0	8.7L	47L	1.3L	.70	4.6	6.3	2.2	.87L	110	w190632
w190633	10	13L	51L	1.9L	.60	4.3	2.8	2.4	1.3L	48	w190633
w190634	6.2	3.7L	38L	.55L	1.3	3.6	4.9	.90	.82	94	w190634
w190635	4.6	8.6L	57L	1.3L	.40	3.2	3.5	1.4	.86L	99	w190635
w190636	3.1	6.9L	52L	1.0L	.40	2.5	4.5	1.1	.69L	88	w190636
w190637	4.9	11L	59L	1.6L	.30	3.9	3.6	1.4	1.1L	98	w190637
w190638	4.6	11L	57L	1.7L	.30	3.8	4.4	1.5	1.5	110	w190638
w190639	4.8	7.4L	60L	1.1L	1.0	3.0	3.1	1.1	.74L	100	w190639
w190640	5.7	13L	43L	1.9L	.30	4.1	4.1	1.5	1.3L	70	w190640
w190641	4.3	9.4L	39L	1.4L	.20	2.9	4.1	1.1	.94L	82	w190641

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w189348	0.2	3.0	0.36L	0.24L	1.7	9.9	4.5	0.6	7.7	12	w189348
w189349	.3	5.2	.74L	.51L	2.8	20	2.7	.6	22	9.1	w189349
w190604	.3	4.3	1.6L	.75L	1.1	19	9.8	.7	9.7	38	w190604
w190605	.3	4.2	1.4L	.65L	1.4	16	6.3	.6	14	31	w190605
w190606	.3	6.3	1.2L	.55L	1.3	17	5.3	.8	14	17	w190606
w190607	.4	7.5	3.4L	1.6L	2.4	46	14	1.1	13	99	w190607
w190608	.3	6.9	1.6L	.76L	1.3	22	6.4	.8	4.4	16	w190608
w190609	.2	3.0L	1.7L	.78L	1.5	27	9.8	.9	7.3	35	w190609
w190610	.2	3.0	1.2L	.56L	1.0	22	7.1	.7	3.4	31	w190610
w190611	.3	4.0	1.9L	.88L	1.5	28	12	1.0	4.3	76	w190611
w190612	.3	5.2	1.8L	.85L	1.8	15	6.5	1.0	5.5	21	w190612
w190613	.3	4.0	1.1L	.50L	1.4	17	12	.8	3.9	61	w190613
w190614	.3	3.0L	3.6L	1.7L	.98	59	15	.6	20	75	w190614
w190615	.3	3.0	1.5L	.72L	1.3	22	10	.7	9.3	36	w190615
w190616	.3	4.0	1.3L	.59L	1.7	27	15	1.1	13	27	w190616
w190617	.2	3.0L	.63	.22L	.67	5.6	2.4	.3	2.3	7.9	w190617
w190618	.3	3.0	1.2L	.59L	1.0	18	9.8	.8	6.6	29	w190618
w190619	.2	3.0L	.63L	.30L	1.3	8.6	4.4	.6	4.5	7.7	w190619
w190620	.2	4.0	.99L	.47L	1.0	16	3.6	.6	6.1	7.8	w190620
w190621	.2	4.4	1.0L	.48L	.78	14	5.5	.5	3.3	22	w190621
w190622	.2	3.0L	1.0L	.48L	.77	18	6.1	.7	2.8	12	w190622
w190623	.2	4.7	.78L	.37L	.83	19	11	.6	10	17	w190623
w190624	.3	3.0L	1.4L	.65L	1.5	21	10	.8	3.5	34	w190624
w190625	.1	3.0L	.45L	.20L	.55	4.2	4.2	.3	3.2	11	w190625
w190626	.2	3.0L	1.6	.39L	.62	9.5	5.1	.5	2.4	20	w190626
w190627	.4	7.1	1.9L	.89L	1.6	24	8.6	.9	4.0	120	w190627
w190628	.4	3.0L	1.2L	.54L	3.3	36	18	1.2	4.6	57	w190628
w190629	.3	3.0L	.74L	.34L	.94	11	3.9	.2	7.4	8.0	w190629
w190630	.2	3.0L	1.1	.46L	1.6	18	8.6	.4	5.0	32	w190630
w190631	.2	3.0L	3.7L	1.7L	1.7	71	24	.5	17	55	w190631
w190632	.3	3.0L	1.3L	.59L	1.7	29	8.9	.9	6.2	23	w190632
w190633	.2	4.0	1.9L	.88L	1.8	25	7.2	.7	5.5	73	w190633
w190634	.3	4.0	.55L	.25L	.95	14	11	.7	9.8	11	w190634
w190635	.2	3.8	1.3L	.58L	.60	20	7.9	.7	6.8	25	w190635
w190636	.2	3.0L	2.1	.47L	.30	12	3.8	.4	4.5	8.0	w190636
w190637	.3	4.0	1.6L	.72L	.95	24	5.5	.6	7.6	17	w190637
w190638	.2	3.0	1.7L	.76L	.95	24	4.3	.6	6.9	14	w190638
w190639	.2	3.0L	1.1L	.50L	1.3	17	3.8	.5	16	7.6	w190639
w190640	.3	3.6	1.9L	.86L	.97	27	6.2	.6	6.2	28	w190640
w190641	.2	3.0L	1.4L	.63L	.85	20	4.9	.3	5.0	25	w190641

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w190642	1.8	1.3	0.086	0.034	0.033	0.092	2.4	0.053	0.03	32	w190642
w190665	.76	.67	.077	.032	.034	.031	.23	.019	.03	2.0	w190665
w190666	.46	.33	.11	.034	.029	.020	.23	.020	.04	5.0	w190666
w190667	.58	.14	.11	.038	.032	.022	.18	.013	.02	1.0	w190667
w190668	4.7	2.1	.28	.066	.055	.13	.19	.29	.05	1.0	w190668
w190669	1.2	.94	.10	.033	.017	.042	.071	.086	.03	1.0	w190669
w190670	4.3	2.0	.088	.12	.052	.15	2.1	.095	.11	36	w190670
w190671	2.3	1.5	.061	.039	.034	.071	.15	.11	.16	2.0	w190671
w190672	.96	.71	.068	.021	.047	.036	.27	.028	.08	19	w190672
w190673	2.6	1.5	.081	.061	.058	.086	.68	.12	.06	7.0	w190673
w190674	1.9	1.3	.14	.082	.064	.086	1.8	.062	.04	1.0	w190674
w190675	2.1	1.4	.080	.072	.057	.072	.39	.077	.04	7.0	w190675
w190676	.64	.56	.12	.042	.034	.037	.86	.029	.02	1.0	w190676
w190677	1.6	.92	.18	.073	.062	.056	.21	.072	.02	1.0	w190677
w190678	12	5.7	.030	.41	.15	.34	.84	.35	.17	2.0	w190678
w190679	7.5	4.3	.039	.27	.12	.23	.59	.23	.20	2.0	w190679
w190680	3.9	3.1	.14	.078	.080	.13	.44	.093	.17	7.0	w190680
w190681	4.8	3.7	.083	.13	.13	.16	.39	.15	.08	5.0	w190681
w190682	2.4	1.7	.11	.052	.047	.078	.18	.090	.08	2.0	w190682
w190683	1.8	.95	.075	.057	.049	.062	.89	.049	.04	20	w190683
w190684	1.9	1.0	.082	.049	.043	.080	2.0	.052	.05	59	w190684
w190685	2.1	.98	.069	.045	.043	.062	.36	.11	.02	10	w190685
w190686	1.9	1.2	.43	.11	.11	.073	.45	.074	.11	2.0	w190686
w190687	2.3	1.4	.29	.051	.086	.076	.22	.10	.02	8.0	w190687
w190922	8.2	5.8	.046	.20	.055	.27	.69	.21	.07	4.9	w190922
w190923	.46	.55	.089	.016	.018	.024	.063	.011	.02	1.0	w190923
w190924	4.5	3.7	.29	.16	.031	.17	.99	.14	.08	78	w190924
w190925	2.3	1.3	.046	.049	.020	.077	.64	.055	.05	3.4	w190925
w190926	1.6	1.3	.14	.026	.015	.11	4.5	.063	.04	38	w190926
w190927	.78B	.50B	.027B	.024	.029	.028B	.22B	.026B	.05	36	w190927
w190928	2.5	1.6	.033	.057	.034	.077	.30	.084	.06	4.0	w190928
w191107	.98	.78	.045	.043	.038	.041	.51	.029	.02	6.0	w191107
w191108	1.4	.98	.046	.021	.012	.059	1.1	.038	.06	46	w191108
w191109	1.6	1.0	.036	.026	.079	.052	.26	.072	.03	3.0	w191109
w191110	.71	.65	.050	.016	.031	.031	.47	.024	.02	14	w191110
w191111	.68	.59	.052	.024	.035	.047	1.8	.020	.05	100	w191111
w191112	4.5	1.2	.040	.068	.12	.16	4.2	.045	.06	200	w191112
w191113	2.7	2.4	.057	.042	.032	.096	.19	.12	.09	2.0	w191113
w191114	6.1	3.3	.046	.11	.037	.18	.32	.19	.03	6.0	w191114
w191115	.93	.62	.12	.018	.036	.032	.15	.035	.05	1.0	w191115

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w190642	54	30	2.0	3.4L	0.14	13	13	20	1.0	7.2	w190642
w190665	14	44	1.6	1.3L	.04	10	5.8	8.9	.6	6.3	w190665
w190666	12	34	1.6	.8L	.06	4.0	6.7	4.1	.1	5.8	w190666
w190667	13	38	2.6	.9L	.05	5.0	11	11	.1	8.1	w190667
w190668	35	95	3.2	5.5L	.11	41	4.4	31	.6	18	w190668
w190669	24	13	2.4	1.7L	.05	16	11	11	.5	10	w190669
w190670	40	110	1.2	6.0L	.25	20	3.6	26	1.8	39	w190670
w190671	14	28	3.8	2.9L	.07	35	8.9	17	.6L	30	w190671
w190672	15	35	2.5	1.5L	.16	11	14	8.8	.2	19	w190672
w190673	29	90	3.4	3.5L	.09	19	5.7	15	.5	19	w190673
w190674	24	62	1.6	3.5L	.03	11	6.4	10	1.1	10	w190674
w190675	32	80	3.4	2.9L	.04	14	8.5	11	.7	17	w190675
w190676	44	22	1.9	1.5L	.01	7.0	3.6	4.7	.2	7.5	w190676
w190677	17	74	1.7	2.1L	.05	9.0	4.2	5.8	.2	16	w190677
w190678	46	660	4.1	14L	.23	56	11	42	6.4	30	w190678
w190679	30	200	7.1	9.3L	.41	42	17	30	3.0	33	w190679
w190680	17	120	7.0	5.3L	.11	37	29	28	.5	39	w190680
w190681	23	210	4.8	6.6L	.08	48	12	37	2.3	35	w190681
w190682	19	67	7.6	3.2L	.04	16	15	15	.2	28	w190682
w190683	75	32	2.2	2.6L	.07	10	3.5	13	.6	5.2	w190683
w190684	75	52	1.6	3.3L	.09	10	3.3	11	.6	4.4	w190684
w190685	24	43	2.1	1.6L	.03	16	3.5	14	.4	16	w190685
w190686	20	88	.4	1.9L	.16	14	4.0	10	.4	26	w190686
w190687	27	89	.9	2.0L	.04	23	2.9	19	.3	19	w190687
w190922	28	180	2.6	7.0L	.03L	70	8.3	52	5.8	35	w190922
w190923	1.6	10	3.5	.6L	.02	13	17	6.5	.5L	6.1	w190923
w190924	18	120	6.0	4.4L	.05	30	1.8	26	3.1	36	w190924
w190925	8.1	79	3.0	2.0L	.05	15	9.4	19	.8	41	w190925
w190926	2.4	22	3.3	2.9L	.08	9.0	3.3	19	.8	11	w190926
w190927	4.8	12	.5	.7L	.03	8.0	1.7	5.4	.6	8.2	w190927
w190928	7.4	61	7.6	2.0L	.06	24	8.4	16	2.2	26	w190928
w191107	8.3	130	1.7	1.5L	.05	10	6.4	7.1	.8	12	w191107
w191108	2.8	71	6.0	2.2L	.12	17	10	16	.4	17	w191108
w191109	16	76	1.8	2.0L	.05	14	1.4	13	.4	11	w191109
w191110	11	37	1.9	1.1L	.03	7.0	2.3	4.6	.2	9.3	w191110
w191111	3.9	29	4.3	1.7L	.11	8.0	3.2	5.2	.5	11	w191111
w191112	4.5	79	5.1	5.8L	.11	13	2.9	9.3	1.1	21	w191112
w191113	8.5	56	2.4	3.6L	.10	36	5.6	31	.5	28	w191113
w191114	18	110	3.7	6.7L	.04	32	8.0	32	2.4	13	w191114
w191115	18	51	1.2	1.2L	.03	14	3.9	7.5	.1	10	w191115

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Sample number
w190642	4.8	10L	32L	1.5L	1.3	4.2	4.1	1.4	1.0L	47	w190642
w190665	1.6	4.1L	22L	.59L	.40	1.2	1.4	1.0	.41L	41	w190665
w190666	1.5	2.6L	20L	.38L	.90	1.3	1.8	.50	.29	48	w190666
w190667	1.1	3.0L	20L	.43L	1.0	2.7	1.4	.70	.35	68	w190667
w190668	11	18L	23L	2.6L	.50	6.5	6.5	3.1	1.8L	85	w190668
w190669	4.6	5.6L	16L	.82L	.50	2.7	7.4	1.5	.77	56	w190669
w190670	5.6	19L	26	2.8L	.80	3.8	6.7	2.1	1.9L	65	w190670
w190671	6.8	9.4L	19L	1.4L	1.3	4.8	3.8	2.8	.94L	54	w190671
w190672	3.4	4.7L	17L	.69L	.70	1.6	2.5	1.1	.47L	47	w190672
w190673	5.2	11L	17L	1.6L	.70	3.3	3.5	1.6	1.5	180	w190673
w190674	2.9	11L	15	1.6L	.80	2.5	3.4	1.1	1.4	76	w190674
w190675	7.4	9.5L	16L	1.4L	.60	2.7	3.5	1.3	1.6	86	w190675
w190676	3.2	4.8L	14L	.70L	.50	1.2	3.1	.60	.62	36	w190676
w190677	3.4	6.4L	13L	.94L	.30	1.4	2.9	.70	.64L	100	w190677
w190678	17	46L	77	6.6L	.90	9.4	7.1	4.7	4.6L	58	w190678
w190679	18	30L	45	4.4L	1.4	7.5	7.8	4.4	3.0L	52	w190679
w190680	15	17L	20L	2.5L	5.6	12	4.8	3.7	1.7L	110	w190680
w190681	16	21L	34L	3.1L	3.0	11	2.6	4.7	2.5	190	w190681
w190682	7.8	10L	15L	1.5L	2.0	3.7	1.9	1.6	1.0L	83	w190682
w190683	4.7	8.3L	10	1.2L	.70	2.6	1.1	1.0	1.1	42	w190683
w190684	3.1	11L	16L	1.5L	1.2	2.1	1.4	.90	1.1L	30	w190684
w190685	5.6	5.0L	14L	.74L	.90	2.8	3.5	1.4	.89	81	w190685
w190686	4.8	6.0L	17L	.88L	.30	2.1	9.4	1.2	.60L	230	w190686
w190687	6.0	6.2L	18L	.91L	.60	3.4	4.0	1.7	1.2	200	w190687
w190922	16	22L	71	3.2L	1.3	13	2.6	7.1	2.2L	100	w190922
w190923	2.9	2.0L	19L	.29L	.54	1.7	1.7	1.9	1.2	41	w190923
w190924	11	14L	48	2.0L	2.3	7.7	4.0	3.0	2.6	40	w190924
w190925	12	6.3L	16	.92L	1.4	4.4	5.1	1.8	1.3	47	w190925
w190926	1.3L	9.0L	22L	1.3L	.49	3.5	4.2	1.6	1.5	33	w190926
w190927	1.8	H	16L	.34L	.60	1.2	2.3	.80	.23L	16	w190927
w190928	6.7	6.3L	20	.93L	.60	4.5	1.2	2.3	.63L	27	w190928
w191107	2.5	4.7L	12	.69L	1.1	2.2	2.0	.90	.47L	47	w191107
w191108	5.1	6.7L	15L	.99L	1.7	5.8	4.2	2.7	.78	45	w191108
w191109	4.0	6.0L	30L	.88L	.40	2.3	2.3	1.2	.88	76	w191109
w191110	2.6	3.5L	18L	.52L	.70	1.1	4.8	.80	.56	81	w191110
w191111	1.5	5.3L	15L	.78L	1.3	1.2	2.1	.90	.53L	51	w191111
w191112	3.4	18L	H	2.6L	1.7	2.1	7.8	B	1.8L	60	w191112
w191113	13	11L	24L	1.6L	.60	7.7	5.7	2.5	1.1L	140	w191113
w191114	6.3	21L	44	3.0L	.40	6.0	4.3	2.9	2.1L	67	w191114
w191115	3.5	3.7L	20L	.55L	.40	2.0	3.6	1.3	.59	130	w191115

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Sample number
w190642	2.3L	6	9.9	0.2	12	3.0	0.96	7.0L	28	19	w190642
w190665	.85L	5	3.0	.1	5.9	1.4	.52	7.0	6.3	15	w190665
w190666	.55L	2	1.2	.1	3.8	.96	.36	2.2	10	7L	w190666
w190667	.62L	2	1.5	.1	19	1.3	.32	2.6	13	12	w190667
w190668	3.7L	23	23	.3	14	1.5	15	23	13	140	w190668
w190669	1.2L	8	7.1	.1	1.3	1.4	3.3	8.7	10	11	w190669
w190670	4.0L	12	16	.2	14	3.5	2.5	16	18	69	w190670
w190671	2.0L	21	14	.2	2.8	2.6	4.8	17	14	300	w190671
w190672	.99L	6	3.7	.1	2.4	3.7	.82	9.5	25	17	w190672
w190673	2.4L	11	24	.2	7.0	1.2	4.9	13	11	90	w190673
w190674	2.4L	6	14	.1	540	.49	1.0	8.7	12	90	w190674
w190675	2.0L	8	14	.1	19	.72	3.2	9.5	20	30	w190675
w190676	1.0L	4	8.4	.1	110	.57	.53	4.2	6.6	58	w190676
w190677	1.4L	5	6.7	.1	16	.26	1.7	4.3L	14	23	w190677
w190678	9.5L	31	41	.4	50	1.4L	8.3	41	22	160	w190678
w190679	6.3L	20	44	.5	33	.93L	4.7	30	38	120	w190679
w190680	3.6L	17	20	.2	110	5.8	1.2	25	36	200	w190680
w190681	4.4L	27	33	.3	29	3.3	2.7	33	23	340	w190681
w190682	2.2L	9	8.1	.1	5.4	2.4	2.4	21	37	700	w190682
w190683	1.7L	5	6.8	.1	7.5	1.7	1.7	11	12	98	w190683
w190684	2.2L	5	8.3	.1	12	1.2	.82	6.8L	9.2	42	w190684
w190685	1.1L	9	10	.2	4.1	.81	4.0	10	5.6	32	w190685
w190686	1.3L	8	7.0	.1	28	.62	1.6	5.9	8.7	77	w190686
w190687	1.4L	16	20	.1	9.1	1.3	2.9	9.1	6.2	280	w190687
w190922	4.8L	38	99	.4	16	1.1	7.0	51	16	420	w190922
w190923	.44L	5	2.9	.1	2.0	5.2	.38	9.9	11	B	w190923
w190924	3.0L	16	26	.3	14	6.2	3.2	24	9.6	87	w190924
w190925	1.4L	7	5.1	.2	6.4	4.1	2.3	14	16	40	w190925
w190926	2.0L	4	9.5	.2	8.6	8.4	3.2	9.6	9.0	58	w190926
w190927	.51L	4	5.1	.1L	4.4	1.6	.37	1.6	5.4	13B	w190927
w190928	1.4L	12	20	.2	7.7	.65	1.8	17	15	41	w190928
w191107	1.0L	5	8.3	.1	5.4	1.0	.41	3.1L	8.8	B	w191107
w191108	1.5L	7	15	.2	7.8	1.3	1.9	8.5	15	710	w191108
w191109	1.3L	9	8.8	.1	3.0	.69	2.1	8.2	4.9	B	w191109
w191110	.78L	4	4.8	.1	2.4	1.1	1.1	7.4	5.2L	B	w191110
w191111	1.2L	4	4.7	.1	2.8	1.2	.45	4.7	6.2	B	w191111
w191112	3.9L	49	12	B	6.8	8.6	1.2	12L	8.6	B	w191112
w191113	2.4L	20	44	.1	3.7	.98	4.0	13	11	150	w191113
w191114	4.5L	18	32	.2	18	1.1	6.7	15	15	B	w191114
w191115	.82L	9	3.6	.1	6.2	1.4	.94	4.7	9.8	310	w191115

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Sample number
w190642	4.8	10L	32L	1.5L	1.3	4.2	4.1	1.4	1.0L	47	w190642
w190665	1.6	4.1L	22L	.59L	.40	1.2	1.4	1.0	.41L	41	w190665
w190666	1.5	2.6L	20L	.38L	.90	1.3	1.8	.50	.29	48	w190666
w190667	1.1	3.0L	20L	.43L	1.0	2.7	1.4	.70	.35	68	w190667
w190668	11	18L	23L	2.6L	.50	6.5	6.5	3.1	1.8L	85	w190668
w190669	4.6	5.6L	16L	.82L	.50	2.7	7.4	1.5	.77	56	w190669
w190670	5.6	19L	26	2.8L	.80	3.8	6.7	2.1	1.9L	65	w190670
w190671	6.8	9.4L	19L	1.4L	1.3	4.8	3.8	2.8	.94L	54	w190671
w190672	3.4	4.7L	17L	.69L	.70	1.6	2.5	1.1	.47L	47	w190672
w190673	5.2	11L	17L	1.6L	.70	3.3	3.5	1.6	1.5	180	w190673
w190674	2.9	11L	15	1.6L	.80	2.5	3.4	1.1	1.4	76	w190674
w190675	7.4	9.5L	16L	1.4L	.60	2.7	3.5	1.3	1.6	86	w190675
w190676	3.2	4.8L	14L	.70L	.50	1.2	3.1	.60	.62	36	w190676
w190677	3.4	6.4L	13L	.94L	.30	1.4	2.9	.70	.64L	100	w190677
w190678	17	46L	77	6.6L	.90	9.4	7.1	4.7	4.6L	58	w190678
w190679	18	30L	45	4.4L	1.4	7.5	7.8	4.4	3.0L	52	w190679
w190680	15	17L	20L	2.5L	5.6	12	4.8	3.7	1.7L	110	w190680
w190681	16	21L	34L	3.1L	3.0	11	2.6	4.7	2.5	190	w190681
w190682	7.8	10L	15L	1.5L	2.0	3.7	1.9	1.6	1.0L	83	w190682
w190683	4.7	8.3L	10	1.2L	.70	2.6	1.1	1.0	1.1	42	w190683
w190684	3.1	11L	16L	1.5L	1.2	2.1	1.4	.90	1.1L	30	w190684
w190685	5.6	5.0L	14L	.74L	.90	2.8	3.5	1.4	.89	81	w190685
w190686	4.8	6.0L	17L	.88L	.30	2.1	9.4	1.2	.60L	230	w190686
w190687	6.0	6.2L	18L	.91L	.60	3.4	4.0	1.7	1.2	200	w190687
w190922	16	22L	71	3.2L	1.3	13	2.6	7.1	2.2L	100	w190922
w190923	2.9	2.0L	19L	.29L	.54	1.7	1.7	1.9	1.2	41	w190923
w190924	11	14L	48	2.0L	2.3	7.7	4.0	3.0	2.6	40	w190924
w190925	12	6.3L	16	.92L	1.4	4.4	5.1	1.8	1.3	47	w190925
w190926	1.3L	9.0L	22L	1.3L	.49	3.5	4.2	1.6	1.5	33	w190926
w190927	1.8	H	16L	.34L	.60	1.2	2.3	.80	.23L	16	w190927
w190928	6.7	6.3L	20	.93L	.60	4.5	1.2	2.3	.63L	27	w190928
w191107	2.5	4.7L	12	.69L	1.1	2.2	2.0	.90	.47L	47	w191107
w191108	5.1	6.7L	15L	.99L	1.7	5.8	4.2	2.7	.78	45	w191108
w191109	4.0	6.0L	30L	.88L	.40	2.3	2.3	1.2	.88	76	w191109
w191110	2.6	3.5L	18L	.52L	.70	1.1	4.8	.80	.56	81	w191110
w191111	1.5	5.3L	15L	.78L	1.3	1.2	2.1	.90	.53L	51	w191111
w191112	3.4	18L	B	2.6L	1.7	2.1	7.8	B	1.8L	60	w191112
w191113	13	11L	24L	1.6L	.60	7.7	5.7	2.5	1.1L	140	w191113
w191114	6.3	21L	44	3.0L	.40	6.0	4.3	2.9	2.1L	67	w191114
w191115	3.5	3.7L	20L	.55L	.40	2.0	3.6	1.3	.59	130	w191115

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w190642	0.4L	4.0	1.5L	0.70L	2.0	22	5.4	0.7	19	10	w190642
w190665	.1	3.0L	.59L	.26L	.40	7.4	4.8	.4	3.7	11	w190665
w190666	.1	3.0L	.38L	.17L	.30	4.1	3.6	.3	4.8	13	w190666
w190667	.1	3.0L	.43L	.19L	.68	7.6	7.0	.5	5.4	9.7	w190667
w190668	.5	8.2	2.6L	1.1L	2.2	32	21	2.0	16	140	w190668
w190669	.3	3.0L	.82L	.36L	1.0	13	9.7	.9	3.1	29	w190669
w190670	.3	3.0L	2.8L	1.2L	4.7	33	9.5	.9	37	39	w190670
w190671	.5	3.0L	1.4L	.60L	1.5	29	14	1.3	4.6	57	w190671
w190672	.1	3.0L	1.9	.31L	.93	16	5.6	.4	41	12	w190672
w190673	.2	4.1	1.6L	.73L	1.4	24	11	1.0	4.4	46	w190673
w190674	.2	3.0L	1.6L	.73L	1.0	16	4.3	.5	5.3	13	w190674
w190675	.2	3.0L	1.4L	.61L	1.0	20	9.5	.6	8.6	25	w190675
w190676	.3L	3.0L	.70L	.31L	.30	8.8	2.1	.3	3.7	5.7	w190676
w190677	.1	4.0	.94L	.43L	.74	9.4	4.4	.4	10	14	w190677
w190678	.6	9.6	6.6L	2.9L	2.6	66	27	2.3	35	100	w190678
w190679	.7	5.0	4.4L	1.9L	3.7	47	27	2.8	110	55	w190679
w190680	.6	7.4	2.5L	1.1L	1.7	56	20	1.4	25	23	w190680
w190681	.6	7.1	3.1L	1.4L	2.6	66	18	1.8	25	37	w190681
w190682	.3	4.9	1.5L	.67L	1.1	32	19	.8	5.1	47	w190682
w190683	.1	3.0L	1.2L	.53L	.74	21	5.9	.4	9.0	27	w190683
w190684	.1	3.0L	1.5L	.68L	.56	12	3.2	.5	9.6	12	w190684
w190685	.3	5.9	.74L	.34L	1.4	13	8.9	.9	3.8	33	w190685
w190686	.2	3.0L	.88L	.40L	.49	5.5	4.1	.5	53	12	w190686
w190687	.2	3.0L	.91L	.42L	1.6	16	7.0	.6	5.1	35	w190687
w190922	.8	11	3.2L	1.5L	3.6	80	25	2.9	18	61	w190922
w190923	.3	3.0L	.29L	.15	.72	14	8.4	1.0	4.1	7.5	w190923
w190924	.4	3.0L	2.0L	.92L	2.4	48	18	1.6	24	28	w190924
w190925	.2	3.0L	.92L	.42L	2.1	44	13	1.1	10	35	w190925
w190926	.3	3.0	1.3L	.61L	.64	17	15	1.1	11	26	w190926
w190927	.5L	3.0L	1.2	.16L	1.5	7.1	.8	.4	3.0	2.6	w190927
w190928	.3	3.0L	.93L	.43L	2.7	21	10	1.2	24	13	w190928
w191107	.2	3.0L	.69L	.31L	1.1	11	2.7	.5	8.8	3.7	w191107
w191108	.6	3.0L	2.7	.45L	1.5	20	13	1.4	6.0	14	w191108
w191109	.2	3.0L	.88L	.40L	1.4	13	5.5	.5	3.9	20	w191109
w191110	.1	3.0L	.52L	.24L	.99	10	6.3	.4	7.4	9.3	w191110
w191111	.1	3.0L	5.3	.36L	.30	6.2	4.3	.5	20	3.5	w191111
w191112	.2	3.0L	9.8	1.2L	1.9	24	7.1	.6	17	18	w191112
w191113	.3	8.4	1.6L	.74L	2.7	44	8.4	.9	6.1	29	w191113
w191114	.3	3.0L	3.0L	1.4L	1.6	43	12	1.4	11	48	w191114
w191115	.2	3.0L	.55L	.25L	.50	8.6	4.7	.5	11	6.6	w191115

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w191116	1.1	0.72	0.070	0.035	0.038	0.039	0.29	0.023	0.01	2.0	w191116
w191117	.59	.50	.028	.011	.028	.022	.067	.025	.02	2.0	w191117
w191118	3.5	2.1	.027	.053	.029	.10	.18	.15	.03	2.0	w191118
w191119	.78	.74	.035	.013	.019	.029	.081	.038	.03	1.0	w191119
w191120	.88	.69	.050	.019	.017	.031	.083	.020	.02	1.0	w191120
w191121	2.1	1.4	.037	.036	.029	.087	1.7	.10	.05	18	w191121
w191122	2.2	1.4	.048	.057	.023	.092	1.9	.086	.04	53	w191122
w191123	2.5	1.7	.035	.044	.038	.082	.23	.089	.03	2.0	w191123
w191124	1.8	1.3	.026	.038	.021	.061	.17	.074	.03	2.0	w191124
w191125	2.4	1.8	.028	.044	.037	.082	.15	.095	.03	2.0	w191125
w191126	4.2	2.1	.030	.058	.021	.12	.060	.12	.02L	1.0	w191126
w191127	1.5	.82	.076	.029	.019	.081	3.0	.058	.06	73	w191127
w191128	5.9	2.7	.013	.065	.030	.15	.12	.16	.05	1.0	w191128
w191129	3.1	2.2	.049	.083	.048	.11	1.4	.12	.09	57	w191129
w191130	.55	.37	.037	.023	.028	.022	.27	.016	.02	3.0	w191130
w191131	.64	.49	.033	.022	.045	.038	1.2	.022	.03	39	w191131
w191132	7.8	4.4	.085	.18	.055	.25	1.7	.23	.06L	8.0	w191132
w191133	2.9	1.1	.019	.012	.032	.072	.018	.073	.02	1.0	w191133
w191178	3.5	1.7	.11	.057	.031	.11	.90	.12	.05	10	w191178
w191179	2.9	1.5	.064	.058	.030	.093	.75	.094	.03	7.8	w191179
w191180	1.5	1.0	.11	.043	.030	.060	.75	.047	.01	7.8	w191180
w191181	3.0	1.6	.063	.073	.032	.092	.43	.10	.07	2.8	w191181
w191182	3.8	2.2	.063	.076	.044	.12	.64	.14	.03	4.1	w191182
w191183	2.4	1.7	.058	.046	.045	.084	.60	.091	.02	3.5	w191183
w191184	3.1	1.8	.039	.071	.041	.11	1.9	.098	.02	2.7	w191184
w191185	4.7	2.9	.066	.085	.037	.15	.96	.17	.04	27	w191185
w191186	2.0	1.2	.067	.033	.024	.098	3.2	.071	.04	14	w191186
w191187	2.3	1.3	.045	.039	.027	.11	3.2	.091	.05	30	w191187
w191188	4.3	2.6	.037	.094	.034	.14	1.6	.16	.05	7.6	w191188
w191189	3.0	1.8	.027	.052	.026	.11	1.4	.091	.02	12	w191189
w191522	2.6	1.3	.12	.062	.015	.090	.50	.097	.05	39	w191522
w191862	.31	.27	.028	.011	.032	.023	.96	.008	.07	17	w191862
w191863	2.3	1.4	.025	.11	.061	.096	3.9	.034	.06	11	w191863
w191864	5.8	3.2	.036	.22	.059	.21	3.6	.14	.10	48	w191864
w191865	3.2	1.7	.024	.039	.012	.093	.22	.18	.03	1.4	w191865
w191866	5.0	3.9	.014	.072	.023	.16	.35	.23	.17	4.0	w191866
w191867	1.4	.98	.051	.030	.013	.050	.32	.050	.04	8.9	w191867
w191868	1.5	1.1	.063	.024	.025	.057	.62	.065	.05	11	w191868
w191869	2.8	1.8	.047	.11	.032	.14	3.8	.060	.12	240	w191869
w191870	.80	.59	.050	.034	.043	.034	.32	.022	.05	32	w191870

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w191116	24	80	1.3	1.5L	0.03	14	5.2	8.2	0.4	7.5	w191116
w191117	10	25	4.7	.8L	.02	10	2.8	4.3	.2	8.3	w191117
w191118	16	83	4.5	3.9L	.10	28	5.8	22	1.6	26	w191118
w191119	10	53	12	1.1L	.02	11	5.7	8.8	.4L	13	w191119
w191120	11	33	1.6	1.1L	.03	11	8.1	4.9	.2	10	w191120
w191121	7.6	770	4.1	3.2L	.05	13	6.0	15	1.3	20	w191121
w191122	8.7	62	3.9	3.4L	.05	14	3.9	15	1.3	12	w191122
w191123	12	68	5.4	3.1L	.07	16	4.2	16	.6	20	w191123
w191124	10	72	1.8	2.3L	.02	17	5.7	11	1.1	12	w191124
w191125	12	96	4.6	3.1L	.03	20	5.5	17	1.1	20	w191125
w191126	9.8	80	7.0	4.4L	.01L	21	8.3	19	1.9	11	w191126
w191127	4.7	27	2.5	4.3L	.01	12	5.6	12	.2	5.6	w191127
w191128	13	89	2.0	8.2L	.06	30	5.3	26	1.4	13	w191128
w191129	12	250	6.1	6.1L	.10	37	7.9	27	1.4	28	w191129
w191130	7.3	42	3.4	1.1L	.00	7.0	3.4	4.2	.4	8.6	w191130
w191131	6.9	27	2.0	2.0L	.06	27	6.5	28	2.5	8.7	w191131
w191132	77	140	3.0	13L	.10	27	6.4	28	2.4	16	w191132
w191133	16	80	1.2	3.8L	.03	46	5.7	47	15	10	w191133
w191178	31	150	2.2	3.4L	.05	20	4.2	34	1.7	7.4	w191178
w191179	43	110	.9	2.8L	.04	14	2.7	19	1.7	4.1	w191179
w191180	49	86	.6	1.8L	.03	13	2.8	11	.7	2.8	w191180
w191181	57	110	.8	2.8L	.03	16	1.9	18	1.5	10	w191181
w191182	60	140	1.0	3.7L	.05	25	3.6	25	2.5	7.7	w191182
w191183	67	140	.9	2.5L	.03	19	3.0	19	1.5	6.1	w191183
w191184	60	120	1.9	3.4L	.05	16	2.9	27	2.2	8.8	w191184
w191185	60	97	4.3	4.7L	.10	26	5.8	37	1.5	13	w191185
w191186	52	84	2.4	3.0L	.01	13	10	18	.4	8.7	w191186
w191187	55	100	.8	3.2L	.05	14	3.0	15	.8	9.9	w191187
w191188	45	100	1.0	4.4L	.09	23	4.7	26	2.3	17	w191188
w191189	46	84	1.1	3.2L	.07	19	3.4	15	1.6	7.0	w191189
w191522	5.8	120	3.1	4.3L	.06	20	5.0	13	1.4	32	w191522
w191862	3.6	28	2.3	1.4L	.09	5.0	7.0	4.5	.2	.9	w191862
w191863	14	97	1.4	5.8L	.06	12	4.0	13	1.1	13	w191863
w191864	23	280	3.6	13L	.07	28	5.8	23	2.7	24	w191864
w191865	22	110	3.1	5.6L	.05	22	8.6	21	.4	13	w191865
w191866	32	500	1.5	9.9L	.13	24	9.1	37	2.4	46	w191866
w191867	29	100	4.3	3.0L	.05	13	5.4	8.8	.5	10	w191867
w191868	14	110	4.8	3.4L	.04	12	4.4	9.5	.4	14	w191868
w191869	20	98	3.5	8.3L	.15	18	5.5	17	1.9	28	w191869
w191870	18	82	2.2	2.1L	.05	7.0	2.7	5.1	.6	10	w191870

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w191116	2.1L	0.7L	0.27	120	3.6	0.56	0.30L	0.3	0.045	0.45L	w191116
w191117	1.2L	.7	.21	140	2.9	.73	.17	.2	.020	.25L	w191117
w191118	5.7L	1.9	.47	100	9.8	1.6	.81L	1.5	.026	1.2L	w191118
w191119	1.6L	.9	.27	96	8.4	.70	1.7	.4	.010L	.33L	w191119
w191120	1.7L	.5L	.23	72	2.2	.52	.24L	.2	.010	.35L	w191120
w191121	4.7L	1.5L	.25	100	14	.99L	6.7	.9	.29	.99L	w191121
w191122	5.0L	1.6L	.30	160	6.9	1.1L	4.3	.7	.27	1.1L	w191122
w191123	4.5L	1.4L	.32	140	8.7	.94L	1.8	.7	.033	.94L	w191123
w191124	3.3L	1.0L	.33	60	6.4	.88	1.8	.8	.030	.69L	w191124
w191125	4.5L	1.4L	.33	140	9.6	.94L	1.4	.9	.026	.94L	w191125
w191126	6.4L	2.0L	.40	96	8.5	1.3L	1.8	.9	.020	1.3L	w191126
w191127	6.2L	1.9L	.26	40	5.0	1.8	15	.5	.57	1.4L	w191127
w191128	12L	3.7L	.41	88	8.6	2.6L	1.7L	1.3	.043	2.6L	w191128
w191129	8.8L	2.8L	.45	110	10	1.9L	4.1	1.0	.21	1.9L	w191129
w191130	1.7L	.7	.15	50	3.6	.88	2.0	.4	.039	.36L	w191130
w191131	2.9L	.9L	.47	60	3.1	1.4	1.2	1.2	.21	.64L	w191131
w191132	19L	6.0L	.43	180	14	4.2L	2.7L	1.2	.13	4.2L	w191132
w191133	5.6L	1.7L	.61	60	1.9	1.2L	.80L	3.1	.038	1.2L	w191133
w191178	4.9L	1.5L	.33	250	12	1.5L	13	1.2	.58	1.0L	w191178
w191179	4.0L	1.2L	.28	200	4.6	1.3	.92	.9	.21	.86L	w191179
w191180	2.6L	.8L	.24	260	2.3	.55L	.79	.5	.090	.55L	w191180
w191181	4.0L	1.2L	.27	150	3.6	2.0	.58L	.9	.050	.85L	w191181
w191182	5.3L	1.6L	.37	150	5.1	1.1L	.76L	1.2	.078	1.1L	w191182
w191183	3.6L	1.1L	.27	160	4.9	1.4	.53L	.7	.17	.78L	w191183
w191184	4.9L	1.5L	.42	100	7.8	1.4	.71L	1.1	.13	1.1L	w191184
w191185	6.7L	2.0L	.68	110	12	3.3	2.8	1.2	.24	1.4L	w191185
w191186	4.2L	1.3L	.43	88	9.4	.91L	2.8	.6	.35	.91L	w191186
w191187	4.6L	1.4L	.25	180	4.2	.98L	.66L	.6	.13	.98L	w191187
w191188	6.3L	1.9L	.36	110	7.8	1.9	.90L	1.3	.14	1.3L	w191188
w191189	4.6L	1.4L	.29	80	4.3	.98L	.66L	.8	.060	.98L	w191189
w191522	6.3L	1.9L	.36	28	3.1	1.3L	.90L	1.1	.090	1.3L	w191522
w191862	2.0L	1.0	.20	20L	5.9	1.3	1.1	.6	.023	.45L	w191862
w191863	8.4L	2.6L	.23	80	6.2	1.8L	1.3L	.5	.073	1.8L	w191863
w191864	19L	5.9L	.53	140	14	4.1L	3.3	.8	.23	4.1L	w191864
w191865	8.2L	2.6L	.34	32	7.4	1.8L	1.2L	1.4	.16	1.8L	w191865
w191866	14L	4.6L	.48	64	22	3.2L	2.2L	1.6	.13	3.2L	w191866
w191867	4.4L	1.4L	.26	48	5.0	1.0	.72	.4	.18	.96L	w191867
w191868	5.0L	1.6L	.19	34	4.4	1.1L	.75L	.6	.14	1.1L	w191868
w191869	12L	3.8L	.36	76	8.8	3.5	1.8L	.5	.19	2.7L	w191869
w191870	3.0L	.9L	.21	20L	3.6	.66L	.45L	.3	.050	.66L	w191870

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Sample number
w191116	0.99L	8	5.2	0.1	18	2.3	0.42	8.0	8.0	120	w191116
w191117	.55L	5	4.7	.1	1.2	.73	.88	6.2	5.2	23	w191117
w191118	2.6L	16	16	.2	4.8	1.1	4.5	18	14		w191118
w191119	.74L	6	8.1	.1	1.1	.63	1.1	7.7	12	B	w191119
w191120	.78L	5	6.3	.1	3.0	.37	.56	4.8	10	97	w191120
w191121	47L	7	11	.2	4.7	1.2	1.9	6.7L	14	5	w191121
w191122	50L	7	13	.2	16	1.4	3.6	8.5	8.1	24	w191122
w191123	2.1L	9	14	.1	6.3	.99	1.8	9.9	12	B	w191123
w191124	1.5L	8	10	.1	3.8	.47	2.3	8.8	5.5	22	w191124
w191125	2.1L	11	17	.2	2.9	.31L	2.2	9.1	9.1	17	w191125
w191126	3.0L	10	17	.2	5.4	.44L	3.6	9.1L	11	31	w191126
w191127	2.9L	6	8.9	.1	19	6.4	1.2	8.9L	13	130	w191127
w191128	5.6L	16	32	.2	3.0	1.0	4.5	20	14	49	w191128
w191129	4.1L	20	32	.2	12	1.8	1.7	13	21	120	w191129
w191130	.78L	3	2.9	.1	4.9	1.1	.36	6.8	9.9	11	w191130
w191131	1.4L	4	5.1	.1	2.9	2.1	.60	6.0	6.4	1,000	w191131
w191132	8.9L	22	98	.2	26	1.8	4.5	27L	27	130	w191132
w191133	2.6L	8	6.3	.1	2.0	.70	3.3	9.6	10	800	w191133
w191178	2.3L	12	22	.2	20	1.0	5.5	16	6.8	710	w191178
w191179	1.9L	9	13	.1	17	.88	2.8	10	5.3	830	w191179
w191180	1.2L	7	5.5	.1	20	1.8	2.0	7.2	3.7	600	w191180
w191181	1.9L	9	12	.1	14	1.1	2.9	9.4	4.6	240	w191181
w191182	2.5L	14	18	.1	13	.99	2.5	12	8.5	1,100	w191182
w191183	1.7L	10	13	.1	11	.90	2.6	12	5.9	750	w191183
w191184	2.3L	9	14	.2	13	.96	3.6	13	8.1	420	w191184
w191185	3.2L	13	19	.3	19	5.2	4.7	14	15	490	w191185
w191186	2.0L	6	9.9	.2	19	3.2	4.7	6.1L	17	31	w191186
w191187	2.2L	8	9.9	.1	10	2.3	4.2	6.6L	7.9	55	w191187
w191188	3.0L	13	33	.1	12	1.1	5.6	11	9.4	30	w191188
w191189	2.2L	10	12	.1	4.1	1.4	4.1	11	8.8	170	w191189
w191522	2.9L	11	13	.1	9.2	1.7	1.8	9.0L	8.0	5	w191522
w191862	.98L	2	3.4	.2	3.6	2.4	.70	4.2	18	12	w191862
w191863	4.0L	7	15	.1	21	2.3	.84L	13L	12	50	w191863
w191864	8.9L	16	31	.2	46	2.8	1.9L	28L	15	22	w191864
w191865	3.9L	13	8.3	.2	3.1	.56L	6.0	12L	17	150	w191865
w191866	6.9L	13	30	.2	7.1	2.0	4.2	22L	24	87	w191866
w191867	2.1L	7	6.0	.1	3.9	2.6	1.4	11	11	16	w191867
w191868	2.4L	6	11	.1	6.8	1.2	3.3	7.5L	12	B	w191868
w191869	5.8L	10	13	.2	27	5.8	1.7	18L	20	B	w191869
w191870	1.4L	3	3.1	.1	6.6	1.7	.53	5.3	5.7	9	w191870

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Sample number
w191116	2.0	4.5L	20L	0.66L	0.40	2.0	3.1	1.4	0.45L	270	w191116
w191117	2.2	2.5L	16L	.36L	.40	1.3	2.1	1.0	.25L	39	w191117
w191118	8.1	12L	18	1.8L	1.3	4.9	4.4	2.5	1.2L	53	w191118
w191119	3.9	3.3L	15L	.49L	.70	2.5	4.1	1.3	.33L	49	w191119
w191120	3.0	3.5L	15L	.52L	.30	1.4	3.4	1.2	.35L	52	w191120
w191121	4.4	9.9L	20	1.5L	2.6	4.7	3.6	1.3	1.1	76	w191121
w191122	5.4	11L	26	1.6L	1.3	3.7	5.5	1.5	1.1	71	w191122
w191123	4.4	9.4L	20	1.4L	1.0	3.6	4.3	1.6	.94L	55	w191123
w191124	4.4	6.9L	17	1.0L	.90	2.8	1.6	1.8	1.0	58	w191124
w191125	8.0	9.4L	17	1.4L	1.1	4.0	3.8	1.8	1.3	72	w191125
w191126	5.4	13L	32	2.0L	.90	4.8	3.6	2.1	1.3L	45	w191126
w191127	5.8	14L	17L	1.9L	1.1	2.2	5.6	1.4	1.6	39	w191127
w191128	6.1	26L	23	3.7L	.40	4.9	6.3	2.4	2.6L	60	w191128
w191129	9.1	19L	25	2.8L	2.2	6.6	4.4	3.1	2.1	130	w191129
w191130	1.4	3.6L	14L	.52L	1.1	1.2	1.9	.80	.42	62	w191130
w191131	1.7	7.8	18	.92L	.90	5.1	11	.90	.64L	64	w191131
w191132	8.0	42L	74	6.0L	.70	5.1	4.0	3.5	4.2L	72	w191132
w191133	4.6	12L	14L	1.7L	.30	9.9	9.2	1.5	1.2L	59	w191133
w191178	6.3	10L	21	1.5L	1.8	6.4	6.6	1.7	1.2	340	w191178
w191179	4.7	8.6L	27	1.2L	.30	3.4	2.2	1.4	.91	120	w191179
w191180	3.7	5.5L	9	.79L	.28	1.9	2.0	1.0	1.1	190	w191180
w191181	2.8	8.5L	24	1.2L	.28	3.1	1.0	1.4	.85L	120	w191181
w191182	4.2	11L	28	1.6L	.38	4.3	1.8	2.0	1.1L	160	w191182
w191183	2.9	7.8L	23	1.1L	.32	3.0	2.8	1.4	1.8	170	w191183
w191184	3.7	11L	30	1.5L	.46	5.7	2.1	1.8	1.1L	90	w191184
w191185	5.4	14L	24	2.0L	1.0	10	6.1	2.8	1.4L	93	w191185
w191186	3.2	9.1L	13L	1.3L	1.5	3.6	7.1	1.7	.94	81	w191186
w191187	3.2	14L	11	1.4L	.34	2.5	4.1	1.1	1.2	85	w191187
w191188	7.3	13L	32	1.9L	.37	4.9	3.2	1.8	1.3L	82	w191188
w191189	2.5	9.8L	24	1.4L	.24	3.0	2.2	1.5	.98L	77	w191189
w191522	6.3	13L	15	1.9L	.86	2.6	2.5	1.9	1.3L	150	w191522
w191862	4.5	4.5L	15L	.64L	1.4	2.9	2.0	.90	.45L	42	w191862
w191863	2.8	18L	20	2.6L	.70	3.2	3.5	1.2	1.8L	68	w191863
w191864	8.2	41L	43	5.9L	.80	5.3	6.1	2.7	4.1L	110	w191864
w191865	8.3	18L	14L	2.6L	.29	3.8	5.3	1.8	1.3L	72	w191865
w191866	13	32L	31	4.6L	.64	7.2	8.5	2.4	3.2L	61	w191866
w191867	3.7	9.6L	11	1.4L	.59	2.0	3.8	1.1	.96L	66	w191867
w191868	3.5	11L	14L	1.6L	.40	2.1	4.6	1.0	1.1L	120	w191868
w191869	4.0	27L	24	3.8L	1.7	3.8	4.4	1.9	2.7L	83	w191869
w191870	3.0	6.6L	15L	.94L	.84	1.6	3.8	1.0	.66L	94	w191870

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w191116	0.2	3.0L	0.66L	0.30L	0.40	12	4.1	0.5	3.2	4.7	w191116
w191117	.2	3.0L	.36L	.17L	.50	7.3	6.5	.6	3.1	7.0	w191117
w191118	.4	5.0	1.8L	.81L	1.9	28	12	1.2	18	52	w191118
w191119	.2	3.0L	.49L	.23	.30	14	7.7	.8	3.4	10	w191119
w191120	.2	3.0L	.52L	.24L	.40	7.4	4.4	.5	3.2	7.8	w191120
w191121	.2	4.0	3.5	.67L	1.3	14	4.0	.9	27	9.0	w191121
w191122	.3	5.0	1.6L	.71L	1.0	24	9.7	.9	7.5	23	w191122
w191123	.2	3.0L	1.4L	.63L	1.3	21	9.6	.8	32	21	w191123
w191124	.3	3.0L	1.0L	.47L	.84	18	6.7	.8	5.0	20	w191124
w191125	.3	5.0	1.4L	.63L	1.6	24	8.9	1.0	4.0	17	w191125
w191126	.3	3.0L	2.0L	.91L	1.2	24	9.1	1.4	5.4	31	w191126
w191127	.2	6.6	1.9L	.89L	.94	12	7.2	.7	33	13	w191127
w191128	.3	4.0	3.7L	1.7L	1.3	37	12	1.0	8.4	63	w191128
w191129	.4	6.0	2.8L	1.3L	2.8	41	8.6	1.1	25	18	w191129
w191130	.1	3.0L	.52L	.24L	.20L	8.3	6.8	.4	6.2	4.9	w191130
w191131	.5	5.0	2.4	.42L	.60	12	5.5	1.1	9.2	7.8	w191131
w191132	.4	7.9	6.0L	2.7L	1.5	66	9.5	1.1	16	39	w191132
w191133	.6	5.2	1.7L	.80L	.20L	14	8.7	1.7	2.4	42	w191133
w191178	.3	4.0	4.6	.70L	1.6	70	13	1.1	9.5	73	w191178
w191179	.2	3.0	1.2L	.58L	.61	24	7.6	.7	8.3	45	w191179
w191180	.2	3.0L	.79L	.37L	.53	12	4.2	.4	6.1	27	w191180
w191181	.2	3.0L	1.2L	.58L	.64	19	7.4	.6	7.5	52	w191181
w191182	.3	4.3	1.6L	.76L	1.1	28	6.4	.8	6.1	28	w191182
w191183	.2	4.9	1.1L	.53L	.51	23	6.5	.6	4.5	33	w191183
w191184	.3	3.0L	1.5L	.71L	2.6	33	11	.9	5.5	49	w191184
w191185	.5	3.0L	2.0L	.97L	2.9	45	20	1.7	14	74	w191185
w191186	.3	3.0L	1.3L	.61L	4.0	21	12	.9	10	52	w191186
w191187	.2	3.0L	1.4L	.66L	.82	19	5.5	.4	9.1	44	w191187
w191188	.3	5.1	1.9L	.90L	1.1	31	7.8	.8	17	63	w191188
w191189	.2	3.0L	1.4L	.66L	.57	20	7.6	.6	14	56	w191189
w191522	.3	3.0L	1.9L	.90L	1.6	17	6.5	.9	6.2	17	w191522
w191862	.2L	3.0L	1.8	.31L	2.1	13	9.8	.8	21	2.8	w191862
w191863	.2	3.0L	2.6L	1.3L	1.0	23	4.6	.6	16	10	w191863
w191864	.4L	5.5	5.9L	2.8L	3.9	36	6.6	1.1	28	17	w191864
w191865	.2	6.3	2.6L	1.2L	.98	22	8.8	.9	5.3	50	w191865
w191866	.5	7.8	4.6L	2.2L	2.5	69	6.1	1.0	24	36	w191866
w191867	.5L	3.0L	2.1L	.66L	.67	18	12	.6	4.3	14	w191867
w191868	.5L	3.0L	1.6L	.75L	.60	17	8.8	.5	4.8	29	w191868
w191869	.4	6.6	3.8L	1.8L	2.4	38	14	.9	11	23	w191869
w191870	.2	3.0L	.94L	.45L	.93	13	6.6	.5	13	7.4	w191870

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w191871	0.58	0.46	0.039	0.017	0.035	0.027	0.40	0.017	0.02	14	w191871
w191872	1.8	1.2	.076	.038	.043	.063	.26	.082	.03	3.3	w191872
w191873	3.1	2.0	.075	.076	.029	.11	.10	.12	.04	1.0	w191873
w191874	2.2	1.3	.075	.039	.027	.079	.50	.10	.02	40	w191874
w191875	.62	.52	.062	.017	.019	.025	.17	.023	.03	3.3	w191875
w191876	1.3	.49	.039	.028	.019	.038	.25	.041	.02	4.1	w191876
w191877	6.8	4.4	.41	.22	.050	.25	2.1	.27	.09	15	w191877
w191878	1.3	.95	.080	.033	.016	.062	1.6	.058	.02	12	w191878
w191879	1.7	1.1	.062	.033	.014	.056	.34	.056	.04	7.0	w191879
w191880	2.3	1.7	.025	.036	.023	.073	.12	.11	.05	4.8	w191880
w191881	2.5	2.0	.030	.042	.016	.087	.26	.15	.06	11	w191881
w191882	2.5	1.8	.037	.041	.033	.087	.18	.082	.07	8.9	w191882
w191883	2.2	1.3	.027	.016	.017	.064	.038	.11	.03	1.0	w191883
w191884	5.0	2.3	.035	.042	.027	.14	.080	.24	.03	2.0	w191884
w191885	1.6	1.1	.074	.040	.030	.054	.23	.039	.05	2.9	w191885
w191886	2.5	1.8	.043	.064	.037	.084	.37	.085	.04	4.7	w191886
w191887	1.1	.88	.031	.019	.027	.041	.28	.047	.04	5.1	w191887
w191888	5.9	3.6	.030	.067	.026	.17	.10	.26	.08	.9	w191888
w191889	.45	.34	.072	.015	.029	.044	2.4	.013	.04	41	w191889
w191890	1.9	1.3	.041	.028	.038	.068	.45	.098	.05	3.6	w191890
w191891	1.0	.62	.17	.041	.014	.054	1.5	.047	.01	1.6	w191891
w191892	2.7	1.5	.060	.069	.021	.12	3.0	.083	.04	55	w191892
w191893	4.6	2.3	.034	.063	.022	.13	.28	.24	.05	56	w191893
w191894	.71	.68	.038	.017	.008	.027	.14	.014	.01	1.4	w191894
w191895	11	6.7	.057	.22	.062	.33	.72	.38	.08L	42	w191895
w191896	4.3	2.7	.035	.081	.025	.14	.16	.16	.03L	1.9	w191896
w191897	1.6	.87	.063	.025	.024	.049	.14	.053	.03	.8	w191897
w191898	3.1	2.2	.051	.046	.019	.10	.18	.11	.05	1.0	w191898
w191899	2.2	1.7	.034	.051	.026	.079	.19	.051	.05	1.9	w191899
w191900	2.6	1.4	.020	.020	.043	.077	.059	.14	.03	1.3	w191900
w191901	1.7	1.2	.058	.031	.025	.067	1.1	.073	.05	75	w191901
w191902	.85	.67	.048	.020	.015	.031	.052	.020	.05	.9	w191902
w191903	1.9	1.5	.070	.041	.039	.068	.14	.084	.02	.7	w191903
w191904	1.4	1.2	.049	.033	.039	.052	.20	.079	.05	1.5	w191904
w192710	2.9	1.1	.059	.025	.032	.077	.22	.12	.03	2.0	w192710
w192711	1.2	1.0	.047	.028	.039	.046	.17	.069	.03	1.0	w192711
w192712	.37	.25	.055	.016	.027	.027	.85	.018	.02	3.0	w192712
w192713	1.4	.78	.045	.055	.036	.053	.58	.046	.02	24	w192713
w192714	.84	.68	.058	.029	.037	.036	.36	.036	.03	8.0	w192714
w192715	.99	.80	.064	.033	.044	.047	.70	.034	.04	21	w192715

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w191871	11	99	3.1	1.6L	0.07	6.0	4.0	3.2	0.4	12	w191871
w191872	52	76	2.7	3.8L	.02	11	1.6	12	.6	7.3	w191872
w191873	26	160	4.4	6.6L	.08	18	5.4	19	1.6	16	w191873
w191874	11	100	1.6	4.8L	.03	23	3.3	13	.4	16	w191874
w191875	42	48	1.7	1.5L	.01	6.0	6.3	4.4	.3L	12	w191875
w191876	44	60	2.8	2.3L	.01	9.0	2.4	8.1	.4	5.1	w191876
w191877	49	400	6.1	15L	.03L	47	5.9	34	1.4	20	w191877
w191878	29	52	3.8	3.8L	.04	12	8.7	9.3	.6	14	w191878
w191879	36	34	9.4	3.4L	.01	12	5.3	9.5	.5	11	w191879
w191880	26	78	2.7	4.4L	.05	17	5.7	17	.7	16	w191880
w191881	14	50	6.6	5.3L	.06	24	8.4	23	1.1	17	w191881
w191882	27	150	8.3	4.5L	.15	16	22	30	1.3	24	w191882
w191883	24	64	2.0	3.3L	.12	18	100	23	.2	13	w191883
w191884	28	87	3.4	7.1L	.04	25	7.1	26	.8	16	w191884
w191885	26	51	5.3	2.8L	.10	11	9.4	10	.7	20	w191885
w191886	30	100	3.4	4.3L	.04	20	6.7	16	1.1	22	w191886
w191887	20	46	1.9	2.1L	.05	10	5.2	8.1	.4	11	w191887
w191888	18	110	5.5	10L	.05	43	6.5	39	1.5	32	w191888
w191889	2.9	74	2.3	2.3L	.04	6.0	2.4	2.8	.1	10	w191889
w191890	13	90	3.0	3.5L	.11	21	4.9	17	1.0	28	w191890
w191891	25	45	2.2	2.8L	.01	10	5.7	7.0	.4	13	w191891
w191892	26	47	5.4	6.0L	.08	13	4.3	15	1.7	13	w191892
w191893	27	84	8.8	6.8L	.17	30	14	14	.9	33	w191893
w191894	23	31	3.6	1.4L	.04	9.0	14	7.1	.3	6.9	w191894
w191895	44	270	2.9	17L	.04	50	8.4	59	5.3	18	w191895
w191896	33	130	4.4	7.0L	.05	26	8.3	26	1.9	13	w191896
w191897	8.3	71	2.9	2.9L	.04	17	5.3	9.9	.3	7.7	w191897
w191898	11	71	2.8	5.2L	.07	23	7.1	24	.8	16	w191898
w191899	16	87	5.7	4.1L	.05	12	11	16	.9	14	w191899
w191900	21	86	1.8	4.0L	.05	17	3.0	13	.4	13	w191900
w191901	15	60	3.8	3.5L	.04	14	2.9	11	.4	11	w191901
w191902	9.6	56	5.2	1.9L	.04	7.0	11	5.7	.2	9.6	w191902
w191903	25	98	1.4	4.1L	.03	17	4.1	15	1.1	7.5	w191903
w191904	18	76	3.4	3.2L	.05	14	7.0	14	.6	20	w191904
w192710	20	35	3.7	2.0L	.05	17	4.0	14	.3	16	w192710
w192711	21	36	2.4	1.2L	.07	11	6.6	7.7	.4	20	w192711
w192712	2.7	11	3.8	.7L	.02	5.0	4.2	4.0	.1	8.3	w192712
w192713	7.0	27	1.8	1.4L	.06	10	4.5	7.9	1.4	11	w192713
w192714	6.5	27	1.5	.9L	.06	9.0	2.4	6.4	.5	12	w192714
w192715	7.8	26	1.7	1.2L	.05	17	4.9	9.5	.5	26	w192715

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w191871	2.3L	0.8	0.16	20L	2.9	0.90	3.5	0.4	0.050	0.51L	w191871
w191872	5.5L	1.7L	.19	27	5.9	1.2L	2.0	.7	.070	1.2L	w191872
w191873	9.6L	3.0L	.26	30	10	2.1L	2.0	1.0	.020	2.1L	w191873
w191874	6.9L	2.2L	.28	88	3.1	2.4	1.0L	.8	.077	1.5L	w191874
w191875	2.2L	.7L	.09	20L	3.9	.54	2.5	.2	.026	.48L	w191875
w191876	3.4L	1.1L	.19	34	4.2	.74L	1.9	.5	.11	.74L	w191876
w191877	22L	7.0L	.73	140	12	4.9L	3.4L	3.1	.11	4.9L	w191877
w191878	5.5L	1.7L	.19	20L	6.2	1.2L	7.3	.5	.11	1.2L	w191878
w191879	4.9L	1.5L	.27	42	6.1	1.1L	2.2	.5	.034	1.1L	w191879
w191880	6.4L	2.0L	.32	34	7.1	1.6	.97L	1.0	.085	1.4L	w191880
w191881	7.7L	2.4L	.39	46	8.2	1.7L	1.2L	1.4	.15	1.7L	w191881
w191882	6.6L	2.2	.49	140	17	1.5L	2.0	.7	.18	1.5L	w191882
w191883	4.9L	1.5L	.38	56	4.3	1.3	.72L	1.1	.031	1.1L	w191883
w191884	10L	3.3L	.42	26	6.7	2.3L	1.5L	1.6	.087	2.3L	w191884
w191885	4.1L	1.3L	.39	40	11	1.0	6.5	.3	.040	.91L	w191885
w191886	6.4L	2.0L	.39	61	6.8	1.4	.94L	.7	.034	1.4L	w191886
w191887	3.1L	1.0L	.18	20L	3.1	.69L	.46L	.4	.055	.69L	w191887
w191888	15L	4.8L	.77	86	13	3.4L	2.3L	2.0	.023	3.4L	w191888
w191889	3.3L	1.1L	.17	20L	3.8	1.1L	.53	.6	.55	.74L	w191889
w191890	5.2L	1.6L	.35	28	8.0	1.1	2.2	1.1	.10	1.1L	w191890
w191891	4.1L	1.3L	.18	20L	3.4	.91L	.60L	.4	.019	.91L	w191891
w191892	8.8L	2.8L	.34	48	6.5	1.9L	1.3L	.6	.48	1.9L	w191892
w191893	10L	4.6	.85	48	17	4.7	7.3	.8	.38	2.2L	w191893
w191894	2.1L	.7L	.33	20L	3.0	.46L	.56	.2	.043	.46L	w191894
w191895	25L	8.0L	1.1	82	14	5.6L	3.7L	2.7	.15	5.6L	w191895
w191896	10L	3.3L	.45	190	8.6	2.3L	1.5L	1.2	.019	2.3L	w191896
w191897	4.2L	1.4L	.35	20L	5.3	1.1	.65L	.5	.016	.94L	w191897
w191898	7.6L	2.4L	.44	52	13	1.7L	1.1L	.8	.031	1.7L	w191898
w191899	6.0L	1.9L	.38	34	12	1.3L	1.5	.4	.031	1.3L	w191899
w191900	5.9L	1.9L	.23	86	4.4	1.3L	.86L	1.1	.048	1.3L	w191900
w191901	5.1L	1.6L	.20	28	5.6	1.1L	2.1	.6	.32	1.1L	w191901
w191902	2.7L	.9L	.26	61	3.7	.93	.41L	.2	.023	.59L	w191902
w191903	6.0L	1.9L	.31	36	9.0	1.3L	2.9	.8	.012	1.3L	w191903
w191904	4.6L	1.4L	.24	20L	7.6	1.0L	2.4	.7	.019	1.0L	w191904
w192710	3.0L	1.3	.27	27	3.5	.74	.47L	1.2	.030	.65L	w192710
w192711	1.8L	.6	.23	20L	4.7	.55	1.6	.4	.010L	.39L	w192711
w192712	1.0L	.3L	.13	20L	1.0L	.51	2.6	.2	.010L	.22L	w192712
w192713	2.0L	.6L	.19	38	2.6	.45L	.38	.4	.050	.45L	w192713
w192714	1.4L	.6	.20	21	2.9	.56	.52	.3	.010	.30L	w192714
w192715	1.8L	.6L	.28	54	2.6	1.2	1.2	.4	.050	.39L	w192715

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Sample number
w191871	1.1L	3	3.2	0.1	3.5	2.0	1.2	6.7	8.3	14	w191871
w191872	2.7L	6	19	.1	3.6	.38L	2.7	8.4L	8.4		w191872
w191873	4.6L	11	24	.1	12	.66L	5.9	16	17	40	w191873
w191874	3.3L	14	21	.1	10	1.9	5.8	14	9.2	170	w191874
w191875	1.1L	3	6.3	.1	4.5	.78	.99	3.3	14	66	w191875
w191876	1.6L	5	5.5	.1	5.5	.69	2.3	6.9	6.4	12	w191876
w191877	11L	28	34	.4	61	1.5L	7.9	34L	16	67	w191877
w191878	2.6L	7	20	.1	12	2.0	1.3	8.3L	15	200	w191878
w191879	2.3L	7	10	.1	7.4	.74	1.0	8.0	11	18	w191879
w191880	3.1L	10	14	.1	2.6	1.6	3.6	9.7	15	B	w191880
w191881	3.7L	15	20	.2	3.0	1.1	3.2	12L	15	B	w191881
w191882	3.2L	8	10	.3	4.1	2.5	.87	15	25	B	w191882
w191883	2.3L	11	11	.1	2.1	1.8	4.9	13	13	10	w191883
w191884	4.9L	15	36	.2	5.7	1.4	4.8	15L	14	B	w191884
w191885	2.0L	5	7.2	.2	7.8	2.7	.59	7.2	15	17	w191885
w191886	3.0L	11	13	.2	12	1.2	.71	12	13	B	w191886
w191887	1.5L	6	6.9	.1	1.7	1.8	1.3	5.9	14	B	w191887
w191888	7.1L	23	34	.4	5.3	1.0L	6.3	32	18	B	w191888
w191889	33L	2	2.1	.1	16	2.6	.33L	5.0	4.0	7	w191889
w191890	2.5L	13	17	.2	3.6	2.2	2.7	11	11	18	w191890
w191891	2.0L	6	7.8	.1	20	.85	1.5	9.1	9.1	17	w191891
w191892	4.2L	7	11	.2	56	3.8	.88L	13L	8.9	B	w191892
w191893	100L	13	15	.5	27	4.7	1.7	17	27	140	w191893
w191894	.99L	4	7.9	.1	12	2.7	.23	4.3	11		w191894
w191895	12L	29	40	.3	9.2	1.7L	7.6	37L	15	35	w191895
w191896	4.9L	16	20	.2	7.7	.77	4.4	15L	15	B	w191896
w191897	2.0L	10	6.5	.1	18	1.1	.71	9.4	11	26	w191897
w191898	3.6L	13	17	.1	19	1.1	2.3	13	19	31	w191898
w191899	2.9L	7	10	.3	6.7	1.5	1.1	12	20	25	w191899
w191900	2.8L	11	8.5	.1	5.9	.90	6.1	9.2	11	B	w191900
w191901	2.4L	8	13	.1	8.1	1.1	1.9	8.0	6.8	4	w191901
w191902	1.3L	3	5.9	.1	3.6	1.7	.41	6.7	15	10	w191902
w191903	2.9L	10	21	.1	6.5	1.1	2.5	11	9.8	110	w191903
w191904	2.2L	8	12	.1	8.8	.52	.88	6.9L	10	14	w191904
w192710	1.4L	10	18	.1	6.5	.65	3.6	8.3	7.7	77	w192710
w192711	.83L	6	12	.1	5.3	.66	1.0	5.5	10	19	w192711
w192712	.48	3	2.2	.1L	120	.35	.26	1.5L	5.1	21	w192712
w192713	.96L	5	12	.1	9.0	.58	.38	2.9L	4.5	22	w192713
w192714	.65L	5	6.9	.1	4.0	.90	.65	5.6	5.6	180	w192714
w192715	.84	9	13	.1	4.0	1.5	1.1	9.0	10	27	w192715

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Sample number
w191871	2.7	5.1L	13L	0.74L	1.9	1.1	3.3	0.70	0.51	110	w191871
w191872	3.5	12L	13	1.7L	.30	2.8	4.6	.90	1.2L	110	w191872
w191873	8.2	21L	27	3.0L	1.0	4.3	4.9	1.6	2.1L	110	w191873
w191874	5.0	15L	16L	2.2L	.52	2.9	1.8	1.9	1.5L	140	w191874
w191875	2.6	4.8L	10L	.69L	.61	1.3	2.8	.60	.48L	120	w191875
w191876	4.0	7.4L	8	1.1L	.29	3.0	5.5	.90	.74L	97	w191876
w191877	12	49L	46	7.0L	1.0	8.2	6.2	4.0	4.9L	180	w191877
w191878	5.6	12L	13L	1.7L	.77	2.3	4.3	1.1	1.2L	110	w191878
w191879	4.4	11L	14L	1.5L	.73	2.2	3.6	1.4	1.1L	61	w191879
w191880	6.9	14L	8	2.0L	.64	3.6	8.3	1.5	1.5	88	w191880
w191881	7.1	17L	13	2.4L	.43	4.8	11	2.2	1.7L	33	w191881
w191882	13	15L	16	2.1L	1.3	8.9	5.9	2.1	1.5L	86	w191882
w191883	7.1	11L	13L	1.5L	.35	3.4	6.4	1.8	1.2	85	w191883
w191884	10	23L	16L	3.3L	.48	5.2	6.4	2.1	2.3L	92	w191884
w191885	6.5	9.1L	16	1.3L	2.7	3.8	2.5	1.7	.91L	60	w191885
w191886	9.1	14L	18	2.0L	.76	3.5	6.2	2.2	1.4L	67	w191886
w191887	3.4	6.9L	11L	.98L	.36	1.7	8.3	.90	.69L	64	w191887
w191888	18	34L	19	4.8L	.84	9.5	10	3.9	3.4L	53	w191888
w191889	1.1	7.4L	13L	1.1L	.48	.80	4.3	.70	.74L	85	w191889
w191890	7.6	11L	15L	1.6L	1.0	3.8	4.5	1.9	1.1L	130	w191890
w191891	4.0	9.1L	12L	1.3L	.58	1.5	2.9	.80	1.4	72	w191891
w191892	8.1	19L	21	2.8L	2.0	3.7	7.9	1.5	1.9L	50	w191892
w191893	12	27	13	3.2L	2.6	7.3	3.0	3.6	2.2L	100	w191893
w191894	3.0	4.6L	10L	.66L	.80	2.0	2.9	1.5	.76	56	w191894
w191895	15	56L	80	8.0L	.75	10	9.5	4.5	5.6L	92	w191895
w191896	6.8	23L	27	3.3L	.42	5.0	5.1	2.2	2.8	83	w191896
w191897	3.1	9.4L	13L	1.4L	.37	2.8	3.7	1.7	.94L	57	w191897
w191898	7.4	17L	9	2.4L	.42	4.4	4.9	2.3	2.0	65	w191898
w191899	8.6	13L	21	1.9L	.94	5.5	2.2	1.6	1.3L	70	w191899
w191900	5.6	13L	14L	1.9L	.18	2.5	7.1	1.2	1.9	100	w191900
w191901	3.2	11L	14L	1.6L	.81	2.3	4.9	1.1	1.6	81	w191901
w191902	7.8	5.9L	10L	.85L	.58	1.9	2.4	1.1	2.9	74	w191902
w191903	3.9	13L	17	1.9L	1.1	3.2	2.8	1.6	1.3L	170	w191903
w191904	7.6	10L	16L	1.4L	.82	3.0	3.6	1.3	1.0L	57	w191904
w192710	8.0	6.3L	7L	.93L	.60	2.9	4.5	1.4	.93	68	w192710
w192711	7.2	3.7L	5	.55L	1.8	2.3	4.4	1.1	.66	66	w192711
w192712	1.2	2.2L	12L	.32L	.40	.80	1.2	.30	.22L	21	w192712
w192713	2.9	4.4L	16	.64L	.70	1.9	1.6	.80	.45L	29	w192713
w192714	3.0	2.9L	8	.43L	.70	1.6	1.2	.90	.30L	42	w192714
w192715	3.9	3.8L	28L	.56L	1.0	2.1	2.0	1.4	.78	54	w192715

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w191871	0.1	3.0L	0.74L	0.35L	0.54	13	9.0	0.4	12	14	w191871
w191872	.1	3.0L	1.7L	.84L	.66	20	6.9	.6	2.7	20	w191872
w191873	.3	4.2	3.0L	1.5L	1.1	34	12	.9	18	53	w191873
w191874	.4	3.0	2.2L	1.0L	1.5	24	14	.7	6.8	67	w191874
w191875	.4L	3.0L	.69L	.33L	.20	9.3	6.0	.3	4.2	13	w191875
w191876	.1	3.0L	1.1	.51L	.68	14	9.2	.8	4.5	17	w191876
w191877	.8	11	7.0L	3.4L	2.7	49	21	2.2	18	79	w191877
w191878	.5L	3.0L	1.7L	.83L	.83	11	5.7	.5	14	15	w191878
w191879	.2	3.0L	1.5L	.74L	.79	15	9.4	.8	4.6	10	w191879
w191880	.3	3.0L	2.0L	.97L	1.3	31	11	.7	4.1	26	w191880
w191881	.3	4.6	2.4L	1.2L	1.5	27	6.7	1.3	6.5	15	w191881
w191882	.5	5.2	2.1L	.98L	2.5	56	21	1.9	49	15	w191882
w191883	.3	3.0L	1.5L	.72L	1.4	25	10	.9	3.9	39	w191883
w191884	.4	9.3	3.3L	1.5L	1.5	31	8.0	1.1	3.8	34	w191884
w191885	.4	3.0L	1.3L	.60L	1.5	21	11	1.2	22	5.8	w191885
w191886	.3	4.9	2.0L	.94L	1.5	31	9.0	.9	9.6	11	w191886
w191887	.2	3.0L	.98L	.46L	.64	15	5.4	.5	5.4	10	w191887
w191888	.7	9.5	4.8L	2.3L	3.0	59	21	2.2	16	63	w191888
w191889	.2	3.0L	1.1L	.49L	.57	5.8	4.5	.4	6.9	3.6	w191889
w191890	.3	3.0L	1.6L	.76L	1.7	25	9.8	1.0	13	20	w191890
w191891	.1	3.0L	1.3L	.60L	.75	6.5	5.8	.4	6.4	14	w191891
w191892	.3	3.0L	5.7	1.3L	1.5	18	7.0	1.3	13	12	w191892
w191893	.9	3.0L	9.3	1.5L	3.1	38	33	2.9	41	14	w191893
w191894	.3	3.0L	.66L	.31L	.47	11	5.6	.8	10	3.2	w191894
w191895	.5	11	8.0L	3.7L	2.3	76	14	1.8	21	76	w191895
w191896	.3	5.7	3.3L	1.5L	1.2	39	10	.9	11	33	w191896
w191897	.3	3.0L	1.4L	.65L	.64	12	7.1	.7	5.7	12	w191897
w191898	.4	3.0L	2.4L	1.1L	1.9	37	8.9	.8	9.1	20	w191898
w191899	.3	3.0L	1.9L	.88L	1.4	34	18	1.5	15	18	w191899
w191900	.2	3.0L	1.9L	.86L	1.0	20	7.6	.7	2.9	46	w191900
w191901	.2	3.0L	2.4L	.75L	1.3	16	7.2	.6	5.8	16	w191901
w191902	.3	3.0	.85L	.41L	.50	11	11	.7	4.8	4.4	w191902
w191903	.2	3.0L	1.9L	.90L	1.4	23	9.8	.8	11	21	w191903
w191904	.2	3.0L	1.4L	.69L	1.4	18	3.7	.6	6.9	13	w191904
w192710	.2	5.0	.93L	.47L	2.0	12	6.8	.8	3.0	33	w192710
w192711	.2	3.0L	.55L	.28L	1.1	10	5.1	.7	13	7.2	w192711
w192712	.1	3.0L	.32L	.16L	.20	2.4	1.7	.3	2.6	3.5	w192712
w192713	.2	3.0L	1.1	.32L	.90	9.0	1.5	.4	6.3	3.7	w192713
w192714	.2	3.0L	.43L	.22L	.90	9.0	3.7	.5	5.2	5.2	w192714
w192715	.2	4.0	.56L	.28L	.70	13	5.3	.6	3.1	11	w192715

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ay-S (ppm)	As (ppm)	Sample number
w192716	0.97	0.62	0.042	0.019	0.024	0.037	0.31	0.054	0.04	17	w192716
w192717	3.9	2.0	.21	.051	.033	.12	.61	.18	.08	18	w192717
w192718	1.4	.99	.075	.037	.038	.062	.89	.045	.04	9.0	w192718
w192719	3.0	1.4	.32	.038	.027	.10	.55	.19	.05	7.0	w192719
w192720	1.1	.74	.21	.038	.032	.045	.026	.045	.02	1.0	w192720
w192721	2.2	.99	.045	.018	.022	.067	.35	.15	.06	12	w192721
w192722	1.2	1.0	.066	.041	.043	.052	.43	.041	.04	4.0	w192722
w192723	.75	.56	.059	.027	.026	.034	.49	.027	.03	10	w192723
w192724	.67	.56	.041	.007	.016	.027	.17	.023	.03	10	w192724
w192725	4.4	1.9	.078	.075	.046	.13	.55	.20	.05	1.0	w192725
w192726	1.8	1.3	.032	.031	.015	.062	.32	.042	.04	3.0	w192726
w192727	1.8	1.0	.045	.030	.034	.059	.39	.072	.04	2.0	w192727
w192728	3.8	1.2	.059	.12	.044	.10	.39	.16	.05	1.0	w192728
w192729	.74	.53	.033	.035	.036	.030	.33	.024	.02	1.0	w192729
w192730	7.2	2.3	.064	.092	.066	.19	.47	.21	.07	2.0	w192730
w192731	1.3	.71	.035	.030	.011	.042	.22	.033	.04	1.0L	w192731
w192732	.54	.36	.082	.031	.023	.026	.35	.035	.01	6.0	w192732
w192733	1.6	.94	.36	.044	.051	.062	.43	.14	.02	2.0	w192733
w192734	.83	.40	.15	.025	.037	.032	.29	.050	.02	3.0	w192734
w192735	1.3	.82	.23	.035	.044	.052	.40	.10	.02	2.0	w192735
w192736	1.1	.83	.086	.035	.031	.050	.92	.040	.02	11	w192736
w192737	7.3	1.8	.093	.069	.027	.18	.77	.49	.04	5.0	w192737
w192738	.87	.56	.054	.021	.023	.032	.23	.030	.02	8.0	w192738
w192739	2.8	1.7	.075	.065	.034	.098	.78	.11	.06	19	w192739
w193126	1.4	.70	.090	.028	.036	.058	1.1	.046	.01	10	w193126
w193127	1.2	.70	.11	.025	.051	.061	1.5	.048	.01	10	w193127
w193128	1.2	.67	.11	.017	.023	.056	1.2	.044	.03	7.0	w193128
w193129	3.0	1.2	.093	.032	.052	.098	1.2	.085	.02	12	w193129
w193130	2.9	1.2	.37	.057	.031	.13	2.9	.080	.03	18	w193130
w193131	1.2	.76	.14	.038	.044	.070	2.1	.048	.02	10	w193131
w193132	1.2	.76	.093	.024	.046	.054	.91	.047	.02	10	w193132
w193133	1.1	.73	.31	.023	.015	.082	2.8	.043	.03	21	w193133
w192647	B	B	B	.013	.005	B	B	B	.04	1.0L	w192647
w192648	B	B	B	.011	.008	B	B	B	.04	14	w192648
w192649	B	B	B	.034	.009	B	B	B	.06	4.0	w192649
w192650	B	B	B	.021	.005	B	B	B	.06	1.0	w192650
w192651	1.5	1.1	.052	.027	.005	.051	.27	.051	.01L	1.0	w192651
w192652	3.0	1.0	.054	.11	.005	.086	.66	.048	.02	11	w192652
w192653	1.1	.58	.18	.042	.007	.043	.44	.024	.01L	4.0	w192653
w192654	2.4	1.4	.14	.059	.007	.079	.29	.091	.01L	2.0	w192654

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w192716	4.3	11	1.7	1.0L	0.06	9.0	4.0	6.9	0.3	33	w192716
w192717	12	48	3.5	3.3L	.11	31	12	23	1.5	33	w192717
w192718	8.3	32	2.1	1.7L	.08	18	4.0	11	1.3	26	w192718
w192719	7.9	28	3.4	2.7L	.10	25	11	17	.3	33	w192719
w192720	5.4	31	2.0	1.2L	.05	12	9.8	6.5	.1	12	w192720
w192721	5.1	14	3.7	1.8L	.08	18	8.4	13	.4L	25	w192721
w192722	8.1	29	1.5	1.4L	.12	15	13	12	.5	29	w192722
w192723	4.1	17	2.1	.9L	.05	9.0	4.9	5.9	.3	11	w192723
w192724	2.1	12	3.8	.7L	.04	7.0	3.0	5.7	.1	12	w192724
w192725	13	61	2.7	3.4L	.09	18	8.0	11	.8	22	w192725
w192726	3.8	16	3.0	1.6L	.03	18	7.0	10	.2	16	w192726
w192727	6.2	23	1.8	1.6L	.04	15	7.0	9.0	.4	13	w192727
w192728	13	40	2.2	2.7L	.07	23	5.0	14	.9	21	w192728
w192729	4.7	20	.6	.8L	.00L	8.0	4.4	4.3	.1	9.0	w192729
w192730	16	78	1.8	4.9L	.17	43	4.6	24	1.7	27	w192730
w192731	2.4	21	2.9	1.1L	.04	8.0	8.4	6.3	.2	12	w192731
w192732	3.4	43	.6	.7L	.03	8.0	5.1	4.0	.3L	6.8	w192732
w192733	13	27	1.9	1.6L	.02	20	9.7	13	.4L	21	w192733
w192734	5.3	12	2.3	.8L	.02	8.0	4.0	5.1	.3L	10	w192734
w192735	8.7	19	2.1	1.4L	.05	19	9.4	11	.4L	21	w192735
w192736	43	31	1.1	1.3L	.06	8.0	2.9	7.3	.3	16	w192736
w192737	67	52	2.4	4.8L	.05	28	3.7	27	.9	20	w192737
w192738	8.4	27	2.1	.8L	.03	8.0	2.4	5.1	.1	8.4	w192738
w192739	14	59	5.8	2.6L	.09	20	8.4	15	1.0	39	w192739
w193126	70G	39	.6	1.5L	.05	8.0	1.4	7.9	.4	5.0	w193126
w193127	49	58	.5	1.6L	.05	8.0	1.9	7.7	.4L	5.2	w193127
w193128	42	58	.7	1.5L	.06	8.0	2.3	8.4	.3	5.1	w193128
w193129	78	78	.8	2.6L	.07	13	3.1	15	.5	8.0	w193129
w193130	63	64	.8	3.5L	.08	12	4.1	14	.9	9.3	w193130
w193131	53	59	.4	1.8L	.07	9.0	3.7	11	.3	5.0	w193131
w193132	42	65	1.6	1.4L	.06	8.0	2.4	8.1	.4	5.3	w193132
w193133	H	51	.7	2.2L	.08	9.0	3.2	9.5	.3	4.7	w193133
w192647	1.2	16	11	.4L	.02	6.0	20	2.7	.4L	6.6	w192647
w192648	1.8	12	.6	.4L	.03	3.0	5.7	1.8	.3L	5.8	w192648
w192649	4.4	29	1.1	1.2L	.04	10	7.7	3.1	.4L	23	w192649
w192650	3.1	19	1.8	1.0L	.02	20	7.1	7.7	.4L	23	w192650
w192651	3.4	38	8.5	1.3L	.02	14	16	13	1.3	29	w192651
w192652	8.2	39	10	2.3L	.09	12	2.6	9.7	1.9	19	w192652
w192653	5.2	62	1.5	1.1L	.03	9.0	2.3	6.0	1.1	6.8	w192653
w192654	6.1	66	1.2	2.1L	.10	19	3.6	13	3.5	24	w192654

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w192716	1.4L	0.5L	0.19	20L	3.1	0.32	2.2	0.3	0.050	0.32L	w192716
w192717	4.8L	1.8	.50	58	6.3	1.7	.75	1.6	.11	1.1L	w192717
w192718	2.4L	.8L	.46	44	5.0	1.1	.83	.4	.10	.75L	w192718
w192719	3.9L	2.0	.43	26	4.7	1.8	.98	1.6	.10	.86L	w192719
w192720	1.7L	.5L	.22	20L	2.4	.86	.65	.4	.010L	.54L	w192720
w192721	2.6L	.8L	.31	20L	4.4	.57L	1.9	1.1	.14	.57L	w192721
w192722	2.0L	.6L	.28	32	2.3	.43L	.93L	.3	.050	.43L	w192722
w192723	1.3L	.4L	.18	20	2.2	.49	.21	.3	.030	.29L	w192723
w192724	1.0L	.8	.19	20L	2.2	.77	3.2	.2	.030	.26	w192724
w192725	5.0L	1.6	.29	55	4.7	1.4	.78L	.9	.050	1.1L	w192725
w192726	2.4L	.8	.33	24	3.3	1.1	1.8	.4	.090	.52L	w192726
w192727	2.3L	.7L	.27	33	2.9	.57	.43	.6	.070	.50L	w192727
w192728	3.9L	1.2L	.28	43	5.0	.97	.73	1.0	.050	.85L	w192728
w192729	1.2L	.4L	.17	20L	1.6	.40	.18L	.2	.13	.25L	w192729
w192730	7.2L	2.2L	.64	75	5.4	1.6L	1.1L	2.6	.080	1.6L	w192730
w192731	1.6L	.7	.23	20L	3.1	.70	4.3	.3	.050	.35L	w192731
w192732	1.0L	.3L	.15	20L	.8	.40	.16L	.3	.12	.22L	w192732
w192733	2.4L	.7L	.31	20L	3.5	.74	.52	1.0	.060	.52L	w192733
w192734	1.2L	.4L	.14	20L	1.7	.38	.84	.4	.11	.27L	w192734
w192735	2.0L	.6L	.29	20L	3.3	.93	.62	.9	.10	.43L	w192735
w192736	1.9L	.6L	.17	29	3.8	.54	.60	.3	.14	.42L	w192736
w192737	6.9L	2.4	.44	63	5.8	1.7	1.1L	3.3	.16	1.5L	w192737
w192738	1.2L	.4L	.18	20L	1.7	.46	.53	.2	.12	.27L	w192738
w192739	3.8L	1.7	.41	55	6.6	2.0	4.1	.7	.16	.83L	w192739
w193126	2.2L	.7L	.14	37	2.6	.49L	1.9	.3	.090	.49L	w193126
w193127	2.3L	.7L	.14	28	2.6	.88	2.4	.4	.040	.51L	w193127
w193128	2.1L	.7L	.14	54	2.5	.47L	1.1	.4	.030	.47L	w193128
w193129	3.8L	1.2L	.24	37	3.7	.83L	.59L	.9	.080	.83L	w193129
w193130	5.0L	1.6L	.26	140	4.4	1.7	1.7	.7	.13	1.1L	w193130
w193131	2.7L	.8L	.21	34	3.1	.84	2.7	.4	.10	.59L	w193131
w193132	2.1L	.7L	.14	67	4.0	.65	2.4	.3	.010L	.46L	w193132
w193133	3.2L	1.0L	.18	42	3.4	2.0	2.0	.4	.070	.69L	w193133
w192647	1.4	1.1	.13	20L	2.2	1.0	3.5	.7	.010L	.35	w192647
w192648	.5L	.2	.06	20L	.6	.38	.40	.2	.030	.11L	w192648
w192649	1.7L	.9	.20	27	1.6	.97	.70	.2	.020	.38L	w192649
w192650	1.5L	.9	.34	39	1.1	.94	.56	.5	.010L	.47L	w192650
w192651	2.0L	.9	.34	37	4.9	1.3	1.4	.4	.010L	.43L	w192651
w192652	3.3L	1.5	.29	80	5.0	1.0	1.2	.3	.060	.72L	w192652
w192653	1.7L	.5L	.18	32	2.1	.68	.26L	.3	.040	.36L	w192653
w192654	3.0L	1.2	.45	57	3.1	1.3	.48L	.7	.010	.67L	w192654

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Sample number
w192716	0.68L	4	9.0	0.1	3.1	2.3	0.18	2.6	5.9	20	w192716
w192717	2.3L	18	36	.2	21	2.6	6.6	20	21	140	w192717
w192718	1.1L	9	14	.1	8.3	2.6	.75	8.3	9.0	39	w192718
w192719	1.8L	15	28	.2	52	2.8	8.7	9.8	12	110	w192719
w192720	.81	6	8.1	.1	22	1.9	1.4	5.2	11	12	w192720
w192721	1.2L	10	11	.1	4.9	1.5	2.6	5.9	12	7	w192721
w192722	.93L	8	14	.1	19	1.9	.37	4.5	7.4	49	w192722
w192723	.62L	5	6.2	.1	4.5	.78	.29	3.1	6.2	7	w192723
w192724	.48L	3	4.2	.1	2.1	1.0	.58	3.8	4.2	3	w192724
w192725	2.3L	9	20	.1	16	1.1	4.1	12	12	20	w192725
w192726	1.1L	8	18	.1	6.3	1.2	1.1	8.1	10	29	w192726
w192727	1.1L	8	11	.1	6.9	1.1	2.2	7.8	9.9	25	w192727
w192728	1.8L	13	18	.1	28	1.2	3.4	9.3	13	42	w192728
w192729	.54L	4	5.8	.1L	11	1.2	.29	1.9	5.0	6	w192729
w192730	3.4L	22	29	.2	20	.45L	5.2	12	8.3	69	w192730
w192731	.75L	4	6.0	.1	8.0	.45	.65	3.3	7.0	15	w192731
w192732	.47L	5	4.3	.1	9.0	.62	.68	1.8	8.7	9	w192732
w192733	1.1L	11	18	.1	50	1.6	3.3	7.0	8.9	45	w192733
w192734	.57L	5	5.7	.1	19	1.3	1.2	1.7L	6.1	3	w192734
w192735	.93L	12	16	.1	29	1.7	2.5	6.8	9.3	35	w192735
w192736	.90L	4	12	.1	6.6	.54	.54	3.8	5.6	29	w192736
w192737	3.2L	16	35	.3	13	1.7	13	12	7.1	94	w192737
w192738	.57L	4	5.3	.1	3.8	.49	.65	3.4	4.6	7	w192738
w192739	1.8L	11	15	.2	7.9	1.2	2.1	11	14	41	w192739
w193126	3.2L	4	9.8	.1	7.7	2.0	.56	3.2L	4.2	43	w193126
w193127	1.1L	4	8.8	.1	13	.51	.66	3.4L	3.7	38	w193127
w193128	1.0L	4	6.0	.1	8.7	.54	1.1	4.8	4.5	240	w193128
w193129	1.8L	7	19	.1	21	.83	1.3	5.4L	7.3	88	w193129
w193130	2.4L	6	10	.1	41	1.7	.47L	7.2L	7.1	440	w193130
w193131	1.3L	4	12	.1	18	.59	.50	3.9L	5.0	18	w193131
w193132	.98L	4	5.7	.1	8.5	.72	.72	3.9	4.8	230	w193132
w193133	1.5L	4	8.9	.1	29	2.3	.89	4.6L	4.2	30	w193133
w192647	.24L	2	1.9	.1	6.1	1.5	.48	3.4	11	B	w192647
w192648	.24L	1	2.2	.1L	5.1	.98	.37	1.8	9.1	B	w192648
w192649	.81L	4	16	.1L	24	1.4	.86	8.6	21	B	w192649
w192650	.71L	7	11	.1	10	.38	1.7	9.4	8.0	B	w192650
w192651	.92L	5	26	.1	7.9	.49	1.6	8.5	12	13	w192651
w192652	1.5L	4	14	.2	21	3.5	1.5	4.7L	8.2	100	w192652
w192653	.78L	3	6.2	.1	37	2.1	.73	2.6	5.2	36	w192653
w192654	1.4L	6	23	.1	32	1.0	2.6	7.5	6.4	37	w192654

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Sample number
w192716	3.9	3.1L	22L	0.45L	2.1	1.8	1.5	1.0	0.50	15	w192716
w192717	11	10	19	1.5L	.80	5.3	8.2	2.3	1.7	78	w192717
w192718	5.5	5.1L	21	.75L	1.6	2.7	.8	1.9	.53L	34	w192718
w192719	9.5	8.4L	25L	1.2L	.70	3.9	4.7	1.9	1.4	68	w192719
w192720	4.5	3.7L	22L	.54L	.30	1.8	1.8	1.1	.49	52	w192720
w192721	7.8	5.5	22L	.81	1.1	2.6	7.9	1.4	.89	34	w192721
w192722	3.4	4.2L	9	.62L	.40	2.1	1.7	1.4	.50	47	w192722
w192723	2.4	2.8L	7	.41L	.40	1.2	2.5	.90	.29L	38	w192723
w192724	3.6	2.2L	17L	.32L	1.5	2.1	.8	.90	.42	25	w192724
w192725	13	11L	25L	1.6L	.40	2.5	2.5	1.3	1.7	42	w192725
w192726	5.7	5.0L	19L	.74L	2.0	2.4	1.8	1.6	.52L	24	w192726
w192727	4.7	4.8L	22L	.71L	.50	2.2	2.6	1.3	.78	32	w192727
w192728	12	8.2L	25L	1.2L	.30	2.8	3.6	2.0	1.9	42	w192728
w192729	2.2	2.4L	21L	.36L	.10	.90	2.0	.80	.25L	28	w192729
w192730	13	15L	28	2.2L	.30	4.7	5.7	3.3	1.6L	52	w192730
w192731	5.5	3.4L	15L	.50L	1.5	1.8	1.8	1.0	.45	23	w192731
w192732	1.6	2.1L	13L	.31L	.30	.90	2.1	.70	.22L	59	w192732
w192733	5.9	5.0L	24L	.74L	.40	2.8	4.3	1.5	.89	63	w192733
w192734	2.4	2.6L	20L	.38L	.80	1.4	2.6	.70	.38	38	w192734
w192735	6.2	4.2L	22L	.62L	.70	2.6	4.1	1.4	.68	48	w192735
w192736	5.0	4.1L	16L	.60L	.40	1.8	3.5	.80	.42L	60	w192736
w192737	11	15L	18L	2.2L	1.0	5.6	5.6	2.4	2.4	80	w192737
w192738	2.7	2.6L	13L	.38L	.80	1.1	2.4	.80	.42	61	w192738
w192739	13	8.0L	15	1.2L	1.6	3.5	4.6	2.1	1.3	81	w192739
w193126	2.2	4.8L	6	.70L	.20	1.5	1.1	.60	.49L	43	w193126
w193127	2.6	5.0L	5	.73L	.20	1.6	1.5	.60	.51L	49	w193127
w193128	2.9	4.6L	6	.67L	.20	1.7	1.2	.60	.47L	87	w193128
w193129	4.1	8.0L	8	1.2L	.30	3.0	2.3	1.1	.83L	94	w193129
w193130	6.0	11L	16	1.6L	.40	2.6	1.0	1.1	1.1L	96	w193130
w193131	2.7	5.7L	9L	.84L	.20	2.1	1.4L	1.1	.59L	49	w193131
w193132	2.5	4.4L	6	.65L	.30	2.0	2.1	.60	.46L	63	w193132
w193133	1.6	6.7L	6	.99L	.20	1.8	1.5L	.80	.69L	39	w193133
w192647	2.9	1.1L	13L	.16L	.20	1.3	1.4L	.40	.11L	27	w192647
w192648	1.4	1.6L	13L	.16L	.50	.30	1.6	.20	.11L	22	w192648
w192649	4.7	3.7L	13L	.54L	.10	.80	.9	.60	.38L	65	w192649
w192650	6.1	3.2L	13L	.47L	.10	2.0	.9	1.3	.33L	39	w192650
w192651	10	4.1L	14	.61L	.20	2.7	1.2	1.1	.43L	39	w192651
w192652	4.1	7.0L	16	1.0L	1.9	2.8	1.7L	1.1	.82	27	w192652
w192653	2.9	3.5L	10	.52L	.70	1.3	1.3L	.60	.36L	37	w192653
w192654	4.8	6.5L	16	.95L	.20	2.7	.6	1.5	.67L	42	w192654

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w192716	0.2	3.0L	1.0	0.23L	2.5	9.9	1.7	0.7	8.1	2.6	w192716
w192717	.4	6.0	1.7	.75L	2.5	26	11	1.2	12	32	w192717
w192718	.3	5.0	.75L	.38L	3.4	18	5.0	.8	11	5.7	w192718
w192719	.4	3.0L	1.2L	.62L	2.0	21	11	1.0	6.6	55	w192719
w192720	.2	3.0L	.54L	.27L	.70	8.6	5.9	.6	5.2	12	w192720
w192721	.3	4.0	1.1	.41L	1.5	13	4.0	.7	1.9	15	w192721
w192722	.2	3.0L	.62L	.31L	.80	9.3	3.0	.6	31	4.0	w192722
w192723	.1	3.0L	.41L	.21L	1.0	5.7	1.9	.4	4.0	3.1	w192723
w192724	.2	3.0L	.32L	.16L	1.4	7.7	6.1	.9	4.5	3.8	w192724
w192725	.2	3.0L	1.6L	.78L	1.2	19	8.9	.8	7.8	33	w192725
w192726	.3	3.0L	.74L	.37L	1.9	15	7.4	.8	3.0	8.9	w192726
w192727	.2	3.0	.71L	.36L	.90	11	5.6	.6	2.9	15	w192727
w192728	.3	4.0	1.2L	.61L	.90	18	7.4	.9	9.1	25	w192728
w192729	.2L	3.0L	.36L	.18L	.50	4.0	1.2	.3	1.7	2.4	w192729
w192730	.5	7.0	2.2L	1.1L	1.6	22	6.9	1.5	25	72	w192730
w192731	.2	3.0L	.50L	.25L	.70	8.0	6.5	.9	12	6.0	w192731
w192732	.1	3.0L	.68	.16L	.50	3.4	2.4	.4	2.2	8.7	w192732
w192733	.3	4.0	.74L	.37L	1.2	10	6.4	.9	2.4	27	w192733
w192734	.2	3.0L	.38L	.19L	.80	5.3	3.0	.4	1.8	7.6	w192734
w192735	.2	4.0	.62L	.31L	1.2	9.3	5.8	.7	2.4	19	w192735
w192736	.1	3.0L	.60L	.30L	.70	8.4	2.1	.4	10	4.7	w192736
w192737	.4	13	2.2L	1.1L	3.6	28	12	2.0	10	95	w192737
w192738	.1	3.0L	.65	.19L	.40	5.7	3.8	.4	1.8	6.8	w192738
w192739	.4	5.0	1.3	.59	1.7	24	14	1.0	12	25	w192739
w193126	.2	3.0L	.70L	.35L	.30	6.6	1.3	.4	5.5	5.4	w193126
w193127	.3L	4.0	.73L	.37L	.80	4.5	1.7	.4	4.6	5.4	w193127
w193128	.2	3.0L	.67L	.34L	.30	7.4	2.5	.4	6.4	7.4	w193128
w193129	.2	3.0L	1.2L	.59L	1.5	15	3.3	.6	7.1	17	w193129
w193130	.2	3.0L	1.6L	.79L	1.7	9.3	2.8	.6	19	8.3	w193130
w193131	.2	4.0	.84L	.42L	7.3	7.5	2.1	.4	11	5.0	w193131
w193132	.2	3.0L	.65L	.33L	.50	7.2	1.8	.3	12	6.4	w193132
w193133	.2	3.0L	.99L	.50L	.50	7.4	3.1	.4	13	8.0	w193133
w192647	.5L	3.0L	.16L	.14	.70	4.0	9.9	.7	3.4	5.0	w192647
w192648	.4L	3.0L	.80	.08L	.20L	1.8	1.3	.1	2.6	4.6	w192648
w192649	.1	3.0L	.54L	.27L	.30	7.0	5.3	.2	14	7.6	w192649
w192650	.3	3.0L	.47L	.24L	.70	8.0	5.6	.6	7.1	20	w192650
w192651	.2	3.0L	.61L	.31L	1.1	17	8.5	.7	4.9	13	w192651
w192652	.3	3.0L	1.0L	.52L	7.9	22	10	1.0	16	13	w192652
w192653	.2	3.0L	.52L	.26L	1.9	7.3	4.9	.4	5.0	8.3	w192653
w192654	.5	3.0L	.95L	.48L	1.3	14	7.7	.7	8.2	17	w192654

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w192655	B	B	B	0.029	0.005	B	B	B	0.03	1.0	w192655
w192656	2.3	1.4	.055	.068	.007	.075	.22	.070	.12	1.0L	w192656
w192657	7.0	3.5	.061	.16	.017	.21	.86	.26	.10	6.0	w192657
w192658	1.7	.68	.038	.017	.008	.047	.17	.091	.02	1.0L	w192658
w192659	B	B	B	.008	.008	B	B	B	.01	1.0L	w192659
w192660	B	B	B	.013	.012	B	B	B	.01	1.0L	w192660
w192661	B	B	B	.019	.011	B	B	B	.02	1.0	w192661
w192662	B	B	B	.015	.009	B	B	B	.02	1.0	w192662
w192663	B	B	B	.015	.016	B	B	B	.02	1.0	w192663
w192664	B	B	B	.012	.010	B	B	B	.11	1.0	w192664
w192665	1.8	1.2	.11	.039	.006	.068	.69	.047	.01	4.0	w192665
w192666	B	B	B	.017	.010	B	B	B	.02	6.0	w192666
w192667	B	B	B	.020	.006	B	B	B	.16	6.0	w192667

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w192655	2.7	63	3.0	1.9L	0.10	17	4.8	11	1.9	30	w192655
w192656	6.7	56	4.2	2.0L	.26	14	6.4	20	2.5	76	w192656
w192657	22	120	21	5.5L	.18	52	6.2	33	3.9	40	w192657
w192658	5.6	16	11	1.2L	.04	16	4.2	8.4	.3	13	w192658
w192659	4.0	7	.6	.4L	.02	7.0	1.4	3.5	.3L	9.8	w192659
w192660	5.3	8	.3	.4L	.01	5.0	1.1	2.5	.3L	6.1	w192660
w192661	7.4	12	1.0	.7L	.02	15	4.2	4.2	.1	14	w192661
w192662	4.2	11	.7	.6L	.01	14	7.2	4.1	.4L	13	w192662
w192663	3.6	12	.6	.6L	.01	15	14	3.2	.4L	15	w192663
w192664	3.2	23	2.7	1.2L	.03	23	20	11	.5L	38	w192664
w192665	4.5	53	1.3	1.8L	.03	24	5.9	11	.5	11	w192665
w192666	4.1	32	.7	1.0L	.01	20	2.8	7.9	.4	9.0	w192666
w192667	4.6	45	5.0	2.1L	.10	24	3.7	23	.4	51	w192667

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w192655	2.8L	1.5	0.39	34	2.0	1.9	0.44L	0.5	0.010L	0.62L	w192655
w192656	2.9L	1.9	.32	82	7.7	1.1	.72	.5	.10	.63L	w192656
w192657	8.0L	2.5	.87	140	22	2.0	7.5	1.7	.060	1.8L	w192657
w192658	1.8L	.9	.27	20L	2.0	1.1	.67	.7	.010L	.39L	w192658
w192659	.6L	.2	.14	20L	.5	.32	.10L	.3	.010L	.14L	w192659
w192660	.6	.2	.12	20L	.5	.26	.08L	.2	.010L	.11L	w192660
w192661	1.0L	.4	.28	20L	1.0	.90	.19	.2	.010L	.22L	w192661
w192662	.9	.3	.23	20L	.9	.64	.17	.2	.010L	.20L	w192662
w192663	.9L	.4	.29	20L	.9	.73	.34	.2	.010L	.20L	w192663
w192664	2.1	1.1	.38	20L	3.4	2.0	3.8	.3	.010L	.42	w192664
w192665	2.6L	.8L	.45	29	3.0	1.1	.57	.4	.010	.57L	w192665
w192666	1.4L	.6	.38	20L	1.8	.81	.23	.3	.050	.32L	w192666
w192667	3.1L	2.2	.55	28	5.0	2.4	1.8	.9	.47	.68L	w192667

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Sample number
w192655	1.3L	5	13	0.2	17	0.97	2.5	9.7	5.5	B	w192655
w192656	1.4L	4	46	.2	20	1.1	3.0	8.3	11	43	w192656
w192657	3.8L	18	35	.3	16	1.3	5.5	20	16	99	w192657
w192658	.84L	6	6.2	.1	3.4	.45	2.1	6.7	6.2	12	w192658
w192659	.30L	3	3.2	.1L	1.2	.44	.78	2.2	3.6	B	w192659
w192660	.24L	2	2.2	.1L	1.9	.75	.64	2.6	5.1	B	w192660
w192661	10L	6	8.6	.1	3.5	.96	.45	6.1	9.0	B	w192661
w192662	.42L	5	8.1	.1L	2.5	1.3	.31	5.3	11	B	w192662
w192663	.42L	5	7.6	.1L	3.1	.92	.28	6.2	10	B	w192663
w192664	.80L	7	14	.1	2.9	.58	1.2	13	13	B	w192664
w192665	1.2L	8	20	.1	21	1.5	1.1	9.8	11	22	w192665
w192666	.68L	7	8.1	.1	6.8	2.3	.36	7.2	8.1	B	w192666
w192667	1.5L	8	17	.3	5.6	2.0	3.1	14	19	B	w192667

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Re-S (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Sample number
w192655	3.6	6.0L	11	0.88L	0.40	2.3	0.7	1.4	0.62L	41	w192655
w192656	16	6.1L	20	.90L	.40	6.2	1.4	1.4	1.3	29	w192656
w192657	20	17L	42	2.5L	3.5	6.4	5.7	3.0	1.8L	60	w192657
w192658	6.7	3.8L	14L	.56L	.70	1.7	.9	1.0	1.1	32	w192658
w192659	2.4	1.4L	12L	.20L	.10	.70	1.0	.40	.24	22	w192659
w192660	1.2	1.1L	11L	.16L	.10	.50	.8	.30	.11L	19	w192660
w192661	3.2	2.2L	14L	.32L	.10	.80	1.3	1.0	.22L	28	w192661
w192662	4.2	1.9L	13L	.28L	.10	.80	1.3	1.0	.20L	25	w192662
w192663	3.9	1.9L	14L	.28L	.20	.80	.9	1.0	.20L	21	w192663
w192664	9.5	3.6L	15L	.53L	.80	2.3	2.0	1.7	.37L	23	w192664
w192665	4.7	5.6L	10	.82L	.30	2.5	1.0	1.8	.57L	34	w192665
w192666	2.0	3.1L	14L	.45L	.40	1.4	1.5	1.3	.32L	19	w192666
w192667	7.6	6.6L	13L	.97L	1.1	4.2	5.2	1.9	1.2	25	w192667

Table 7h -- Major, minor, and trace element composition of 252 coal samples from West Virginia reported on whole coal basis.

Sample number	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w192655	0.3	4.0	0.88L	0.44L	1.5	18	14	0.9	6.1	41	w192655
w192656	.5	8.0	.90L	.45L	12	45	14	1.6	9.9	15	w192656
w192657	.6	12	2.5L	1.3L	6.0	50	15	2.1	28	40	w192657
w192658	.3	8.0	.56L	.28L	1.2	9.0	6.2	.7	3.2	16	w192658
w192659	.4L	3.0L	.20L	.10L	.30	2.6	2.2	.2	1.5	7.4	w192659
w192660	.4L	3.0L	.16L	.08L	.20L	2.1	1.8	.1	1.6	8.5	w192660
w192661	.2	3.0L	.32L	.16L	.40	4.8	3.5	.4	3.1	5.8	w192661
w192662	.2	3.0L	.28L	.14L	.30	4.8	3.4	.3	2.2	4.5	w192662
w192663	.2	3.0L	.28L	.14L	.20	4.5	3.4	.3	3.4	3.4	w192663
w192664	.3	3.0L	.53L	.27L	3.3	12	12	.6	12	17	w192664
w192665	.3	3.0L	.82L	.41L	1.0	15	5.8	.7	7.8	7.5	w192665
w192666	.3	4.0	.45L	.23L	.90	9.9	5.0	.7	3.9	4.5	w192666
w192667	.7	5.0	.97L	.49L	2.3	30	18	1.6	3.1	28	w192667

Summary of the analytical data from 72 Virginia coal samples

Data on 45 Virginia coal samples have been reported by Swanson and others (1976). The generalized distribution of the 72 Virginia coal samples are shown on figure 6. other descriptive and location information is listed in table 8d. The 72 samples were collected from 24 different beds, three of the samples come from beds for which no bed identity has been received. The statistical data on these coals are given in tables 8a, b and c, the analytical data in tables 8e, f, g and h.

In the following three paragraphs comparisons are made between the geometric means of analytical data on the Virginia coal samples and the 617 samples of this report.

The geometric means for the Bureau of Mines type of analyses (table 8a) show lower average values for moisture, volatile matter, ash, oxygen and sulfur and higher values for fixed carbon, carbon, and Btu's for the Virginia coals compared to all the samples of this report. The higher fixed carbon and lower volatile matter indicate a higher rank for the Virginia coals. This is to be expected as the rank of coals in the Appalachian Region increased to the east and southeast. The ash fusion temperatures of the ash of Virginia coals is similar to those of all the samples.

The geometric means for the major oxides in ash (table 8b) show that the average ash composition of Virginia coals is similar to that of all coals described in this report. This similarity of the ash composition is reflected in the similarity of the ash fusion temperature.

Comparison of the geometric means for trace elements (table 8c) shows that As, Ba, and Sr are significantly higher in Virginia coals. The means for Cd, Cr, Co, Cu, F, Hg, Lu, Mn, Mo, Sb, Se, Tb, U and Yb are between the two sets of data, whereas all other elements have means that are significantly lower in Virginia coals.

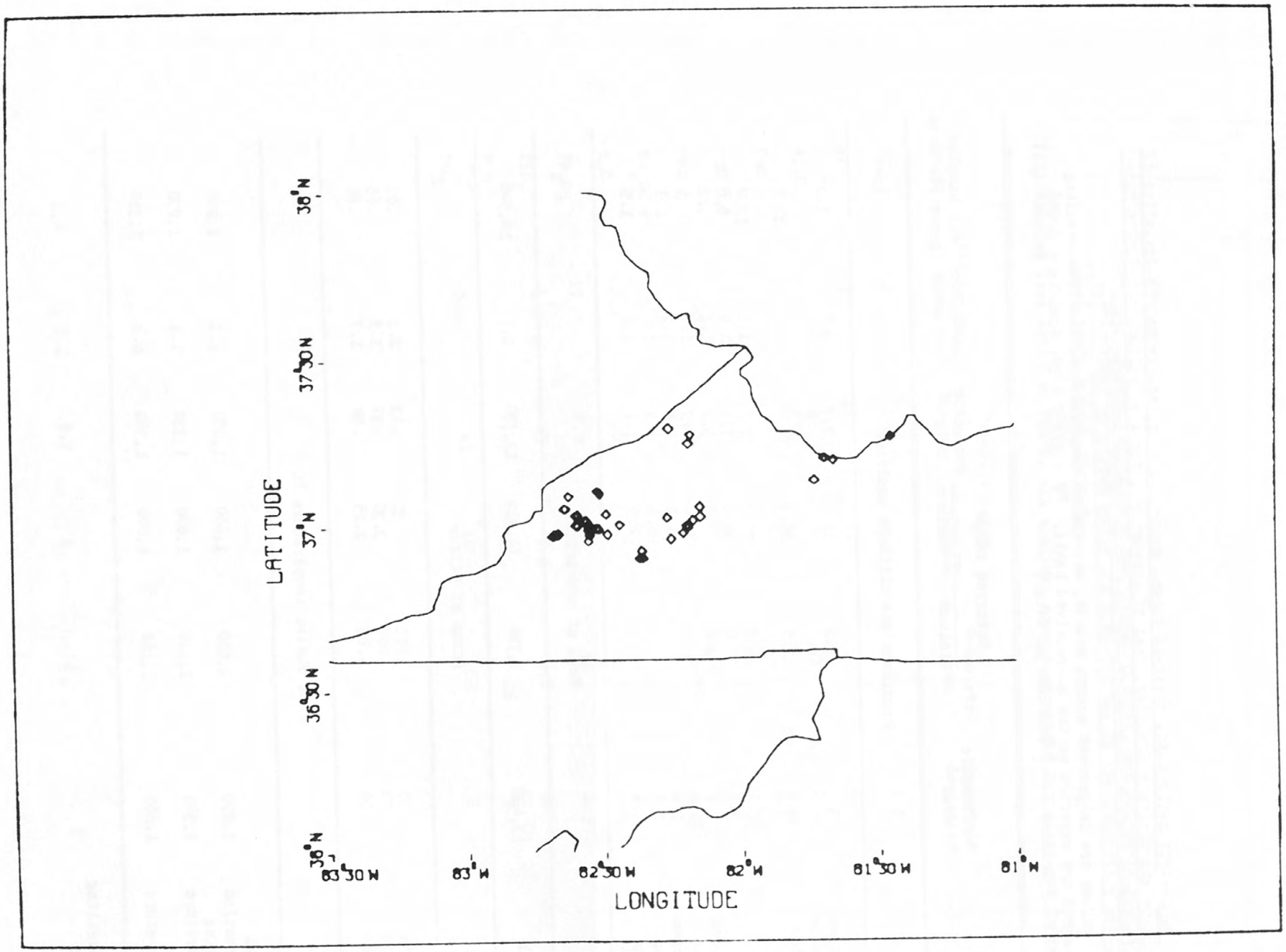

Figure 6 -- Distribution of Virginia coal samples.

Table 8a.--Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, ash-fusion temperatures and free swelling index of 72 coal samples from Virginia.

[All values are in percent except Btu/lb, ash-fusion temperatures, and free swelling index and are reported on the as-received basis. °F = 9/5°C + 32; Kcal/Kg = 0.556 (Btu/lb). Leaders (---) indicate no data.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	3	1.2	11	2.7	1.6	3.3
Volatile matter	30.6	18.9	36.5	30.3	1.1	31.9
Fixed carbon	57.2	36.8	70.8	57	1.1	52.2
Ash	9.2	2.0	36.6	7.4	1.9	8.8
Hydrogen	5.2	3.9	5.8	5.2	1.1	5.2
Carbon	75.2	49.2	83.8	74.9	1.1	70.5
Nitrogen	1.4	.9	1.8	1.4	1.2	1.3
Oxygen	7.7	5.2	16.6	7.5	1.2	9.3
Sulfur	1.4	.5	4.9	1.1	1.9	1.5
Heat of combustion						
Btu/lb	13,430	8,786	14,912	13,380	1.1	12,590
Forms of sulfur						
Sulfate	.05	.01	.31	.03	2.3	.07
Pyritic	.74	.02	3.30	.37	3.5	.65
Organic	.66	.03	2.05	.59	1.7	.80
Ash fusion temperature °C						
Initial deformation	1,290	1,050	1,600	1,280	1.1	1,240
Softening temperature	1,340	1,110	1,600	1,330	1.1	1,290
Fluid temperature	1,380	1,160	1,600	1,380	1.1	1,350
Free Swelling Index	8	1	9	7.6	1.5	4.3

Table 8b.--Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of eleven major and minor oxides in the laboratory ash of 72 coal samples from Virginia.

[All samples were ashed at 525°C; all analyses except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
(Ash)	9.5	1.9	28.6	7.9	1.9	9.46
SiO_2	43	13	71	41	1.4	42
Al_2O_3	23	8	38	23	1.3	23
CaO	3	.45	15	2.1	2.1	1.3
MgO	1	.23	3	.87	1.7	.78
MnO	.04	.01	.41	.03	2	.02
Na_2O	.66	.17	2.8	.52	2	.44
K_2O	2.2	.5	5	1.9	1.6	1.6
Fe_2O_3	17	2.3	57	12	2.3	11
TiO_2	1.2	.3	2.6	1.1	1.5	1.13
P_2O_5	.31	.02	1.6	.16	3.1	.17
SO_3	3.9	.61	14	3.2	2	2.03

Table 8c.--Arithmetic mean, observed range, geometric mean, and geometric deviation of 38 elements in 72 coal samples from Virginia.

[All analyses are in percent or parts per million and are reported on a whole-coal basis. Leaders (---) indicate means could not be calculated because an insufficient number of analyses were above the detection limit.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Ag	.04	.01	.13	.03	1.6	.05
As	21	1	140	9.4	3.7	7.4
B	16	3.5	69	13	1.8	21
Ba	96	15	280	80	1.9	56
Be	2.2	.41	11	1.9	1.7	2.4
Cd	.09	.02	.71	.07	1.9	.08
Ce	16	4	58	13	1.8	15
Co	6.7	1.6	21	5.6	1.8	5.5
Cr	12	3	47	9.9	1.8	14
Cs	.82	.02	4	.53	2.6	.75
Cu	17	6.9	70	16	1.5	14
Eu	.3	.09	.9	.26	1.6	.31
F	81	21	240	69	1.8	64
Ga	4.3	1.2	16	3.7	1.7	5.1
Ge	2.1	.26	13	1.5	2.3	2.9
Hf	.66	.1	2.8	.53	1.9	.65
Hg	.11	.01	.33	.08	2.3	.10
La	8.5	2	33	6.9	1.9	7.8
Li	14	.89	57	9.5	2.6	12
Lu	.14	.1	.4	.13	1.5	.14
Mn	24	.75	260	14	2.7	14
Mo	1.9	.8	5.3	1.7	1.6	1.8
Nb	1.9	.23	8.8	1.4	2.2	1.9
Nd	9.5	2.1	35	8	1.8	9.8
Ni	11	2.7	32	9	1.8	12
Pb	5.8	.83	61	4	2.3	5.9
Sb	1	.15	19	.67	2.1	.69
Sc	2.9	.9	9.8	2.6	1.6	3.1
Se	2.9	.92	7.6	2.6	1.6	2.9
Sm	1.5	.4	4.8	1.3	1.7	1.5
Sr	100	21	580	81	2	57
Tb	.26	.1	.7	.23	1.6	.26
U	1.5	.3	4.7	1.2	1.9	1.2
V	16	3.3	43	13	1.9	17
Y	7	1.8	26	5.9	1.8	7.2
Yb	.76	.3	2.1	.68	1.6	.74
Zn	16	1.5	94	9.6	2.7	13
Zr	17	1.6	110	11	2.4	20

Table 3d Descriptions for 72 bituminous coal samples from Virginia

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w191030	virginia	tazewell	371155n	813913w	pocahontas	pocahontas no 4	channel	63.0
w191031	virginia	tazewell	370814n	814324w	new river	lower seaboard	channel	22.0
w191032	virginia	tazewell	371219n	814112w	new river	upper horsepen	channel	3.0
w191033	virginia	tazewell	371215n	814102w	new river	upper horsepen	channel	
w191063	virginia	wise	365839n	823927w	wise	lyons	channel	29.0
w191064	virginia	wise	365828n	823227w	wise	dorchester	channel	14.5
w191065	virginia	wise	365823n	823942w	wise	dorchester	channel	17.0
w191066	virginia	wise	365716n	823254w	wise	dorchester	channel	12.0
w191067	virginia	wise	365716n	823254w	wise	dorchester	channel	26.0
w191068	virginia	wise	365807n	824042w	wise	lyons	channel	22.0
w191069	virginia	wise	365823n	823942w	wise	dorchester	channel	25.0
w191134	virginia	wise	365916n	823249w	wise	blair marker	channel	8.0
w191135	virginia	wise	365956n	823518w	wise	clintwood marker	channel	16.0
w191136	virginia	wise	370010n	823530w	wise	blair	channel	22.0
w191328	virginia	wise	365833n	822838w	norton	upper banner	channel	26.0
w191329	virginia	wise	365833n	822838w	norton	upper banner	channel	30.0
w191330	virginia	wise	370151n	823533w	wise	blair	channel	27.0
w191331	virginia	wise	370308n	823802w	wise	upper standiford	channel	40.0
w191332	virginia	wise	365932n	823033w	wise	lyons	channel	28.0
w191333	virginia	wise	370310n	823800w	wise	lower standiford	channel	32.5
w191334	virginia	wise	370012n	823244w	wise	clintwood	channel	38.0
w191335	virginia	wise	365714n	823258w	wise	dorchester no 4	channel	22.0
w191336	virginia	wise	365714n	823258w	wise	dorchester no 3	channel	11.0
w191337	virginia	wise	365936n	823057w	wise	dorchester no 3	channel	21.0
w191338	virginia	wise	370157n	823518w	wise	clintwood	channel	17.0
w191521	virginia	tazewell	371600n	812645w	new river	war creek	channel	23.0
w192536	virginia	wise	365915n	823248w	wise	blair marker	channel	10.0
w192537	virginia	wise	365828n	823235w	wise	dorchester	channel	16.0
w192538	virginia	wise	365931n	823034w	wise	dorchester	channel	23.0
w192539	virginia	wise	365828n	823235w	wise	dorchester	channel	6.0
w192590	virginia	wise	365412n	822133w	norton	raven	channel	15.0
w192591	virginia	wise	370007n	823530w	wise	blair	channel	36.0
w192592	virginia	wise	370148n	823536w	wise	dorchester	channel	34.0
w192599	virginia	wise	365827n	823235w	wise	dorchester	channel	10.0
w192600	virginia	wise	365827n	823235w	wise	dorchester	channel	11.0

Table 6d Descriptions for 72 bituminous coal samples from Virginia continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w192601	virginia	wise	365217n	823252w	wise	blair	channel	39.0
w192602	virginia	wise	365953n	823516w	wise	clintwood	channel	18.0
w192603	virginia	wise	365717n	823256w	wise	dorchester	channel	37.0
w192604	virginia	wise	365833n	823927w	wise	blair	channel	27.0
w192605	virginia	wise	370158n	823519w	wise	clintwood	channel	18.0
w192606	virginia	russell	365943n	821106w	norton	kennedy	channel	24.0
w192607	virginia	russell	370142n	820822w	norton	aily	channel	25.0
w192608	virginia	wise	370158n	823520w	wise	clintwood	channel	17.0
w192609	virginia	wise	370527n	823710w	wise	imboden	channel	28.0
w192610	virginia	dickenson	370556n	823013w	wise	clintwood marker	channel	19.0
w192611	virginia	dickenson	370621n	823050w	wise	eagle	channel	32.0
w192612	virginia	dickenson	370132n	821529w	wise	clintwood	channel	28.0
w192613	virginia	wise	370048n	823321w	wise	clintwood	channel	11.0
w192697	virginia	wise	365529n	822110w	norton	hog wallow	channel	21.0
w192698	virginia	dickenson	370214n	822852w	norton	upper banner	channel	9.0
w192699	virginia	dickenson	370214n	822852w	norton	upper banner	channel	9.0
w192700	virginia	dickenson	370214n	822852w	norton	upper banner	channel	23.0
w192701	virginia	wise	370049n	823321w	wise	clintwood	channel	20.0
w192702	virginia	wise	370049n	823321w	wise	clintwood	channel	10.0
w192703	virginia	wise	370046n	823329w	wise	blair marker	channel	18.0
w192704	virginia	dickenson	370015n	822550w	norton	upper banner	channel	52.0
w192705	virginia	dickenson	370015n	822550w	norton	upper banner	channel	58.0
w192706	virginia	russell	365945n	821201w	norton	jawbone	channel	40.0
w192707	virginia	russell	370100n	820955w	norton	jawbone	channel	78.0
w192708	virginia	russell	365741n	821442w	norton	jawbone	channel	50.0
w192709	virginia	russell	370002n	821108w	norton	tiller	channel	51.0
w193663	virginia	wise	365923n	824017w	wise	blair	channel	20.0
w193664	virginia	wise	365411n	822052w	norton	jawbone	channel	42.0
w193665	virginia	dickenson	370330n	820827w	norton	no data entered	channel	27.0
w193666	virginia	dickenson	370330n	820827w	norton	no data entered	channel	34.0
w193667	virginia	dickenson	370330n	820827w	norton	no data entered	channel	59.0
w193668	virginia	buchanan	371502n	821053w	wise	blair	channel	12.0
w193669	virginia	buchanan	371502n	821053w	wise	blair	channel	8.0
w193670	virginia	buchanan	371502n	821053w	wise	blair	channel	9.0
w193671	virginia	buchanan	371638n	821024w	norton	splash dam	channel	37.0
w193672	virginia	buchanan	371638n	821024w	norton	splash dam	channel	35.0
w193673	virginia	buchanan	371747n	821503w	wise	blair	channel	21.0

Table 8e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191030	0.0	0.02	0.17	0.43	1.0	1,105	1,170	1,235
	---	.02	.18	.46				
	---	.02	.20	.49				
w191031	.0	.02	.13	.54	1.0	1,375	1,440	1,500
	---	.02	.13	.55				
	---	.03	.17	.69				
w191032	.0	.02	.19	.62	9.0	1,195	1,240	1,305
	---	.02	.19	.63				
	---	.02	.20	.65				
w191033	.0	.02	.45	.55	9.0	1,165	1,225	1,300
	---	.02	.46	.56				
	---	.02	.48	.59				
w191063	.0	.02	1.83	1.26	9.0	1,120	1,175	1,220
	---	.02	1.88	1.29				
	---	.02	2.01	1.38				
w191064	.0	.04	.67	.81	9.0	1,055	1,110	1,215
	---	.04	.68	.83				
	---	.04	.73	.89				
w191065	.0	.02	.06	.49	9.0	1,315	1,390	1,455
	---	.02	.06	.50				
	---	.02	.06	.53				
w191066	.0	.02	.23	.68	9.0	1,430	1,500	1,540
	---	.02	.24	.70				
	---	.02	.26	.76				
w191067	.0	.02	.13	.44	9.0	1,540	0	0
	---	.02	.13	.45				
	---	.02	.15	.52				
w191068	.0	.02	2.03	1.07	9.0	1,100	1,150	1,215
	---	.02	2.07	1.09				
	---	.02	2.19	1.16				
w191069	.0	.02	1.94	.91	9.0	1,090	1,140	1,180
	---	.02	2.01	.94				
	---	.02	2.13	1.00				
w191134	.0	.04	.07	.60	8.0	1,405	1,455	1,600
	---	.04	.07	.64				
	---	.05	.08	.70				

Table 8e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia.

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in percent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section Department of Energy, Pittsburgh, Pa. B means not determined. O for ash fusion temperatures means greater than 1600°C.

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191030	6.4	18.9	68.2	6.5	4.7	77.3	1.5	9.4	0.6	7,330	13,200
	---	20.2	72.9	6.9	4.3	82.6	1.6	4.0	.6	7,830	14,100
	---	21.7	78.3	---	4.6	88.7	1.7	4.3	.7	8,420	15,150
w191031	2.7	23.8	54.3	19.2	4.4	66.3	1.2	8.2	.7	6,480	11,660
	---	24.5	55.8	19.7	4.2	68.1	1.2	6.0	.7	6,660	11,980
	---	30.5	69.5	---	5.2	84.9	1.5	7.4	.9	8,290	14,930
w191032	1.8	24.0	70.8	3.4	4.9	83.8	1.4	5.7	.8	8,240	14,840
	---	24.4	72.1	3.5	4.8	85.3	1.4	4.2	.8	8,400	15,110
	---	25.3	74.7	---	5.0	88.4	1.5	4.3	.8	8,700	15,650
w191033	1.4	23.4	70.0	5.2	5.0	81.9	1.3	5.6	1.0	8,090	14,570
	---	23.7	71.0	5.3	4.9	83.1	1.3	4.4	1.0	8,210	14,780
	---	25.1	74.9	---	5.2	87.7	1.4	4.7	1.1	8,670	15,600
w191063	2.6	34.8	56.3	6.3	5.3	76.1	1.4	7.8	3.1	7,650	13,770
	---	35.7	57.8	6.5	5.1	78.1	1.4	5.6	3.2	7,850	14,140
	---	38.2	61.8	---	5.5	83.5	1.5	6.0	3.4	8,400	15,120
w191064	2.0	32.6	58.7	6.7	5.3	77.5	1.5	7.5	1.5	7,720	13,900
	---	33.3	59.9	6.8	5.2	79.1	1.5	5.8	1.5	7,880	14,180
	---	35.7	64.3	---	5.6	84.9	1.6	6.3	1.6	8,460	15,220
w191065	1.3	35.2	57.2	6.3	5.7	79.2	1.7	6.5	.6	7,910	14,230
	---	35.7	58.0	6.4	5.6	80.2	1.7	5.4	.6	8,010	14,420
	---	38.1	61.9	---	6.0	85.7	1.8	5.8	.6	8,560	15,400
w191066	2.3	33.0	56.3	8.4	5.3	75.8	1.5	8.1	.9	7,560	13,600
	---	33.8	57.6	8.6	5.2	77.6	1.5	6.2	.9	7,730	13,920
	---	37.0	63.0	---	5.6	84.9	1.7	6.8	1.0	8,460	15,230
w191067	1.3	31.1	53.1	14.5	5.0	71.6	1.5	6.8	.6	7,120	12,820
	---	31.5	53.8	14.7	4.9	72.5	1.5	5.7	.6	7,220	12,990
	---	36.9	63.1	---	5.8	85.0	1.8	6.7	.7	8,460	15,230
w191068	1.9	36.5	56.1	5.5	5.4	77.4	1.4	7.2	3.1	7,840	14,120
	---	37.2	57.2	5.6	5.3	78.9	1.4	5.6	3.2	8,000	14,390
	---	39.4	60.6	---	5.6	83.6	1.5	6.0	3.3	8,470	15,250
w191069	3.6	32.9	58.0	5.5	5.4	74.8	1.5	9.9	2.9	7,670	13,810
	---	34.1	60.2	5.7	5.2	77.6	1.6	7.0	3.0	7,960	14,330
	---	36.2	63.8	---	5.5	82.3	1.7	7.4	3.2	8,440	15,190
w191134	6.2	32.2	54.0	7.6	5.6	74.4	1.4	10.3	.7	7,410	13,330
	---	34.3	57.6	8.1	5.2	79.3	1.5	5.1	.7	7,900	14,210
	---	37.4	62.6	---	5.7	86.3	1.6	5.6	.8	8,590	15,460

Table 8e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Moisture	Proximate Analysis: Volatile matter	Fixed carbon	Ash	Ultimate Analysis: Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Heat of Combustion: Kcal/kg	Btu/lb
w191135	2.9	32.2	53.5	11.4	5.0	72.2	1.5	7.1	2.8	7,240	13,030
	---	33.2	55.1	11.7	4.8	74.4	1.5	4.7	2.9	7,460	13,420
	---	37.6	62.4	---	5.5	84.2	1.8	5.3	3.3	8,450	15,200
w191136	6.4	31.2	59.6	2.8	5.7	78.4	1.5	10.9	.7	7,760	13,970
	---	33.3	63.7	3.0	5.3	83.8	1.6	5.6	.7	8,290	14,930
	---	34.4	65.6	---	5.5	86.3	1.7	5.7	.8	8,550	15,390
w191328	1.4	34.1	60.8	3.7	5.4	81.5	1.5	7.3	.6	8,110	14,600
	---	34.6	61.7	3.8	5.3	82.7	1.5	6.1	.6	8,230	14,810
	---	35.9	64.1	---	5.5	85.9	1.6	6.4	.6	8,550	15,380
w191329	1.7	35.2	58.0	5.1	5.4	80.4	1.3	7.3	.5	8,010	14,410
	---	35.8	59.0	5.2	5.3	81.8	1.3	5.9	.5	8,140	14,660
	---	37.8	62.2	---	5.6	86.3	1.4	6.2	.5	8,590	15,460
w191330	2.7	32.0	53.7	11.6	5.0	72.5	.9	7.6	2.4	7,240	13,030
	---	32.9	55.2	11.9	4.8	74.5	.9	5.3	2.5	7,440	13,390
	---	37.3	62.7	---	5.5	84.6	1.1	6.1	2.8	8,450	15,200
w191331	4.9	32.3	57.5	5.3	5.6	76.5	1.1	9.9	1.6	7,620	13,710
	---	34.0	60.5	5.6	5.3	80.4	1.2	5.8	1.7	8,010	14,420
	---	36.0	64.0	---	5.6	85.2	1.2	6.2	1.8	8,480	15,270
w191332	3.9	35.0	55.0	6.1	5.4	76.3	1.0	8.2	3.0	7,650	13,770
	---	36.4	57.2	6.3	5.2	79.4	1.0	4.9	3.1	7,960	14,330
	---	38.9	61.1	---	5.5	84.8	1.1	5.3	3.3	8,500	15,300
w191333	4.3	35.8	57.0	2.9	5.7	79.7	1.1	9.7	.9	7,940	14,290
	---	37.4	59.6	3.0	5.5	83.3	1.1	6.1	.9	8,300	14,930
	---	38.6	61.4	---	5.6	85.9	1.2	6.3	1.0	8,550	15,400
w191334	1.5	33.5	54.6	10.4	5.0	73.5	1.2	5.5	4.4	7,380	13,290
	---	34.0	55.4	10.6	4.9	74.6	1.2	4.2	4.5	7,500	13,490
	---	38.0	62.0	---	5.5	83.4	1.4	4.7	5.0	8,380	15,090
w191335	3.4	35.0	59.1	2.5	5.7	80.3	1.2	9.2	1.1	7,920	14,260
	---	36.2	61.2	2.6	5.5	83.1	1.2	6.4	1.1	8,200	14,760
	---	37.2	62.8	---	5.7	85.3	1.3	6.6	1.2	8,420	15,150
w191336	2.5	36.1	59.2	2.2	5.6	80.7	1.2	9.1	1.2	8,060	14,500
	---	37.0	60.7	2.3	5.5	82.8	1.2	7.1	1.2	8,260	14,870
	---	37.9	62.1	---	5.6	84.7	1.3	7.2	1.3	8,450	15,220
w191337	3.5	34.4	58.5	3.6	5.6	79.0	1.2	9.5	1.1	7,830	14,100
	---	35.6	60.6	3.7	5.4	81.9	1.2	6.6	1.1	8,120	14,610
	---	37.0	63.0	---	5.6	85.0	1.3	6.9	1.2	8,430	15,180

Table 8a.— Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Forms of sulfur: Pyritic	Forms of sulfur: Organic	Free swelling	Ash fusion temperature C°: Initial deform.	Ash fusion temperature C°: soften.	Ash fusion temperature C°: fluid
w191135	0.0	0.22	1.77	0.77	7.5	1,145	1,240	1,320
	---	.23	1.82	.79				
	---	.26	2.07	.90				
w191136	.0	.02	.03	.64	9.0	1,600	0	0
	---	.02	.03	.68				
	---	.02	.03	.70				
w191328	.0	.02	.06	.55	8.5	1,375	1,425	1,475
	---	.02	.06	.56				
	---	.02	.06	.58				
w191329	.0	.02	.02	.47	9.0	1,375	1,535	1,540
	---	.02	.02	.48				
	---	.02	.02	.50				
w191330	.0	.04	1.99	.33	8.5	1,255	1,370	1,410
	---	.04	2.05	.34				
	---	.05	2.32	.39				
w191331	.0	.25	1.00	.38	9.0	1,200	1,315	1,365
	---	.26	1.05	.40				
	---	.28	1.11	.42				
w191332	.0	.02	2.12	.91	9.0	1,150	1,210	1,245
	---	.02	2.21	.95				
	---	.02	2.36	1.01				
w191333	.0	.02	.22	.62	9.0	1,370	1,420	1,480
	---	.02	.23	.65				
	---	.02	.24	.67				
w191334	.0	.02	3.30	1.09	9.0	1,140	1,205	1,225
	---	.02	3.35	1.11				
	---	.02	3.75	1.24				
w191335	.0	.02	.30	.78	9.0	1,100	1,165	1,205
	---	.02	.31	.81				
	---	.02	.32	.83				
w191336	.0	.07	.52	.59	9.0	1,100	1,195	1,245
	---	.07	.53	.61				
	---	.07	.55	.62				
w191337	.0	.02	.26	.82	9.0	1,125	1,175	1,225
	---	.02	.27	.85				
	---	.02	.28	.88				

Table 8e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 77 coal samples from Virginia--continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191338	3.9	34.3	51.3	10.5	5.2	71.8	1.2	8.0	3.3	7,210	12,980
	---	35.7	53.4	10.9	5.0	74.7	1.2	4.7	3.4	7,500	13,510
	---	40.1	59.9	---	5.6	83.9	1.4	5.3	3.9	8,420	15,160
w191521	2.8	26.8	66.1	4.3	5.1	82.0	1.2	6.6	.8	8,020	14,430
	---	27.6	68.0	4.4	4.9	84.4	1.2	4.2	.8	8,250	14,850
	---	28.8	71.2	---	5.2	88.3	1.3	4.4	.9	8,630	15,530
w192586	4.5	29.3	50.0	16.2	4.9	65.9	1.4	8.9	2.7	6,590	11,870
	---	30.7	52.4	17.0	4.6	69.0	1.5	5.1	2.8	6,910	12,430
	---	36.9	63.1	---	5.5	83.1	1.8	6.2	3.4	8,320	14,970
w192587	2.3	32.4	58.5	6.8	5.4	75.4	1.7	7.8	.9	7,760	13,970
	---	33.2	59.9	7.0	5.3	77.2	1.7	7.9	.9	7,940	14,300
	---	35.6	64.4	---	5.7	82.9	1.9	8.5	1.0	8,540	15,370
w192588	2.6	31.5	62.1	3.8	5.4	80.3	1.6	7.7	1.2	7,980	14,370
	---	32.3	63.8	3.9	5.2	82.4	1.6	5.5	1.2	8,200	14,750
	---	33.7	66.3	---	5.5	85.8	1.7	5.8	1.3	8,530	15,350
w192589	4.0	32.6	57.5	5.9	5.7	77.7	1.6	8.3	.8	7,720	13,900
	---	34.0	59.9	6.1	5.5	80.9	1.7	4.9	.8	8,040	14,480
	---	36.2	63.8	---	5.8	86.2	1.8	5.3	.9	8,570	15,430
w192590	2.6	33.9	53.0	10.5	5.2	72.9	1.1	5.4	4.9	7,410	13,340
	---	34.8	54.4	10.8	5.0	74.8	1.1	3.2	5.0	7,610	13,700
	---	39.0	61.0	---	5.7	83.9	1.3	3.6	5.6	8,530	15,350
w192591	11.0	28.2	54.1	6.7	5.5	68.9	1.4	16.6	.9	6,670	12,010
	---	31.7	60.8	7.5	4.8	77.4	1.6	7.7	1.0	7,500	13,490
	---	34.3	65.7	---	5.2	83.7	1.7	8.3	1.1	8,110	14,590
w192592	4.4	27.5	59.5	8.6	5.1	74.9	1.7	8.7	1.0	7,440	13,400
	---	28.8	62.2	9.0	4.8	78.3	1.8	5.0	1.0	7,790	14,020
	---	31.6	68.4	---	5.3	86.1	2.0	5.5	1.1	8,560	15,400
w192599	2.4	30.2	55.0	12.4	5.1	71.5	1.4	7.3	2.3	7,130	12,830
	---	30.9	56.4	12.7	5.0	73.3	1.4	5.3	2.4	7,300	13,150
	---	35.4	64.6	---	5.7	83.9	1.6	6.1	2.7	8,370	15,060
w192600	1.2	32.2	57.3	9.3	5.3	76.7	1.5	6.5	.7	7,640	13,760
	---	32.6	58.0	9.4	5.2	77.6	1.5	5.5	.7	7,740	13,930
	---	36.0	64.0	---	5.8	85.7	1.7	6.1	.8	8,540	15,370
w192601	3.9	32.2	61.9	2.0	5.8	81.3	1.6	8.8	.5	8,050	14,490
	---	33.5	64.4	2.1	5.6	84.6	1.7	5.5	.5	8,380	15,080
	---	34.2	65.8	---	5.7	86.4	1.7	5.7	.5	8,550	15,400

Table 8a.— Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191338	0.0	0.02	2.32	0.99	8.5	1,150	1,245	1,265
	---	.02	2.41	1.03				
	---	.02	2.71	1.16				
w191521	.0	.13	.11	.55	9.0	1,290	1,320	1,375
	---	.13	.11	.57				
	---	.14	.12	.59				
w192586	.0	.02	1.37	1.27	9.0	1,170	1,235	1,320
	---	.02	1.43	1.33				
	---	.03	1.73	1.60				
w192587	.0	.02	.25	.62	9.0	1,425	1,480	1,535
	---	.02	.26	.63				
	---	.02	.28	.68				
w192588	.0	.02	.50	.67	9.0	1,110	1,155	1,225
	---	.02	.51	.69				
	---	.02	.53	.72				
w192589	.0	.02	.06	.68	9.0	1,540	0	0
	---	.02	.06	.71				
	---	.02	.07	.75				
w192590	.0	.02	2.85	2.05	7.0	1,150	1,200	1,255
	---	.02	2.93	2.10				
	---	.02	3.28	2.36				
w192591	.0	.02	.23	.65	2.0	1,265	1,315	1,355
	---	.02	.26	.73				
	---	.02	.28	.79				
w192592	.0	.02	.24	.72	8.5	1,480	1,530	1,540
	---	.02	.25	.75				
	---	.02	.28	.83				
w192599	.0	.02	1.93	.32	8.5	1,305	1,370	1,440
	---	.02	1.98	.33				
	---	.02	2.27	.38				
w192600	.0	.02	.50	.17	8.0	1,455	1,525	1,540
	---	.02	.51	.17				
	---	.02	.56	.19				
w192601	.0	.02	.18	.34	9.0	1,320	1,390	1,445
	---	.02	.19	.35				
	---	.02	.19	.36				

Table 8e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w192602	0.0	0.31	0.28	0.26	8.0	1,520	1,540	0
	---	.32	.29	.27				
	---	.35	.32	.30				
w192603	.0	.02	.96	1.14	9.0	1,095	1,155	1,180
	---	.02	1.00	1.18				
	---	.02	1.05	1.25				
w192604	.0	.02	.64	.48	9.0	1,360	1,430	1,480
	---	.02	.67	.50				
	---	.02	.70	.53				
w192605	.0	.17	.28	.47	8.5	1,355	1,420	1,455
	---	.18	.29	.49				
	---	.19	.32	.53				
w192606	.0	.02	.48	.28	8.0	1,305	1,375	1,445
	---	.02	.49	.29				
	---	.03	.61	.36				
w192607	.0	.02	.66	.03	8.0	1,320	1,380	1,440
	---	.02	.69	.03				
	---	.02	.76	.03				
w192608	.0	.02	.15	.40	9.0	1,090	1,175	1,215
	---	.02	.15	.41				
	---	.02	.16	.43				
w192609	.0	.02	1.70	.97	9.0	1,060	1,115	1,165
	---	.02	1.75	1.00				
	---	.02	1.87	1.07				
w192610	.0	.02	.26	.76	9.0	1,350	1,415	1,480
	---	.02	.27	.78				
	---	.02	.27	.80				
w192611	.0	.02	2.02	.71	9.0	1,095	1,155	1,190
	---	.02	2.07	.73				
	---	.02	2.17	.76				
w192612	.0	.02	.67	.42	9.0	1,100	1,230	1,325
	---	.02	.69	.43				
	---	.02	.71	.45				
w192613	.0	.02	2.20	1.12	9.0	1,075	1,140	1,215
	---	.02	2.34	1.19				
	---	.02	2.58	1.31				

Table 8e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w192602	2.9	29.9	58.2	9.0	5.4	75.7	1.5	7.6	0.8	7,510	13,510
	---	30.8	59.9	9.3	5.2	78.0	1.5	5.2	.8	7,730	13,910
	---	33.9	66.1	---	5.8	85.9	1.7	5.7	.9	8,520	15,330
w192603	3.7	34.9	56.4	5.0	5.7	77.0	1.4	8.8	2.1	7,700	13,860
	---	36.2	58.6	5.2	5.5	80.0	1.5	5.7	2.2	8,000	14,390
	---	38.2	61.8	---	5.8	84.3	1.5	6.0	2.3	8,430	15,180
w192604	4.3	32.3	58.5	4.9	5.6	77.8	1.6	9.0	1.1	7,720	13,890
	---	33.8	61.1	5.1	5.4	81.3	1.7	5.4	1.1	8,060	14,510
	---	35.6	64.4	---	5.6	85.7	1.8	5.7	1.2	8,500	15,300
w192605	4.1	30.2	58.1	7.6	5.5	76.2	1.6	8.2	.9	7,550	13,590
	---	31.5	60.6	7.9	5.3	79.5	1.7	4.8	.9	7,870	14,170
	---	34.2	65.8	---	5.7	86.3	1.8	5.2	1.0	8,550	15,390
w192606	2.4	27.9	50.4	19.3	4.8	67.2	1.4	6.5	.8	6,650	11,970
	---	28.6	51.6	19.8	4.6	68.9	1.4	4.5	.8	6,810	12,260
	---	35.6	64.4	---	5.8	85.8	1.8	5.6	1.0	8,490	15,290
w192607	4.6	27.3	59.6	8.5	5.1	74.6	1.2	9.9	.7	7,300	13,140
	---	28.6	62.5	8.9	4.8	78.2	1.3	6.1	.7	7,650	13,770
	---	31.4	68.6	---	5.3	85.8	1.4	6.7	.8	8,400	15,120
w192608	3.1	30.1	63.0	3.8	5.5	80.7	1.6	7.8	.6	8,020	14,430
	---	31.1	65.0	3.9	5.3	83.3	1.7	5.2	.6	8,270	14,890
	---	32.3	67.7	---	5.5	86.7	1.7	5.4	.6	8,610	15,500
w192609	2.6	33.8	57.2	6.4	5.4	76.7	1.5	7.3	2.7	7,690	13,850
	---	34.7	58.7	6.6	5.2	78.7	1.5	5.1	2.8	7,900	14,220
	---	37.1	62.9	---	5.6	84.3	1.6	5.5	3.0	8,460	15,220
w192610	3.0	31.6	63.1	2.3	5.5	81.8	1.6	7.8	1.0	8,110	14,590
	---	32.6	65.1	2.4	5.3	84.3	1.6	5.3	1.0	8,360	15,040
	---	33.4	66.6	---	5.5	86.4	1.7	5.4	1.1	8,560	15,410
w192611	2.3	33.4	59.6	4.7	5.5	79.1	1.5	6.4	2.8	7,930	14,270
	---	34.2	61.0	4.8	5.4	81.0	1.5	4.5	2.9	8,110	14,610
	---	35.9	64.1	---	5.6	85.1	1.6	4.7	3.0	8,520	15,340
w192612	2.7	32.8	61.3	3.2	5.6	79.9	1.5	8.7	1.1	7,950	14,310
	---	33.7	63.0	3.3	5.4	82.1	1.5	6.5	1.1	8,170	14,710
	---	34.9	65.1	---	5.6	84.9	1.6	6.7	1.2	8,450	15,210
w192613	6.0	28.2	57.1	8.7	5.2	71.8	1.5	9.5	3.3	7,120	12,810
	---	30.0	60.7	9.3	4.8	76.4	1.6	4.4	3.5	7,570	13,630
	---	33.1	66.9	---	5.3	84.2	1.8	4.9	3.9	8,340	15,020

Table 8e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w192697	3.0	31.7	55.4	9.9	5.0	74.1	1.4	8.8	0.8	7,290	13,130
	---	32.7	57.1	10.2	4.8	76.4	1.4	6.3	.8	7,520	13,530
	---	36.4	63.6	---	5.4	85.1	1.6	7.0	.9	8,370	15,070
w192698	2.6	28.0	61.8	7.6	5.2	78.2	1.6	6.2	1.2	7,770	13,980
	---	28.7	63.4	7.8	5.0	80.3	1.6	4.0	1.2	7,980	14,360
	---	31.2	68.8	---	5.5	87.1	1.8	4.3	1.3	8,650	15,570
w192699	2.0	30.0	64.3	3.7	5.3	82.6	1.8	5.8	.9	8,210	14,770
	---	30.6	65.6	3.8	5.2	84.3	1.8	4.1	.9	8,370	15,070
	---	31.8	68.2	---	5.4	87.6	1.9	4.3	1.0	8,700	15,660
w192700	2.8	25.9	62.8	8.5	5.0	77.9	1.5	6.4	.8	7,670	13,810
	---	26.6	64.6	8.7	4.8	80.1	1.5	4.0	.8	7,890	14,210
	---	29.2	70.8	---	5.3	87.8	1.7	4.4	.9	8,650	15,570
w192701	2.1	31.9	60.0	6.0	5.3	79.0	1.8	7.1	.8	7,880	14,180
	---	32.6	61.3	6.1	5.2	80.7	1.8	5.3	.8	8,040	14,480
	---	34.7	65.3	---	5.5	86.0	2.0	5.7	.9	8,570	15,420
w192702	4.0	22.6	36.8	36.6	3.9	49.2	1.1	8.3	.8	4,880	8,790
	---	23.5	38.3	38.1	3.6	51.2	1.1	4.9	.8	5,080	9,150
	---	38.0	62.0	---	5.8	82.8	1.9	8.0	1.3	8,220	14,790
w192703	3.9	30.3	60.7	5.1	5.5	78.8	1.7	8.1	.9	7,810	14,060
	---	31.5	63.2	5.3	5.3	82.0	1.8	4.8	.9	8,130	14,630
	---	33.3	66.7	---	5.6	86.6	1.9	5.1	1.0	8,590	15,450
w192704	2.4	25.4	48.3	23.9	4.4	63.0	1.4	6.6	.7	6,190	11,150
	---	26.0	49.5	24.5	4.2	64.5	1.4	4.6	.7	6,350	11,420
	---	34.5	65.5	---	5.6	85.5	1.9	6.1	.9	8,400	15,120
w192705	2.0	29.1	55.8	13.1	4.9	73.6	1.6	6.3	.6	7,280	13,100
	---	29.7	56.9	13.4	4.8	75.1	1.6	4.6	.6	7,420	13,360
	---	34.3	65.7	---	5.5	86.7	1.9	5.3	.7	8,570	15,430
w192706	1.6	28.1	54.2	16.1	4.6	71.3	1.3	6.1	.6	6,950	12,500
	---	28.6	55.1	16.4	4.5	72.5	1.3	4.8	.6	7,060	12,710
	---	34.1	65.9	---	5.4	86.6	1.6	5.7	.7	8,440	15,190
w192707	2.6	22.6	45.2	29.6	4.0	58.2	1.2	6.5	.5	5,660	10,190
	---	23.2	46.4	30.4	3.8	59.8	1.2	4.3	.5	5,810	10,470
	---	33.3	66.7	---	5.5	85.8	1.8	6.2	.7	8,350	15,040
w192708	1.2	31.3	53.7	13.8	4.7	72.7	1.4	6.8	.6	7,140	12,850
	---	31.7	54.4	14.0	4.6	73.6	1.4	5.8	.6	7,220	13,000
	---	36.8	63.2	---	5.4	85.5	1.6	6.7	.7	8,400	15,110

Table 8a.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Forms of sulfur: Pyritic	Forms of sulfur: Organic	Free swelling	Ash fusion temperature C°: Initial deform.	Ash fusion temperature C°: soften.	Ash fusion temperature C°: fluid
w192697	0.0	0.00	0.30	0.50	4.0	1,220	1,265	1,295
	---	.00	.31	.52				
	---	.00	.34	.57				
w192698	.0	.00	.40	.70	9.0	1,385	1,460	1,525
	---	.00	.41	.72				
	---	.00	.45	.78				
w192699	.0	.00	.20	.70	9.0	1,345	1,395	1,435
	---	.00	.20	.71				
	---	.00	.21	.74				
w192700	.0	.00	.20	.50	7.5	1,540	1,540	1,540
	---	.00	.21	.51				
	---	.00	.23	.56				
w192701	.0	.00	.10	.70	9.0	1,540	1,540	1,540
	---	.00	.10	.72				
	---	.00	.11	.76				
w192702	.0	.10	.30	.40	5.5	1,540	1,540	1,540
	---	.10	.31	.42				
	---	.17	.51	.67				
w192703	.0	.00	.00	.80	9.0	1,540	1,540	1,540
	---	.00	.00	.83				
	---	.00	.00	.88				
w192704	.0	.00	.10	.60	9.0	1,290	1,365	1,390
	---	.00	.10	.61				
	---	.00	.14	.81				
w192705	.0	.00	.10	.50	7.5	1,450	1,515	1,540
	---	.00	.10	.51				
	---	.00	.12	.59				
w192706	.0	.00	.00	.50	6.5	1,325	1,400	1,430
	---	.00	.00	.51				
	---	.00	.00	.61				
w192707	.0	.00	.10	.30	5.0	1,490	1,525	1,540
	---	.00	.10	.31				
	---	.00	.15	.44				
w192708	.0	.00	.00	.50	5.0	1,215	1,285	1,320
	---	.00	.00	.51				
	---	.00	.00	.59				

Table 8e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w192709	1.8	29.2	56.8	12.2	4.9	75.2	1.3	5.8	0.6	7,370	13,260
	---	29.7	57.8	12.4	4.8	76.6	1.3	4.3	.6	7,500	13,510
	---	34.0	66.0	---	5.5	87.4	1.5	4.9	.7	8,570	15,420
w193663	1.5	33.5	53.3	11.7	5.1	74.3	1.4	6.3	1.2	7,380	13,280
	---	34.0	54.1	11.9	5.0	75.4	1.4	5.0	1.2	7,490	13,480
	---	38.6	61.4	---	5.7	85.6	1.6	5.7	1.4	8,500	15,300
w193664	1.5	32.9	50.6	15.0	4.7	70.9	1.4	6.8	1.2	6,960	12,540
	---	33.4	51.4	15.2	4.6	72.0	1.4	5.5	1.2	7,070	12,730
	---	39.4	60.6	---	5.4	84.9	1.7	6.5	1.4	8,340	15,010
w193665	3.3	25.6	55.7	15.4	4.6	70.7	1.2	7.2	.8	6,950	12,510
	---	26.5	57.6	15.9	4.4	73.1	1.2	4.4	.8	7,190	12,940
	---	31.5	68.5	---	5.2	87.0	1.5	5.2	1.0	8,550	15,390
w193666	1.7	23.2	45.8	29.3	4.0	59.1	1.0	6.1	.6	5,770	10,390
	---	23.6	46.6	29.8	3.9	60.1	1.0	4.7	.6	5,870	10,570
	---	33.6	66.4	---	5.5	85.7	1.4	6.7	.9	8,360	15,060
w193667	1.9	26.4	58.7	13.0	4.7	75.4	1.3	5.2	.5	7,340	13,220
	---	26.9	59.8	13.3	4.6	76.9	1.3	3.6	.5	7,480	13,470
	---	31.0	69.0	---	5.3	88.6	1.5	4.1	.6	8,630	15,530
w193668	2.5	31.0	59.8	6.7	5.3	78.6	1.4	6.4	1.5	7,800	14,030
	---	31.8	61.3	6.9	5.2	80.6	1.4	4.3	1.5	7,990	14,390
	---	34.1	65.9	---	5.5	86.6	1.5	4.6	1.7	8,580	15,450
w193669	1.7	33.6	62.3	2.4	5.5	83.2	1.7	6.1	1.2	8,280	14,910
	---	34.2	63.4	2.4	5.4	84.6	1.7	4.7	1.2	8,430	15,170
	---	35.0	65.0	---	5.5	86.8	1.8	4.8	1.3	8,640	15,550
w193670	1.7	32.0	61.4	4.9	5.1	79.7	1.4	5.4	3.4	7,990	14,380
	---	32.6	62.5	5.0	5.0	81.1	1.4	4.0	3.5	8,130	14,630
	---	34.3	65.7	---	5.3	85.3	1.5	4.2	3.6	8,550	15,400
w193671	3.6	28.1	59.6	8.7	5.2	75.9	1.5	7.3	1.4	7,520	13,530
	---	29.1	61.8	9.0	5.0	78.7	1.6	4.3	1.5	7,800	14,040
	---	32.0	68.0	---	5.5	86.5	1.7	4.7	1.6	8,570	15,430
w193672	1.8	25.7	58.7	13.8	4.6	73.8	1.5	5.4	.9	7,270	13,090
	---	26.2	59.8	14.1	4.5	75.2	1.5	3.9	.9	7,400	13,330
	---	30.5	69.5	---	5.2	87.4	1.8	4.5	1.1	8,610	15,500
w193673	1.9	35.2	50.6	12.3	5.0	72.2	1.4	5.4	3.9	7,290	13,120
	---	35.9	51.6	12.5	4.9	73.6	1.4	3.8	4.0	7,430	13,370
	---	41.0	59.0	---	5.6	84.1	1.6	4.3	4.5	8,490	15,290

Table 8a.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 72 coal samples from Virginia--continued

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Forms of sulfur: Pyritic	Forms of sulfur: Organic	Free swelling	Ash fusion temperature C°: Initial deform.	Ash fusion temperature C°: soften.	Ash fusion temperature C°: fluid
w192709	0.0	0.00	0.00	0.50	0.0	1,265	1,305	1,325
	---	.00	.00	.51				
	---	.00	.00	.58				
w193663	.0	.04	.45	.67	5.5	1,425	1,465	1,500
	---	.04	.46	.68				
	---	.05	.52	.77				
w193664	.0	.01	.49	.71	6.0	1,205	1,260	1,305
	---	.01	.50	.72				
	---	.01	.59	.85				
w193665	.0	.01	.17	.65	8.5	1,375	1,440	1,500
	---	.01	.18	.67				
	---	.01	.21	.80				
w193666	.0	.01	.03	.51	5.5	1,520	1,540	1,540
	---	.01	.03	.52				
	---	.01	.04	.74				
w193667	.0	.00	.05	.44	8.5	1,215	1,260	1,305
	---	.00	.05	.45				
	---	.00	.06	.52				
w193668	.0	.06	.68	.73	9.0	1,285	1,340	1,400
	---	.06	.70	.75				
	---	.07	.75	.80				
w193669	.0	.01	.31	.87	9.0	1,235	1,280	1,350
	---	.01	.32	.89				
	---	.01	.32	.91				
w193670	.0	.10	2.66	.66	.0	1,320	1,375	1,430
	---	.10	2.71	.67				
	---	.11	2.85	.71				
w193671	.0	.22	.53	.62	8.5	1,350	1,420	1,480
	---	.23	.55	.64				
	---	.25	.60	.71				
w193672	.0	.07	.19	.59	9.0	1,430	1,490	1,540
	---	.07	.19	.60				
	---	.05	.23	.70				
w193673	.0	.01	2.59	1.26	8.5	1,125	1,170	1,230
	---	.01	2.64	1.28				
	---	.01	3.02	1.47				

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia.

[Values in percent or parts-per-million. Coal ashed at 525°C. L means less than the value shown: N, not detected; B, not determined; S after element title indicates determinations by automatic plate reading computer assisted, emission spectographic analyses. The standard deviation of any single answer should be taken as plus 50% and minus 35%. Methods of analyses for other elements as shown in figures.]

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w191030	8.1	40	19	7.4	2.2	1.1	1.8	12	0.90	0.40	w191030
w191031	18.0	55	27	.90	1.7	.40	4.6	8.0	.80	.08	w191031
w191032	5.5	47	30	1.7	1.7	.53	3.5	12	1.3	.10	w191032
w191033	5.7	39	27	1.5	1.6	.56	2.8	22	1.1	.20	w191033
w191063	6.8	27	19	1.6	.70	.46	1.7	43	.80	.05	w191063
w191064	6.0	53	28	2.0	1.3	.43	1.5	8.7	1.5	1.0	w191064
w191065	6.8	43	14	2.1	1.5	.52	1.7	32	.50	.20	w191065
w191066	10.2	57	29	1.5	.90	.20	1.5	3.9	1.5	1.0	w191066
w191067	15.4	59	29	1.1	1.1	.35	2.2	2.3	1.4	.80	w191067
w191068	5.7	19	17	2.0	.61	.44	.90	54	.80	.10	w191068
w191069	6.9	25	10	1.1	1.2	.47	1.5	53	.40	.10	w191069
w191134	5.7	58	25	1.4	1.3	.90	2.6	6.3	1.1	.90	w191134
w191135	11.2	44	24	1.4	1.1	.94	2.1	22	1.2	1.4	w191135
w191136	3.6	54	38	2.5	.90	1.1	2.0	5.2	1.3	B	w191136
w191328	4.3	46	29	1.9	1.3	1.0	1.7	9.4	1.1	.10	w191328
w191329	4.8	44	35	2.2	1.0	.71	2.0	9.4	.90	.02	w191329
w191330	6.2	37	29	.80	.61	.45	3.3	25	1.0	.05	w191330
w191331	11.5	37	29	.80	.58	.27	3.3	25	1.0	.05	w191331
w191332	5.6	25	19	2.9	.68	1.0	1.2	42	1.0	.30	w191332
w191333	2.7	43	29	2.1	.30	.88	.50	18	1.6	.40	w191333
w191334	10.8	30	17	1.3	.32	.28	.70	46	1.5	.40	w191334
w191335	3.0	34	21	2.4	1.0	2.0	2.5	29	.70	.02	w191335
w191336	2.4	28	14	3.4	.93	1.7	1.4	41	.50	.08	w191336
w191337	3.8	31	15	2.9	3.0	1.4	1.9	37	.50	.50	w191337
w191338	13.8	37	19	1.3	.37	.24	2.0	35	1.0	.60	w191338
w191521	5.4	40	27	2.8	1.6	.31	1.8	15	1.1	.03	w191521
w192586	18.8	47	22	.65	1.2	.29	3.8	17	.98	.05	w192586
w192587	7.1	54	24	2.3	.58	.61	.89	8.8	1.6	1.3	w192587
w192588	3.4	41	16	1.9	.95	1.5	2.5	23	.56	.16	w192588
w192589	9.3	49	30	2.2	1.5	.40	1.8	4.6	1.1	1.3	w192589
w192590	13.6	13	8.0	6.6	2.0	.76	.93	48	.43	.10	w192590
w192591	18.2	32	21	9.3	1.4	.22	2.2	12	.97	.17	w192591
w192592	9.6	56	25	1.2	.95	.50	1.8	7.5	1.6	.37	w192592
w192599	7.3	48	24	3.0	.58	.47	1.5	9.6	2.3	1.6	w192599
w192600	9.4	60	24	2.4	.73	.57	1.3	3.4	1.6	1.5	w192600
w192601	2.5	45	30	2.2	.85	2.8	1.4	6.0	1.7	.19	w192601
w192602	9.9	56	27	1.0	.68	.29	4.6	5.9	1.9	.27	w192602
w192603	5.1	30	19	4.1	1.4	1.4	1.9	28	1.0	.10	w192603
w192604	4.3	42	27	2.3	.33	.39	1.1	13	1.1	.04	w192604
w192605	7.7	49	25	3.0	.43	.39	1.5	9.1	2.3	1.6	w192605

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	SO3 (percent)	Ag-S (ppm)	Au-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w191030	9.5	1.6	18L	85	2,700	11	2.2	150	51	79	w191030
w191031	3.0	.18L	18L	100	1,300	10	.20	130	31	120	w191031
w191032	3.2	.83	18L	120	2,000	45	1.5	200	45	140	w191032
w191033	3.4	.60	18L	96	1,400	31	2.5	190	51	140	w191033
w191063	3.6	.52	18L	180	1,200	25	1.0	120	46	110	w191063
w191064	3.3	.20	18L	180	1,300	38	1.6	100	130	92	w191064
w191065	5.0	.47	18L	330	1,400	22	.72	210	47	160	w191065
w191066	2.2	.71	18L	160	1,500	43	1.5	250	110	170	w191066
w191067	1.5	.25	18L	180	1,200	15	.50	160	56	140	w191067
w191068	4.3	.74	18L	200	1,600	40	1.1	110	40	88	w191068
w191069	3.9	.45	18L	170	600	22	.92	58	28	61	w191069
w191134	2.9	1.4	18L	240	1,300	92	2.0	280	360	220	w191134
w191135	2.2	.56	18L	120	1,400	24	1.3	150	58	130	w191135
w191136	8.2	.76	18L	310	1,600	96	1.9	250	260	160	w191136
w191328	4.2	.76	20L	400	2,000	54	.56	260	37	110	w191328
w191329	4.3	1.3	20L	400	1,800	54	1.1	310	130	140	w191329
w191330	2.1	.56	20L	150	980	30	.76	160	32	140	w191330
w191331	2.1	.36	20L	94	840	58	.62	190	61	140	w191331
w191332	6.0	.60	20L	240	2,400	26	1.2	110	73	120	w191332
w191333	3.4	1.2	20L	260	1,800	19	1.0	300	63	150	w191333
w191334	2.4	.54	20L	130	1,100	8.6	.62	130	40	120	w191334
w191335	7.7	.74	20L	440	1,900	38	1.5	170	140	160	w191335
w191336	8.2	.86	20L	340	1,600	56	4.3	170	510	180	w191336
w191337	7.7	.20L	20L	260	1,700	24	1.0	110	140	110	w191337
w191338	2.3	.66	20L	66	580	22	1.2	140	38	110	w191338
w191521	1.4	.43	18L	65	1,100	58	.76	170	110	120	w191521
w192586	1.1	.30	10L	150	490	13	1.2	140	59	130	w192586
w192587	2.4	.50	10L	210	1,600	21	.90	210	61	150	w192587
w192588	4.0	.50	10L	300	1,300	35	1.6	120	85	88	w192588
w192589	2.3	.70	10L	220	1,100	48	1.7	220	110	120	w192589
w192590	13	.40	10L	H	490	6.0	.83	81	29	64	w192590
w192591	14	.40	10L	200	960	16	3.9	100	39	55	w192591
w192592	1.5	.30	10L	150	640	18	1.2	180	36	130	w192592
w192599	3.4	.30	10L	120	2,300	20	.96	300	150	260	w192599
w192600	1.8	.20	10L	150	1,100	15	1.0	260	69	190	w192600
w192601	4.4	.90	10L	410	2,200	36	2.2	400	280	620	w192601
w192602	1.2	.40	10L	120	410	18	1.1	220	79	190	w192602
w192603	6.9	.60	10L	540	1,600	8.0	1.7	140	43	130	w192603
w192604	3.1	1.1	10L	240	980	41	3.8	400	100	150	w192604
w192605	2.9	.30	10L	160	2,100	21	1.2	250	150	220	w192605

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w191030	4.9	290	58L	18L	2.3	25	12L	8.3L	6.2	12L	w191030
w191031	22	110	58L	18L	2.2	51	12L	8.3L	4.4	12L	w191031
w191032	24	420	58L	18L	3.6	49	16	8.3L	7.3	12L	w191032
w191033	19	450	58L	18L	3.9	45	15	8.3L	5.3	12L	w191033
w191063	5.9	160	58L	18L	2.5	49	12L	45	4.4	12L	w191063
w191064	5.0	270	58L	18L	2.8	36	20	12	5.0	12L	w191064
w191065	5.9	170	58L	18L	3.4	52	12L	8.3L	8.8	12L	w191065
w191066	4.9	200	58L	27	5.6	47	31	8.3L	7.8	12L	w191066
w191067	10	120	58L	18L	2.6	43	13	8.3L	6.5	12L	w191067
w191068	3.5	180	58L	18L	2.3	45	12L	27	3.5	12L	w191068
w191069	4.3	180	58L	18L	1.4	29	20	8.3L	2.9	12L	w191069
w191134	7.0	380	58L	33	8.1	85	29	100	7.0	12L	w191134
w191135	8.9	200	58L	18L	3.5	51	12L	13	5.4	12L	w191135
w191136	2.8	420	58L	22	6.9	83	20	100	8.3	12L	w191136
w191328	4.7	160	64L	20L	3.5	60	22	9.2L	14	14L	w191328
w191329	6.3	320	64L	24	5.6	62	24	9.2L	8.3	14L	w191329
w191330	11	190	64L	20L	3.1	66	19	9.2L	4.8	14L	w191330
w191331	16	160	64L	20L	3.7	60	14L	26	6.1	14L	w191331
w191332	7.1	190	64L	20L	2.7	54	20	24	5.4	14L	w191332
w191333	3.7	340	64L	20L	5.6	46	20	9.2L	11	14L	w191333
w191334	2.8	140	64L	20L	2.4	48	14L	9.6	8.3	14L	w191334
w191335	10	310	64L	20L	3.0	54	14	9.2L	3.3	14L	w191335
w191336	4.2	480	64L	20L	5.0	64	26	50	8.3	14L	w191336
w191337	7.9	280	64L	20L	3.2	52	15	18	2.6	14L	w191337
w191338	6.5	150	64L	20L	2.6	46	14L	15	5.1	14L	w191338
w191521	13	270	58L	18L	3.3	31	12L	8.3L	5.6	12L	w191521
w192586	9.0	150	32L	10L	2.4	46	7.0L	7.0	4.3	7.0L	w192586
w192587	2.8	150	32L	15	3.5	56	14	10	9.9	10L	w192587
w192588	.6	390	32L	11	4.4	54	21	28	18	7.0L	w192588
w192589	5.4	260	30L	15	4.8	65	13	40	6.5	7.0L	w192589
w192590	2.9	91	32L	10L	2.1	22	15	19	2.2	7.0L	w192590
w192591	2.7	210	32L	10L	2.6	30	14	9.0	2.7	7.0L	w192591
w192592	8.3	160	32L	10L	2.4	47	12	14	7.3	7.0L	w192592
w192599	9.6	180	32L	14	5.5	58	25	27	15	7.0L	w192599
w192600	5.3	150	32L	10	3.2	48	7.0L	14	12	7.0L	w192600
w192601	20L	400	32L	13	11	62	17	31	16	7.0L	w192601
w192602	5.1	170	32L	10	4.1	42	7.0L	12	10	7.0L	w192602
w192603	9.8	190	32L	10L	2.9	41	13	6.0	5.9	7.0L	w192603
w192604	4.7	410	32L	16	7.9	59	8.0	31	9.3	7.0L	w192604
w192605	5.2	190	32L	12	4.4	57	7.0L	32	12	7.0L	w192605

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Sample number
w191030	86	73	1L	3,200	15	7	85	98	58	120L	w191030
w191031	72	100	1	120	12	9	83L	49	41	120L	w191031
w191032	91	120	2L	170	22	17	160	91	52	120L	w191032
w191033	110	97	2	120	31	12	140	87	41	120L	w191033
w191063	59	120	1	290	27	14	87	94	24	180L	w191063
w191064	50	56	2	1,300	34	9	83L	150	23	120L	w191064
w191065	120	120	1	11	18	17	150	120	44	120L	w191065
w191066	140	200	2	80	24	38	340	220	58	120L	w191066
w191067	91	250	.6	80	8.5	42	150	120	44	120L	w191067
w191068	53	97	2	180	36	13	83L	67	22	180L	w191068
w191069	29	46	1	280	36	6L	83L	58	12	120L	w191069
w191134	120	110	5	130	36	18	360	360	76	120L	w191134
w191135	80	97	2	64	38	13	87	180	44	120L	w191135
w191136	140	90	3	220	33	24	250	290	72	120L	w191136
w191328	120	130	2	150	54	66	200	120	110	140L	w191328
w191329	150	180	2	97	44	22	280	170	110	140L	w191329
w191330	81	160	2	170	22	11	110	58	43	140L	w191330
w191331	87	140	2	97	17	20	150	130	43	140L	w191331
w191332	71	61	2	270	26	14	94	96	18	140L	w191332
w191333	190	110	4	180	34	34	200	150	84	140L	w191333
w191334	74	81	.9	120	26	24	92L	90	24	140L	w191334
w191335	67	69	3	120	92	6L	92L	220	56	140L	w191335
w191336	83	37	4	250	100	14	130	580	46	140L	w191336
w191337	53	51	3	730	52	7	92L	160	23	140L	w191337
w191338	72	110	1	220	30	9	92L	120	46	140L	w191338
w191521	74	130	2	160	36	10	120	120	48	120L	w191521
w192586	90	210	1	100	19	5	46L	110	47	68L	w192586
w192587	110	100	1	50	16	22	73	160	45	68L	w192587
w192588	59	70	3	210	66	12	76	130	46	68L	w192588
w192589	120	160	2	78	17	16	130	160	59	68L	w192589
w192590	44	330	.7	230	20	8	46L	44	10L	68L	w192590
w192591	49	150	1	530	10	11	66	170	53	68L	w192591
w192592	94	270	1	130	12	32	94	92	53	68L	w192592
w192599	160	150	3	250	35	40	89	200	56	68L	w192599
w192600	150	170	2	180	10	22	46L	66	49	68L	w192600
w192601	120	250	4	320	32	20	46L	300	75	68L	w192601
w192602	120	150	2	140	15	31	46L	100	80	68L	w192602
w192603	78	50	2	450	19	10	46L	53	1,200	68L	w192603
w192604	190	190	2	290	36	22	49	150	86	68L	w192604
w192605	130	140	3	320	31	28	50	200	140	68L	w192605

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm (ppm)	U (ppm)	Sample number
w191030	86	16	12	12L	1,800	1.2	37L	18L	8.3L	7.4	w191030
w191031	250	28	12	12L	850	1.7	17L	18L	8.3L	20	w191031
w191032	240	35	18	12L	2,000	1.8	55L	18L	8.3L	23	w191032
w191033	210	32	19	12L	2,000	3.5	53L	40	8.3L	22	w191033
w191063	120	31	12	12L	1,000	1.5	44L	18L	8.3L	11	w191063
w191064	220L	25	12	12L	1,000	1.7	50L	47	8.3L	13	w191064
w191065	220L	31	19	12L	2,700	2.9	44L	18L	8.3L	20	w191065
w191066	140L	35	28	12L	2,700	4.9	62	18L	8.3L	8.8	w191066
w191067	140	28	14	12L	2,200	1.9	32	18L	8.3L	8.0	w191067
w191068	190L	26	11	12L	1,700	1.8	53L	18L	8.3L	12	w191068
w191069	140L	19	7.2	12L	760	2.9	43L	18L	8.3L	16	w191069
w191134	260L	53	37	12L	690	7.0	53	18L	8.3L	12	w191134
w191135	130	30	14	12L	1,800	2.7	27L	18L	8.3L	20	w191135
w191136	310L	47	31	12L	1,600	5.6	83	18L	8.3L	8.3	w191136
w191328	280L	33	23	17	4,400	4.7	70L	20L	9.2L	33	w191328
w191329	270L	40	35	24	3,000	6.3	63L	20L	9.2L	26	w191329
w191330	160	37	15	22	620	3.2	48L	20L	9.2L	27	w191330
w191331	170	34	17	14L	740	2.6	26	20L	9.2L	10	w191331
w191332	250L	34	11	14L	2,400	1.8	54L	58	9.2L	11	w191332
w191333	370L	33	26	58	3,200	3.7	110L	20L	9.2L	14	w191333
w191334	130L	25	11	14L	1,500	1.9	39	20L	9.2L	15	w191334
w191335	400L	43	17	19	1,900	3.3	100L	20L	9.2L	14	w191335
w191336	460L	54	25	20	1,700	4.2	130L	20L	9.2L	19	w191336
w191337	290L	47	13	14L	1,300	2.6	79L	20L	9.2L	14	w191337
w191338	140	30	12	14L	800	2.9	22	20L	9.2L	11	w191338
w191521	130	24	17	12L	2,500	3.7	56L	18L	8.3L	19	w191521
w192586	160	30	13	7.0L	210	3.7L	37	21	5.0L	14	w192586
w192587	390L	39	17	7.0L	2,200	11L	42L	11	7.0	17	w192587
w192588	710L	44	15	7.0L	1,300	18L	88L	26	5.0L	21	w192588
w192589	280L	38	20	13	2,500	3.2	32L	10L	5.0L	8.6	w192589
w192590	130L	15	8.8	7.0L	380	3.7L	22L	10L	5.0L	5.9	w192590
w192591	150L	15	14	9.0	410	2.2	16L	14	5.0L	10	w192591
w192592	280L	30	16	7.0L	1,100	8.3L	31L	10L	5.0L	16	w192592
w192599	300L	58	26	13	1,000	4.1	41L	10L	5.0L	32	w192599
w192600	260L	37	20	7.0L	1,600	3.2	32L	10L	5.0L	17	w192600
w192601	880L	76	24	7.0L	1,600	24L	120L	12	5.0L	16	w192601
w192602	190L	43	21	7.0L	430	3.0	40	10L	5.0L	33	w192602
w192603	290L	27	14	280	1,200	9.8L	59L	10L	5.0L	25	w192603
w192604	350L	49	44	15	1,800	9.3	70L	32	5.0L	19	w192604
w192605	250L	49	22	42	1,000	3.9	39L	10	5.0L	32	w192605

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)
w191030	78	65	4.9	740	180
w191031	180	24	5.0	75	58
w191032	220	100	9.1	210	240
w191033	200	110	8.8	360	200
w191063	140	54	7.4	62	130
w191064	140	89	8.3	1,200	69
w191065	250	89	8.8	85	220
w191066	330	250	15	250	450
w191067	250	98	5.8	68	580
w191068	94	69	7.0	52	140
w191069	130	49	4.3	400	63
w191134	420	310	25	220	180
w191135	220	62	8.0	260	130
w191136	310	200	19	56	240
w191328	170	170	12	100	400
w191329	260	180	17	65	220
w191330	260	94	9.7	110	170
w191331	280	120	9.6	90	200
w191332	110	58	7.1	65	130
w191333	190	120	11	99	440
w191334	140	52	6.5	51	220
w191335	240	110	13	190	78
w191336	170	160	17	1,400	70
w191337	140	60	7.9	140	56
w191338	170	64	8.0	130	92
w191521	160	96	9.3	35	160
w192586	150	27	6.4	220	46
w192587	220	86	9.9	37	140
w192588	180	100	12	270	60
w192589	250	130	12	640	100
w192590	54	21	3.7	690	40
w192591	130	96	5.5	400	140
w192592	180	70	5.2	92	220
w192599	270	120	12	120	210
w192600	180	27	7.4	40	110
w192601	130	77	20	100	110
w192602	180	46	10	160	170
w192603	96	35	5.9	140	73
w192604	150	75	19	110	99
w192605	220	62	13	120	110

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w192606	22.2	53	22	1.2	1.8	0.17	5.0	8.5	1.1	0.07	w192606
w192607	9.4	49	23	3.1	1.6	.22	3.5	10	1.4	.09	w192607
w192608	4.2	53	30	1.5	.50	.35	1.8	4.1	1.4	.15	w192608
w192609	7.5	32	14	1.9	.48	.19	1.1	42	1.1	.78	w192609
w192610	2.0	41	34	1.9	.63	1.5	1.3	8.8	1.4	.14	w192610
w192611	4.5	25	16	1.6	.60	.43	1.5	39	1.0	.11	w192611
w192612	6.1	30	24	2.6	.85	.85	1.7	23	1.0	.12	w192612
w192613	10.6	32	18	1.2	.80	.22	1.8	38	.69	.27	w192613
w192697	21.7	41	22	5.2	1.3	.19	3.0	7.2	1.2	.12	w192697
w192698	7.8	46	28	1.8	.90	.38	3.8	12	.96	.06	w192698
w192699	3.0	41	29	3.6	.43	.22	.90	9.6	1.0	.27	w192699
w192700	8.3	52	31	1.4	.68	.34	1.3	7.7	1.5	.09	w192700
w192701	6.1	52	31	1.6	.81	.41	2.5	7.3	2.1	.43	w192701
w192702	16.6	56	25	.45	.40	.44	4.3	5.0	1.4	.07	w192702
w192703	5.1	49	28	2.9	.51	.69	2.2	6.4	1.2	.05	w192703
w192704	15.3	51	27	2.1	1.2	.56	4.0	5.3	1.3	.03	w192704
w192705	9.2	47	25	2.7	1.8	1.2	2.1	5.8	1.1	.03	w192705
w192706	17.6	46	18	13	.80	.18	1.4	4.6	1.7	.12	w192706
w192707	28.6	57	23	3.6	.23	.41	3.4	4.0	1.4	.11	w192707
w192708	13.8	38	18	15	1.8	.91	.91	5.7	1.4	.08	w192708
w192709	11.4	42	18	10	1.1	1.2	2.3	6.5	.94	.04	w192709
w193663	10.7	52	29	.85	.71	.27	2.1	9.0	1.5	.12	w193663
w193664	15.1	41	20	14	1.1	.33	.69	7.0	1.4	.34	w193664
w193665	13.9	53	25	2.8	1.4	.44	2.7	6.2	1.3	.05	w193665
w193666	28.3	52	30	3.0	.68	.37	3.5	2.9	1.8	.15	w193666
w193667	8.4	44	18	13	1.0	.33	1.6	7.0	.95	.09	w193667
w193668	21.3	43	25	1.0	1.4	.20	3.8	17	.86	.06	w193668
w193669	1.9	40	22	2.0	1.3	2.3	2.2	20	.67	.13	w193669
w193670	4.7	16	11	1.1	.40	.85	.82	57	.30	.08	w193670
w193671	9.7	47	28	.71	.73	.87	3.3	12	1.3	.05	w193671
w193672	11.1	71	17	.55	.40	1.0	2.0	3.9	2.6	.09	w193672
w193673	12.1	44	17	.88	.65	.36	2.2	27	.64	.16	w193673

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	SO3 (percent)	Ag-S (ppm)	Au-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w192606	1.8	0.10	10L	120	550	8.0	0.36	99	35	90	w192606
w192607	4.1	.10	10L	110	500	25	.40	130	33	120	w192607
w192608	2.7	1.0	10L	170	4,900	55	.56	190	320	150	w192608
w192609	1.8	.50	10L	100	830	17	.72	110	56	99	w192609
w192610	3.4	1.8	10L	320	750	180	2.8	300	590	280	w192610
w192611	2.6	.50	10L	150	510	36	.80	110	60	120	w192611
w192612	B	.60	10L	290	900	18	1.4	110	130	80	w192612
w192613	1.6	.40	10L	91	340	18	.94	110	120	100	w192613
w192697	7.8	.20	10L	320	860	12	.55	51	11	53	w192697
w192698	2.7	.30	10L	150	780	29	.97	220	130	180	w192698
w192699	5.2	.70	10L	160	800	41	.54	370	110	110	w192699
w192700	1.9	.50	10L	110	640	34	.74	220	130	89	w192700
w192701	1.6	.50	10L	210	890	17	.88	230	95	160	w192701
w192702	.62	.20	10L	120	460	12	.84	300	87	230	w192702
w192703	5.0	.60	10L	250	820	22	.72	290	76	140	w192703
w192704	2.6	.40	10L	220	1,000	17	.28	160	44	140	w192704
w192705	5.3	.30	10L	340	1,200	23	.52	180	23	80	w192705
w192706	5.4	.10L	100	100	790	12	.36	160	36	130	w192706
w192707	2.2	.10	10L	130	870	8.0	.28	120	18	110	w192707
w192708	8.8	.10	10L	280	1,100	10	.20	160	55	99	w192708
w192709	8.0	.10	10L	180	1,100	16	.34	140	37	90	w192709
w193663	1.3	.20	10L	93	390	25	.70	280	130	150	w193663
w193664	9.1	.10L	10L	200	700	9.0	.20	170	29	120	w193664
w193665	3.5	.20	10L	86	780	9.0	.54	180	75	150	w193665
w193666	1.6	.10	10L	99	630	9.0	.20	200	39	160	w193666
w193667	7.5	.10L	10L	83	620	25	.30	180	52	88	w193667
w193668	1.8	.10	10L	110	590	50	2.2	47	50	37	w193668
w193669	3.6	.90	10L	230	950	120	2.7	260	290	170	w193669
w193670	2.3	.60	10L	H	450	27	2.2	150	110	85	w193670
w193671	1.2	.20	10L	140	640	18	1.1	210	66	160	w193671
w193672	.61	.20	10L	180	610	18	.22	150	26	110	w193672
w193673	2.2	.40	10L	H	2,300	49	.82	220	130	97	w193673

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w192606	15	100	32L	10L	1.7	49	7.0L	7.0	4.1	7.0L	w192606
w192607	21	140	32L	10L	2.3	33	7.0L	19	5.3	7.0L	w192607
w192608	4.8	240	32L	16	4.5	88	19	79	9.5	10L	w192608
w192609	2.7	140	32L	10L	2.0	52	18	23	5.3	7.0L	w192609
w192610	15	610	42	26	9.0	120	35	300	10	11	w192610
w192611	6.7	190	32L	10L	2.2	51	7.0L	120	6.7	7.0L	w192611
w192612	3.3	280	32L	10L	3.1	35	19	8.0	3.3	7.0L	w192612
w192613	2.8	180	32L	10L	2.8	36	7.0L	12	2.8	7.0L	w192613
w192697	8.8	130	32L	10L	.97	34	9.0	6.0	2.3	7.0L	w192697
w192698	14	260	35	22	7.2	58	34	7.0	5.1	9.0	w192698
w192699	3.3	250	33	23	8.3	75	31	10	20	10L	w192699
w192700	4.8	250	32L	10L	3.4	62	7.0L	8.0	13	7.0L	w192700
w192701	6.6	260	32L	16	3.3	50	12	8.0	9.8	7.0L	w192701
w192702	17	100	32L	10L	5.2	37	7.0L	5.0L	10	7.0L	w192702
w192703	7.8	180	32L	17	6.9	35	19	5.0	14	7.0L	w192703
w192704	14	160	32L	12	2.9	46	7.0L	11	5.9	7.0L	w192704
w192705	7.6	110	32L	11	2.8	46	11	12	12	7.0L	w192705
w192706	7.4	120	32L	10L	2.2	31	17	6.0	8.5	7.0L	w192706
w192707	8.7	80	32L	10L	1.9	36	8.0	5.0	7.3	7.0L	w192707
w192708	4.3	150	32L	10L	2.3	28	14	5.0L	8.0	7.0L	w192708
w192709	7.9	130	32L	10L	2.4	28	13	5.0L	6.1	7.0L	w192709
w193663	4.7	250	32L	10L	3.5	37	7.0	15	8.4	7.0L	w193663
w193664	3.3	150	32L	10L	2.3	25	10	5.0L	7.9	7.0L	w193664
w193665	15	130	32L	10L	3.1	48	8.0	9.0	7.9	7.0L	w193665
w193666	8.8	110	32L	10L	3.2	45	9.0	5.0L	9.9	7.0L	w193666
w193667	4.8	160	32L	10L	2.9	25	13	5.0L	8.3	7.0L	w193667
w193668	5.2	330	32L	10L	1.1	75	7.0	59	1.9	7.0L	w193668
w193669	21	510	37	21	11	110	37	170	16	7.0L	w193669
w193670	4.3	340	32L	10L	5.3	60	30	9.0	4.3	7.0L	w193670
w193671	10	190	32L	10L	3.3	50	11	8.0	8.2	7.0L	w193671
w193672	5.4	95	32L	10L	2.0	37	9.0	37	12	7.0L	w193672
w193673	11	170	32L	10L	3.3	41	23	70	5.8	7.0L	w193673

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Sample number
w192606	50	140	0.5	320	6.0	13	63	60	37	68L	w192606
w192607	64	170	1	250	10	15	61	53	35	68L	w192607
w192608	95	110	2	90	37	22	150	330	28	68L	w192608
w192609	53	130	1	250	20	16	51	87	72	68L	w192609
w192610	150	150	5	200	41	34	170	510	130	68L	w192610
w192611	67	86	2	200	30	16	46L	77	48	68L	w192611
w192612	49	100	2	210	19	12	92	320	59	68L	w192612
w192613	66	160	2	190	30	11	60	180	59	68L	w192613
w192697	28	150	.5	230	14	31	81	45	40	68L	w192697
w192698	100	220	3	180	53	17	180	160	74	68L	w192698
w192699	200	140	3	120	59	61	150	150	180	68L	w192699
w192700	110	270	2	67	18	35	69	130	200	68L	w192700
w192701	130	160	2	80	20	30	130	150	77	68L	w192701
w192702	160	180	2	110	5.0	19	62	73	31	68L	w192702
w192703	140	160	2	98	19	16	210	120	56	68L	w192703
w192704	85	190	1	100	10	19	75	70	56	68L	w192704
w192705	98	170	1	150	11	38	110	60	16	68L	w192705
w192706	91	160	1	590	9.0	50	88	57	44	68L	w192706
w192707	63	180	.7	130	4.0	29	75	43	36	68L	w192707
w192708	94	160	.7	500	10	39	66	51	41	68L	w192708
w192709	70	72	.9	320	10	25	80	56	33	68L	w192709
w193663	150	210	2	490	9.0	11	46L	140	90	68L	w193663
w193664	99	160	1	310	16	15	46L	50	26	68L	w193664
w193665	94	150	.7	230	15	11	46L	82	57	68L	w193665
w193666	120	200	1	170	5.0	11	51	62	50	68L	w193666
w193667	95	62	1	350	10	10	58	61	14	68L	w193667
w193668	23	100	.9	240	25	4	49	150	110	68L	w193668
w193669	110	65	5	190	67	12	130	270	78	68L	w193669
w193670	64	21	2	190	50	11	60	190	18	68L	w193670
w193671	110	180	1	220	23	10	46L	74	100	68L	w193671
w193672	110	49	2	44	8.0	45	69	42	40	68L	w193672
w193673	140	67	2	150	17	12	110	210	22	78	w193673

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm (ppm)	U (ppm)	Sample number
w192606	220	18	7.2	11	440	1.4	23	10L	5.0L	6.8	w192606
w192607	260	23	11	8.0	470	2.1	32L	10L	5.0L	14	w192607
w192608	240	55	19	17	490	2.4	71L	10L	5.0L	21	w192608
w192609	150L	24	8.0	11	600	4.0L	40L	10L	5.0L	11	w192609
w192610	650L	100	35	14	1,100	10	150L	15	5.0L	25	w192610
w192611	240L	47	8.9	12	470	4.4	67L	42	5.0L	11	w192611
w192612	210L	18	13	17	1,600	3.3L	49	27	5.0L	4.9	w192612
w192613	150L	27	13	12	470	1.9	28L	10L	5.0L	25	w192613
w192697	120	12	4.6	7.0L	1,100	.92	14	10L	5.0L	4.6	w192697
w192698	210	58	32	7.0L	640	6.4	38L	10L	5.0L	32	w192698
w192699	370L	50	47	20	1,700	10	100L	10L	5.0L	67	w192699
w192700	190L	31	19	20	750	3.6	48	10L	5.0L	57	w192700
w192701	230L	46	18	13	1,100	3.3	49L	10L	5.0L	20	w192701
w192702	420	51	25	7.0L	220	3.6	54	10L	5.0L	17	w192702
w192703	140	33	31	7.0L	790	5.9	59L	10L	5.0L	18	w192703
w192704	200	36	13	7.0L	760	2.0	26	10L	5.0L	15	w192704
w192705	240L	24	16	19	930	2.2	43	10L	5.0L	35	w192705
w192706	110	26	11	13	1,100	1.7	34	10L	5.0L	11	w192706
w192707	170	24	8.0	14	560	1.7	35	10L	5.0L	7.0	w192707
w192708	170L	22	11	8.0	4,200	1.4	43	10L	5.0L	9.4	w192708
w192709	200L	21	12	7.0L	890	1.8	44	10L	5.0L	6.1	w192709
w193663	120	26	24	7.0L	400	3.7	28L	10L	5.0L	21	w193663
w193664	46	27	13	7.0L	1,200	2.0	33	10L	5.0L	12	w193664
w193665	170	29	15	7.0L	530	2.2	29	10L	5.0L	14	w193665
w193666	160	35	17	7.0L	350	2.5	32	10L	5.0L	13	w193666
w193667	83	21	18	7.0L	1,000	2.4	36L	10L	5.0L	12	w193667
w193668	56	15	4.7	7.0L	630	1.4	14L	10L	5.0L	7.0	w193668
w193669	370L	110	47	7.0L	1,600	11	160L	10L	5.0L	53	w193669
w193670	190L	45	23	7.0L	760	4.3	64L	10L	5.0L	38	w193670
w193671	180	37	20	7.0L	510	3.1	41	16	5.0L	20	w193671
w193672	99	22	14	7.0L	500	1.8	27	10L	5.0L	9.9	w193672
w193673	120	25	17	7.0L	770	2.5	25L	10L	5.0L	14	w193673

Table 8f.-- Major and minor oxide and trace element composition of the laboratory ash of 72 coal samples from Virginia--continued

Sample number	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)
w192606	130	26	3.6	220	91
w192607	130	43	6.4	110	100
w192608	280	150	12	280	220
w192609	91	30	4.0	180	89
w192610	490	240	25	180	220
w192611	140	41	8.9	85	110
w192612	130	87	6.6	85	130
w192613	170	76	8.5	92	120
w192697	150	68	1.8	71	260
w192698	230	160	18	250	110
w192699	130	150	20	51	200
w192700	110	51	9.6	42	190
w192701	210	92	9.8	79	200
w192702	160	50	11	170	120
w192703	200	140	14	130	190
w192704	200	66	7.2	58	140
w192705	120	73	7.6	66	210
w192706	140	80	5.1	20	610
w192707	150	49	4.2	44	260
w192708	110	62	5.1	21	340
w192709	130	84	6.1	40	240
w193663	180	45	9.3	120	100
w193664	130	40	6.0	29	180
w193665	170	38	6.5	160	110
w193666	150	44	7.4	45	130
w193667	100	78	8.3	36	170
w193668	160	75	4.7	310	55
w193669	320	240	32	830	86
w193670	160	120	17	1,200	51
w193671	160	31	8.2	83	62
w193672	140	31	8.1	39	370
w193673	180	87	7.4	150	160

Table 8g.-- Content of 22 trace elements in 72 coal samples from Virginia.

[Analysis performed on whole coal. Values in parts-per-million (ppm). L, less than the value shown, B, not determined.]

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w191030	16	12	4.1	6.4	0.4	0.19	56	0.5	0.082	7	w191030
w191031	46	24	5.6	22	4.0	.39	180	.8	.12	13	w191031
w191032	10	11	2.5	7.9	1.3	.20	160	.4	.030	5	w191032
w191033	64	11	2.9	8.2	1.1	.22	36	.3	.082	6	w191033
w191063	97	8.0	3.1	7.8	.4	.17	170	.3	.24	4	w191063
w191064	68	6.0	7.8	5.5	.3	.17	46	.3	.050	3	w191064
w191065	1.9	14	3.2	11	.4	.23	47	.6	.020	8	w191065
w191066	3.7	25	11	17	.5	.57	92	.8	.060	14	w191066
w191067	1.3	24	8.7	22	1.6	.40	20L	1.0	.020	14	w191067
w191068	35	6.0	2.3	5.0	.2	.13	160	.2	.15	3	w191068
w191069	98	4.0	1.9	4.2	.3	.10	42	.2	.16	2	w191069
w191134	2.6	16	21	12	.4	.46	110	.4	.030	7	w191134
w191135	21	17	6.5	14	1.0	.39	140	.6	.073	9	w191135
w191136	1.6	9.0	9.5	5.7	.1	.25	140	.3	.020	5	w191136
w191328	3.6	11	1.6	4.9	.2	.15	46	.6	.29	5	w191328
w191329	2.0	15	6.0	6.7	.3	.27	28	.4	.010L	7	w191329
w191330	26	10	2.0	8.7	.7	.19	90	.3	.17	5	w191330
w191331	50	22	7.0	17	1.8	.42	78	.7	.18	10	w191331
w191332	140	6.0	4.1	6.8	.4	.15	54	.3	.23	4	w191332
w191333	3.0	8.0	1.7	4.0	.1	.15	42	.3	.070	5	w191333
w191334	42	14	4.3	13	.3	.26	78	.9	.27	8	w191334
w191335	7.0	5.0	4.1	4.7	.3	.09	46	.1	.050	2	w191335
w191336	17	4.0	12	4.2	.1	.12	22	.2	.050	2	w191336
w191337	6.3	4.0	5.4	4.2	.3	.12	150	.1	.030	2	w191337
w191338	43	19	5.3	15	.9	.36	100	.7	.26	10	w191338
w191521	11	9.0	5.8	6.4	.7	.18	92	.3	.060	4	w191521
w192586	78	27	11	24	1.7	.45	120	.8	.33	17	w192586
w192587	16	15	4.3	11	.2	.25	63	.7	.10	8	w192587
w192588	18	4.0	2.9	3.0	.0	.15	20L	.6	.090	2	w192588
w192589	2.0	20	9.9	11	.5	.45	54	.6	.010	11	w192589
w192590	45	11	4.0	8.7	.4	.29	70	.3	.22	6	w192590
w192591	16	19	7.1	10	.5	.47	51	.5	.22	9	w192591
w192592	7.0	17	3.5	13	.8	.23	58	.7	.12	9	w192592
w192599	4.0	22	11	19	.7	.40	110	1.1	.11	12	w192599
w192600	1.0	24	6.5	18	.5	.30	140	1.1	.040	14	w192600
w192601	2.0	10	7.1	16	.5L	.28	20L	.4	.020	3	w192601
w192602	3.0	22	7.8	19	.5	.41	75	1.0	.11	12	w192602
w192603	20	7.0	2.2	6.6	.5	.15	37	.3	.15	4	w192603
w192604	12	17	4.5	6.5	.2	.34	60	.4	.21	8	w192604
w192605	4.0	19	11	17	.4	.34	130	.9	.080	10	w192605

Table 8g.-- Content of 22 trace elements in 72 coal samples from Virginia--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w191030	0.1L	640	140	7	0.40	1.3	5.9	1.0	0.1	3.0L	w191030
w191031	.2	530	63	45	.80	5.1	1.8	2.2	.3	3.0L	w191031
w191032	.1L	220	24	13	.50	1.9	1.4	1.0	.1	3.0L	w191032
w191033	.1	240	50	12	.60	1.8	2.0	1.1	.2	3.0L	w191033
w191063	.1	230	15	8	.91	2.1	7.6	.80	.1	3.0L	w191063
w191064	.1	190	260	13L	.87	1.5	2.4	.70	.1	3.0L	w191064
w191065	.1	260	59	15L	.37	2.1	1.3	1.3	.2	3.0L	w191065
w191066	.2	150	450	14L	.37	3.6	1.7	2.9	.5	6.3	w191066
w191067	.1	400	540	22	.34	4.3	1.5	2.2	.3	5.0	w191067
w191068	.1	190	25	11L	.37	1.5	7.0	.60	.1	3.0L	w191068
w191069	.1	240	30	10L	.82	1.3	4.4	.50	.2	3.0L	w191069
w191134	.3	380	220	15L	.78	3.0	1.5	2.1	.4	3.0	w191134
w191135	.2	780	690	15	2.5	3.4	1.8	1.6	.3	3.0L	w191135
w191136	.1	290	B	11L	.50	1.7	3.3	1.1	.2	3.0	w191136
w191328	.1	330	19	12L	.31	1.4	2.2	1.0	.2	3.0L	w191328
w191329	.1	250	4	13L	.23	1.9	2.7	1.7	.3	3.0L	w191329
w191330	.1	210	14	10	.45	2.3	5.8	.90	.2	3.0L	w191330
w191331	.2	230	25	20	1.2	3.9	5.3	2.0	.3	3.0	w191331
w191332	.1	410	73	14L	.96	1.9	6.0	.60	.1	3.0L	w191332
w191333	.1	180	47	10L	.15	.90	2.5	.70	.1	3.0L	w191333
w191334	.1	220	190	14L	.55	2.7	3.2	1.2	.2	4.2	w191334
w191335	.1	450	3	12L	.62	1.3	2.5	.50	.1	3.0L	w191335
w191336	.1	290	8	11L	.77	1.3	1.7	.60	.1	3.0L	w191336
w191337	.1	400	83	11L	.70	1.8	2.1	.50	.1	3.0L	w191337
w191338	.2	250	360	19	1.1	4.1	2.7	1.7	.4	3.0	w191338
w191521	.1	120	7	7	.69	1.3	.9	.90	.2	3.0L	w191521
w192586	.2	400	41	30	1.4	5.6	2.7	2.5	.7L	7.0	w192586
w192587	.1	320	400	28L	.40	2.8	1.1	1.2	.8L	3.0L	w192587
w192588	.1	380	24	24L	.80	1.5	2.1	.50	.6L	3.0L	w192588
w192589	.2	280	530	26L	.60	3.5	2.2L	1.9	.3	3.0L	w192589
w192590	.1	770	59	18L	.30	2.0	2.0	1.2	.5L	3.0L	w192590
w192591	.2	300	140	27L	.30	2.7	3.2	2.5	.4	3.0L	w192591
w192592	.1	360	160	27L	.40	2.9	2.5	1.5	.8L	3.0L	w192592
w192599	.2	250	510	22L	.70	4.2	2.1	1.9	.3	3.0L	w192599
w192600	.2	400	620	24L	.40	3.5	1.5	1.9	.3	3.0L	w192600
w192601	.1	510	21	22L	.30	1.9	3.1	.60	.6L	3.0L	w192601
w192602	.2	210	120	19L	.70	4.3	2.9	2.1	.3	4.0	w192602
w192603	.1	520	22	15L	19	1.4	6.8	.70	.5L	3.0L	w192603
w192604	.1	120	8	15L	.50	2.1	3.6	1.9	.4	3.0L	w192604
w192605	.2	220	540	19L	.90	3.8	1.2	1.7	.3	3.0L	w192605

Table 8g.-- Content of 22 trace elements in 72 coal samples from Virginia--continued

Sample number	U (ppm)	Yb (ppm)
w191030	0.60	0.4
w191031	3.7	.9
w191032	1.3	.5
w191033	1.3	.5
w191063	.72	.5
w191064	.77	.5
w191065	1.3	.6
w191066	.90	1.5
w191067	1.2	.9
w191068	.70	.4
w191069	1.1	.3
w191134	.70	1.4
w191135	2.2	.9
w191136	.30	.7
w191328	1.4	.5
w191329	1.3	.8
w191330	1.7	.6
w191331	1.2	1.1
w191332	.60	.4
w191333	.37	.3
w191334	1.6	.7
w191335	.42	.4
w191336	.46	.4
w191337	.53	.3
w191338	1.5	1.1
w191521	1.0	.5
w192586	2.6	1.2
w192587	1.2	.7
w192588	.70	.4
w192589	.80	1.1
w192590	.80	.5
w192591	1.9	1.0
w192592	1.5	.5
w192599	2.3	.9
w192600	1.6	.7
w192601	.40	.5
w192602	3.3	1.0
w192603	1.3	.3
w192604	.80	.8
w192605	2.5	1.0

Table 8g.-- Content of 22 trace elements in 72 coal samples from Virginia--continued

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w192606	18	22	7.8	20	3.4	0.37	190	0.9	0.10	11	w192606
w192607	9.0	12	3.1	11	2.0	.22	82	.5	.020	6	w192607
w192608	1.0	8.0	13	6.1	.2	.19	22	.4	.010	4	w192608
w192609	15	8.0	4.2	7.4	.2	.15	80	.4	.18	4	w192609
w192610	6.0	6.0	12	5.6	.3	.18	20L	.2	.040	3	w192610
w192611	82	5.0	2.7	5.5	.3	.10	28	.3	.14	3	w192611
w192612	13	7.0	8.2	4.9	.2	.19	28	.2	.28	3	w192612
w192613	37	12	13	11	.3	.30	63	.3	.24	7	w192613
w192697	9.0	11	2.4	12	1.9	.21	90	.5	.050	6	w192697
w192698	10	17	9.9	14	1.1	.56	76	.4	.18	8	w192698
w192699	7.0	11	3.3	3.3	.1	.25	20L	.6	.12	6	w192699
w192700	4.0	18	10	7.4	.4	.28	36	1.1	.080	9	w192700
w192701	3.0	14	5.8	9.9	.4	.20	62	.6	.070	8	w192701
w192702	6.0	50	15	38	2.9	.87	240	1.7	.070	27	w192702
w192703	1.0	15	3.9	7.3	.4	.35	38	.7	.11	7	w192703
w192704	7.0	24	6.8	21	2.2	.45	110	.9	.15	13	w192704
w192705	3.0	17	2.1	7.4	.7	.26	50	1.1	.060	9	w192705
w192706	3.0	28	6.4	22	1.3	.39	66	1.5	.020	16	w192706
w192707	3.0	34	5.1	31	2.5	.55	150	2.1	.040	18	w192707
w192708	3.0	22	7.6	14	.6	.32	54	1.1	.060	13	w192708
w192709	3.0	16	4.2	10	.9	.27	66	.7	.030	8	w192709
w193663	10	30	14	16	.5	.37	70	.9	.11	16	w193663
w193664	13	25	4.4	18	.5	.35	64	1.2	.060	15	w193664
w193665	12	25	10	20	2.1	.43	96	1.1	.16	13	w193665
w193666	1.0	58	11	47	2.5	.90	170	2.8	.040	33	w193666
w193667	3.0	15	4.4	7.4	.4	.24	41	.7	.040	8	w193667
w193668	22	10	11	7.8	1.1	.24	58	.4	.050	5	w193668
w193669	6.0	5.0	5.6	3.2	.4	.21	21	.3	.010L	2	w193669
w193670	88	7.0	5.4	4.0	.2	.25	31	.2	.13	3	w193670
w193671	23	20	6.4	16	1.0	.32	67	.8	.11	11	w193671
w193672	2.0	17	2.9	13	.6	.22	55	1.3	.040	12	w193672
w193673	37	27	16	12	1.3	.40	63	.7	.060	17	w193673

Table 8g.-- Content of 22 trace elements in 72 coal samples from Virginia--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w192606	0.1	280	68	48	1.0	4.1	3.1	1.6	0.3	5.0	w192606
w192607	.1	150	37	24	.40	2.2	2.3	1.0	.2	3.0L	w192607
w192608	.1	110	28	10	.60	2.3	1.3	.80	.1	3.0L	w192608
w192609	.1	110	260	11L	.80	1.8	3.4	.60	.3L	3.0L	w192609
w192610	.1	220	12	13L	1.4	2.0	3.9	.70	.2	3.0L	w192610
w192611	.1	140	22	11L	1.5	2.1	6.2	.40	.2	3.0L	w192611
w192612	.1	380	32	13L	.40	1.1	2.2	.80	.2L	3.0	w192612
w192613	.2	170	130	16L	1.6	2.9	2.8	1.4	.2	3.0L	w192613
w192697	.1	310	110	25	.60	2.5	1.8	1.0	.2	3.0	w192697
w192698	.2	220	20	16	1.8	4.5	1.4	2.5	.5	3.0L	w192698
w192699	.1	49	35	11L	2.1	1.5	2.2	1.4	.3	3.0L	w192699
w192700	.2	210	33	16L	.50	2.6	4.3	1.6	.3	4.0	w192700
w192701	.1	190	110	14L	.30	2.8	1.7	1.1	.2	3.0L	w192701
w192702	.3	540	51	70	.60	8.5	2.3	4.1	.6	9.0	w192702
w192703	.1	260	11	7	.20	1.7	1.6	1.6	.3	3.0L	w192703
w192704	.2	630	20	30	.70	5.5	6.9	2.0	.3	4.0	w192704
w192705	.1	810	12	22L	.60	2.2	3.6	1.5	.2	4.0	w192705
w192706	.2	230	92	19	.60	4.5	2.7	1.9	.3	6.0	w192706
w192707	.2	870	140	48	.40	6.9	2.7	2.3	.5	10	w192707
w192708	.1	930	48	24L	.40	3.0	2.8	1.5	.2	6.0	w192708
w192709	.1	1,000	20	23L	.20	2.4	2.9	1.4	.2	5.0	w192709
w193663	.2	210	56	13	.60	2.8	4.0	2.6	.4	3.0L	w193663
w193664	.2	370	220	7	.90	4.1	2.9	1.9	.3	5.0	w193664
w193665	.1	450	30	23	.60	4.0	1.7	2.1	.3	4.0	w193665
w193666	.4	780	190	44	.70	9.8	3.4	4.8	.7	9.0	w193666
w193667	.1	210	33	7	.30	1.8	2.6	1.5	.2	3.0L	w193667
w193668	.2	320	56	12	2.6	3.1	1.6	1.0	.3	3.0L	w193668
w193669	.1	320	11	7L	2.7	2.1	2.0	.90	.2	3.0L	w193669
w193670	.1	300	16	9L	.90	2.1	3.7	1.1	.2	3.0L	w193670
w193671	.1	630	21	17	.80	3.6	4.8	1.9	.3	4.0	w193671
w193672	.2	840	44	11	.90	2.4	1.7	1.6	.2	3.0	w193672
w193673	.2	320	85	14	2.3	3.0	2.3	2.1	.3	3.0L	w193673

Table 8g.— Content of 22 trace elements in 72 coal samples from Virginia--continued

Sample number	U (ppm)	Yb (ppm)
w192606	1.5	0.8
w192607	1.3	.6
w192608	.90	.5
w192609	.80	.3
w192610	.50	.5
w192611	.50	.4
w192612	.30	.4
w192613	2.6	.9
w192697	1.0	.4
w192698	2.5	1.4
w192699	2.0	.6
w192700	4.7	.8
w192701	1.2	.6
w192702	2.8	1.9
w192703	.90	.7
w192704	2.3	1.1
w192705	3.2	.7
w192706	2.0	.9
w192707	2.0	1.2
w192708	1.3	.7
w192709	.70	.7
w193663	2.2	1.0
w193664	1.8	.9
w193665	1.9	.9
w193666	3.6	2.1
w193667	1.0	.7
w193668	1.5	1.0
w193669	1.0	.6
w193670	1.8	.8
w193671	1.9	.8
w193672	1.1	.9
w193673	1.7	.9

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis.

[Values in percent or parts-per-million. 22 values are from direct determinations on whole coal; all other values calculated from analyses of ash. S means analysis by emission spectrography; L, less than the value shown; N, not detected: B, not determined.]

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w191030	1.5	0.81	0.43	0.11	0.064	0.067	0.66	0.044	0.13	16	w191030
w191031	4.6	2.6	.12	.18	.053	.15	1.0	.086	.03L	46	w191031
w191032	1.2	.87	.067	.055	.022	.046	.47	.043	.05	10	w191032
w191033	1.0	.81	.061	.054	.024	.047	.87	.038	.03	64	w191033
w191063	.86	.68	.078	.029	.023	.057	2.0	.033	.04	97	w191063
w191064	1.5	.89	.086	.048	.019	.050	.36	.054	.01	68	w191064
w191065	1.4	.50	.10	.060	.026	.057	1.5	.020	.03	1.9	w191065
w191066	2.7	1.6	.11	.055	.015	.085	.28	.092	.07	3.7	w191066
w191067	4.2	2.4	.12	.097	.040	.13	.25	.13	.04	1.3	w191067
w191068	.51	.51	.081	.021	.019	.047	2.2	.027	.04	35	w191068
w191069	.81	.37	.054	.049	.024	.057	2.6	.017	.03	98	w191069
w191134	1.5	.76	.057	.044	.038	.047	.25	.038	.08	2.6	w191134
w191135	2.3	1.4	.11	.076	.078	.093	1.8	.081	.06	21	w191135
w191136	.91	.72	.064	.020	.029	.030	.13	.028	.03	1.6	w191136
w191328	.92	.66	.058	.034	.033	.036	.28	.028	.03	3.6	w191328
w191329	.99	.89	.075	.030	.025	.040	.32	.026	.06	2.0	w191329
w191330	1.1	.95	.035	.023	.021	.052	1.1	.037	.03	26	w191330
w191331	2.0	1.8	.066	.040	.023	.096	2.0	.069	.04	50	w191331
w191332	.65	.56	.12	.023	.042	.047	1.6	.034	.03	140	w191332
w191333	.54	.41	.040	.005	.018	.022	.34	.026	.03	3.0	w191333
w191334	1.5	.97	.10	.021	.022	.090	3.5	.097	.06	42	w191334
w191335	.48	.33	.051	.019	.045	.025	.61	.013	.02	7.0	w191335
w191336	.31	.18	.058	.013	.029	.020	.69	.007	.02	17	w191336
w191337	.55	.30	.079	.068	.040	.032	.98	.011	.01L	6.3	w191337
w191338	2.4	1.4	.13	.031	.025	.11	3.4	.083	.09	43	w191338
w191521	1.0	.77	.11	.051	.012	.045	.57	.036	.02	11	w191521
w192586	4.1	2.2	.087	.14	.040	.16	2.2	.11	.06	78	w192586
w192587	1.8	.90	.12	.025	.032	.059	.44	.068	.04	16	w192587
w192588	.65	.29	.046	.019	.038	.028	.55	.011	.02	18	w192588
w192589	2.1	1.5	.15	.083	.028	.077	.30	.061	.07	2.0	w192589
w192590	.83	.58	.64	.16	.077	.11	4.6	.035	.05	45	w192590
w192591	2.7	2.0	1.2	.16	.030	.15	1.5	.11	.07	16	w192591
w192592	2.5	1.3	.082	.055	.036	.080	.50	.092	.03	7.0	w192592
w192599	1.6	.93	.16	.025	.025	.061	.49	.10	.02	4.0	w192599
w192600	2.6	1.2	.16	.041	.040	.078	.22	.090	.02	1.0	w192600
w192601	.53	.40	.039	.013	.051	.021	.10	.025	.02	2.0	w192601
w192602	2.6	1.4	.071	.041	.021	.082	.41	.11	.04	3.0	w192602
w192603	.71	.51	.15	.043	.052	.042	1.0	.031	.03	20	w192603
w192604	.84	.61	.071	.009	.012	.036	.39	.028	.05	12	w192604
w192605	1.8	1.0	.16	.020	.022	.064	.49	.11	.02	4.0	w192605

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Au-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w191030	1.5L	6.9	220	0.9	0.18	12	4.1	6.4	0.4	23	w191030
w191031	3.2L	18	230	1.8	.04	24	5.6	22	4.0	20	w191031
w191032	1.0L	6.6	110	2.5	.08	11	2.5	7.9	1.3	23	w191032
w191033	1.0L	5.5	80	1.8	.14	11	2.9	8.2	1.1	26	w191033
w191063	1.2L	12	82	1.7	.07	8.0	3.1	7.8	.4	11	w191063
w191064	1.1L	11	78	2.3	.10	6.0	7.8	5.5	.3	16	w191064
w191065	1.2L	22	95	1.5	.05	14	3.2	11	.4	12	w191065
w191066	1.8L	16	150	4.4	.15	25	11	17	.5	20	w191066
w191067	2.8L	28	180	2.3	.08	24	8.7	22	1.6	18	w191067
w191068	1.0L	11	91	2.3	.06	6.0	2.3	5.0	.2	10	w191068
w191069	1.2L	12	41	1.5	.06	4.0	1.9	4.2	.3	12	w191069
w191134	1.0L	14	74	5.2	.11	16	21	12	.4	22	w191134
w191135	2.0L	13	160	2.7	.15	17	6.5	14	1.0	22	w191135
w191136	.6L	11	58	3.5	.07	9.0	9.5	5.7	.1	15	w191136
w191328	.9L	17	86	2.3	.02	11	1.6	4.9	.2	6.9	w191328
w191329	1.0L	19	86	2.6	.05	15	6.0	6.7	.3	15	w191329
w191330	1.2L	9.3	61	1.9	.05	10	2.0	8.7	.7	12	w191330
w191331	2.3L	11	97	6.7	.07	22	7.0	17	1.8	18	w191331
w191332	1.1L	13	130	1.5	.07	6.0	4.1	6.8	.4	11	w191332
w191333	.5L	7.0	49	.5	.03	8.0	1.7	4.0	.1	9.2	w191333
w191334	2.2L	14	120	.9	.07	14	4.3	13	.3	15	w191334
w191335	.6L	13	57	1.1	.05	5.0	4.1	4.7	.3	9.3	w191335
w191336	.5L	8.2	38	1.3	.10	4.0	12	4.2	.1	12	w191336
w191337	.8L	9.9	65	.9	.04	4.0	5.4	4.2	.3	11	w191337
w191338	2.8L	9.1	80	3.0	.17	19	5.3	15	.9	21	w191338
w191521	1.0L	3.5	59	3.1	.04	9.0	5.8	6.4	.7	15	w191521
w192586	1.9L	28	92	2.4	.23	27	11	24	1.7	28	w192586
w192587	.7L	15	110	1.5	.06	15	4.3	11	.2	11	w192587
w192588	.3L	10	44	1.2	.05	4.0	2.9	3.0	.0	13	w192588
w192589	.9L	20	100	4.5	.16	20	9.9	11	.5	24	w192589
w192590	1.4L	H	67	.8	.11	11	4.0	8.7	.4	12	w192590
w192591	1.8L	36	170	2.9	.71	19	7.1	10	.5	38	w192591
w192592	1.0L	14	61	1.7	.12	17	3.5	13	.8	15	w192592
w192599	.7L	8.8	170	1.5	.07	22	11	19	.7	13	w192599
w192600	.9L	14	100	1.4	.09	24	6.5	18	.5	14	w192600
w192601	.3L	10	55	.9	.06	10	7.1	16	.5L	10	w192601
w192602	1.0L	12	41	1.8	.11	22	7.8	19	.5	17	w192602
w192603	.5L	28	82	.4	.09	7.0	2.2	6.6	.5	9.7	w192603
w192604	.4L	10	42	1.8	.16	17	4.5	6.5	.2	18	w192604
w192605	.8L	12	160	1.6	.09	19	11	17	.4	15	w192605

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w191030	4.7L	1.5L	0.19	56	2.0	0.97L	0.67L	0.5	0.082	0.97L	w191030
w191031	10L	3.2L	.39	180	9.2	2.2L	1.5L	.8	.12	2.2L	w191031
w191032	3.2L	1.0L	.20	160	2.7	.88	.46L	.4	.030	.66L	w191032
w191033	3.3L	1.0L	.22	36	2.6	.86	.47L	.3	.082	.68L	w191033
w191063	3.9L	1.2L	.17	170	3.3	.82L	3.1	.3	.24	.82L	w191063
w191064	3.5L	1.1L	.17	46	2.2	1.2	.72	.3	.050	.72L	w191064
w191065	3.9L	1.2L	.23	47	3.5	.82L	.56L	.6	.020	.82L	w191065
w191066	5.9L	2.8	.57	92	4.8	3.2	.85L	.8	.060	1.2L	w191066
w191067	8.9L	2.8L	.40	20L	6.6	2.0	1.3L	1.0	.020	1.8L	w191067
w191068	3.3L	1.0L	.13	160	2.6	.68L	1.5	.2	.15	.68L	w191068
w191069	4.0L	1.2L	.10	42	2.0	1.4	.57L	.2	.16	.83L	w191069
w191134	3.3L	1.9	.46	110	4.8	1.7	5.7	.4	.030	.68L	w191134
w191135	6.5L	2.0L	.39	140	5.7	1.3L	1.5	.6	.073	1.3L	w191135
w191136	2.1L	.8	.25	140	3.0	.72	3.6	.3	.020	.43L	w191136
w191328	2.8L	.9L	.15	46	2.6	.95	.40L	.6	.29	.60L	w191328
w191329	3.1L	1.2	.27	28	3.0	1.2	.44L	.4	.010L	.67L	w191329
w191330	4.0L	1.2L	.19	90	4.1	1.2	.57L	.3	.17	.87L	w191330
w191331	7.4L	2.3L	.42	78	6.9	1.6L	3.0	.7	.18	1.6L	w191331
w191332	3.6L	1.1L	.15	54	3.0	1.1	1.3	.3	.23	.78L	w191332
w191333	1.7L	.5L	.15	42	1.2	.54	.25L	.3	.070	.38L	w191333
w191334	6.9L	2.2L	.26	78	5.2	1.5L	1.0	.9	.27	1.5L	w191334
w191335	1.9L	.6L	.09	46	1.6	.42	.28L	.1	.050	.42L	w191335
w191336	1.5L	.5L	.12	22	1.5	.62	1.2	.2	.050	.34L	w191336
w191337	2.4L	.8L	.12	150	2.0	.57	.68	.1	.030	.53L	w191337
w191338	8.8L	2.8L	.36	100	6.3	1.9L	2.1	.7	.26	1.9L	w191338
w191521	3.1L	1.0L	.18	92	1.7	.65L	.45L	.3	.060	.65L	w191521
w192586	6.0L	1.9L	.45	120	8.6	1.3L	1.3	.8	.33	1.3L	w192586
w192587	2.3L	1.1	.25	63	4.0	.99	.71	.7	.10	.71L	w192587
w192588	1.1L	.4	.15	20L	1.8	.71	.95	.6	.090	.24L	w192588
w192589	2.8L	1.4	.45	54	6.0	1.2	3.7	.6	.010	.65L	w192589
w192590	4.4L	1.4L	.29	70	3.0	2.0	2.6	.3	.22	.95L	w192590
w192591	5.8L	1.8L	.47	51	5.5	2.5	1.6	.5	.22	1.3L	w192591
w192592	3.1L	1.0L	.23	58	4.5	1.2	1.3	.7	.12	.67L	w192592
w192599	2.3L	1.0	.40	110	4.2	1.8	2.0	1.1	.11	.51L	w192599
w192600	3.0L	.9	.30	140	4.5	.66L	1.3	1.1	.040	.66L	w192600
w192601	.8L	.3	.28	20L	1.6	.43	.78	.4	.020	.18L	w192601
w192602	3.2L	1.0	.41	75	4.2	.69L	1.2	1.0	.11	.69L	w192602
w192603	1.6L	.5L	.15	37	2.1	.66	.31	.3	.15	.36L	w192603
w192604	1.4L	.7	.34	60	2.5	.34	1.3	.4	.21	.30L	w192604
w192605	2.5L	.9	.34	130	4.4	.54L	2.5	.9	.080	.54L	w192605

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Sample number
w191030	7	5.9	0.1L	260	1.2	0.60	6.9	7.9	140	4.7	w191030
w191031	13	18	.2	22	2.2	1.6	15L	8.8	63	7.4	w191031
w191032	5	6.6	.1L	9.4	1.2	.94	8.8	5.0	24	2.9	w191032
w191033	6	5.5	.1	6.8	1.8	.68	8.0	5.0	50	2.3	w191033
w191063	4	8.2	.1	20	1.8	.95	5.9	6.4	15	1.6	w191063
w191064	3	3.4	.1	78	2.0	.53	5.0L	9.0	260	1.4	w191064
w191065	8	8.2	.1	.7	1.2	1.2	10	8.2	59	3.0	w191065
w191066	14	20	.2	8.2	2.4	3.9	35	22	450	5.9	w191066
w191067	14	39	.1	12	1.3	6.5	23	18	540	6.8	w191067
w191068	3	5.5	.1	10	2.1	.74	4.7L	3.8	25	1.3	w191068
w191069	2	3.2	.1	19	2.5	.40L	5.7L	4.0	30	.83	w191069
w191134	7	6.3	.3	7.4	2.1	1.0	21	21	220	4.3	w191134
w191135	9	11	.2	7.2	4.3	1.5	9.7	20	690	4.9	w191135
w191136	5	3.2	.1	7.9	1.2	.86	9.0	10	B	2.6	w191136
w191328	5	5.6	.1	6.5	2.3	2.8	8.6	5.2	19	4.7	w191328
w191329	7	8.6	.1	4.7	2.1	1.1	13	8.2	4	5.3	w191329
w191330	5	9.9	.1	11	1.4	.68	6.8	3.6	14	2.7	w191330
w191331	10	16	.2	11	2.0	2.3	17	15	25	4.9	w191331
w191332	4	3.4	.1	15	1.5	.78	5.3	5.4	73	1.0	w191332
w191333	5	3.0	.1	4.9	.92	.92	5.4	4.1	47	2.3	w191333
w191334	8	8.7	.1	13	2.8	2.6	9.9L	9.7	190	2.6	w191334
w191335	2	2.1	.1	3.6	2.8	.19L	2.8L	6.6	3	1.7	w191335
w191336	2	.9	.1	6.0	2.4	.34	3.1	14	8	1.1	w191336
w191337	2	1.9	.1	28	2.0	.26	3.5L	6.1	83	.87	w191337
w191338	10	15	.2	30	4.1	1.2	13L	17	360	6.3	w191338
w191521	4	7.0	.1	8.6	1.9	.54	6.5	6.5	7	2.6	w191521
w192586	17	39	.2	19	3.6	.94	8.6L	21	41	8.8	w192586
w192587	8	7.1	.1	3.6	1.1	1.6	5.2	11	400	3.2	w192587
w192588	2	2.4	.1	7.1	2.2	.41	2.6	4.4	24	1.6	w192588
w192589	11	15	.2	7.3	1.6	1.5	12	15	530	5.5	w192589
w192590	6	45	.1	31	2.7	1.1	6.3L	6.0	59	1.4L	w192590
w192591	9	27	.2	96	1.8	2.0	12	31	140	9.6	w192591
w192592	9	26	.1	12	1.2	3.1	9.0	8.8	160	5.1	w192592
w192599	12	11	.2	18	2.6	2.9	6.5	15	510	4.1	w192599
w192600	14	16	.2	17	.94	2.1	4.3L	6.2	620	4.6	w192600
w192601	3	6.3	.1	8.0	.80	.50	1.2L	7.5	21	1.9	w192601
w192602	12	15	.2	14	1.5	3.1	4.6L	9.9	120	7.9	w192602
w192603	4	2.6	.1	23	.97	.51	2.3L	2.7	22	61	w192603
w192604	8	8.2	.1	12	1.5	.95	2.1	6.5	8	3.7	w192604
w192605	10	11	.2	25	2.4	2.2	3.9	15	540	11	w192605

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Pr-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Sample number
w191030	9.7L	7	0.40	1.3	5.9	1.0	0.97L	150	0.1	3.0L	w191030
w191031	22L	45	.80	5.1	1.8	2.2	2.2L	150	.3	3.0L	w191031
w191032	6.6L	13	.50	1.9	1.4	1.0	.66L	110	.1	3.0L	w191032
w191033	6.8L	12	.60	1.8	2.0	1.1	.68L	110	.2	3.0L	w191033
w191063	12L	8	.91	2.1	7.6	.80	.82L	68	.1	3.0L	w191063
w191064	7.2L	13L	.87	1.5	2.4	.70	.72L	60	.1	3.0L	w191064
w191065	8.2L	15L	.37	2.1	1.3	1.3	.82L	180	.2	3.0L	w191065
w191066	12L	14L	.37	3.6	1.7	2.9	1.2L	280	.5	6.3	w191066
w191067	18L	22	.34	4.3	1.5	2.2	1.8L	340	.3	5.0	w191067
w191068	10L	11L	.37	1.5	7.0	.60	.68L	97	.1	3.0L	w191068
w191069	8.3L	10L	.82	1.3	4.4	.50	.83L	52	.2	3.0L	w191069
w191134	6.8L	15L	.78	3.0	1.5	2.1	.68L	39	.4	3.0	w191134
w191135	13L	15	2.5	3.4	1.8	1.6	1.3L	200	.3	3.0L	w191135
w191136	4.3L	11L	.50	1.7	3.3	1.1	.43L	58	.2	3.0	w191136
w191328	6.0L	12L	.31	1.4	2.2	1.0	.73	190	.2	3.0L	w191328
w191329	6.7L	13L	.23	1.9	2.7	1.7	1.2	140	.3	3.0L	w191329
w191330	8.7L	10	.45	2.3	5.8	.90	1.4	38	.2	3.0L	w191330
w191331	16L	20	1.2	3.9	5.3	2.0	1.6L	85	.3	3.0	w191331
w191332	7.8L	14L	.96	1.9	6.0	.60	.78L	130	.1	3.0L	w191332
w191333	3.8L	10L	.15	.90	2.5	.70	1.6	86	.1	3.0L	w191333
w191334	15L	14L	.55	2.7	3.2	1.2	1.5L	160	.2	4.2	w191334
w191335	4.2L	12L	.62	1.3	2.5	.50	.57	57	.1	3.0L	w191335
w191336	3.4L	11L	.77	1.3	1.7	.60	.48	41	.1	3.0L	w191336
w191337	5.3L	11L	.70	1.8	2.1	.50	.53L	49	.1	3.0L	w191337
w191338	19L	19	1.1	4.1	2.7	1.7	1.9L	110	.4	3.0	w191338
w191521	6.5L	7	.69	1.3	.9	.90	.65L	140	.2	3.0L	w191521
w192586	13L	30	1.4	5.6	2.7	2.5	1.3L	39	.7L	7.0	w192586
w192587	4.8L	28L	.40	2.8	1.1	1.2	.50L	160	.8L	3.0L	w192587
w192588	2.3L	24L	.80	1.5	2.1	.50	.24L	44	.6L	3.0L	w192588
w192589	6.3L	26L	.60	3.5	2.2L	1.9	1.2	230	.3	3.0L	w192589
w192590	9.2L	18L	.30	2.0	2.0	1.2	.95L	52	.5L	3.0L	w192590
w192591	12L	27L	.30	2.7	3.2	2.5	1.6	75	.4	3.0L	w192591
w192592	6.5L	27L	.40	2.9	2.5	1.5	.67L	110	.8L	3.0L	w192592
w192599	5.0L	22L	.70	4.2	2.1	1.9	.95	73	.3	3.0L	w192599
w192600	6.4L	24L	.40	3.5	1.5	1.9	.66L	150	.3	3.0L	w192600
w192601	1.7L	22L	.30	1.9	3.1	.60	.18L	40	.6L	3.0L	w192601
w192602	6.7L	19L	.70	4.3	2.9	2.1	.69L	43	.3	4.0	w192602
w192603	3.5L	15L	19	1.4	6.8	.70	14	61	.5L	3.0L	w192603
w192604	2.9L	15L	.50	2.1	3.6	1.9	.65	77	.4	3.0L	w192604
w192605	5.2L	19L	.90	3.8	1.2	1.7	3.2	77	.3	3.0L	w192605

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w191030	1.5L	0.67L	0.60	6.3	5.3	0.4	60	15	w191030
w191031	3.2L	1.5L	3.7	32	4.3	.9	14	10	w191031
w191032	.99L	.46L	1.3	12	5.5	.5	12	13	w191032
w191033	2.3	.47L	1.3	11	6.3	.5	21	11	w191033
w191063	1.2L	.56L	.72	9.5	3.7	.5	4.2	8.8	w191063
w191064	2.8	.50L	.77	8.4	5.3	.5	72	4.1	w191064
w191065	1.2L	.56L	1.3	17	6.1	.6	5.8	15	w191065
w191066	1.8L	.85L	.90	34	26	1.5	26	46	w191066
w191067	2.8L	1.3L	1.2	39	15	.9	10	89	w191067
w191068	1.0L	.47L	.70	5.4	3.9	.4	3.0	8.0	w191068
w191069	1.2L	.57L	1.1	9.0	3.4	.3	28	4.3	w191069
w191134	1.0L	.47L	.70	24	18	1.4	13	10	w191134
w191135	2.0L	.93L	2.2	25	6.9	.9	29	15	w191135
w191136	.65L	.30L	.30	11	7.2	.7	2.0	8.6	w191136
w191328	.86L	.40L	1.4	7.3	7.3	.5	4.3	17	w191328
w191329	.96L	.44L	1.3	12	8.6	.8	3.1	11	w191329
w191330	1.2L	.57L	1.7	16	5.8	.6	6.8	11	w191330
w191331	2.3L	1.1L	1.2	32	14	1.1	10	23	w191331
w191332	3.2	.52L	.60	6.2	3.2	.4	3.6	7.3	w191332
w191333	.54L	.25L	.37	5.1	3.2	.3	2.7	12	w191333
w191334	2.2L	.99L	1.6	15	5.6	.7	5.5	24	w191334
w191335	.60L	.28L	.42	7.2	3.3	.4	5.7	2.3	w191335
w191336	.48L	.22L	.46	4.1	3.8	.4	34	1.7	w191336
w191337	.76L	.35L	.53	5.3	2.3	.3	5.3	2.1	w191337
w191338	2.8L	1.3L	1.5	23	8.8	1.1	18	13	w191338
w191521	.97L	.45L	1.0	8.6	5.2	.5	1.9	8.6	w191521
w192586	3.9	.94L	2.6	28	5.1	1.2	41	8.6	w192586
w192587	.78	.50	1.2	16	6.1	.7	2.6	9.9	w192587
w192588	.88	.17L	.70	6.1	3.4	.4	9.2	2.0	w192588
w192589	.93L	.47L	.80	23	12	1.1	60	9.3	w192589
w192590	1.4L	.68L	.80	7.3	2.9	.5	94	5.4	w192590
w192591	2.5	.91L	1.9	24	17	1.0	73	25	w192591
w192592	.96L	.48L	1.5	17	6.7	.5	8.8	21	w192592
w192599	.73L	.37L	2.3	20	8.8	.9	8.8	15	w192599
w192600	.94L	.47L	1.6	17	2.5	.7	3.8	10	w192600
w192601	.30	.13L	.40	3.3	1.9	.5	2.5	2.8	w192601
w192602	.99L	.50L	3.3	18	4.6	1.0	16	17	w192602
w192603	.51L	.26L	1.3	4.9	1.8	.3	7.1	3.7	w192603
w192604	1.4	.22L	.80	6.5	3.2	.8	4.7	4.3	w192604
w192605	.77	.39L	2.5	17	4.8	1.0	9.2	8.5	w192605

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w192606	5.5	2.6	0.19	0.24	0.028	0.18	1.3	0.15	0.02	18	w192606
w192607	2.2	1.1	.21	.093	.015	.078	.66	.079	.01	9.0	w192607
w192608	1.0	.67	.045	.013	.011	.035	.12	.035	.04	1.0	w192608
w192609	1.1	.56	.10	.022	.011	.062	2.2	.049	.04	15	w192609
w192610	.38	.36	.027	.008	.022	.017	.12	.017	.04	6.0	w192610
w192611	.53	.38	.051	.016	.014	.037	1.2	.027	.02	82	w192611
w192612	.85	.77	.11	.031	.038	.051	.98	.037	.04	13	w192612
w192613	1.6	1.0	.091	.051	.017	.088	2.8	.044	.04	37	w192613
w192697	4.2	2.5	.81	.17	.031	.18	1.1	.16	.04	9.0	w192697
w192698	1.7	1.2	.10	.042	.022	.065	.65	.045	.02	10	w192698
w192699	.57	.46	.077	.008	.005	.025	.20	.018	.02	7.0	w192699
w192700	2.0	1.4	.083	.034	.021	.069	.45	.075	.04	4.0	w192700
w192701	1.5	1.0	.070	.030	.019	.051	.31	.077	.03	3.0	w192701
w192702	4.3	2.2	.053	.040	.054	.14	.58	.14	.03	6.0	w192702
w192703	1.2	.76	.11	.016	.026	.042	.23	.037	.03	1.0	w192703
w192704	3.6	2.2	.23	.11	.063	.13	.57	.12	.06	7.0	w192704
w192705	2.0	1.2	.18	.10	.081	.077	.37	.061	.03	3.0	w192705
w192706	3.8	1.7	1.6	.085	.023	.15	.57	.18	.02L	3.0	w192706
w192707	7.6	3.5	.74	.040	.087	.24	.80	.24	.03	3.0	w192707
w192708	2.4	1.3	1.5	.15	.093	.11	.55	.12	.01	3.0	w192708
w192709	2.2	1.1	.81	.074	.10	.095	.52	.064	.01	3.0	w192709
w193663	2.6	1.6	.065	.046	.021	.089	.67	.096	.02	10	w193663
w193664	2.9	1.6	1.5	.10	.037	.13	.74	.13	.02L	13	w193664
w193665	3.4	1.8	.28	.11	.045	.12	.60	.11	.03	12	w193665
w193666	6.9	4.5	.61	.12	.078	.24	.57	.31	.03	1.0	w193666
w193667	1.7	.80	.78	.051	.021	.070	.41	.048	.01L	3.0	w193667
w193668	4.3	2.8	.15	.17	.032	.18	2.5	.11	.02	22	w193668
w193669	.35	.22	.027	.014	.032	.016	.27	.008	.02	6.0	w193669
w193670	.35	.27	.037	.011	.030	.039	1.9	.008	.03	88	w193670
w193671	2.1	1.4	.049	.043	.063	.081	.81	.076	.02	23	w193671
w193672	3.7	1.0	.044	.027	.084	.092	.30	.17	.02	2.0	w193672
w193673	2.5	1.1	.076	.047	.032	.10	2.3	.046	.05	37	w193673

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Au-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w192606	2.2L	27	120	1.8	0.08	22	7.8	20	3.4	22	w192606
w192607	.9L	10	47	2.4	.04	12	3.1	11	2.0	13	w192607
w192608	.4L	7.1	210	2.3	.02	8.0	13	6.1	.2	10	w192608
w192609	.8L	7.5	62	1.3	.05	8.0	4.2	7.4	.2	11	w192609
w192610	.2L	6.4	15	3.6	.06	6.0	12	5.6	.3	12	w192610
w192611	.5L	6.8	23	1.6	.04	5.0	2.7	5.5	.3	8.6	w192611
w192612	.6L	18	55	1.1	.09	7.0	8.2	4.9	.2	17	w192612
w192613	1.1L	9.6	36	1.9	.10	12	13	11	.3	19	w192613
w192697	2.2L	69	190	2.6	.12	11	2.4	12	1.9	28	w192697
w192698	.8L	12	61	2.3	.08	17	9.9	14	1.1	20	w192698
w192699	.3L	4.8	24	1.2	.02	11	3.3	3.3	.1	7.5	w192699
w192700	.8L	9.1	53	2.8	.06	18	10	7.4	.4	21	w192700
w192701	.6L	13	54	1.0	.05	14	5.8	9.9	.4	16	w192701
w192702	1.7L	20	76	2.0	.14	50	15	38	2.9	17	w192702
w192703	.5L	13	42	1.1	.04	15	3.9	7.3	.4	9.2	w192703
w192704	1.5L	34	150	2.6	.04	24	6.8	21	2.2	24	w192704
w192705	.9L	31	110	2.1	.05	17	2.1	7.4	.7	10	w192705
w192706	18	18	140	2.1	.06	28	6.4	22	1.3	21	w192706
w192707	2.9L	37	250	2.3	.08	34	5.1	31	2.5	23	w192707
w192708	1.4L	39	150	1.4	.03	22	7.6	14	.6	21	w192708
w192709	1.1L	21	130	1.8	.04	16	4.2	10	.9	15	w192709
w193663	1.1L	10	42	2.7	.07	30	14	16	.5	27	w193663
w193664	1.5L	30	110	1.4	.03	25	4.4	18	.5	23	w193664
w193665	1.4L	12	110	1.3	.08	25	10	20	2.1	18	w193665
w193666	2.8L	28	180	2.5	.06	58	11	47	2.5	31	w193666
w193667	.8L	7.0	52	2.1	.03	15	4.4	7.4	.4	13	w193667
w193668	2.1L	23	130	11	.47	10	11	7.8	1.1	70	w193668
w193669	.2L	4.4	18	2.3	.05	5.0	5.6	3.2	.4	9.7	w193669
w193670	.5L	H	21	1.3	.10	7.0	5.4	4.0	.2	16	w193670
w193671	1.0L	14	62	1.7	.11	20	6.4	16	1.0	18	w193671
w193672	1.1L	20	68	2.0	.02	17	2.9	13	.6	11	w193672
w193673	1.2L	H	280	5.9	.10	27	16	12	1.3	21	w193673

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w192606	7.1L	2.2L	0.37	190	11	1.6L	1.6	0.9	0.10	1.6L	w192606
w192607	3.0L	.9L	.22	82	3.1	.66L	1.8	.5	.020	.66L	w192607
w192608	1.3L	.7	.19	22	3.7	.80	3.3	.4	.010	.42L	w192608
w192609	2.4L	.8L	.15	80	3.9	1.4	1.7	.4	.18	.53L	w192609
w192610	.8	.5	.18	20L	2.4	.70	6.0	.2	.040	.22	w192610
w192611	1.4L	.5L	.10	28	2.3	.32L	5.4	.3	.14	.32L	w192611
w192612	2.0L	.6L	.19	28	2.1	1.2	.49	.2	.28	.43L	w192612
w192613	3.4L	1.1L	.30	63	3.8	.74L	1.3	.3	.24	.74L	w192613
w192697	6.9L	2.2L	.21	90	7.4	2.0	1.3	.5	.050	1.5L	w192697
w192698	2.7	1.7	.56	76	4.5	2.7	.55	.4	.18	.70	w192698
w192699	1.0	.7	.25	20L	2.3	.93	.30	.6	.12	.30L	w192699
w192700	2.7L	.8L	.28	36	5.1	.58L	.66	1.1	.080	.58L	w192700
w192701	2.0L	1.0	.20	62	3.1	.73	.49	.6	.070	.43L	w192701
w192702	5.3L	1.7L	.87	240	6.1	1.2L	.83L	1.7	.070	1.2L	w192702
w192703	1.6L	.9	.35	38	1.8	.97	.26	.7	.11	.36L	w192703
w192704	4.9L	1.8	.45	110	7.0	1.1L	1.7	.9	.15	1.1L	w192704
w192705	2.9L	1.0	.26	50	4.2	1.0	1.1	1.1	.060	.64L	w192705
w192706	5.6L	1.8L	.39	66	5.5	3.0	1.1	1.5	.020	1.2L	w192706
w192707	9.2L	2.9L	.55	150	10	2.3	1.4	2.1	.040	2.0L	w192707
w192708	4.4L	1.4L	.32	54	3.9	1.9	.69L	1.1	.060	.97L	w192708
w192709	3.6L	1.1L	.27	66	3.2	1.5	.57L	.7	.030	.80L	w192709
w193663	3.4L	1.1L	.37	70	4.0	.75	1.6	.9	.11	.75L	w193663
w193664	4.8L	1.5L	.35	64	3.8	1.5	.76L	1.2	.060	1.1L	w193664
w193665	4.4L	1.4L	.43	96	6.7	1.1	1.3	1.1	.16	.97L	w193665
w193666	9.1L	2.8L	.90	170	13	2.5	1.4L	2.8	.040	2.0L	w193666
w193667	2.7L	.8L	.24	41	2.1	1.1	.42L	.7	.040	.59L	w193667
w193668	6.8L	2.1L	.24	58	16	1.5	13	.4	.050	1.5L	w193668
w193669	.7	.4	.21	21	2.1	.70	3.2	.3	.010L	.13L	w193669
w193670	1.5L	.5L	.25	31	2.8	1.4	.42	.2	.13	.33L	w193670
w193671	3.1L	1.0L	.32	67	4.9	1.1	.78	.8	.11	.68L	w193671
w193672	3.6L	1.1L	.22	55	4.1	1.0	4.1	1.3	.040	.78L	w193672
w193673	3.9L	1.2L	.40	63	5.0	2.8	8.5	.7	.060	.85L	w193673

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Sample number
w192606	11	31	0.1	71	1.3	2.9	14	13	68	8.2	w192606
w192607	6	16	.1	24	.94	1.4	5.7	5.0	37	3.3	w192607
w192608	4	4.6	.1	3.8	1.6	.92	6.3	14	28	1.2	w192608
w192609	4	9.8	.1	19	1.5	1.2	3.8	6.5	260	5.4	w192609
w192610	3	3.0	.1	4.0	.82	.68	3.4	10	12	2.6	w192610
w192611	3	3.9	.1	9.0	1.4	.72	2.1L	3.5	22	2.2	w192611
w192612	3	6.1	.1	13	1.2	.73	5.6	20	32	3.6	w192612
w192613	7	17	.2	20	3.2	1.2	6.4	19	130	6.3	w192613
w192697	6	33	.1	50	3.0	6.7	18	9.8	110	8.7	w192697
w192698	8	17	.2	14	4.1	1.3	14	12	20	5.8	w192698
w192699	6	4.2	.1	3.6	1.8	1.8	4.5	4.5	35	5.4	w192699
w192700	9	22	.2	5.6	1.5	2.9	5.7	11	33	17	w192700
w192701	8	9.8	.1	4.9	1.2	1.8	7.9	9.2	110	4.7	w192701
w192702	27	30	.3	18	.83	3.2	10	12	51	5.1	w192702
w192703	7	8.2	.1	5.0	.97	.82	11	6.1	11	2.9	w192703
w192704	13	29	.2	15	1.5	2.9	11	11	20	8.6	w192704
w192705	9	16	.1	14	1.0	3.5	10	5.5	12	1.5	w192705
w192706	16	28	.2	100	1.6	8.8	15	10	92	7.7	w192706
w192707	18	51	.2	37	1.1	8.3	21	12	140	10	w192707
w192708	13	22	.1	69	1.4	5.4	9.1	7.0	48	5.7	w192708
w192709	8	8.2	.1	36	1.1	2.9	9.1	6.4	20	3.8	w192709
w193663	16	22	.2	52	.96	1.2	4.9L	15	56	9.6	w193663
w193664	15	24	.2	47	2.4	2.3	6.9L	7.6	220	3.9	w193664
w193665	13	21	.1	32	2.1	1.5	6.4L	11	30	7.9	w193665
w193666	33	57	.4	48	1.4	3.1	14	18	190	14	w193666
w193667	8	5.2	.1	29	.84	.84	4.9	5.1	33	1.2	w193667
w193668	5	21	.2	51	5.3	.85	10	32	56	23	w193668
w193669	2	1.2	.1	3.6	1.3	.23	2.5	5.1	11	1.5	w193669
w193670	3	1.0	.1	8.9	2.4	.52	2.8	8.9	16	.85	w193670
w193671	11	17	.1	21	2.2	.97	4.5L	7.2	21	9.7	w193671
w193672	12	5.4	.2	4.9	.89	5.0	7.7	4.7	44	4.4	w193672
w193673	17	8.1	.2	18	2.1	1.5	13	25	85	2.7	w193673

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Pr-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Sample number
w192606	15L	48	1.0	4.1	3.1	1.6	2.4	98	0.3	5.0	w192606
w192607	6.4L	24	.40	2.2	2.3	1.0	.75	44	.2	3.0L	w192607
w192608	2.9L	10	.60	2.3	1.3	.80	.71	21	.1	3.0L	w192608
w192609	5.1L	11L	.80	1.8	3.4	.60	.83	45	.3L	3.0L	w192609
w192610	1.4L	13L	1.4	2.0	3.9	.70	.28	22	.2	3.0L	w192610
w192611	3.1L	11L	1.5	2.1	6.2	.40	.54	21	.2	3.0L	w192611
w192612	4.1L	13L	.40	1.1	2.2	.80	1.0	98	.2L	3.0	w192612
w192613	7.2L	16L	1.6	2.9	2.8	1.4	1.3	50	.2	3.0L	w192613
w192697	15L	25	.60	2.5	1.8	1.0	1.5L	240	.2	3.0	w192697
w192698	5.3L	16	1.8	4.5	1.4	2.5	.55L	50	.5	3.0L	w192698
w192699	2.0L	11L	2.1	1.5	2.2	1.4	.60	51	.3	3.0L	w192699
w192700	5.6L	16L	.50	2.6	4.3	1.6	1.7	62	.3	4.0	w192700
w192701	4.1L	14L	.30	2.8	1.7	1.1	.79	67	.2	3.0L	w192701
w192702	11L	70	.60	8.5	2.3	4.1	1.2L	37	.6	9.0	w192702
w192703	3.5L	7	.20	1.7	1.6	1.6	.36L	40	.3	3.0L	w192703
w192704	10L	30	.70	5.5	6.9	2.0	1.1L	120	.3	4.0	w192704
w192705	6.3L	22L	.60	2.2	3.6	1.5	1.7	86	.2	4.0	w192705
w192706	12L	19	.60	4.5	2.7	1.9	2.3	190	.3	6.0	w192706
w192707	19L	48	.40	6.9	2.7	2.3	4.0	160	.5	10	w192707
w192708	9.4L	24L	.40	3.0	2.8	1.5	1.1	580	.2	6.0	w192708
w192709	7.8L	23L	.20	2.4	2.9	1.4	.80L	100	.2	5.0	w192709
w193663	7.3L	13	.60	2.8	4.0	2.6	.75L	43	.4	3.0L	w193663
w193664	10L	7	.90	4.1	2.9	1.9	1.1L	180	.3	5.0	w193664
w193665	9.5L	23	.60	4.0	1.7	2.1	.97L	74	.3	4.0	w193665
w193666	19L	44	.70	9.8	3.4	4.8	2.0L	99	.7	9.0	w193666
w193667	5.7L	7	.30	1.8	2.6	1.5	.59L	84	.2	3.0L	w193667
w193668	14L	12	2.6	3.1	1.6	1.0	1.5L	130	.3	3.0L	w193668
w193669	1.3L	7L	2.7	2.1	2.0	.90	.13L	30	.2	3.0L	w193669
w193670	3.2L	9L	.90	2.1	3.7	1.1	.33L	36	.2	3.0L	w193670
w193671	6.6L	17	.80	3.6	4.8	1.9	.68L	49	.3	4.0	w193671
w193672	7.5L	11	.90	2.4	1.7	1.6	.78L	56	.2	3.0	w193672
w193673	9.4	14	2.3	3.0	2.3	2.1	.85L	93	.3	3.0L	w193673

Table 8h.-- Major, minor, and trace element composition of 72 coal samples from Virginia reported on whole coal basis--continued

Sample number	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w192606	2.2L	1.1L	1.5	29	5.8	0.8	49	20	w192606
w192607	.94L	.47L	1.3	12	4.0	.6	10	9.4	w192607
w192608	.42L	.21L	.90	12	6.3	.5	12	9.2	w192608
w192609	.75L	.38L	.80	6.8	2.3	.3	14	6.7	w192609
w192610	.30	.10L	.50	9.8	4.8	.5	3.6	4.4	w192610
w192611	1.9	.23L	.50	6.3	1.8	.4	3.8	5.0	w192611
w192612	1.6	.31L	.30	7.9	5.3	.4	5.2	7.9	w192612
w192613	1.1L	.53L	2.6	18	8.1	.9	9.8	13	w192613
w192697	2.2L	1.1L	1.0	33	15	.4	15	56	w192697
w192698	.78L	.39L	2.5	18	12	1.4	20	8.6	w192698
w192699	.30L	.15L	2.0	3.9	4.5	.6	1.5	6.0	w192699
w192700	.83L	.42L	4.7	9.1	4.2	.8	3.5	16	w192700
w192701	.61L	.31L	1.2	13	5.6	.6	4.8	12	w192701
w192702	1.7L	.83L	2.8	27	8.3	1.9	28	20	w192702
w192703	.51L	.26L	.90	10	7.1	.7	6.6	9.7	w192703
w192704	1.5L	.77L	2.3	31	10	1.1	8.9	21	w192704
w192705	.92L	.46L	3.2	11	6.7	.7	6.1	19	w192705
w192706	1.8L	.88L	2.0	25	14	.9	3.5	110	w192706
w192707	2.9L	1.4L	2.0	43	14	1.2	13	74	w192707
w192708	1.4L	.69L	1.3	15	8.6	.7	2.9	47	w192708
w192709	1.1L	.57L	.70	15	9.6	.7	4.6	27	w192709
w193663	1.1L	.54L	2.2	19	4.8	1.0	13	11	w193663
w193664	1.5L	.76L	1.8	20	6.0	.9	4.4	27	w193664
w193665	1.4L	.70L	1.9	24	5.3	.9	22	15	w193665
w193666	2.8L	1.4L	3.6	42	12	2.1	13	37	w193666
w193667	.84L	.42L	1.0	8.4	6.6	.7	3.0	14	w193667
w193668	2.1L	1.1L	1.5	34	16	1.0	66	12	w193668
w193669	.19L	.10L	1.0	6.1	4.6	.6	16	1.6	w193669
w193670	.47L	.24L	1.8	7.5	5.6	.8	56	2.4	w193670
w193671	1.6	.49L	1.9	16	3.0	.8	8.1	6.0	w193671
w193672	1.1L	.56L	1.1	16	3.4	.9	4.3	41	w193672
w193673	1.2L	.61L	1.7	22	11	.9	18	19	w193673

Summary of the analytical data from 27 eastern Kentucky coal samples

Data on 34 eastern Kentucky coal samples have been reported by Swanson and others (1976). The distribution of the 27 samples of this report is shown on figure 7. Twenty samples were collected from 12 different coal beds, seven of the samples were collected from beds for which correlation data are not available. Descriptions of the samples and their locations are given in table 9d. Statistical comparisons on the data are reported in tables 9a, b and c, the analytical data in tables 9e, f, g, and h.

In the following three paragraphs comparisons are made between the geometric means of the analytical data on eastern Kentucky coal samples and the 617 samples of this report.

Comparison of the geometric means for Kentucky samples on which the Bureau of Mines type of analyses have been made shows that these coals are similar to the average coal of this report (table 9a). The range of analytic values for some components such as ash, sulfur, oxygen, nitrogen and the ash fusion temperatures indicates a considerable dissimilarity among individual samples.

The geometric means for the major ash forming oxides in the ash (table 9b) of Kentucky samples are similar to those of all coals described in this report. However, the wide range in contents values of such oxides as SiO_2, Al_2O_3, Fe_2O_3, CaO and others may be the reason for the wide range in fusion temperatures of ash from the Kentucky coals.

Comparison of the geometric means for trace elements (table 9c) indicates that the means for Kentucky coals are similar to all of the samples. Only B, Ce, Cu, Ga, La, Sr, V, and Y are significantly higher whereas, As, Cs, F, Mn, and Nb are significantly lower in Kentucky coals.

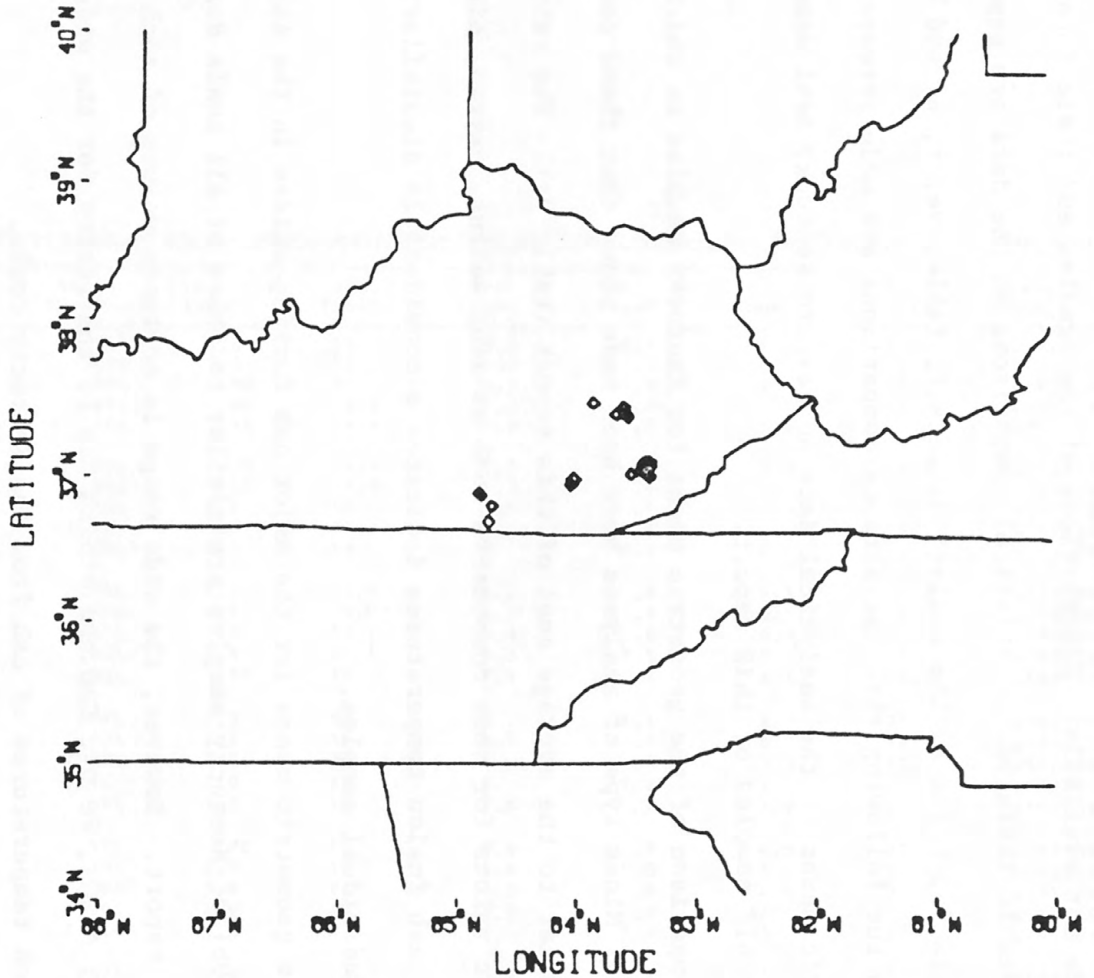

Figure 7 -- Distribution of Kentucky coal samples.

Table 9a.--Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, ash-fusion temperatures and free swelling index of 18 coal samples from Kentucky.

[All values are in percent except Btu/lb, ash-fusion temperatures, and free swelling index and are reported on the as-received basis. °F = 9/5°C + 32; Kcal/kg = 0.556 (Btu/lb). Leaders (---) indicate no data.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	2.5	1.2	4.5	2.4	1.3	3.3
Volatile matter	36.7	32.5	40.8	36.6	1.1	31.9
Fixed carbon	51.4	40.9	58.3	51.3	1.1	52.2
Ash	9.3	2.5	24.8	8.0	1.7	8.8
Hydrogen	5.4	4.7	5.9	5.4	1.1	5.2
Carbon	72.2	60.1	77.8	72.0	1.1	70.5
Nitrogen	1.4	.9	1.9	1.4	1.2	1.3
Oxygen	10	7.4	13.4	9.9	1.2	9.3
Sulfur	1.7	.6	4	1.5	1.7	1.5
Heat of combustion						
Btu/lb	12,970	10,810	13,970	12,940	1.1	12,590
Forms of sulfur						
Sulfate	.04	.02	.11	.03	1.8	.07
Pyritic	.77	.11	2.92	.49	2.6	.65
Organic	.87	.43	1.39	.82	1.4	.80
Ash fusion temperature °C						
Initial deformation	1,270	1,080	1,460	1,260	1.1	1,240
Softening temperature	1,330	1,130	1,510	1,320	1.1	1,290
Fluid temperature	1,370	1,180	1,540	1,370	1.1	1,350
Free Swelling Index	3.2	1	5.5	2.7	1.9	4.3

Table 9b .--Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of eleven major and minor oxides in the laboratory ash of 27 coal samples from Kentucky.

[All samples were ashed at 525°C; all analyses except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
(Ash)	9	1	25.8	7.6	1.9	9.46
SiO_2	44	16	60	42	1.4	42
Al_2O_3	27	12	38	26	1.3	23
CaO	1.7	.3	6	1.4	1.9	1.3
MgO	.77	.27	1.8	.69	1.6	.78
MnO	.02	.01	.11	.02	1.8	.02
Na_2O	.39	.03	1.3	.3	2.3	.44
K_2O	1.8	.4	3.5	1.5	1.9	1.6
Fe_2O_3	15	2.3	55	11	2.3	11
TiO_2	1.3	.42	2.8	1.2	1.5	1.13
P_2O_5	.32	.02	1.5	.17	3.1	.17
SO_3	2.7	.32	7.1	2.3	2	2.03

Table 9c.--Arithmetic mean, observed range, geometric mean, and geometric deviation of 36 elements in 27 coal samples from Kentucky.

[All analyses are in percent or parts per million and are reported on a whole-coal basis. Leaders (---) indicate means could not be calculated because an insufficient number of analyses were above the detection limit.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Ag	.06	.03	.13	.06	1.5	.05
As	14	.12	110	6.5	3.8	7.4
B	36	12	93	32	1.7	21
Ba	63	14	310	52	1.8	56
Be	3.2	1.1	9.4	2.7	1.7	2.4
Cd	.08	.01	.2	.06	2.1	.08
Ce	21	5	78	18	1.8	15
Co	6.6	2.2	16	5.9	1.7	5.5
Cr	15	6.4	36	14	1.6	14
Cs	.78	.2	3.4	.53	2.4	.75
Cu	19	7.6	36	18	1.5	14
Eu	.39	.12	.79	.36	1.6	.31
F	68	22	220	56	1.9	64
Ga	7	1.8	18	6.3	1.6	5.1
Ge	5	.55	25	2.9	2.8	2.9
Hf	.79	.2	3.9	.62	1.9	.65
Hg	.11	.03	.48	.09	2	.10
La	11	3	42	9.3	1.8	7.8
Li	16	.9	39	12	2.2	12
Lu	.16	.1	.4	.14	1.5	.14
Mn	12	1.7	68	9.1	2.1	14
Mo	2.1	.19	5	1.7	2	1.8
Nb	1.9	.33	9.8	1.4	2.1	1.9
Nd	16	1.4	93	11	2.4	9.8
Ni	13	5	49	12	1.6	12
Pb	6.9	.98	16	5.6	2	5.9
Sb	1.2	.12	5.2	.76	2.6	.69
Sc	3.7	1.3	6.9	3.3	1.6	3.1
Se	3.7	.93	9.8	3.2	1.8	2.9
Sm	2.1	.6	6.5	1.8	1.6	1.5
Sr	100	24	440	80	1.9	57
Tb	.3	.1	1	.25	1.8	.26
U	1.9	.36	5.9	1.5	2	1.2
V	23	2.5	54	19	1.9	17
Y	11	3.5	49	8.6	1.9	7.2
Yb	.93	.3	3	.8	1.6	.74
Zn	13	3.9	34	11	1.8	13
Zr	34	2.7	310	21	2.4	20

Table 9d Descriptions for 27 bituminous coal samples from Kentucky

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w189262	kentucky	leslie	370525n	832021w	breathitt	hazard	channel	33.0
w189263	kentucky	leslie	370516n	832016w	breathitt	hazard	channel	29.0
w189264	kentucky	leslie	365918n	832018w	breathitt	hazard no 9	channel	33.0
w189265	kentucky	leslie	365905n	832032w	breathitt	hazard no 9	channel	33.0
w189755	kentucky	breathitt	372512n	833646w	breathitt	uncorrelated	channel	27.0
w189756	kentucky	owsley	372758n	833252w	breathitt	taylor	channel	35.0
w189757	kentucky	leslie	370334n	832017w	breathitt	hazard	channel	31.0
w189758	kentucky	leslie	370335n	832113w	breathitt	hazard	channel	30.0
w189940	kentucky	leslie	370142n	832134w	breathitt	upper elkhorn no 3	channel	36.0
w190600	kentucky	leslie	370141n	832142w	breathitt	whitesburg	drill core	22.0
w190601	kentucky	leslie	370141n	832142w	breathitt	no data entered	drill core	14.0
w190602	kentucky	leslie	370141n	832142w	breathitt	no data entered	drill core	18.0
w190603	kentucky	leslie	370141n	832142w	breathitt	no data entered	drill core	15.0
w190664	kentucky	breathitt	372458n	833152w	breathitt	haddix	channel	18.0
w191202	kentucky	lee	372954n	834819w	breathitt	gray hawk	channel	18.0
w191520	kentucky	breathitt	372400n	833100w	breathitt	hazard	channel	25.0
w191844	kentucky	leslie	370107n	832329w	breathitt	fire clay	channel	26.0
w191845	kentucky	leslie	370231n	832318w	breathitt	no 10	channel	38.0
w191846	kentucky	leslie	370457n	832241w	breathitt	no 7	channel	21.0
w191847	kentucky	leslie	370457n	832241w	breathitt	no 7	channel	26.0
w191848	kentucky	leslie	370017n	832946w	breathitt	fire clay	channel	51.0
w191849	kentucky	leslie	370411n	832334w	breathitt	no 9	channel	30.0
w191850	kentucky	wayne	365131n	844455w	breathitt	no data entered	channel	
w191851	kentucky	wayne	364708n	843935w	breathitt	no data entered	channel	
w191852	kentucky	wayne	365206n	844547w	breathitt	no data entered	channel	40.0
w191854	kentucky	knox	365805n	835830w	breathitt	jellico	channel	22.0
w191855	kentucky	knox	365548n	835944w	breathitt	jellico	channel	43.0

Table 9e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 17 coal samples from Kentucky.

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in precent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section Department of Energy, Pittsburgh, Pa. B means not determined. 0 for ash fusion temperatures means greater than 1800°C.

		Proximate Analysis			Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w189755	2.2	39.6	52.6	5.6	5.7	75.3	1.2	9.1	3.1	7,640	13,760
	---	40.5	53.8	5.7	5.6	77.0	1.2	7.3	3.2	7,820	14,070
	---	43.0	57.0	---	5.9	81.7	1.3	7.7	3.4	8,290	14,920
w189756	2.3	35.5	48.4	13.8	5.2	68.6	1.3	9.7	1.4	6,790	12,230
	---	36.3	49.5	14.1	5.1	70.2	1.3	7.8	1.4	6,950	12,520
	---	42.3	57.7	---	5.9	81.8	1.5	9.1	1.7	8,100	14,580
w189757	1.9	34.3	48.0	15.8	5.1	67.0	1.2	9.8	1.1	6,680	12,020
	---	35.0	48.9	16.1	5.0	68.3	1.2	8.3	1.1	6,810	12,250
	---	41.7	58.3	---	5.9	81.4	1.5	9.9	1.3	8,110	14,610
w189758	2.0	34.1	50.4	13.5	5.1	69.4	1.2	8.6	2.2	6,870	12,360
	---	34.8	51.4	13.8	5.0	70.8	1.2	7.0	2.2	7,010	12,610
	---	40.4	59.6	---	5.8	82.1	1.4	8.1	2.6	8,130	14,630
w189940	1.2	38.5	54.1	6.2	5.5	76.0	.9	7.4	4.0	7,670	13,800
	---	39.0	54.8	6.3	5.4	76.9	.9	6.4	4.0	7,760	13,970
	---	41.6	58.4	---	5.8	82.1	1.0	6.8	4.3	8,280	14,900
w190664	2.5	38.3	54.0	5.2	5.7	75.9	1.7	10.2	1.3	7,600	13,680
	---	39.3	55.4	5.3	5.6	77.8	1.7	8.2	1.3	7,790	14,030
	---	41.5	58.5	---	5.9	82.2	1.8	8.6	1.4	8,230	14,820
w191202	4.5	34.7	58.3	2.5	5.9	76.4	1.2	13.4	.6	7,520	13,540
	---	36.3	61.0	2.6	5.7	80.0	1.3	9.8	.6	7,880	14,180
	---	37.3	62.7	---	5.8	82.2	1.3	10.1	.6	8,090	14,560
w191844	1.8	32.5	40.9	24.8	4.7	60.1	1.3	8.0	1.1	6,010	10,810
	---	33.1	41.6	25.3	4.6	61.2	1.3	6.5	1.1	6,120	11,010
	---	44.3	55.7	---	6.1	81.9	1.8	8.7	1.5	8,180	14,730
w191845	2.5	40.1	51.6	5.8	5.7	75.2	1.6	10.0	1.7	7,560	13,600
	---	41.1	52.9	5.9	5.6	77.1	1.6	8.0	1.7	7,750	13,950
	---	43.7	56.3	---	5.9	82.0	1.7	8.5	1.9	8,240	14,830
w191846	2.1	33.6	45.9	18.4	4.9	65.0	1.3	9.6	.8	6,460	11,630
	---	34.3	46.9	18.8	4.8	66.4	1.3	7.9	.8	6,600	11,880
	---	42.3	57.7	---	5.9	81.8	1.6	9.7	1.0	8,130	14,630
w191847	2.8	37.0	53.7	6.5	5.6	74.5	1.5	11.0	.9	7,390	13,310
	---	38.1	55.2	6.7	5.4	76.6	1.5	8.8	.9	7,610	13,690
	---	40.8	59.2	---	5.8	82.1	1.7	9.4	1.0	8,150	14,670
w191848	1.9	36.2	57.0	4.9	5.5	77.8	1.7	9.1	1.0	7,760	13,970
	---	36.9	58.1	5.0	5.4	79.3	1.7	7.6	1.0	7,910	14,240
	---	38.8	61.2	---	5.7	83.5	1.8	8.0	1.1	8,330	14,990

Table 9e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 17 coal samples from Kentucky--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w189755	0.0	0.11	1.86	1.12	4.0	1,080	1,130	1,175
	---	.11	1.90	1.15				
	---	.12	2.02	1.21				
w189756	.0	.09	.35	.98	3.0	1,540	0	0
	---	.09	.36	1.00				
	---	.11	.42	1.17				
w189757	.0	.02	.31	.80	1.0	1,460	1,515	1,540
	---	.02	.32	.82				
	---	.02	.38	.97				
w189758	.0	.02	1.18	.99	1.5	1,540	0	0
	---	.02	1.20	1.01				
	---	.02	1.40	1.17				
w189940	.0	.06	2.92	.98	5.0	1,160	1,190	1,215
	---	.06	2.96	.99				
	---	.06	3.15	1.06				
w190664	.0	.06	.80	.43	3.0	1,320	1,380	1,410
	---	.06	.82	.44				
	---	.07	.87	.47				
w191202	.0	.02	.12	.51	1.0	1,350	1,395	1,445
	---	.02	.13	.53				
	---	.02	.13	.55				
w191844	.0	.03	.31	.81	4.5	1,540	0	0
	---	.03	.32	.82				
	---	.04	.42	1.10				
w191845	.0	.02	.98	.72	4.5	1,170	1,235	1,295
	---	.02	1.01	.74				
	---	.02	1.07	.79				
w191846	.0	.05	.30	.44	1.0	1,540	0	0
	---	.05	.31	.45				
	---	.06	.38	.55				
w191847	.0	.02	.15	.74	2.5	1,540	0	0
	---	.02	.15	.76				
	---	.02	.17	.82				
w191848	.0	.04	.11	.82	5.5	1,540	0	0
	---	.04	.11	.84				
	---	.04	.12	.88				

Table 9e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 17 coal samples from Kentucky--continued

Sample number	Moisture	Proximate Analysis			Ultimate Analysis					Heat of Combustion	
		Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191849	3.5	35.1	53.2	8.2	5.3	72.9	1.3	11.2	1.1	7,160	12,880
	---	36.4	55.1	8.5	5.1	75.5	1.3	8.4	1.1	7,420	13,350
	---	39.8	60.2	---	5.6	82.6	1.5	9.2	1.2	8,100	14,590
w191850	2.3	40.8	48.0	8.9	5.6	71.6	1.4	9.9	2.6	7,250	13,050
	---	41.8	49.1	9.1	5.5	73.3	1.4	8.0	2.7	7,420	13,360
	---	45.9	54.1	---	6.0	80.6	1.6	8.8	2.9	8,160	14,700
w191851	2.4	40.3	48.3	9.0	5.7	71.5	1.3	9.3	3.2	7,240	13,030
	---	41.3	49.5	9.2	5.6	73.3	1.3	7.3	3.3	7,420	13,350
	---	45.5	54.5	---	6.1	80.7	1.5	8.1	3.6	8,170	14,710
w191852	3.5	36.9	51.6	8.0	5.5	71.4	1.4	12.0	1.7	7,080	12,750
	---	38.2	53.5	8.3	5.3	74.0	1.5	9.2	1.8	7,340	13,210
	---	41.7	58.3	---	5.8	80.7	1.6	10.0	1.9	8,000	14,410
w191854	2.4	38.4	53.9	5.3	5.7	76.0	1.9	9.9	1.2	7,620	13,720
	---	39.3	55.2	5.4	5.6	77.9	1.9	8.0	1.2	7,810	14,060
	---	41.6	58.4	---	5.9	82.3	2.1	8.4	1.3	8,260	14,860
w191855	3.3	34.9	56.0	5.8	5.5	74.9	1.9	10.9	1.0	7,420	13,350
	---	36.1	57.9	6.0	5.3	77.5	2.0	8.2	1.0	7,670	13,810
	---	38.4	61.6	---	5.6	82.4	2.1	8.8	1.1	8,160	14,690

Table 9e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 17 coal samples from Kentucky--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191849	0.0	0.02	0.48	0.65	1.0	1,375	1,435	1,485
	---	.02	.50	.67				
	---	.02	.54	.74				
w191850	.0	.04	1.17	1.37	5.0	1,150	1,225	1,270
	---	.04	1.20	1.40				
	---	.05	1.32	1.54				
w191851	.0	.02	1.77	1.39	5.5	1,105	1,170	1,225
	---	.02	1.81	1.42				
	---	.02	2.00	1.57				
w191852	.0	.02	.48	1.16	2.0	1,370	1,440	1,495
	---	.02	.50	1.20				
	---	.02	.54	1.31				
w191854	.0	.02	.29	.92	5.0	1,425	1,480	1,525
	---	.02	.30	.94				
	---	.02	.31	1.00				
w191855	.0	.02	.20	.79	2.0	1,520	1,540	0
	---	.02	.21	.82				
	---	.02	.22	.87				

Table 9f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Kentucky.

[Values in percent or parts-per-million. Coal ashed at 525°C. L means less than the value shown; N, not detected: B, not determined; S after element title indicates determinations by automatic plate reading computer assisted, emission spectographic analyses. The standard deviation of any single answer should be taken as plus 50% and minus 35%. Methods of analyses for other elements as shown in figure.]

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w189262	6.6	54	23	2.4	0.50	0.19	0.97	4.6	2.1	1.2	w189262
w189263	5.4	45	26	1.8	.60	.27	1.1	8.3	1.6	1.0L	w189263
w189264	9.0	42	27	1.1	.58	.22	1.1	12	1.2	1.0L	w189264
w189265	8.2	48	30	1.2	.53	.24	.85	3.4	1.6	1.0L	w189265
w189755	5.9	20	16	2.3	.61	.27	.85	51	.53	1.1	w189755
w189756	14.4	47	33	.52	.78	.40	3.5	7.6	1.8	.19	w189756
w189757	16.2	52	28	.84	.73	.54	2.1	11	1.4	.17	w189757
w189758	14.3	54	30	.88	.86	.15	2.4	5.3	1.4	.19	w189758
w189940	4.0	16	12	2.3L	.27	.42	.40	55	.79	1.0L	w189940
w190600	7.0	57	28	1.3	.48	.51	.70	5.4	2.8	.30	w190600
w190601	8.2	40	22	1.9	.78	.81	3.2	24	.80	.08	w190601
w190602	1.0	16	12	6.0	1.8	.38	.88	8.1	.42	B	w190602
w190603	9.3	31	22	1.0	1.2	.58	2.9	38	.80	.05	w190603
w190664	5.9	39	30	2.6	.83	.03	.50	22	1.0	.10	w190664
w191202	3.1	50	29	2.3	1.3	1.3	2.2	9.5	1.4	.08	w191202
w191520	16.9	49	29	.60	1.6	.26	3.1	13	1.1	.03	w191520
w191844	25.8	56	30	.50	.96	.31	3.3	3.4	1.5	.10	w191844
w191845	4.6	37	28	2.6	.43	.03	.60	24	1.0	1.5	w191845
w191846	18.7	60	31	.30	.43	.18	2.2	2.3	2.0	.30	w191846
w191847	7.0	50	37	1.2	.33	.23	1.1	4.8	1.6	.06	w191847
w191848	5.0	48	38	1.2	.38	.87	1.5	5.3	1.8	.30	w191848
w191849	8.4	50	28	4.2	.90	.25	1.8	5.4	1.2	.20	w191849
w191850	9.1	42	26	1.0	.66	.33	2.1	23	1.0	.20	w191850
w191851	9.3	39	24	1.4	.75	.25	1.9	28	1.1	.09	w191851
w191852	8.7	45	30	1.1	.78	.29	2.3	14	1.4	.80	w191852
w191853	B			B	B	B	B			B	w191853
w191854	5.5	46	32	2.0	.85	.53	1.6	10	1.0	.10	w191854
w191855	6.3	46	34	1.6	.78	.60	3.2	7.9	1.2	.02	w191855

Table 9f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Kentucky--continued

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w189262	2.5	0.84	420	1,100	33	5L	1.1	290	120	190	w189262
w189263	2.1	1.1	380	980	39	5	1.8	300	170	240	w189263
w189264	1.5	.75	250	400	24	5L	.94	200	44	150	w189264
w189265	.97	.52	310	430	30	5L	.16	210	27	200	w189265
w189755	3.2	1.6	410	840	27	5L	.76	340	130	170	w189755
w189756	.32	.59	250	750	14	5L	.28	200	47	220	w189756
w189757	.76	.78	210	440	13	5L	.96	200	35	150	w189757
w189758	.74	.83	240	390	18	5L	.92	210	46	190	w189758
w189940	4.3	1.0	310	630	32	5L	.80	150	63	160	w189940
w190600	1.9	.65	220	520	46	22L	2.0	330	130	210	w190600
w190601	3.9	.78	270	690	62	22L	1.6	180	68	130	w190601
w190602	B	5.2	680G	1,400	330	22L	4.5	500	1,500	830	w190602
w190603	2.9	.44	170	390	26	22L	1.6	150	28	160	w190603
w190664	3.2	.88	490	940	87	22L	.54	240	150	200	w190664
w191202	4.6	1.1	460G	800	120	5L	.66	160	530	230	w191202
w191520	1.9	.49	250	560	34	40L	.72	210	49	140	w191520
w191844	1.4	.36	180	1,200	29	42L	.36	300	16	88	w191844
w191845	3.8	1.8	520	1,200	36	42L	2.5	480	160	200	w191845
w191846	1.1	.40	180	360	50	42L	.38	170	29	190	w191846
w191847	2.8	1.6	420	830	67	42L	1.7	330	140	240	w191847
w191848	2.5	1.4	500	1,000	50	42L	1.5	200	110	190	w191848
w191849	7.1	.19L	400	1,200	17	42L	2.4	180	36	140	w191849
w191850	2.9	.38	1,000	360	40	42L	.22	190	84	140	w191850
w191851	3.1	.29	1,000	290	12	42L	.46	230	71	120	w191851
w191852	2.9	.38	790	500	17	42L	.20	230	64	170	w191852
w191853		B	B	B	B	B	B	B	B	B	w191853
w191854	4.2	.86	1,000	1,000	48	42L	1.3	250	60	150	w191854
w191855	4.0	.71	790	1,100	44	42L	1.0	220	52	140	w191855

Table 9f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Kentucky--continued

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w189262	4.5	260	58	26	6.4	86	22L	12	12	14	w189262
w189263	5.6	340	15L	16	5.9	100	22L	24	11	15L	w189263
w189264	5.6	170	15L	4.6L	2.9	82	22L	9.3	7.8	15L	w189264
w189265	2.4	190	23	11	3.3	79	22L	22	9.8	9.2	w189265
w189755	5.1	240	15L	14	4.9	130	15L	200	6.8	3.2L	w189755
w189756	10	160	15L	4.6L	3.8	52	22L	14	10	15L	w189756
w189757	9.9	190	15L	9.3	3.7	49	22L	3.2L	7.4	3.2L	w189757
w189758	8.4	200	25	21	4.3	49	22L	3.8	8.4	7.5	w189758
w189940	7.5	290	7L	4.6L	3.0	67	15L	84	7.5	3.2L	w189940
w190600	2.9	310	32L	14	5.3	78	23	74	14	6.8L	w190600
w190601	13	370	38	19	3.3	100	20	42	4.9	10	w190601
w190602	30	950	48	32	18	900	37	1,200	20	11	w190602
w190603	12	390	32L	10L	3.8	75	15	62	5.4	6.8L	w190603
w190664	3.4	310	32L	16	6.3	130	26	110	6.8	10L	w190664
w191202	6.5	470	65	40	5.5	260	22L	800	6.5	17	w191202
w191520	9.5	190	58L	18L	3.8	43	14	8.3L	5.3	12L	w191520
w191844	13	75	61L	23	3.1	69	29	8.8L	15	13L	w191844
w191845	4.3	270	61L	19L	9.1	40	18	8.8L	6.5	13L	w191845
w191846	7.0	180	61L	19L	3.9	65	13	8.8L	8.6	13L	w191846
w191847	2.9	350	67	31	10	120	54	16	8.6	13	w191847
w191848	4.0	300	61L	19L	6.4	130	420	29	8.0	13L	w191848
w191849	2.4	110	61L	19L	3.0	88	13L	46	7.1	13L	w191849
w191850	11	83	61L	19L	3.0	42	13	8.8L	6.6	13L	w191850
w191851	14	110	61L	19L	4.2	33	13L	8.8L	6.5	13L	w191851
w191852	15	130	61L	19L	4.1	54	13L	8.8L	8.0	13L	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	7.3	430	61L	19L	6.4	86	25	23	7.3	13L	w191854
w191855	11	290	61L	19L	4.1	110	13L	120	7.9	13L	w191855

Table 9f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Kentucky--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Sample number
w189262	150	140	2	150	18	37	170	290	70	28	w189262
w189263	130	250	2	120	17	15L	68L	240	110	14	w189263
w189264	100	220	1	110	35	15	68L	76	80	15	w189264
w189265	110	230	1	78	27	38	100L	61	75	20	w189265
w189755	100	130	2	130	25	15L	68L	200	58	22	w189755
w189756	100	200	1	67	19	15L	68L	52	93	10L	w189756
w189757	110	210	1	62	13	15L	68L	89	59	17	w189757
w189758	120	190	1	71	14	15L	68L	110	72	19	w189758
w189940	75	100	3	230	54	37	68L	160	110	32L	w189940
w190600	170	220	3	150	15	40	140	190	110	68L	w190600
w190601	85	140	2	260	31	19	95	600	190	68L	w190601
w190602	300	90	10	290	19	33	140	610	98	68L	w190602
w190603	86	140	1	110	31	7	61	97	70	H	w190603
w190664	100	210	3	240	40	21	100	320	190	68L	w190664
w191202	97	120	3	170	14	20	130	1,000G	330	19	w191202
w191520	110	230	2	120	27	15	130	120	74	120L	w191520
w191844	160	120	2	90	7.1	38	360	58	34	130L	w191844
w191845	260	140	2	37	46	11	210	360	46	130L	w191845
w191846	96	190	2	67	5.2	17	110	88	74	130L	w191846
w191847	160	160	3	72	33	25	360	250	100	130L	w191847
w191848	100	260	4	38	46	13	88L	210	100	130L	w191848
w191849	95	130	1	810	33	13	88L	140	52	130L	w191849
w191850	110	110	1	130	21	19	140	120	23	130L	w191850
w191851	140	110	1	240	13	11	130	79	18	130L	w191851
w191852	160	130	1	82	10	10	100	96	28	130L	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	130	230	2	130	90	17	250	190	52	130L	w191854
w191855	130	180	2	100	36	16	88L	140	78	130L	w191855

Table 9f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Kentucky--continued

Sample number	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm (ppm)	U (ppm)	Sample number
w189262	440L	36	27	15L	3,300	3.0	69	4.6L	3.2L	12	w189262
w189263	500L	56	28	15L	2,200	5.6	67	14	3.2L	15	w189263
w189264	320L	33	14	15L	470	7.8L	34	4.6L	3.2L	8.9	w189264
w189265	300L	39	16	15L	670	1.2	53	4.6L	3.2L	12	w189265
w189755	490	120	31	15L	1,800	3.4	51L	4.6L	3.2L	35	w189755
w189756	300	42	17	15L	170	2.1	72	4.6L	3.2L	24	w189756
w189757	220	31	19	15L	290	1.9	24	18	3.2L	12	w189757
w189758	240	36	21	15L	460	2.1	42	5.9	3.2L	14	w189758
w189940	200L	33	B	15L	1,700	2.5	75L	4.6L	3.2L	45	w189940
w190600	290L	56	26	13	1,100	4.3	96	10L	4.6L	26	w190600
w190601	130	49	17	11	1,300	2.4	37	10L	4.6L	35	w190601
w190602	1,700L	250	60	8.2	4,600G	10	300L	10L	6.3	36	w190602
w190603	270L	34	16	6.8L	370	2.2	32	42	4.6L	40	w190603
w190664	290L	66	34	6.8L	570	5.1	51L	10L	4.6L	31	w190664
w191202	610L	87	23	15L	870	3.2	97L	4.6L	7.7	14	w191202
w191520	160	34	21	12L	400	4.1	28	18L	8.3L	13	w191520
w191844	170	26	25	15	670	3.9	55	19L	8.8L	23	w191844
w191845	240L	37	43	13L	4,400	6.5	65L	19L	8.8L	10	w191845
w191846	110	37	18	13L	290	3.7	44	19L	8.8L	13	w191846
w191847	170L	61	46	17	900	7.1	43L	19L	8.8L	28	w191847
w191848	220L	68	30	13L	1,400	6.0	60L	19L	8.8L	30	w191848
w191849	120L	25	17	13L	1,300	2.4	36	19L	8.8L	53	w191849
w191850	210	21	15	13L	1,000	2.2	33L	19L	8.8L	8.0	w191850
w191851	230	22	20	13L	1,200	3.2	32L	19L	8.8L	8.2	w191851
w191852	200	31	22	13L	5,000	2.3	34L	19L	8.8L	9.1	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	110	47	31	13L	1,900	5.5	55L	23	8.8L	27	w191854
w191855	220	41	24	16	1,700	3.2	48L	19L	8.8L	28	w191855

Table 9f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Kentucky--continued

Sample number	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)
w189262	270	210	11	140	690
w189263	230	110	17	210	240
w189264	200	70	6.7	78	370
w189265	240	110	9.8	55	680
w189755	390	65	8.5	200	560
w189756	200	38	9.0	82	120
w189757	220	80	6.8	140	290
w189758	260	91	7.7	180	230
w189940	210	89	7.5	100	540
w190600	260	140	10	180	410
w190601	360	170	9.8	330	190
w190602	250	370	50	660	270
w190603	210	57	7.5	220	73
w190664	220	170	15	140	370
w191202	320	350	16	420	520
w191520	240	140	12	180	220
w191844	210	190	12	130	1,200
w191845	250	130	13	85	160
w191846	290	120	10	54	190
w191847	480	360	21	130	540
w191848	330	110	18	130	210
w191849	190	46	6.0	150	160
w191850	170	98	5.5	110	310
w191851	120	79	7.5	96	150
w191852	180	50	8.0	82	120
w191853	B	B	B	B	B
w191854	560	180	15	160	210
w191855	310	69	7.9	140	250

Table 9g.-- Content of 22 trace elements in 27 coal samples from Kentucky.

[Analysis performed on whole coal. Values in parts-per-million (ppm). L, less than the value shown, B, not determined.]

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w189262	3.0	19	8.1	12	0.3	0.42	73	0.8	0.042	10	w189262
w189263	11	16	9.0	13	.3	.32	34	.6	.15	7	w189263
w189264	4.0	18	4.0	14	.5	.26	34	.7	.12	9	w189264
w189265	1.0	17	2.2	16	.2	.27	30	.8	.098	9	w189265
w189755	25	20	7.4	9.9	.3	.29	58	.4	.11	6	w189755
w189756	15	29	6.7	31	1.5	.55	130	1.5	.12	15	w189756
w189757	36	32	5.7	25	1.6	.60	74	1.2	.48	18	w189757
w189758	5.0	30	6.6	27	1.2	.61	110	1.2	.090	17	w189758
w189940	34	6.0	2.5	6.4	.3	.12	20L	.3	.19	3	w189940
w190600	4.0	23	8.8	15	.2	.37	22	1.0	.040	12	w190600
w190601	34	15	5.6	11	1.1	.27	70	.4	.090	7	w190601
w190602	4.0	5.0	15	8.3	.3	.18	20L	.2	.010L	3	w190602
w190603	110	14	2.6	15	1.1	.35	56	.5	.28	8	w190603
w190664	16	14	8.8	12	.2	.37	20L	.4	.22	6	w190664
w191202	4.0	5.0	16	7.2	.2	.17	52	.2	.080	3	w191202
w191520	.1	35	8.3	24	1.6	.65	220	.9	.13	18	w191520
w191844	5.6	78	4.1	23	3.4	.79	180	3.9	.040	42	w191844
w191845	10	22	7.3	9.2	.2	.42	100	.3	.13	12	w191845
w191846	3.7	32	5.4	36	1.3	.73	73	1.6	.040	18	w191846
w191847	2.3	23	10	17	.2	.70	27	.6	.025	11	w191847
w191848	4.4	10	5.3	9.3	.2	.32	26	.4	.080	5	w191848
w191849	1.4	15	3.0	12	.2	.25	26	.6	.037	8	w191849
w191850	7.5	17	7.6	13	1.0	.27	50	.6	.070	10	w191850
w191851	3.3	21	6.6	11	1.3	.39	54	.6	.10	13	w191851
w191852	2.4	20	5.6	15	1.3	.36	78	.7	.042	14	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	23	14	3.3	8.4	.4	.35	32	.4	.050	7	w191854
w191855	12	14	3.3	8.9	.7	.26	33	.5	.070	8	w191855

Table 9f.-- Content of 22 trace elements in 27 coal samples from Kentucky--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w189262	0.1	93	330	29L	0.40	2.4	3.3	1.8	0.2	4.6	w189262
w189263	.1	110	240L	27L	.60	3.0	5.0	1.5	.3	3.6	w189263
w189264	.1	150	390L	29L	.20	3.0	6.8	1.3	.7L	3.1	w189264
w189265	.1	150	360L	25L	.20	3.2	2.7	1.3	.1	4.4	w189265
w189755	.1	120	270	29	1.1	6.8	3.7	1.8	.2	3.0L	w189755
w189756	.2	430	120	43	.90	6.1	5.8	2.5	.3	10	w189756
w189757	.2	650	120	35	.90	5.0	5.6	3.1	.3	3.9	w189757
w189758	.2	160	120	35	.80	5.1	5.1	3.0	.3	6.0	w189758
w189940	.1	120	170L	8L	1.1	1.3	9.8	B	.1	3.0L	w189940
w190600	.2	260	92	20L	4.0	3.9	3.8	1.8	.3	6.7	w190600
w190601	.2	490	29	11	2.1	4.0	2.0	1.4	.2	3.0	w190601
w190602	.1	28	B	17L	1.7	2.5	1.3	.60	.1	3.0L	w190602
w190603	.1	400	20	25L	5.2	3.2	2.7	1.5	.2	3.0	w190603
w190664	.2	13	26	17L	2.0	3.9	4.0	2.0	.3	3.0L	w190664
w191202	.1	290	11	19L	1.6	2.7	1.4	.70	.1	3.0L	w191202
w191520	.3	330	22	27	1.0	5.8	7.0	3.6	.7	4.7	w191520
w191844	.4	590	110	43	.78	6.6	1.9	6.5	1	14	w191844
w191845	.1	10	300	11L	.47	1.7	4.8	2.0	.3	3.0L	w191845
w191846	.3	250	250	21	1.0	6.9	4.1	3.3	.7	8.2	w191846
w191847	.2	120	18	12L	1.2	4.3	4.5	3.2	.5	3.0L	w191847
w191848	.2	320	66	11L	.88	3.4	2.5	1.5	.3	3.0L	w191848
w191849	.1	160	73	10L	.23	2.1	3.7	1.4	.2	3.0	w191849
w191850	.1	220	80	19	.13	1.9	.9	1.4	.2	3.0L	w191850
w191851	.1	170	37	21	.12	2.0	1.0	1.9	.3	3.0L	w191851
w191852	.1	190	300	17	.22	2.7	1.1	1.9	.2	3.0L	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	.1	220	24	6	1.3	2.6	2.6	1.7	.3	3.0L	w191854
w191855	.1	280	6	14	.97	2.6	3.1	1.5	.2	3.0L	w191855

Table 9g.-- Content of 22 trace elements in 27 coal samples from Kentucky--continued

Sample number	U (ppm)	Yb (ppm)
w189262	0.79	0.7
w189263	.81	.9
w189264	.80	.6
w189265	.98	.8
w189755	2.1	.5
w189756	3.5	1.3
w189757	2.0	1.1
w189758	2.0	1.1
w189940	1.8	.3
w190600	1.8	.7
w190601	2.9	.8
w190602	.36	.5
w190603	3.8	.7
w190664	1.8	.9
w191202	.44	.5
w191520	2.3	2.0
w191844	5.9	3.0
w191845	.47	.6
w191846	2.4	1.9
w191847	2.0	1.5
w191848	1.5	.9
w191849	4.5	.5
w191850	.73	.5
w191851	.76	.7
w191852	.79	.7
w191853	.20L	B
w191854	1.5	.8
w191855	1.7	.5

Table 9h.-- Major, minor, and trace element composition of 27 coal samples from Kentucky reported on whole coal basis.

[Values in percent or parts-per-million. 22 values are from direct determinations on whole coal; all other values calculated from analyses of ash. S means analysis by emission spectrography; L, less than the value shown; N, not detected; B, not determined.]

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w189262	1.6	0.81	0.11	0.020	0.009	0.055	0.21	0.081	0.06	3.0	w189262
w189263	1.1	.74	.068	.020	.011	.045	.31	.052	.06	11	w189263
w189264	1.8	1.3	.067	.031	.015	.075	.76	.065	.07	4.0	w189264
w189265	1.8	1.3	.069	.026	.015	.068	.20	.078	.04	1.0	w189265
w189755	.55	.51	.097	.022	.012	.049	2.1	.019	.10	25	w189755
w189756	3.2	2.5	.053	.068	.043	.12	.76	.16	.08	15	w189756
w189757	3.9	2.4	.097	.071	.065	.13	1.3	.13	.13	36	w189757
w189758	3.6	2.2	.090	.074	.016	.12	.53	.12	.12	5.0	w189758
w189940	.30	.26	.066L	.007	.012	.033	1.6	.019	.04	34	w189940
w190600	1.9	1.0	.065	.020	.026	.058	.26	.12	.05	4.0	w190600
w190601	1.5	.95	.11	.039	.049	.068	1.4	.039	.06	34	w190601
w190602	.07	.06	.043	.011	.003	.008	.057	.003	.05	4.0	w190602
w190603	1.3	1.1	.066	.066	.040	.077	2.5	.045	.04	110	w190603
w190664	1.1	.94	.11	.029	.001	.049	.91	.035	.05	16	w190664
w191202	.72	.48	.051	.025	.029	.026	.21	.026	.03	4.0	w191202
w191520	3.9	2.6	.072	.16	.033	.14	1.5	.11	.08	.1	w191520
w191844	6.7	4.1	.092	.15	.059	.21	.61	.23	.09	5.6	w191844
w191845	.79	.68	.085	.012	.001	.038	.77	.028	.08	10	w191845
w191846	5.2	3.1	.040	.048	.025	.16	.30	.22	.07	3.7	w191846
w191847	1.6	1.4	.060	.014	.012	.058	.23	.067	.11	2.3	w191847
w191848	1.1	1.0	.043	.011	.032	.042	.19	.054	.07	4.4	w191848
w191849	2.0	1.2	.25	.046	.016	.070	.32	.060	.02L	1.4	w191849
w191850	1.8	1.3	.065	.036	.022	.076	1.5	.055	.03	7.5	w191850
w191851	1.7	1.2	.093	.042	.017	.077	1.8	.061	.03	3.3	w191851
w191852	1.8	1.4	.068	.041	.019	.072	.85	.073	.03	2.4	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	1.2	.93	.079	.028	.022	.046	.38	.033	.05	23	w191854
w191855	1.4	1.1	.072	.030	.028	.052	.35	.045	.04	12	w191855

Table 9h.-- Major, minor, and trace element composition of 27 coal samples from Kentucky reported on whole coal basis--continued

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w189262	28	76	2.2	0.3L	0.07	19	8.1	12	0.3	17	w189262
w189263	20	53	2.1	.3	.10	16	9.0	13	.3	18	w189263
w189264	23	36	2.2	.4L	.08	18	4.0	14	.5	15	w189264
w189265	26	36	2.5	.4L	.01	17	2.2	16	.2	16	w189265
w189755	24	50	1.6	.3L	.04	20	7.4	9.9	.3	14	w189755
w189756	36	110	2.0	.7L	.04	29	6.7	31	1.5	23	w189756
w189757	34	71	2.1	.8L	.16	32	5.7	25	1.6	31	w189757
w189758	34	56	2.5	.7L	.13	30	6.6	27	1.2	29	w189758
w189940	12	25	1.3	.2L	.03	6.0	2.5	6.4	.3	12	w189940
w190600	15	36	3.2	1.5L	.14	23	8.8	15	.2	22	w190600
w190601	22	57	5.1	1.8L	.13	15	5.6	11	1.1	30	w190601
w190602	6.8G	14	3.3	.2L	.05	5.0	15	8.3	.3	9.5	w190602
w190603	16	36	2.4	2.0L	.15	14	2.6	15	1.1	36	w190603
w190664	29	55	5.1	1.3L	.03	14	8.8	12	.2	18	w190664
w191202	14G	25	3.8	.1L	.02	5.0	16	7.2	.2	15	w191202
w191520	42	95	5.7	6.8L	.12	35	8.3	24	1.6	32	w191520
w191844	46	310	7.5	11L	.09	78	4.1	23	3.4	19	w191844
w191845	24	55	1.7	1.9L	.12	22	7.3	9.2	.2	12	w191845
w191846	34	67	9.4	7.9L	.07	32	5.4	36	1.3	34	w191846
w191847	29	58	4.7	2.9L	.12	23	10	17	.2	25	w191847
w191848	25	50	2.5	2.1L	.08	10	5.3	9.3	.2	15	w191848
w191849	34	100	1.4	3.5L	.20	15	3.0	12	.2	9.2	w191849
w191850	91	33	3.6	3.8L	.02	17	7.6	13	1.0	7.6	w191850
w191851	93	27	1.1	3.9L	.04	21	6.6	11	1.3	10	w191851
w191852	69	44	1.5	3.7L	.02	20	5.6	15	1.3	11	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	55	55	2.6	2.3L	.07	14	3.3	8.4	.4	24	w191854
w191855	50	69	2.8	2.6L	.06	14	3.3	8.9	.7	18	w191855

Table 9h.-- Major, minor, and trace element composition of 27 coal samples from Kentucky reported on whole coal basis--continued

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w189262	3.8	1.7	0.42	73	5.7	1.4L	0.77	0.8	0.042	0.91	w189262
w189263	.8L	.8	.32	34	5.6	1.2L	1.3	.6	.15	.79L	w189263
w189264	1.3L	.4L	.26	34	7.4	1.9L	.83	.7	.12	1.3L	w189264
w189265	1.8	.9	.27	30	6.5	1.8L	1.8	.8	.098	.76	w189265
w189755	.9L	.8	.29	58	7.5	.87L	12	.4	.11	.19L	w189755
w189756	2.1L	.7L	.55	130	7.4	3.1L	2.0	1.5	.12	2.1L	w189756
w189757	2.4L	1.5	.60	74	8.0	3.5L	.51L	1.2	.48	.51L	w189757
w189758	3.5	2.9	.61	110	6.9	3.1L	.55	1.2	.090	1.1	w189758
w189940	.3L	.2L	.12	20L	2.7	.59L	3.4	.3	.19	.13L	w189940
w190600	2.2L	1.0	.37	22	5.5	1.6	5.2	1.0	.040	.48L	w190600
w190601	3.1	1.6	.27	70	8.2	1.6	3.4	.4	.090	.82	w190601
w190602	.5	.3	.18	20L	9.0	.37	12	.2	.010L	.11	w190602
w190603	3.0L	.9L	.35	56	7.0	1.4	5.8	.5	.28	.63L	w190603
w190664	1.9L	.9	.37	20L	7.7	1.5	6.5	.4	.22	.59L	w190664
w191202	2.0	1.2	.17	52	8.1	.67L	25	.2	.080	.51	w191202
w191520	9.8L	3.0L	.65	220	7.3	2.4	1.4L	.9	.13	2.0L	w191520
w191844	16L	5.9	.79	180	18	7.5	2.3L	3.9	.040	3.4L	w191844
w191845	2.8L	.9L	.42	100	1.8	.83	.40L	.3	.13	.60L	w191845
w191846	11L	3.6L	.73	73	12	2.4	1.6L	1.6	.040	2.4L	w191846
w191847	4.7	2.2	.70	27	8.4	3.8	1.1	.6	.025	.91	w191847
w191848	3.1L	1.0L	.32	26	6.5	21	1.5	.4	.080	.65L	w191848
w191849	5.1L	1.6L	.25	26	7.4	1.1L	3.9	.6	.037	1.1L	w191849
w191850	5.6L	1.7L	.27	50	3.8	1.2	.80L	.6	.070	1.2L	w191850
w191851	5.7L	1.8L	.39	54	3.1	1.2L	.82L	.6	.10	1.2L	w191851
w191852	5.3L	1.7L	.36	78	4.7	1.1L	.77L	.7	.042	1.1L	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	3.4L	1.0L	.35	32	4.7	1.4	1.3	.4	.050	.72L	w191854
w191855	3.8L	1.2L	.26	33	6.9	.82L	7.6	.5	.070	.82L	w191855

Table 9h.-- Major, minor, and trace element composition of 27 coal samples from Kentucky reported on whole coal basis--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Sample number
w189262	10	9.2	0.1	9.8	1.2	2.4	11	19	330	4.6	w189262
w189263	7	14	.1	6.4	.94	.79L	3.7L	13	240L	5.9	w189263
w189264	9	20	.1	10	3.1	1.4	6.1L	6.8	390L	7.2	w189264
w189265	9	19	.1	6.4	2.2	3.1	8.2L	5.0	360L	6.2	w189265
w189755	6	7.7	.1	7.8	1.5	.87L	4.0L	12	270	3.4	w189755
w189756	15	29	.2	9.6	2.8	2.1L	9.8L	7.5	120	13	w189756
w189757	18	34	.2	10	2.1	2.4L	11L	14	120	9.6	w189757
w189758	17	27	.2	10	1.9	2.1L	9.7L	16	120	10	w189758
w189940	3	4.0	.1	9.2	2.2	1.5	2.7L	6.3	170L	4.5	w189940
w190600	12	15	.2	11	1.1	2.8	9.8	13	92	7.7	w190600
w190601	7	11	.2	21	2.5	1.6	7.8	49	29	16	w190601
w190602	3	.9	.1	2.9	.19	.33	1.4	6.1	B	.98	w190602
w190603	8	13	.1	10	2.9	.69	5.7	9.0	20	6.5	w190603
w190664	6	12	.2	14	2.4	1.2	5.9	19	26	11	w190664
w191202	3	3.7	.1	5.3	.42	.63	3.9	31G	11	10	w191202
w191520	18	39	.3	20	4.6	2.5	22	20	22	13	w191520
w191844	42	31	.4	23	1.8	9.8	93	15	110	8.8	w191844
w191845	12	6.4	.1	1.7	2.1	.51	9.7	17	300	2.1	w191845
w191846	18	36	.3	13	.97	3.2	21	16	250	14	w191846
w191847	11	11	.2	5.0	2.3	1.8	25	18	18	7.0	w191847
w191848	5	13	.2	1.9	2.3	.65	4.4L	11	66	5.0	w191848
w191849	8	11	.1	68	2.8	1.1	7.4L	12	73	4.4	w191849
w191850	10	10	.1	12	1.9	1.7	13	11	80	2.1	w191850
w191851	13	10	.1	22	1.2	1.0	12	7.3	37	1.7	w191851
w191852	14	11	.1	7.1	.87	.87	8.7	8.4	300	2.4	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	7	13	.1	7.2	5.0	.94	14	10	24	2.9	w191854
w191855	8	11	.1	6.3	2.3	1.0	5.5L	8.8	6	4.9	w191855

Table 9h.-- Major, minor, and trace element composition of 27 coal samples from Kentucky reported on whole coal basis--continued

Sample number	Pr-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Sample number
w189262	1.8	29L	0.40	2.4	3.3	1.8	0.97L	220	0.2	4.6	w189262
w189263	.8	27L	.60	3.0	5.0	1.5	.79L	120	.3	3.6	w189263
w189264	1.3	29L	.20	3.0	6.8	1.3	1.3L	42	.7L	3.1	w189264
w189265	1.6	25L	.20	3.2	2.7	1.3	1.2L	55	.1	4.4	w189265
w189755	1.3	29	1.1	6.8	3.7	1.8	.87L	100	.2	3.0L	w189755
w189756	1.4L	43	.90	6.1	5.8	2.5	2.1L	24	.3	10	w189756
w189757	2.7	35	.90	5.0	5.6	3.1	2.4L	47	.3	3.9	w189757
w189758	2.6	35	.80	5.1	5.1	3.0	2.1L	65	.3	6.0	w189758
w189940	1.3L	8L	1.1	1.3	9.8	B	.59L	70	.1	3.0L	w189940
w190600	4.8L	20L	4.0	3.9	3.8	1.8	.91	77	.3	6.7	w190600
w190601	5.6L	11	2.1	4.0	2.0	1.4	.90	110	.2	3.0	w190601
w190602	.7L	17L	1.7	2.5	1.3	.60	.08	46G	.1	3.0L	w190602
w190603	H	25L	5.2	3.2	2.7	1.5	.63L	34	.2	3.0	w190603
w190664	4.0L	17L	2.0	3.9	4.0	2.0	.40L	34	.3	3.0L	w190664
w191202	.6	19L	1.6	2.7	1.4	.70	.46L	27	.1	3.0L	w191202
w191520	20L	27	1.0	5.8	7.0	3.6	2.0L	68	.7	4.7	w191520
w191844	34L	43	.78	6.6	1.9	6.5	3.9	170	1	14	w191844
w191845	6.0L	11L	.47	1.7	4.8	2.0	.60L	200	.3	3.0L	w191845
w191846	24L	21	1.0	6.9	4.1	3.3	2.4L	54	.7	8.2	w191846
w191847	9.1L	12L	1.2	4.3	4.5	3.2	1.2	63	.5	3.0L	w191847
w191848	6.5L	11L	.88	3.4	2.5	1.5	.65L	70	.3	3.0L	w191848
w191849	11L	10L	.23	2.1	3.7	1.4	1.1L	110	.2	3.0	w191849
w191850	12L	19	.13	1.9	.9	1.4	1.2L	91	.2	3.0L	w191850
w191851	12L	21	.12	2.0	1.0	1.9	1.2L	110	.3	3.0L	w191851
w191852	11L	17	.22	2.7	1.1	1.9	1.1L	440	.2	3.0L	w191852
w191853	B	B	B	B	B	B	B	B	B	B	w191853
w191854	7.2L	6	1.3	2.6	2.6	1.7	.72L	100	.3	3.0L	w191854
w191855	8.2L	14	.97	2.6	3.1	1.5	1.0	110	.2	3.0L	w191855

Table 9h.-- Major, minor, and trace element composition of 27 coal samples from Kentucky reported on whole coal basis--continued

Sample number	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w189262	0.31L	0.21L	0.79	18	14	0.7	9.2	46	w189262
w189263	.73	.17L	.81	12	5.7	.9	11	13	w189263
w189264	.42L	.28L	.80	18	6.3	.6	7.0	33	w189264
w189265	.38L	.26L	.98	20	8.6	.8	4.5	56	w189265
w189755	.27L	.19L	2.1	23	3.9	.5	12	33	w189755
w189756	.67L	.46L	3.5	29	5.5	1.3	12	17	w189756
w189757	3.0	.51L	2.0	35	13	1.1	23	47	w189757
w189758	.85	.45L	2.0	37	13	1.1	26	33	w189758
w189940	.19L	.13L	1.8	8.6	3.5	.3	4.0	22	w189940
w190600	.70L	.32L	1.8	18	9.8	.7	13	29	w190600
w190601	.82L	.38L	2.9	30	14	.8	27	16	w190601
w190602	.10L	.06	.36	2.5	3.7	.5	6.6	2.7	w190602
w190603	3.9	.43L	3.8	20	5.3	.7	20	6.8	w190603
w190664	.59L	.27L	1.8	13	10	.9	8.3	22	w190664
w191202	.14L	.24	.44	9.9	11	.5	13	16	w191202
w191520	3.0L	1.4L	2.3	41	24	2.0	30	37	w191520
w191844	4.9L	2.3L	5.9	54	49	3.0	34	310	w191844
w191845	.87L	.40L	.47	12	6.0	.6	3.9	7.4	w191845
w191846	3.6L	1.6L	2.4	54	22	1.9	10	36	w191846
w191847	1.3L	.62L	2.0	34	25	1.5	9.1	38	w191847
w191848	.95L	.44L	1.5	17	5.5	.9	6.5	11	w191848
w191849	1.6L	.74L	4.5	16	3.9	.5	13	13	w191849
w191850	1.7L	.80L	.73	15	8.9	.5	10	28	w191850
w191851	1.8L	.82L	.76	11	7.3	.7	8.9	14	w191851
w191852	1.7L	.77L	.79	16	4.4	.7	7.1	10	w191852
w191853	B	B	.20L	B	B	B	B	B	w191853
w191854	1.3	.48L	1.5	31	9.9	.8	8.8	12	w191854
w191855	1.2L	.55L	1.7	20	4.3	.5	8.8	16	w191855

Summary of the analytical data from 27 Tennessee coal samples

Data on 18 Tennessee coal samples were reported by Swanson and others (1976). The generalized distribution of the 27 coal sample locations is shown in figure 8. Specific locations and description of the samples are given in table 10d. The 27 samples were obtained from 13 different beds. Three of the samples do not have identifying bed names. The statistical data on the samples is reported in tables 10a, b, and c, the analytical data in tables 10e, f, g, and h.

In the following three paragraphs the geometric means of analytical data on the Tennessee coal samples are compared to the means for all samples of this report.

Comparison of the geometric means (table 10a) shows a lower ash content, sulfur and moisture in Tennessee coals compared to all coals of this report. The volatile matter, fixed carbon, ash fusion temperatures, Btu and free swelling index are slightly higher in Tennessee coals. These data suggest that the rank of Tennessee coals is similar to the average rank of all the samples.

The geometric means for the major and minor oxides (table 10b) show that only Na_2O is much lower and CaO and P_2O_5 higher in the Tennessee coals. The means for the other oxides are similar in the two sets of data.

The means for the trace elements in the Tennessee coal (table 10c) show an unusual distribution. Except for B which is significantly higher and As and F which are equal the elements have lower means in Tennessee coals compared to all coals of this report. Many elements have much lower means in Tennessee coals.

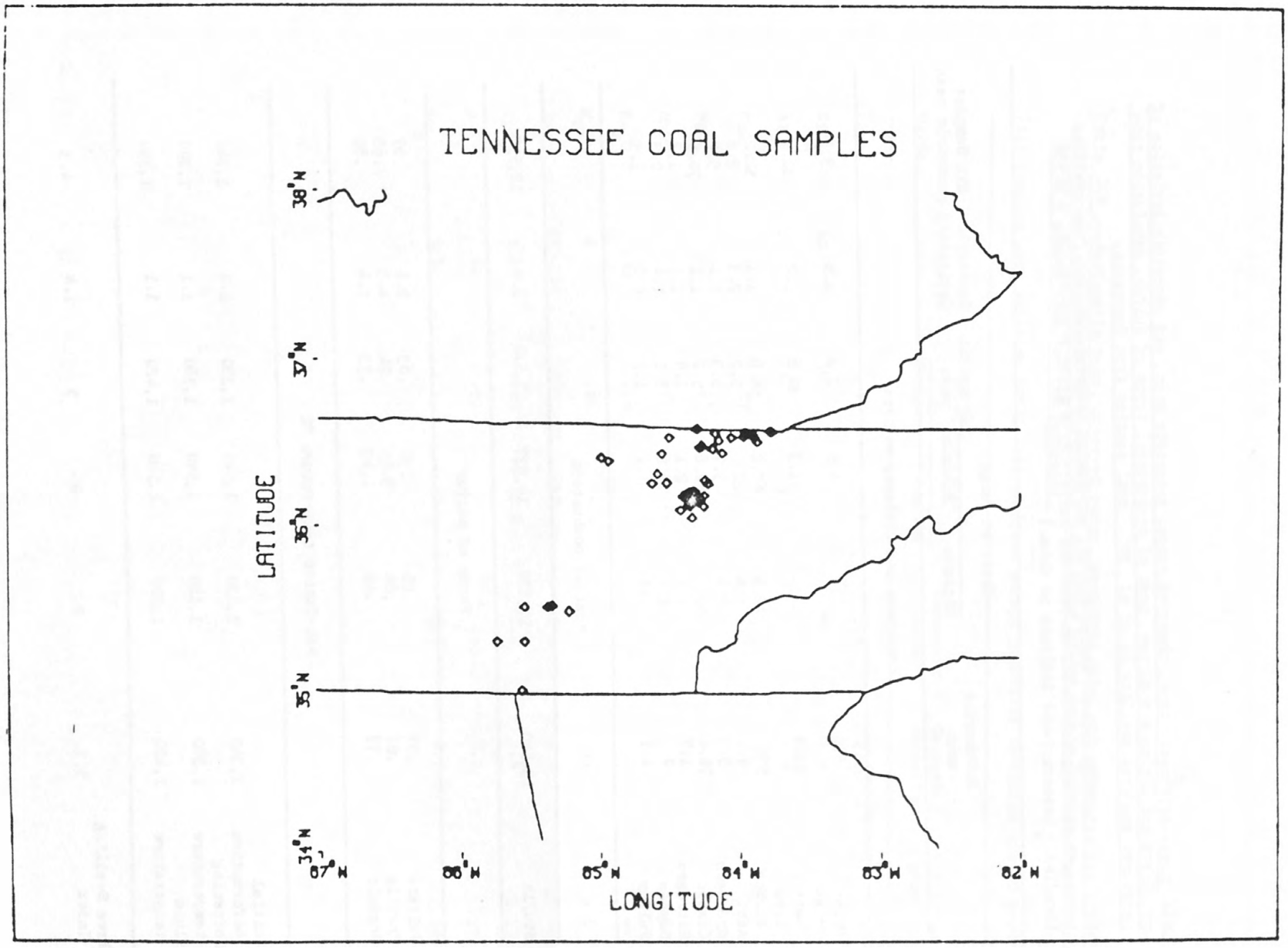

Figure 8 -- Distribution of Tennessee coal samples.

Table 10a.--Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, ash-fusion temperatures and free swelling index of 27 coal samples from Tennessee.

[All values are in percent except Btu/lb, ash-fusion temperatures, and free swelling index and are reported on the as-received basis. °F = 9/5°C + 32; Kcal/kg = 0.556 (Btu/lb). Leaders (---) indicate no data.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	2.6	.7	4.6	2.4	1.5	3.3
Volatile matter	33.2	22.1	41.3	32.8	1.2	31.9
Fixed carbon	57	42.6	67.2	56.8	1.1	52.2
Ash	7.2	1.4	22	5.2	2.3	8.8
Hydrogen	5.3	4.4	5.7	5.3	1.1	5.2
Carbon	75.4	59.4	82.8	75.2	1.1	70.5
Nitrogen	1.7	1.2	2.1	1.6	1.2	1.3
Oxygen	9	2.2	13.8	8.6	1.4	9.3
Sulfur	1.5	.5	5.2	1.2	2.0	1.5
Heat of combustion						
Btu/lb	13,540	10,870	14,837	13,510	1.1	12,590
Forms of sulfur						
Sulfate	.07	.01	.39	.03	3.1	.07
Pyritic	.67	.04	3.65	.24	4.3	.65
Organic	.77	.49	1.43	.73	1.4	.80
Ash fusion temperature °C						
Initial deformation	1,340	1,130	1,540	1,330	1.1	1,240
Softening temperature	1,380	1,180	1,540	1,380	1.1	1,290
Fluid temperature	1,420	1,220	1,540	1,420	1.1	1,350
Free Swelling Index	5.3	2	9	5	1.4	4.3

Table 10b.--Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of eleven major and minor oxides in the laboratory ash of 27 coal samples from Tennessee.

[All samples were ashed at 525°C; all analyses except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
(Ash)	7.2	1.4	23.9	5.4	2.2	9.46
SiO_2	40	19	54	39	1.3	42
Al_2O_3	25	14	33	25	1.2	23
CaO	3.4	.87	6.7	2.8	1.9	1.3
MgO	.87	.18	2.2	.71	1.9	.78
MnO	.02	.01	.1	.02	1.9	.02
Na_2O	.33	.14	1.8	.28	1.7	.44
K_2O	2	.66	4.4	1.7	1.7	1.6
Fe_2O_3	15	3	47	12	2	11
TiO_2	1.2	.43	1.9	1.2	1.4	1.13
P_2O_5	.69	.09	2	.43	2.7	.17
SO_3	4.9	1.1	12	3.7	2.2	2.03

Table 10c.--Arithmetic mean, observed range, geometric mean, and geometric deviation of 36 elements in 27 coal samples from Tennessee.

[All analyses are in percent or parts per million and are reported on a whole-coal basis. Leaders (---) indicate means could not be calculated because an insufficient number of analyses were above the detection limit.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Ag	.03	.01	.07	.03	1.6	.05
As	23	1	160	7.4	4.6	7.4
B	39	14	72	35	1.6	21
Ba	50	8.1	136	36	2.3	56
Be	1.2	.48	2.4	1.1	1.6	2.4
Cd	.08	.01	.41	.05	2.6	.08
Ce	13	4	32	11	1.8	15
Co	5.2	1.4	16	4.4	1.8	5.5
Cr	9.7	2	30	7.4	2.1	14
Cs	.77	.1	3	.42	3.3	.75
Cu	16	6.4	99	13	1.8	14
Eu	.24	.09	.47	.22	1.5	.31
F	77	26	200	64	1.8	64
Ga	2.6	.67	8.2	2	2.1	5.1
Ge	1.2	.15	4.1	.86	2.4	2.9
Hf	.57	.1	1.4	.47	2	.65
Hg	.15	.01	.49	.08	3.2	.10
La	6.9	2	17	5.6	1.9	7.8
Li	13	.7	45	6.5	3.8	12
Lu	.11	.1	.2	.11	1.3	.14
Mn	10	2.8	48	7.6	2.1	14
Mo	1.5	.18	5	1.1	2.2	1.8
Nb	1.4	.29	5.5	1	2.1	1.9
Nd	7.1	1.8	20	5.7	2	9.8
Ni	7.9	3.2	19	6.9	1.7	12
Pb	4.7	1.1	12	4	1.8	5.9
Sb	.68	.1	2.9	.48	2.3	.69
Sc	2.3	.6	6.2	2	1.7	3.1
Se	2.4	.5	4.6	2	1.9	2.9
Sm	1.2	.5	2.6	1.1	1.6	1.5
Sr	78	9.9	260	47	2.8	57
Tb	.2	.1	.4	.18	1.6	.26
U	1.2	.2	6.6	.78	2.4	1.2
V	12	3	41	9.3	2.1	17
Y	5.4	1.5	11	5	1.5	7.2
Yb	.55	.2	1.1	.51	1.5	.74
Zn	9.8	2.2	31	7.4	2.1	13
Zr	14	2	65	9.9	2.3	20

Table 9d Descriptions for 27 bituminous coal samples from Kentucky

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w189262	kentucky	leslie	370525n	832021w	breathitt	hazard	channel	33.0
w189263	kentucky	leslie	370516n	832016w	breathitt	hazard	channel	29.0
w189264	kentucky	leslie	365918n	832018w	breathitt	hazard no 9	channel	33.0
w189265	kentucky	leslie	365905n	832032w	breathitt	hazard no 9	channel	33.0
w189755	kentucky	breathitt	372512n	833646w	breathitt	uncorrelated	channel	27.0
w189756	kentucky	owsley	372758n	833252w	breathitt	taylor	channel	35.0
w189757	kentucky	leslie	370334n	832017w	breathitt	hazard	channel	31.0
w189758	kentucky	leslie	370335n	832113w	breathitt	hazard	channel	30.0
w189940	kentucky	leslie	370142n	832134w	breathitt	upper elkhorn no 3	channel	36.0
w190600	kentucky	leslie	370141n	832142w	breathitt	whitesburg	drill core	22.0
w190601	kentucky	leslie	370141n	832142w	breathitt	no data entered	drill core	14.0
w190602	kentucky	leslie	370141n	832142w	breathitt	no data entered	drill core	18.0
w190603	kentucky	leslie	370141n	832142w	breathitt	no data entered	drill core	15.0
w190664	kentucky	breathitt	372458n	833152w	breathitt	haddix	channel	18.0
w191202	kentucky	lee	372954n	834819w	breathitt	gray hawk	channel	18.0
w191520	kentucky	breathitt	372400n	833100w	breathitt	hazard	channel	25.0
w191844	kentucky	leslie	370107n	832329w	breathitt	fire clay	channel	26.0
w191845	kentucky	leslie	370231n	832318w	breathitt	no 10	channel	38.0
w191846	kentucky	leslie	370457n	832241w	breathitt	no 7	channel	21.0
w191847	kentucky	leslie	370457n	832241w	breathitt	no 7	channel	26.0
w191848	kentucky	leslie	370017n	832946w	breathitt	fire clay	channel	51.0
w191849	kentucky	leslie	370411n	832334w	breathitt	no 9	channel	30.0
w191850	kentucky	wayne	365131n	844455w	breathitt	no data entered	channel	
w191851	kentucky	wayne	364708n	843935w	breathitt	no data entered	channel	
w191852	kentucky	wayne	365206n	844547w	breathitt	no data entered	channel	40.0
w191854	kentucky	knox	365805n	835830w	breathitt	jellico	channel	22.0
w191855	kentucky	knox	365548n	835944w	breathitt	jellico	channel	43.0

Table 10d Descriptions for 27 bituminous coal samples from Tennessee

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w193636	tennessee	campbell	360735n	842106w	red oak mountain	pewee	channel	34.0
w193637	tennessee	anderson	360326n	842018w	slatestone	no data entered	channel	30.0
w193638	tennessee	anderson	360906n	841811w	red oak mountain	pewee	channel	22.0
w193639	tennessee	sequatchie	353012n	853212w	whitwell shale	sewanee	channel	28.0
w193640	tennessee	claiborne	363233n	835346w	slatestone	mason	channel	31.0
w193641	tennessee	marion	345959n	853331w	no data entered	no data entered	channel	25.0
w193642	tennessee	bledsoe	353041n	852019w	whitwell shale	sewanee	channel	46.0
w193643	tennessee	marion	351742n	853215w	whitwell shale	sewanee	channel	40.0
w193644	tennessee	claiborne	363102n	835211w	slatestone	mason	channel	32.0
w193645	tennessee	bledsoe	353038n	852017w	whitwell shale	sewanee	channel	50.0
w193646	tennessee	anderson	361108n	842345w	graves gap	windrock	channel	23.0
w193647	tennessee	claiborne	363438n	834620w	red oak mountain	stray	channel	
w193648	tennessee	anderson	361238n	842105w	red oak mountain	big mary	channel	38.0
w193649	tennessee	anderson	360952n	842020w	slatestone	blue gem	channel	20.0
w193650	tennessee	fentress	362405n	845556w	no data entered	nemo	channel	24.0
w193651	tennessee	campbell	361323n	841930w	slatestone	jellico	channel	28.0
w193652	tennessee	sequatchie	353012n	853212w	whitwell shale	sewanee	channel	30.0
w193653	tennessee	anderson	360921n	842122w	red oak mountain	pewee	channel	22.0
w193654	tennessee	bledsoe	353014n	852219w	no data entered	lantana	channel	31.0
w193655	tennessee	anderson	360845n	842120w	red oak mountain	walnut mountain	channel	41.0
w193656	tennessee	anderson	361238n	842105w	red oak mountain	big mary	channel	33.0
w193657	tennessee	anderson	361058n	841720w	slatestone	jellico	channel	40.0
w193658	tennessee	anderson	361106n	842416w	no data entered	low splint	channel	29.0
w193659	tennessee	scott	361125n	842355w	red oak mountain	big mary	channel	38.0
w193660	tennessee	campbell	363124n	840847w	no data entered	rex	channel	25.0
w193661	tennessee	claiborne	363443n	834649w	slatestone	mason	channel	50.0
w193662	tennessee	claiborne	363437n	834621w	graves gap	no data entered	channel	52.0

Table 9e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 17 coal samples from Kentucky.

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in precent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section Department of Energy, Pittsburgh, Pa. B means not determined. 0 for ash fusion temperatures means greater than 1800°C.

		Proximate Analysis			Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w189755	2.2	39.6	52.6	5.6	5.7	75.3	1.2	9.1	3.1	7,640	13,760
	---	40.5	53.8	5.7	5.6	77.0	1.2	7.3	3.2	7,820	14,070
	---	43.0	57.0	---	5.9	81.7	1.3	7.7	3.4	8,290	14,920
w189756	2.3	35.5	48.4	13.8	5.2	68.6	1.3	9.7	1.4	6,790	12,230
	---	36.3	49.5	14.1	5.1	70.2	1.3	7.8	1.4	6,950	12,520
	---	42.3	57.7	---	5.9	81.8	1.5	9.1	1.7	8,100	14,580
w189757	1.9	34.3	48.0	15.8	5.1	67.0	1.2	9.8	1.1	6,680	12,020
	---	35.0	48.9	16.1	5.0	68.3	1.2	8.3	1.1	6,810	12,250
	---	41.7	58.3	---	5.9	81.4	1.5	9.9	1.3	8,110	14,610
w189758	2.0	34.1	50.4	13.5	5.1	69.4	1.2	8.6	2.2	6,870	12,360
	---	34.8	51.4	13.8	5.0	70.8	1.2	7.0	2.2	7,010	12,610
	---	40.4	59.6	---	5.8	82.1	1.4	8.1	2.6	8,130	14,630
w189940	1.2	38.5	54.1	6.2	5.5	76.0	.9	7.4	4.0	7,670	13,800
	---	39.0	54.8	6.3	5.4	76.9	.9	6.4	4.0	7,760	13,970
	---	41.6	58.4	---	5.8	82.1	1.0	6.8	4.3	8,280	14,900
w190664	2.5	38.3	54.0	5.2	5.7	75.9	1.7	10.2	1.3	7,600	13,680
	---	39.3	55.4	5.3	5.6	77.8	1.7	8.2	1.3	7,790	14,030
	---	41.5	58.5	---	5.9	82.2	1.8	8.6	1.4	8,230	14,820
w191202	4.5	34.7	58.3	2.5	5.9	76.4	1.2	13.4	.6	7,520	13,540
	---	36.3	61.0	2.6	5.7	80.0	1.3	9.8	.6	7,880	14,180
	---	37.3	62.7	---	5.8	82.2	1.3	10.1	.6	8,090	14,560
w191844	1.8	32.5	40.9	24.8	4.7	60.1	1.3	8.0	1.1	6,010	10,810
	---	33.1	41.6	25.3	4.6	61.2	1.3	6.5	1.1	6,120	11,010
	---	44.3	55.7	---	6.1	81.9	1.8	8.7	1.5	8,180	14,730
w191845	2.5	40.1	51.6	5.8	5.7	75.2	1.6	10.0	1.7	7,560	13,600
	---	41.1	52.9	5.9	5.6	77.1	1.6	8.0	1.7	7,750	13,950
	---	43.7	56.3	---	5.9	82.0	1.7	8.5	1.9	8,240	14,830
w191846	2.1	33.6	45.9	18.4	4.9	65.0	1.3	9.6	.8	6,460	11,630
	---	34.3	46.9	18.8	4.8	66.4	1.3	7.9	.8	6,600	11,880
	---	42.3	57.7	---	5.9	81.8	1.6	9.7	1.0	8,130	14,630
w191847	2.8	37.0	53.7	6.5	5.6	74.5	1.5	11.0	.9	7,390	13,310
	---	38.1	55.2	6.7	5.4	76.6	1.5	8.8	.9	7,610	13,690
	---	40.8	59.2	---	5.8	82.1	1.7	9.4	1.0	8,150	14,670
w191848	1.9	36.2	57.0	4.9	5.5	77.8	1.7	9.1	1.0	7,760	13,970
	---	36.9	58.1	5.0	5.4	79.3	1.7	7.6	1.0	7,910	14,240
	---	38.8	61.2	---	5.7	83.5	1.8	8.0	1.1	8,330	14,990

Table 9e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 17 coal samples from Kentucky--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w189755	0.0	0.11	1.86	1.12	4.0	1,080	1,130	1,175
	---	.11	1.90	1.15				
	---	.12	2.02	1.21				
w189756	.0	.09	.35	.98	3.0	1,540	0	0
	---	.09	.36	1.00				
	---	.11	.42	1.17				
w189757	.0	.02	.31	.80	1.0	1,460	1,515	1,540
	---	.02	.32	.82				
	---	.02	.38	.97				
w189758	.0	.02	1.18	.99	1.5	1,540	0	0
	---	.02	1.20	1.01				
	---	.02	1.40	1.17				
w189940	.0	.06	2.92	.98	5.0	1,160	1,190	1,215
	---	.06	2.96	.99				
	---	.06	3.15	1.06				
w190664	.0	.06	.80	.43	3.0	1,320	1,380	1,410
	---	.06	.82	.44				
	---	.07	.87	.47				
w191202	.0	.02	.12	.51	1.0	1,350	1,395	1,445
	---	.02	.13	.53				
	---	.02	.13	.55				
w191844	.0	.03	.31	.81	4.5	1,540	0	0
	---	.03	.32	.82				
	---	.04	.42	1.10				
w191845	.0	.02	.98	.72	4.5	1,170	1,235	1,295
	---	.02	1.01	.74				
	---	.02	1.07	.79				
w191846	.0	.05	.30	.44	1.0	1,540	0	0
	---	.05	.31	.45				
	---	.06	.38	.55				
w191847	.0	.02	.15	.74	2.5	1,540	0	0
	---	.02	.15	.76				
	---	.02	.17	.82				
w191848	.0	.04	.11	.82	5.5	1,540	0	0
	---	.04	.11	.84				
	---	.04	.12	.88				

Table 9e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 17 coal samples from Kentucky--continued

Sample number	Moisture	Proximate Analysis			Ultimate Analysis					Heat of Combustion	
		Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191849	3.5	35.1	53.2	8.2	5.3	72.9	1.3	11.2	1.1	7,160	12,880
	---	36.4	55.1	8.5	5.1	75.5	1.3	8.4	1.1	7,420	13,350
	---	39.8	60.2	---	5.6	82.6	1.5	9.2	1.2	8,100	14,590
w191850	2.3	40.8	48.0	8.9	5.6	71.6	1.4	9.9	2.6	7,250	13,050
	---	41.8	49.1	9.1	5.5	73.3	1.4	8.0	2.7	7,420	13,360
	---	45.9	54.1	---	6.0	80.6	1.6	8.8	2.9	8,160	14,700
w191851	2.4	40.3	48.3	9.0	5.7	71.5	1.3	9.3	3.2	7,240	13,030
	---	41.3	49.5	9.2	5.6	73.3	1.3	7.3	3.3	7,420	13,350
	---	45.5	54.5	---	6.1	80.7	1.5	8.1	3.6	8,170	14,710
w191852	3.5	36.9	51.6	8.0	5.5	71.4	1.4	12.0	1.7	7,080	12,750
	---	38.2	53.5	8.3	5.3	74.0	1.5	9.2	1.8	7,340	13,210
	---	41.7	58.3	---	5.8	80.7	1.6	10.0	1.9	8,000	14,410
w191854	2.4	38.4	53.9	5.3	5.7	76.0	1.9	9.9	1.2	7,620	13,720
	---	39.3	55.2	5.4	5.6	77.9	1.9	8.0	1.2	7,810	14,060
	---	41.6	58.4	---	5.9	82.3	2.1	8.4	1.3	8,260	14,860
w191855	3.3	34.9	56.0	5.8	5.5	74.9	1.9	10.9	1.0	7,420	13,350
	---	36.1	57.9	6.0	5.3	77.5	2.0	8.2	1.0	7,670	13,810
	---	38.4	61.6	---	5.6	82.4	2.1	8.8	1.1	8,160	14,690

Table 9e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 17 coal samples from Kentucky--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191849	0.0	0.02	0.48	0.65	1.0	1,375	1,435	1,485
	---	.02	.50	.67				
	---	.02	.54	.74				
w191850	.0	.04	1.17	1.37	5.0	1,150	1,225	1,270
	---	.04	1.20	1.40				
	---	.05	1.32	1.54				
w191851	.0	.02	1.77	1.39	5.5	1,105	1,170	1,225
	---	.02	1.81	1.42				
	---	.02	2.00	1.57				
w191852	.0	.02	.48	1.16	2.0	1,370	1,440	1,495
	---	.02	.50	1.20				
	---	.02	.54	1.31				
w191854	.0	.02	.29	.92	5.0	1,425	1,480	1,525
	---	.02	.30	.94				
	---	.02	.31	1.00				
w191855	.0	.02	.20	.79	2.0	1,520	1,540	0
	---	.02	.21	.82				
	---	.02	.22	.87				

Table 10e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 27 coal samples from Tennessee.

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in percent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section Department of Energy, Pittsburgh, Pa. B means not determined.]

		Proximate Analysis			Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w193636	2.7	35.3	58.3	3.7	5.4	78.3	1.7	10.2	0.7	7,780	14,000
	---	36.3	59.9	3.8	5.2	80.5	1.7	8.0	.7	7,990	14,390
	---	37.7	62.3	---	5.4	83.7	1.8	8.3	.7	8,310	14,960
w193637	1.8	34.6	54.0	9.6	5.2	73.6	1.8	7.6	2.1	7,400	13,320
	---	35.2	55.0	9.8	5.1	74.9	1.8	6.1	2.1	7,530	13,560
	---	39.1	60.9	---	5.6	83.1	2.0	6.8	2.4	8,350	15,030
w193638	2.5	34.3	60.0	3.2	5.5	79.3	1.6	9.8	.6	7,860	14,140
	---	35.2	61.5	3.3	5.4	81.3	1.6	7.8	.6	8,060	14,500
	---	36.4	63.6	---	5.5	84.1	1.7	8.0	.6	8,330	15,000
w193639	4.2	27.9	60.2	7.7	5.1	74.7	1.5	10.3	.6	7,370	13,270
	---	29.1	62.8	8.0	4.8	78.0	1.6	6.9	.6	7,690	13,850
	---	31.7	68.3	---	5.3	84.8	1.7	7.5	.7	8,360	15,060
w193640	2.1	34.0	61.2	2.7	5.6	80.3	1.8	8.9	.8	8,010	14,430
	---	34.7	62.5	2.8	5.5	82.0	1.8	7.2	.8	8,190	14,740
	---	35.7	64.3	---	5.6	84.3	1.9	7.4	.8	8,420	15,150
w193641	2.9	27.5	67.2	2.4	5.5	82.8	1.6	6.9	.8	8,240	14,840
	---	28.3	69.2	2.5	5.3	85.3	1.6	4.5	.8	8,490	15,280
	---	29.0	71.0	---	5.5	87.4	1.7	4.6	.8	8,700	15,670
w193642	2.0	27.2	63.6	7.2	5.0	78.0	1.5	7.4	.9	7,700	13,860
	---	27.8	64.9	7.3	4.9	79.6	1.5	5.7	.9	7,850	14,140
	---	30.0	70.0	---	5.3	85.9	1.7	6.2	1.0	8,480	15,260
w193643	3.5	25.4	62.4	8.7	4.9	75.4	1.5	8.9	.6	7,370	13,270
	---	26.3	64.7	9.0	4.7	78.1	1.6	6.0	.6	7,640	13,750
	---	28.9	71.1	---	5.1	85.9	1.7	6.6	.7	8,390	15,110
w193644	2.3	37.1	59.0	1.6	5.7	80.9	2.0	9.4	.5	8,030	14,450
	---	38.0	60.4	1.6	5.6	82.8	2.0	7.5	.5	8,210	14,790
	---	38.6	61.4	---	5.7	84.2	2.1	7.7	.5	8,350	15,030
w193645	1.6	25.7	53.5	19.2	4.4	66.8	1.3	7.2	1.0	6,590	11,860
	---	26.1	54.4	19.5	4.3	67.9	1.3	5.9	1.0	6,700	12,060
	---	32.4	67.6	---	5.3	84.3	1.6	7.3	1.3	8,320	14,980
w193646	2.6	38.7	56.2	2.5	5.7	75.2	2.1	13.8	.7	7,890	14,210
	---	39.7	57.7	2.6	5.6	77.2	2.2	11.8	.7	8,110	14,590
	---	40.8	59.2	---	5.7	79.2	2.2	12.1	.7	8,320	14,970
w193647	2.2	41.3	55.1	1.4	5.7	80.7	2.0	9.7	.6	8,070	14,520
	---	42.2	56.3	1.4	5.6	82.5	2.0	7.9	.6	8,250	14,850
	---	42.8	57.2	---	5.7	83.7	2.1	8.0	.6	8,370	15,060

Table 10e.— Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 27 coal samples from Tennessee--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w193636	0.0	0.02	0.06	0.57	5.0	1,270	1,320	1,375
	---	.02	.06	.59				
	---	.02	.06	.61				
w193637	.0	.02	1.08	.97	5.0	1,370	1,430	1,490
	---	.02	1.10	.99				
	---	.02	1.22	1.09				
w193638	.0	.00	.05	.56	4.0	1,235	1,285	1,320
	---	.00	.05	.57				
	---	.00	.05	.59				
w193639	.0	.00	.05	.57	5.0	1,505	1,540	1,540
	---	.00	.05	.59				
	---	.00	.06	.65				
w193640	.0	.00	.06	.71	5.0	1,490	1,540	1,540
	---	.00	.06	.73				
	---	.00	.06	.75				
w193641	.0	.09	.16	.52	9.0	1,280	1,335	1,395
	---	.09	.16	.54				
	---	.10	.17	.55				
w193642	.0	.02	.16	.69	9.0	1,495	1,540	1,540
	---	.02	.16	.70				
	---	.02	.18	.76				
w193643	.0	.00	.07	.51	5.0	1,540	1,540	1,540
	---	.00	.07	.53				
	---	.00	.08	.58				
w193644	.0	.00	.06	.49	5.0	1,395	1,440	1,480
	---	.00	.06	.50				
	---	.00	.06	.51				
w193645	.0	.05	.39	.53	4.0	1,435	1,500	1,540
	---	.05	.40	.54				
	---	.06	.49	.67				
w193646	.0	.01	.05	.65	5.0	1,345	1,400	1,455
	---	.01	.05	.67				
	---	.01	.05	.68				
w193647	.0	.01	.05	.51	5.0	1,440	1,490	1,535
	---	.01	.05	.52				
	---	.01	.05	.53				

Table 10e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 27 coal samples from Tennessee--continued

Sample number	Moisture	Proximate Analysis			Ultimate Analysis					Heat of Combustion	
		Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w193648	2.6	32.8	42.6	22.0	4.6	59.4	1.3	7.5	5.2	6,040	10,870
	---	33.7	43.7	22.6	4.4	61.0	1.3	5.3	5.3	6,200	11,160
	---	43.5	56.5	---	5.7	78.8	1.7	6.9	6.9	8,010	14,420
w193649	2.3	35.8	59.8	2.1	5.6	80.9	2.0	8.5	.9	8,070	14,520
	---	36.6	61.2	2.1	5.5	82.8	2.0	6.6	.9	8,260	14,860
	---	37.4	62.6	---	5.6	84.6	2.1	6.8	.9	8,440	15,190
w193650	3.9	35.0	51.5	9.6	5.2	69.8	1.5	11.1	2.8	7,010	12,620
	---	36.4	53.6	10.0	5.0	72.6	1.6	7.9	2.9	7,300	13,140
	---	40.5	59.5	---	5.5	80.7	1.7	8.8	3.2	8,110	14,590
w193651	.7	22.1	58.2	19.0	4.4	68.7	1.2	2.2	4.5	6,860	12,350
	---	22.3	58.6	19.1	4.4	69.2	1.2	1.6	4.5	6,910	12,430
	---	27.5	72.5	---	5.4	85.6	1.5	2.0	5.6	8,540	15,380
w193652	2.4	33.3	55.4	8.9	5.1	74.9	1.5	8.9	.8	7,440	13,390
	---	34.1	56.8	9.1	5.0	76.7	1.5	6.9	.8	7,620	13,720
	---	37.5	62.5	---	5.4	84.4	1.7	7.6	.9	8,390	15,100
w193653	4.0	35.3	57.3	3.4	5.4	77.6	1.6	10.9	1.0	7,680	13,820
	---	36.8	59.7	3.5	5.2	80.8	1.7	7.7	1.0	8,000	14,400
	---	38.1	61.9	---	5.4	83.8	1.7	7.9	1.1	8,290	14,930
w193654	1.7	33.9	57.4	7.0	5.1	76.6	1.4	6.5	3.3	7,720	13,890
	---	34.5	58.4	7.1	5.0	77.9	1.4	5.1	3.4	7,850	14,130
	---	37.1	62.9	---	5.4	83.9	1.5	5.5	3.6	8,450	15,210
w193655	2.5	33.5	48.5	15.5	4.8	67.5	1.4	9.7	.9	6,720	12,100
	---	34.4	49.7	15.9	4.6	69.2	1.4	7.7	.9	6,890	12,410
	---	40.9	59.1	---	5.5	82.3	1.7	9.1	1.1	8,200	14,750
w193656	1.8	34.4	54.8	9.0	5.4	73.4	1.7	8.0	2.5	7,410	13,340
	---	35.0	55.8	9.2	5.3	74.7	1.7	6.5	2.5	7,550	13,580
	---	38.6	61.4	---	5.8	82.3	1.9	7.2	2.8	8,310	14,950
w193657	2.0	33.1	57.2	7.7	5.4	75.3	1.8	8.0	1.7	7,560	13,610
	---	33.8	58.4	7.9	5.3	76.8	1.8	6.3	1.7	7,710	13,880
	---	36.7	63.3	---	5.7	83.4	2.0	6.9	1.9	8,370	15,070
w193658	4.6	32.2	60.3	2.9	5.6	77.5	1.6	11.7	.8	7,640	13,760
	---	33.8	63.2	3.0	5.3	81.2	1.7	8.0	.8	8,010	14,420
	---	34.8	65.2	---	5.5	83.8	1.7	8.2	.9	8,260	14,870
w193659	2.3	37.2	48.8	11.7	5.1	70.4	1.6	8.3	2.8	7,090	12,760
	---	38.1	49.9	12.0	5.0	72.1	1.6	6.4	2.9	7,260	13,060
	---	43.3	56.7	---	5.6	81.9	1.9	7.3	3.3	8,250	14,840

Table 10e.— Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 27 coal samples from Tennessee--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w193648	0.0	0.39	3.41	1.35	3.5	1,275	1,330	1,385
	---	.40	3.50	1.39				
	---	.52	4.52	1.79				
w193649	.0	.01	.14	.72	6.0	1,265	1,320	1,375
	---	.01	.14	.74				
	---	.01	.15	.75				
w193650	.0	.14	1.73	.91	5.0	1,345	1,385	1,430
	---	.15	1.80	.95				
	---	.16	2.00	1.05				
w193651	.0	.02	3.65	.88	9.0	1,145	1,210	1,265
	---	.02	3.68	.89				
	---	.02	4.55	1.10				
w193652	.0	.02	.28	.50	6.0	1,480	1,540	1,540
	---	.02	.29	.51				
	---	.02	.32	.56				
w193653	.0	.01	.27	.76	3.0	1,185	1,240	1,305
	---	.01	.28	.79				
	---	.01	.29	.82				
w193654	.0	.01	2.16	1.16	9.0	1,130	1,185	1,245
	---	.01	2.20	1.18				
	---	.01	2.37	1.27				
w193655	.0	.01	.22	.71	4.0	1,540	1,540	1,540
	---	.01	.23	.73				
	---	.01	.27	.87				
w193656	.0	.10	1.11	1.28	6.0	1,165	1,215	1,265
	---	.10	1.13	1.30				
	---	.11	1.24	1.43				
w193657	.0	.07	.62	1.05	6.0	1,345	1,395	1,445
	---	.07	.63	1.07				
	---	.08	.69	1.16				
w193658	.0	.05	.06	.68	2.0	1,300	1,340	1,385
	---	.05	.06	.71				
	---	.05	.06	.74				
w193659	.0	.23	1.19	1.43	5.0	1,235	1,290	1,325
	---	.24	1.22	1.46				
	---	.27	1.38	1.66				

Table 10e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 27 coal samples from Tennessee--continued

Sample number	Moisture	Proximate Analysis			Ultimate Analysis					Heat of Combustion	
		Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w193660	4.4	33.0	59.8	2.8	5.5	76.0	1.9	12.2	1.6	7,540	13,570
	---	34.5	62.6	2.9	5.2	79.5	2.0	8.7	1.7	7,890	14,200
	---	35.6	64.4	---	5.4	81.9	2.0	8.9	1.7	8,130	14,630
w193661	2.2	38.3	57.9	1.6	5.7	81.2	1.9	8.6	.8	8,120	14,620
	---	39.2	59.2	1.6	5.6	83.0	1.9	6.8	.8	8,300	14,950
	---	39.8	60.2	---	5.7	84.4	2.0	6.9	.8	8,440	15,200
w193662	2.4	36.3	59.0	2.3	5.7	79.5	2.1	9.8	.6	7,960	14,330
	---	37.2	60.5	2.4	5.6	81.5	2.2	7.9	.6	8,160	14,680
	---	38.1	61.9	---	5.7	83.4	2.2	8.0	.6	8,350	15,040

Table 10e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 27 coal samples from Tennessee--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w193660	0.0	0.05	0.91	0.61	3.0	1,125	1,180	1,215
	---	.05	.95	.64				
	---	.05	.98	.66				
w193661	.0	.00	.07	.78	5.0	1,370	1,430	1,420
	---	.00	.07	.80				
	---	.00	.07	.81				
w193662	.0	.00	.04	.61	4.0	1,395	1,455	1,505
	---	.00	.04	.62				
	---	.00	.04	.64				

Table 10f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Tennessee.

[Values in percent or parts-per-million. Coal ashed at 525°C. L means less than the value shown; N, not detected; B, not determined: S after element title indicates determinations by automatic plate reading computer assisted, emission spectographic analyses. The standard deviation of any single answer should be taken as plus 50% and minus 35%. Methods of analyses for other elements as shown in figures.]

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w193636	4.2	30	22	6.7	1.8	0.28	0.90	18	1.1	0.93	w193636
w193637	10.1	44	25	2.0	.58	.21	2.0	16	1.3	.49	w193637
w193638	3.1	41	23	6.5	2.2	.42	1.3	9.4	1.2	.14	w193638
w193639	8.2	53	29	2.7	.43	.26	2.5	3.0	1.3	2.0	w193639
w193640	2.7	40	31	4.0	.86	.26	1.4	8.0	1.4	1.3	w193640
w193641	2.4	23	19	6.2	1.7	.30	1.1	29	.66	.22	w193641
w193642	7.5	51	29	2.2	.70	.16	2.8	5.3	1.4	2.0	w193642
w193643	9.0	51	27	1.3	.41	.14	2.3	8.6	1.4	1.6	w193643
w193644	1.4	39	25	6.4	1.6	.29	.68	7.1	1.9	.11	w193644
w193645	17.5	54	26	1.6	.70	.19	4.0	5.9	1.2	.85	w193645
w193646	2.7	37	31	6.2	1.1	.32	.97	7.7	1.2	1.9	w193646
w193647	1.8	B	B	B	1.5	.24	B	B	B	B	w193647
w193648	23.9	46	21	1.2	1.3	.37	3.3	15	1.2	.23	w193648
w193649	2.5	31	25	4.0	.58	.54	2.8	19	1.0	.22	w193649
w193650	11.0	35	24	.87	.18	.18	2.2	25	1.0	.16	w193650
w193651	9.6	30	19	1.8	.38	.20	1.5	34	1.0	.27	w193651
w193652	9.4	54	27	1.6	.48	.16	2.3	7.2	1.4	.58	w193652
w193653	3.6	44	24	4.5	.65	.26	1.7	11	1.5	.11	w193653
w193654	7.7	B	B	B	.32	.18	B	B	B	B	w193654
w193655	16.4	47	31	1.8	.43	.29	4.4	5.3	1.3	.60	w193655
w193656	9.5	40	27	2.3	.46	.30	1.5	18	1.5	.36	w193656
w193657	8.0	B	B	B	.48	.52	B	B	B	B	w193657
w193658	3.1	B	B	B	1.8	.18	B	B	B	B	w193658
w193659	12.7	44	25	1.9	.27	.35	2.4	16	1.4	.19	w193659
w193660	3.0	19	14	2.3	.46	.17	.70	47	.43	.09	w193660
w193661	1.7	B	B	B	.93	1.8	B	B	B	B	w193661
w193662	2.3	33	33	6.7	1.3	.40	.66	9.0	1.2	.86	w193662

Table 10f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Tennessee--continued

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Sample number
w193636	11	0.40	1,000G	810	19	2.7	240	160	140	2.4	w193636
w193637	2.8	.50	440	890	14	2.0	190	34	110	5.9	w193637
w193638	12	.90	710	520	30	1.6	420	140	350	45	w193638
w193639	2.1	.10	370	780	19	.10	85	41	46	1.2	w193639
w193640	4.7	.90	1,000G	940	35	5.1	260	580	140	3.7	w193640
w193641	12	1.4	H	1,300	45	1.2	290	660	150	25L	w193641
w193642	1.1	.20	230	1,200	19	.32	200	44	150	19	w193642
w193643	1.5	.20	160	1,300	26	.22	180	71	140	13	w193643
w193644	10	1.2	1,000G	970	85	.53	360	290	320	29L	w193644
w193645	1.1	.10	270	760	11	.12	130	30	140	17	w193645
w193646	6.5	.90	1,000G	780	24	2.2	330	78	190	3.7	w193646
w193647	B	1.0	1,000G	620	64	1.1	280	200	180	17L	w193647
w193648	2.4	.30	300	570	10	1.7	130	26	130	8.4	w193648
w193649	6.6	.90	1,000G	880	20	.70	240	180	150	12	w193649
w193650	1.4	.50	470	190	16	.72	160	100	140	14	w193650
w193651	2.9	.50	480	560	17	.92	180	38	88	5.2	w193651
w193652	1.8	.20	310	620	11	.22	180	76	150	12	w193652
w193653	7.2	.90	650	460	32	1.1	170	130	120	2.8	w193653
w193654	B	.50	H	440	8.0	.54	250	75	84	6.5	w193654
w193655	1.9	.30	380	830	11	.92	150	33	150	8.5	w193655
w193656	3.3	.30	430	480	19	.76	170	31	150	6.3	w193656
w193657	B	.50	630	890	13	1.4	240	45	120	3.8	w193657
w193658	B	.80	630	770	29	1.8	230	65	150	3.2	w193658
w193659	3.0	.50	430	440	11	.56	160	26	130	7.9	w193659
w193660	3.8	.90	H	270	17	2.2	130	47	67	3.3	w193660
w193661	B	1.5	1,000G	810	36	6.2	240	180	160	18L	w193661
w193662	8.7	.90	1,000G	780	21	4.3	260	87	170	4.3	w193662

Table 10f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Tennessee--continued

Sample number	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	In-S (ppm)	Sample number
w193636	240	32L	10L	5.5	27	22	5.0L	7.1	10L	7.0L	w193636
w193637	270	32L	13	3.8	30	12	6.0	7.9	7.0L	7.0L	w193637
w193638	3,200	32L	10L	6.5	26	29	5.0L	23	10L	7.0L	w193638
w193639	130	32L	10L	2.1	31	11	5.0L	3.7	7.0L	7.0L	w193639
w193640	360	32L	20	5.2	46	27	53	19	10L	7.0L	w193640
w193641	330	32L	16	6.7	52	22	76	21	7.0L	7.0L	w193641
w193642	140	32L	10L	2.9	35	10	9.0	8.0	7.0L	7.0	w193642
w193643	130	32L	10	2.8	35	12	13	10	7.0L	7.0L	w193643
w193644	460	48	38	12	76	47	270	21	12	7.0	w193644
w193645	85	32L	10L	1.8	36	7.0L	13	6.9	7.0L	7.0	w193645
w193646	250	32L	16	6.7	41	31	9.0	11	10L	7.0L	w193646
w193647	430	32L	21	8.3	50	19	230	17	10L	7.0L	w193647
w193648	77	32L	10L	2.0	32	8.0	8.0	5.9	7.0L	7.0L	w193648
w193649	290	32L	10L	5.6	32	25	6.0	8.0	7.0L	7.0L	w193649
w193650	230	32L	10L	2.7	39	10L	8.0	8.2	7.0L	7.0L	w193650
w193651	310	32L	10L	3.6	32	9.0	7.0	6.3	7.0L	7.0L	w193651
w193652	130	32L	10L	2.7	33	12	5.0L	8.5	7.0L	7.0L	w193652
w193653	180	32L	10L	3.9	35	10	6.0	8.3	7.0L	7.0L	w193653
w193654	210	32L	10L	3.8	36	10L	5.0	3.9	7.0L	7.0L	w193654
w193655	100	32L	10L	2.8	50	7.0L	6.0	5.5	7.0L	7.0L	w193655
w193656	140	32L	10L	2.4	29	7.0L	7.0	8.4	7.0L	7.0L	w193656
w193657	260	32L	12	4.1	40	12	5.0L	11	7.0L	7.0L	w193657
w193658	360	32L	11	6.1	44	13	69	6.5	7.0L	7.0L	w193658
w193659	110	32L	10L	2.3	33	10	8.0	7.9	7.0L	7.0L	w193659
w193660	310	32L	10L	3.0	36	16	20	6.7	7.0L	7.0L	w193660
w193661	680	34	25	7.6	44	19	19	5.9	12	7.0L	w193661
w193662	360	32L	13	5.7	29	25	5.0L	8.7	7.0L	7.0L	w193662

Table 10f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Tennessee--continued

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Sample number
w193636	15L	120	110	2	670	21	12	120	210	70	w193636
w193637	320L	99	210	1	76	26	15	120	110	41	w193637
w193638	15L	230	71	3	790	26	21	120	290	400	w193638
w193639	15L	49	150	1	79	6.0	36	130	55	35	w193639
w193640	15L	150	110	4	180	50	34	210	180	100	w193640
w193641	15L	170	97	4	160	31	18	130	540	150	w193641
w193642	15L	110	180	1	76	8.0	18	140	77	47	w193642
w193643	15	89	120	1	62	9.0	26	130	110	77	w193643
w193644	15L	140	60	7	270	16	41	180	360	160	w193644
w193645	15L	74	190	1	110	4.0	12	76	72	44	w193645
w193646	15L	150	100	4	110	53	20	240	170	80	w193646
w193647	15L	110	47	6	240	10	34	130	260	150	w193647
w193648	15L	71	190	.8	200	21	23	75	69	41	w193648
w193649	320L	120	28	4	140	44	16	150	180	44	w193649
w193650	15L	91	220	.9	45	20	9	56	170	92	w193650
w193651	320L	83	240	1	110	47	14	89	77	40	w193651
w193652	15L	96	280	1	99	9.0	27	100	130	64	w193652
w193653	15L	83	66	3	120	27	27	90	270	47	w193653
w193654	320L	140	88	1	190	27	11	110	76	71	w193654
w193655	15L	85	150	1	100	14	15	120	74	55	w193655
w193656	15L	84	270	1	170	11	16	49	43	56	w193656
w193657	15L	130	320	1	72	24	14	95	49	83	w193657
w193658	15L	130	150	3	210	18	13	61	120	120	w193658
w193659	15L	79	240	.8	130	20	21	58	61	32	w193659
w193660	15L	67	44	3L	110	53	17	82	130	88	w193660
w193661	15L	120	70	6	220	74	17	150	260	140	w193661
w193662	15L	130	87	4	120	38	17	77	140	100	w193662

Table 10f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Tennessee--continued

Sample number	Pr-S (ppm)	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	U (ppm)	Sample number
w193636	68L	400L	36	31	13	880	4.8	71L	10L	9.5	w193636
w193637	68L	270L	27	18	7.0L	840	3.0	30	10L	11	w193637
w193638	68L	650	65	39	150	760	6.5	97L	10L	6.5	w193638
w193639	68L	260L	13	11	7.0L	2,900	1.2	37	10L	7.3	w193639
w193640	68L	850L	48	26	17	1,200	3.7	110L	10L	11	w193640
w193641	100	960L	54	25	7.0L	4,600G	4.2	130L	10L	8.3L	w193641
w193642	68L	190	29	16	11	3,100	2.7	40	10L	9.3	w193642
w193643	68L	280	31	16	12	2,900	2.2	44	10L	6.7	w193643
w193644	68L	790L	160	50	20	710	14	210L	10L	21	w193644
w193645	68L	260	26	11	7.0L	1,300	1.7	23	10L	6.3	w193645
w193646	68L	520L	52	37	13	1,500	7.4	110	10L	19	w193646
w193647	68L	560L	100	39	27	570	5.6	220	10L	11L	w193647
w193648	68L	170	26	11	7.0L	380	1.7	13L	10L	28	w193648
w193649	68L	640L	40	24	7.0L	600	4.0	120L	11	16	w193649
w193650	68L	220L	30	15	7.0L	350	1.8	36	27	20	w193650
w193651	68L	260L	27	18	7.0L	450	4.2	31L	10L	19	w193651
w193652	68L	180	28	14	13	1,300	2.1	32L	10L	6.4	w193652
w193653	68L	390L	33	19	29	420	2.8	83L	10L	11	w193653
w193654	100L	310L	22	21	13	930	2.6	39L	10L	6.5	w193654
w193655	68L	160	28	13	12	560	1.8	24	10L	12	w193655
w193656	68L	140	39	14	8.0	570	2.1	32L	10L	13	w193656
w193657	68L	290L	33	24	12	2,100	3.8	50	10L	29	w193657
w193658	68L	450L	42	26	37	760	3.2	97L	10L	9.7	w193658
w193659	68L	150L	30	13	10	400	1.6	24L	10L	36	w193659
w193660	68L	430L	20	17	15	540	3.3	100L	72	30	w193660
w193661	68L	820L	53	35	23	730	12	180L	10L	24	w193661
w193662	68L	480L	57	35	19	810	4.3	130L	10L	22	w193662

Table 10f.-- Major and minor oxide and trace element composition of the laboratory ash of 27 coal samples from Tennessee--continued

Sample number	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)
w193636	150	120	12	130	160
w193637	140	79	7.9	210	190
w193638	140	180	16	880	210
w193639	200	98	4.9	70	350
w193640	240	180	11	230	310
w193641	190	160	13	300	200
w193642	180	78	8.0	96	180
w193643	180	81	7.8	140	360
w193644	320	260	36	160	540
w193645	160	45	5.1	100	140
w193646	270	210	15	260	270
w193647	240	230	28	130	390
w193648	170	47	4.6	130	270
w193649	190	130	12	130	180
w193650	190	38	6.4	100	110
w193651	170	69	7.3	86	120
w193652	180	68	6.4	120	360
w193653	170	150	11	100	270
w193654	72	48	5.2	110	74
w193655	190	50	4.9	140	99
w193656	130	43	7.4	46	140
w193657	210	70	10	160	190
w193658	150	86	13	110	120
w193659	150	43	5.5	87	140
w193660	100	51	6.7	110	68
w193661	210	210	18	220	140
w193662	160	130	17	170	110

Table 10g.-- Content of 22 trace elements in 27 coal samples from Tennessee.

[Analysis performed on whole coal. Values in parts-per-million (ppm). L, less than the value shown, B, not determined.]

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w193636	3.0	10	6.7	5.8	0.1	0.23	62	0.3	0.070	5	w193636
w193637	75	19	3.4	11	.6	.38	70	.8	.13	10	w193637
w193638	1.0	13	4.4	11	1.4	.20	34	.7	.010L	7	w193638
w193639	1.0	7.0	3.4	3.8	.1	.17	110	.3	.010L	4	w193639
w193640	4.0	7.0	16	3.9	.1	.14	33	.5	.010L	4	w193640
w193641	4.0	7.0	16	3.7	.6L	.16	20L	.5	.040	4	w193641
w193642	3.0	15	3.3	11	1.4	.22	110	.6	.040	8	w193642
w193643	2.0	16	6.4	12	1.2	.25	75	.9	.050	8	w193643
w193644	1.0L	5.0	4.0	4.5	.4L	.17	20L	.3	.010L	2	w193644
w193645	14	23	5.2	24	3.0	.31	170	1.2	.010L	13	w193645
w193646	2.0	9.0	2.1	5.2	.1	.18	58	.3	.010L	4	w193646
w193647	1.0L	5.0	3.6	3.2	.3L	.15	20L	.3	.010L	2	w193647
w193648	30	32	6.3	30	2.0	.47	160	1.4	.18	17	w193648
w193649	6.0	6.0	4.4	3.7	.3	.14	20L	.2	.020	3	w193649
w193650	50	18	11	16	1.5	.30	49	.9	.44	10	w193650
w193651	160	17	3.6	8.4	.5	.35	43	.6	.28	8	w193651
w193652	5.0	17	7.1	14	1.1	.25	58	.8	.010	9	w193652
w193653	1.0	6.0	4.6	4.3	.1	.14	26	.3	.010L	3	w193653
w193654	51	19	5.8	6.5	.5	.29	20L	.3	.49	11	w193654
w193655	13	24	5.4	24	1.4	.46	200	.9	.16	14	w193655
w193656	9.0	16	2.9	14	.6	.23	47	.8	.12	8	w193656
w193657	48	19	3.6	9.9	.3	.33	110	.9	.13	10	w193657
w193658	8.0	7.0	2.0	4.6	.1	.19	41	.2	.040	4	w193658
w193659	9.0	20	3.3	17	1.0	.29	61	1.0	.11	10	w193659
w193660	61	4.0	1.4	2.0	.1	.09	20L	.2	.41	2	w193660
w193661	1.1	4.0	3.0	2.7	.3L	.13	20L	.1	.040	2	w193661
w193662	1.0	6.0	2.0	3.9	.1	.13	26	.2	.010	3	w193662

Table 10g.-- Content of 22 trace elements in 27 coal samples from Tennessee--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w193636	0.1	87	170	17L	0.40	1.5	4.5	1.3	0.2	3.0L	w193636
w193637	.1	160	220	27L	1.4	2.7	4.4	1.8	.3	3.0	w193637
w193638	.1	96	19	20	.20	2.0	.5	1.2	.2	3.0L	w193638
w193639	.1	160	720	21L	.30	1.1	1.3	.90	.1	3.0	w193639
w193640	.1	52	150	23L	.50	1.3	1.9	.70	.1	3.0L	w193640
w193641	.1	53	23	23L	.80	1.3	2.1	.60	.1	3.0L	w193641
w193642	.1	89	660	14	.30	2.2	.5	1.2	.2	3.0	w193642
w193643	.1	93	630	25	.80	2.8	1.2	1.4	.2	4.0	w193643
w193644	.1	30	7	11L	.70	2.2	1.7	.70	.2	3.0L	w193644
w193645	.2	250	650	46	.70	4.5	.8	1.9	.3	4.0	w193645
w193646	.1	64	220	14L	.20	1.4	1.7	1.0	.2	3.0	w193646
w193647	.1	32	B	10L	.80	1.8	2.2	.70	.1	4.0	w193647
w193648	.2	660	240	41	.70	6.2	4.4	2.6	.4	3.0L	w193648
w193649	.1	100	24	16L	.10	1.0	1.2	.60	.1	3.0L	w193649
w193650	.1	150	77	24L	1.2	3.3	3.1	1.6	.2	4.0	w193650
w193651	.1	140	110	25L	2.1	2.6	4.2	1.7	.4	3.0L	w193651
w193652	.1	110	240	17	.30	2.6	1.1	1.3	.2	3.0L	w193652
w193653	.1	69	17	14L	.10	1.2	3.6	.70	.1	3.0L	w193653
w193654	.1	100	B	24L	.60	1.7	1.1	1.6	.2	3.0L	w193654
w193655	.2	350	430	27	2.9	4.6	4.6	2.1	.3	4.0	w193655
w193656	.1	210	150	13	.20	3.7	3.2	1.3	.2	3.0L	w193656
w193657	.1	310	B	23L	1.1	2.6	4.1	1.9	.3	4.0	w193657
w193658	.1	41	B	14L	.40	1.3	3.1	.80	.1	3.0L	w193658
w193659	.1	330	110	19L	.30	3.8	3.5	1.6	.2	3.0L	w193659
w193660	.1L	38	12	13L	.80	.60	2.3	.50	.1	3.0L	w193660
w193661	.1	230	B	14L	.20	.90	1.1	.60	.2	3.0L	w193661
w193662	.1	68	86	11L	.20	1.3	1.3	.80	.1	3.0L	w193662

Table 10g.-- Content of 22 trace elements in 27 coal samples from Tennessee--continued

Sample number	U (ppm)	Yb (ppm)
w193636	0.40	0.5
w193637	1.1	.8
w193638	.20	.5
w193639	.60	.4
w193640	.30	.3
w193641	.20L	.3
w193642	.70	.6
w193643	.60	.7
w193644	.30	.5
w193645	1.1	.9
w193646	.50	.4
w193647	.20L	.5
w193648	6.6	1.1
w193649	.40	.3
w193650	2.2	.7
w193651	1.8	.7
w193652	.60	.6
w193653	.40	.4
w193654	.50	.4
w193655	1.9	.8
w193656	1.2	.7
w193657	2.3	.8
w193658	.30	.4
w193659	4.6	.7
w193660	.90	.2
w193661	.40	.3
w193662	.50	.4

Table 10h.-- Major, minor, and trace element composition of 27 coal samples from Tennessee reported on whole coal basis.

[Values in percent or parts-per-million. 22 values are from direct determinations on whole coal; all other values calculated from analyses of ash. S means analysis by emission spectrography; L, less than the value shown, N, not detected; B, not determined.]

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w193636	0.59	0.49	0.20	0.046	0.009	0.035	0.53	0.028	0.02	3.0	w193636
w193637	2.1	1.3	.14	.035	.016	.084	1.1	.079	.05	75	w193637
w193638	.59	.38	.14	.040	.010	.026	.20	.022	.03	1.0	w193638
w193639	2.0	1.3	.16	.021	.016	.068	.17	.064	.01	1.0	w193639
w193640	.50	.44	.077	.014	.005	.022	.15	.023	.02	4.0	w193640
w193641	.26	.24	.11	.024	.005	.020	.49	.009	.03	4.0	w193641
w193642	1.8	1.2	.12	.032	.009	.062	.28	.063	.02	3.0	w193642
w193643	2.1	1.3	.084	.022	.009	.075	.54	.075	.02	2.0	w193643
w193644	.25	.19	.064	.013	.003	.012	.069	.016	.02	1.0L	w193644
w193645	4.4	2.4	.20	.074	.025	.15	.72	.13	.02	14	w193645
w193646	.47	.44	.12	.017	.006	.022	.15	.019	.02	2.0	w193646
w193647	B	B	B	.017	.003	B	B	B	.02	1.0L	w193647
w193648	5.1	2.7	.20	.19	.066	.20	2.5	.17	.07	30	w193648
w193649	.36	.33	.071	.009	.010	.021	.33	.015	.02	6.0	w193649
w193650	1.8	1.4	.068	.012	.015	.092	1.9	.066	.06	50	w193650
w193651	1.3	.96	.12	.022	.014	.080	2.3	.058	.05	160	w193651
w193652	2.4	1.3	.11	.027	.011	.078	.47	.079	.02	5.0	w193652
w193653	.74	.46	.12	.014	.007	.030	.28	.032	.03	1.0	w193653
w193654	B	B	B	.015	.010	B	B	B	.04	51	w193654
w193655	3.6	2.7	.21	.042	.035	.14	.61	.13	.05	13	w193655
w193656	1.8	1.4	.16	.026	.021	.079	1.2	.085	.03	9.0	w193656
w193657	B	B	B	.023	.031	B	B	B	.04	48	w193657
w193658	B	B	B	.034	.004	B	B	B	.02	8.0	w193658
w193659	2.6	1.7	.17	.021	.033	.11	1.4	.11	.06	9.0	w193659
w193660	.27	.22	.049	.008	.004	.025	.99	.008	.03	61	w193660
w193661	B	B	B	.010	.023	B	B	B	.03	1.1	w193661
w193662	.35	.40	.11	.018	.007	.019	.14	.017	.02	1.0	w193662

Table 10h.-- Major, minor, and trace element composition of 27 coal samples from Tennessee reported on whole coal basis--continued

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Sample number
w193636	42G	34	0.8	0.11	10	6.7	5.8	0.1	10	1.3L	w193636
w193637	44	90	1.4	.20	19	3.4	11	.6	27	3.2L	w193637
w193638	22	16	.9	.05	13	4.4	11	1.4	99	1.0L	w193638
w193639	30	64	1.6	.01	7.0	3.4	3.8	.1	11	2.6L	w193639
w193640	27G	25	.9	.14	7.0	16	3.9	.1	9.7	.9L	w193640
w193641	H	31	1.1	.03	7.0	16	3.7	.6L	7.9	.8L	w193641
w193642	17	90	1.4	.02	15	3.3	11	1.4	11	2.4L	w193642
w193643	14	120	2.3	.02	16	6.4	12	1.2	12	2.9L	w193643
w193644	14G	14	1.2	.01	5.0	4.0	4.5	.4L	6.4	.7	w193644
w193645	47	130	1.9	.02	23	5.2	24	3.0	15	5.6L	w193645
w193646	27G	21	.6	.06	9.0	2.1	5.2	.1	6.8	.9L	w193646
w193647	18G	11	1.2	.02	5.0	3.6	3.2	.3L	7.7	.6L	w193647
w193648	72	140	2.4	.41	32	6.3	30	2.0	18	7.6L	w193648
w193649	25G	22	.5	.02	6.0	4.4	3.7	.3	7.3	.8L	w193649
w193650	52	21	1.8	.08	18	11	16	1.5	25	3.5L	w193650
w193651	46	54	1.6	.09	17	3.6	8.4	.5	30	3.1L	w193651
w193652	29	58	1.0	.02	17	7.1	14	1.1	12	3.0L	w193652
w193653	23	17	1.2	.04	6.0	4.6	4.3	.1	6.5	1.2L	w193653
w193654	H	34	.6	.04	19	5.8	6.5	.5	16	2.5L	w193654
w193655	62	140	1.8	.15	24	5.4	24	1.4	16	5.2L	w193655
w193656	41	46	1.8	.07	16	2.9	14	.6	13	3.0L	w193656
w193657	50	71	1.0	.11	19	3.6	9.9	.3	21	2.6L	w193657
w193658	20	24	.9	.06	7.0	2.0	4.6	.1	11	1.0L	w193658
w193659	55	56	1.4	.07	20	3.3	17	1.0	14	4.1L	w193659
w193660	H	8	.5	.07	4.0	1.4	2.0	.1	9.3	1.0L	w193660
w193661	17G	14	.6	.11	4.0	3.0	2.7	.3L	12	.6	w193661
w193662	23G	18	.5	.10	6.0	2.0	3.9	.1	8.3	.7L	w193662

Table 10h.-- Major, minor, and trace element composition of 27 coal samples from Tennessee reported on whole coal basis--continued

Sample number	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	In-S (ppm)	Sample number
w193636	0.4L	0.23	62	1.1	0.92	0.21L	0.3	0.070	0.42L	0.29L	w193636
w193637	1.3	.38	70	3.0	1.2	.61	.8	.13	.71L	.71L	w193637
w193638	.3L	.20	34	.8	.90	.16L	.7	.010L	.31L	.22L	w193638
w193639	.8L	.17	110	2.5	.90	.41L	.3	.010L	.57L	.57L	w193639
w193640	.5	.14	33	1.2	.73	1.4	.5	.010L	.27L	.19L	w193640
w193641	.4	.16	20L	1.2	.53	1.8	.5	.040	.17L	.17L	w193641
w193642	.8L	.22	110	2.6	.75	.68	.6	.040	.53L	.53	w193642
w193643	.9	.25	75	3.2	1.1	1.2	.9	.050	.63L	.63L	w193643
w193644	.5	.17	20L	1.1	.66	3.8	.3	.010L	.17	.10	w193644
w193645	1.8L	.31	170	6.3	1.2L	2.3	1.2	.010L	1.2L	1.2	w193645
w193646	.4	.18	58	1.1	.84	.24	.3	.010L	.27L	.19L	w193646
w193647	.4	.15	20L	.9	.34	4.1	.3	.010L	.18L	.13L	w193647
w193648	2.4L	.47	160	7.6	1.9	1.9	1.4	.18	1.7L	1.7L	w193648
w193649	.3L	.14	20L	.8	.63	.15	.2	.020	.18L	.18L	w193649
w193650	1.1L	.30	49	4.3	1.1L	.88	.9	.44	.77L	.77L	w193650
w193651	1.0L	.35	43	3.1	.86	.67	.6	.28	.67L	.67L	w193651
w193652	.9L	.25	58	3.1	1.1	.47L	.8	.010	.66L	.66L	w193652
w193653	.4L	.14	26	1.3	.36	.22	.3	.010L	.25L	.25L	w193653
w193654	.8L	.29	20L	2.8	.77L	.39	.3	.49	.54L	.54L	w193654
w193655	1.6L	.46	200	8.2	1.1L	.98	.9	.16	1.1L	1.1L	w193655
w193656	1.0L	.23	47	2.8	.67L	.67	.8	.12	.67L	.67L	w193656
w193657	1.0	.33	110	3.2	.96	.40L	.9	.13	.56L	.56L	w193657
w193658	.3	.19	41	1.4	.40	2.1	.2	.040	.22L	.22L	w193658
w193659	1.3L	.29	61	4.2	1.3	1.0	1.0	.11	.89L	.89L	w193659
w193660	.3L	.09	20L	1.1	.48	.60	.2	.41	.21L	.21L	w193660
w193661	.4	.13	20L	.7	.32	.32	.1	.040	.20	.12L	w193661
w193662	1.3	.13	26	.7	.58	.12L	.2	.010	.16L	.16L	w193662

Table 10h.-- Major, minor, and trace element composition of 27 coal samples from Tennessee reported on whole coal basis--continued.

Sample number	Ir-S (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Sample number
w193636	0.63L	5	4.6	0.1	28	0.88	0.50	5.0	8.8	170	w193636
w193637	32L	10	21	.1	7.7	2.6	1.5	12	11	220	w193637
w193638	.47L	7	2.2	.1	24	.81	.65	3.7	9.0	19	w193638
w193639	1.2L	4	12	.1	6.5	.49	3.0	11	4.5	720	w193639
w193640	.41L	4	3.0	.1	4.9	1.4	.92	5.7	4.9	150	w193640
w193641	.36L	4	2.3	.1	3.8	.74	.43	3.1	13	23	w193641
w193642	1.1L	8	14	.1	5.7	.60	1.4	11	5.8	660	w193642
w193643	1.4	8	11	.1	5.6	.81	2.3	12	9.9	630	w193643
w193644	.21L	2	.8	.1	3.8	.22	.57	2.5	5.0	7	w193644
w193645	2.6L	13	33	.2	19	.70	2.1	13	13	650	w193645
w193646	.41L	4	2.7	.1	3.0	1.4	.54	6.5	4.6	220	w193646
w193647	.27L	2	.8	.1	4.3	.18	.61	2.3	4.7	B	w193647
w193648	3.6L	17	45	.2	48	5.0	5.5	18	16	240	w193648
w193649	8.0L	3	.7	.1	3.5	1.1	.40	3.8	4.5	24	w193649
w193650	1.7L	10	24	.1	5.0	2.2	.99	6.2	19	77	w193650
w193651	31L	8	23	.1	11	4.5	1.3	8.5	7.4	110	w193651
w193652	1.4L	9	26	.1	9.3	.85	2.5	9.4	12	240	w193652
w193653	.54L	3	2.4	.1	4.3	.97	.97	3.2	9.7	17	w193653
w193654	25L	11	6.8	.1	15	2.1	.85	8.5	5.9	B	w193654
w193655	2.5L	14	25	.2	16	2.3	2.5	20	12	430	w193655
w193656	1.4L	8	26	.1	16	1.0	1.5	4.7	4.1	150	w193656
w193657	1.2L	10	26	.1	5.8	1.9	1.1	7.6	3.9	B	w193657
w193658	.47L	4	4.7	.1	6.5	.56	.40	1.9	3.7	B	w193658
w193659	1.9L	10	30	.1	17	2.5	2.7	7.4	7.7	110	w193659
w193660	.45L	2	1.3	.1L	3.3	1.6	.51	2.5	3.9	12	w193660
w193661	.26L	2	1.2	.1	3.7	1.3	.29	2.6	4.4	B	w193661
w193662	.35L	3	2.0	.1	2.8	.87	.39	1.8	3.2	86	w193662

Table 10h.-- Major, minor, and trace element composition of 27 coal samples from Tennessee reported on whole coal basis--continued

Sample number	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Sample number
w193636	2.9	2.9L	17L	0.40	1.5	4.5	1.3	0.55	37	0.2	w193636
w193637	4.1	6.9L	27L	1.4	2.7	4.4	1.8	.71L	85	.3	w193637
w193638	12	2.1L	20	.20	2.0	.5	1.2	4.7	24	.2	w193638
w193639	2.9	5.6L	21L	.30	1.1	1.3	.90	.57L	240	.1	w193639
w193640	2.7	1.8L	23L	.50	1.3	1.9	.70	.46	32	.1	w193640
w193641	3.6	2.4	23L	.80	1.3	2.1	.60	.17L	110G	.1	w193641
w193642	3.5	5.1L	14	.30	2.2	.5	1.2	.83	230	.2	w193642
w193643	6.9	6.1L	25	.80	2.8	1.2	1.4	1.1	260	.2	w193643
w193644	2.2	1.0L	11L	.70	2.2	1.7	.70	.28	9.9	.2	w193644
w193645	7.7	12L	46	.70	4.5	.8	1.9	1.2L	230	.3	w193645
w193646	2.2	1.8L	14L	.20	1.4	1.7	1.0	.35	41	.2	w193646
w193647	2.7	1.2L	10L	.80	1.8	2.2	.70	.49	10	.1	w193647
w193648	9.8	16L	41	.70	6.2	4.4	2.6	1.7L	91	.4	w193648
w193649	1.1	1.7L	16L	.10	1.0	1.2	.60	.18L	15	.1	w193649
w193650	10	7.5L	24L	1.2	3.3	3.1	1.6	.77L	39	.2	w193650
w193651	3.8	6.5L	25L	2.1	2.6	4.2	1.7	.67L	43	.4	w193651
w193652	6.0	6.4L	17	.30	2.6	1.1	1.3	1.2	120	.2	w193652
w193653	1.7	2.4L	14L	.10	1.2	3.6	.70	1.0	15	.1	w193653
w193654	5.5	7.7L	24L	.60	1.7	1.1	1.6	1.0	72	.2	w193654
w193655	9.0	11L	27	2.9	4.6	4.6	2.1	2.0	92	.3	w193655
w193656	5.3	6.5L	13	.20	3.7	3.2	1.3	.76	54	.2	w193656
w193657	6.6	5.4L	23L	1.1	2.6	4.1	1.9	.96	170	.3	w193657
w193658	3.7	2.1L	14L	.40	1.3	3.1	.80	1.1	24	.1	w193658
w193659	4.1	8.6L	19L	.30	3.8	3.5	1.6	1.3	51	.2	w193659
w193660	2.6	2.0L	13L	.80	.60	2.3	.50	.45	16	.1	w193660
w193661	2.4	1.2L	14L	.20	.90	1.1	.60	.39	12	.2	w193661
w193662	2.3	1.6L	11L	.20	1.3	1.3	.80	.44	19	.1	w193662

Table 10h.-- Major, minor, and trace element composition of 27 coal samples from Tennessee reported on whole coal basis--continued

Sample number	Th (ppm)	Tl-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w193636	3.0L	0.42L	0.40	6.3	5.0	0.5	5.5	6.7	w193636
w193637	3.0	1.0L	1.1	14	8.0	.8	21	19	w193637
w193638	3.0L	.31L	.20	4.3	5.6	.5	27	6.5	w193638
w193639	3.0	.82L	.60	16	8.0	.4	5.7	29	w193639
w193640	3.0L	.27L	.30	6.5	4.9	.3	6.2	8.4	w193640
w193641	3.0L	.24L	.20L	4.6	3.8	.3	7.2	4.8	w193641
w193642	3.0	.75L	.70	14	5.9	.6	7.2	14	w193642
w193643	4.0	.90L	.60	16	7.3	.7	13	32	w193643
w193644	3.0L	.14L	.30	4.5	3.6	.5	2.2	7.6	w193644
w193645	4.0	1.8L	1.1	28	7.9	.9	18	25	w193645
w193646	3.0	.27L	.50	7.3	5.7	.4	7.0	7.3	w193646
w193647	4.0	.18L	.20L	4.3	4.1	.5	2.3	7.0	w193647
w193648	3.0L	2.4L	6.6	41	11	1.1	31	65	w193648
w193649	3.0L	.28	.40	4.8	3.3	.3	3.3	4.5	w193649
w193650	4.0	3.0	2.2	21	4.2	.7	11	12	w193650
w193651	3.0L	.96L	1.8	16	6.6	.7	8.3	12	w193651
w193652	3.0L	.94L	.60	17	6.4	.6	11	34	w193652
w193653	3.0L	.36L	.40	6.1	5.4	.4	3.6	9.7	w193653
w193654	3.0L	.77L	.50	5.5	3.7	.4	8.5	5.7	w193654
w193655	4.0	1.6L	1.9	31	8.2	.8	23	16	w193655
w193656	3.0L	.95L	1.2	12	4.1	.7	4.4	13	w193656
w193657	4.0	.80L	2.3	17	5.6	.8	13	15	w193657
w193658	3.0L	.31L	.30	4.7	2.7	.4	3.4	3.7	w193658
w193659	3.0L	1.3L	4.6	19	5.5	.7	11	18	w193659
w193660	3.0L	2.2	.90	3.0	1.5	.2	3.3	2.0	w193660
w193661	3.0L	.17L	.40	3.6	3.6	.3	3.7	2.4	w193661
w193662	3.0L	.23L	.50	3.7	3.0	.4	3.9	2.5	w193662

Summary of analytical data from 20 Alabama bituminous coal samples

Data on 12 Alabama coal samples were reported by Swanson and others (1976). The generalized distribution of the 20 samples of this report is shown on figure 9. The 20 samples were obtained from 6 different coal beds. Nine samples from the Pratt-Corona bed constitute the largest number of samples collected from a single bed. Statistical data on these samples is presented in tables 11a, b, and c. The descriptive table is 11d, the analytical data are presented in tables 11e, f, g, and h.

In the following three paragraphs the geometric means of analytical data on Alabama coal samples are compared to the means for all samples of this report.

Comparison of the geometric means of these 20 samples with all the samples of this report (table 11a) shows that the means for ultimate and proximate are almost identical. Only the ash is significantly higher and the moisture lower in the Alabama coal samples. The sulfur, forms of sulfur and Btu values are also similar. The fusion temperatures are slightly higher for Alabama coal ash.

Comparison of the means for major and minor ash forming oxides (table 11b) shows higher values for SiO_2, Al_2O_3, TiO_2, and P_2O_5 in Alabama coal ash. The means for other oxides are similar.

The means for the trace elements (table 11c) As, B, Ba, Ce, Cr, Cu, F, Hg, Li, Mo, Nb, Sc, Se, Sr, U, V, Zr and rare earths are significantly higher in Alabama coals. Only Zn is significantly lower in Alabama coals. Other elements have similar means in the two sets of data. The reason for the higher means for so many of these elements is that most coal beds in Alabama are relatively thin. Zubovic (1966) discussed the reasons thin bedded coals are commonly enriched in their trace element content.

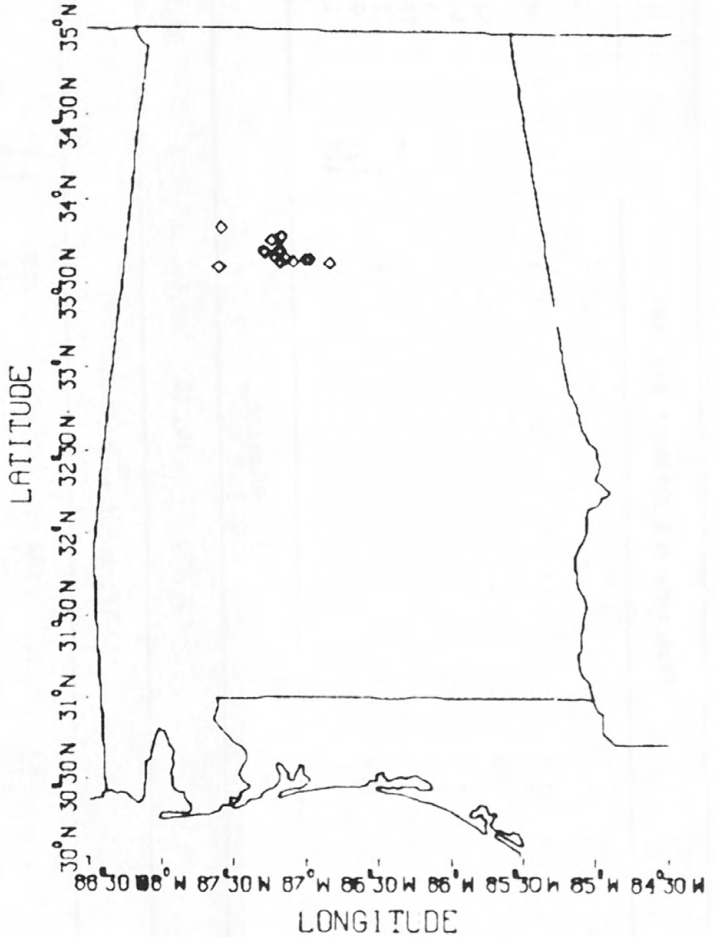

Figure 9 -- Distribution of Alabama coal samples.

Table 11a.--Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, ash-fusion temperatures and free swelling index of 20 coal samples from Alabama.

[All values are in percent except Btu/lb, ash-fusion temperatures, and free swelling index and are reported on the as-received basis. °F = 9/5°C + 32; Kcal/kg = 0.556 (Btu/lb). - Leaders (---) indicate no data.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	1.93	.9	5.3	1.8	1.5	3.3
Volatile matter	31.5	25	39.4	31.4	1.1	31.9
Fixed carbon	53.8	44	68.7	53.5	1.1	52.2
Ash	12.8	5.4	23.9	11.8	1.5	8.8
Hydrogen	5	4.4	5.6	5	1.1	5.2
Carbon	71	60	82	70.8	1.1	70.5
Nitrogen	1.4	.8	1.7	1.3	1.2	1.3
Oxygen	8.3	4.6	15.8	8	1.3	9.3
Sulfur	1.5	.4	3.1	1.6	1.6	1.5
Heat of combustion						
Btu/lb	12,700	10,870	14,550	12,660	1.1	12,590
Forms of sulfur						
Sulfate	.03	.02	.1	.03	1.8	.07
Pyritic	.77	.17	2.1	.66	1.8	.65
Organic	.72	.13	1	.67	1.6	.80
Ash fusion temperature °C						
Initial deformation	1,270	1,110	1,420	1,260	1.1	1,240
Softening temperature	1,340	1,180	1,480	1,340	1.1	1,290
Fluid temperature	1,420	1,240	1,540	1,410	1.1	1,350
Free Swelling Index	5.9	1	9	4.9	2.0	4.3

Table 11b.--Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of eleven major and minor oxides in the laboratory ash of 20 coal samples from Alabama.

[All samples were ashed at 525°C; all analyses except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
(Ash)	13.9	5.1	27.9	12.6	1.6	9.46
SiO_2	48	32	57	48	1.2	42
Al_2O_3	30	24	35	30	1.1	23
CaO	1.2	.3	3.1	.97	1.9	1.3
MgO	.87	.46	1.5	.83	1.4	.78
MnO	.02	.01	.08	.01	1.7	.02
Na_2O	.54	.23	1.4	.46	1.7	.44
K_2O	1.8	.9	2.9	1.7	1.4	1.6
Fe_2O_3	13	2.8	26	11	1.8	11
TiO_2	1.5	1.1	2	1.5	1.2	1.13
P_2O_5	.75	.1	2.9	.51	2.4	.17
SO_3	2	1.1	5.4	1.8	1.5	2.03

Table 11c.--Arithmetic mean, observed range, geometric mean, and geometric deviation of 38 elements in 20 coal samples from Alabama.

[All analyses are in percent or parts per million and are reported on a whole-coal basis. Leaders (---) indicate means could not be calculated because an insufficient number of analyses were above the detection limit.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Ag	.09	.03	.26	.08	1.8	.05
As	26	2.3	96	17	2.5	7.4
B	35	7.4	92	30	1.8	21
Ba	200	46	640	160	1.9	56
Be	2.5	.56	3.8	2.4	1.5	2.4
Cd	.08	.03	.15	.07	1.5	.08
Ce	27	14	48	25	1.5	15
Co	5.8	2.4	11	5.5	1.4	5.5
Cr	21	9.1	40	19	1.5	14
Cs	1.5	.6	2.8	1.4	1.6	.75
Cu	24	11	48	21	1.7	14
Eu	.49	.21	.96	.46	1.5	.31
F	100	28	190	90	1.7	64
Ga	7.8	1.8	15	6.9	1.6	5.1
Ge	5.6	.28	35	2.6	3.3	2.9
Hf	1.2	.40	2.1	1.1	1.6	.65
Hg	.23	.01	.71	.18	2.1	.10
La	15	6	26	14	1.5	7.8
Li	48	10	120	35	2.3	12
Lu	.18	.1	.3	.17	1.4	.14
Mn	13	2.8	31	12	1.6	14
Mo	4.2	.75	13	3.5	1.9	1.8
Nb	4.2	.79	10	3.5	1.9	1.9
Nd	21	7.1	49	18	1.6	9.8
Ni	13	4.1	24	11	1.6	12
Pb	6.1	1.1	16	5.2	1.8	5.9
Sb	1.6	.31	7.8	1.1	2.2	.69
Sc	4.9	1.7	9.4	4.6	1.4	3.1
Se	3.9	1	6.8	3.4	1.8	2.9
Sm	2.2	1.2	3.8	2.1	1.4	1.5
Sr	190	53	470	150	2.1	57
Tb	.33	.1	.6	.31	1.5	.26
U	2.1	.76	6.5	1.8	1.7	1.2
V	33	9.2	70	29	1.6	17
Y	12	4.6	24	11	1.5	7.2
Yb	1	.5	1.5	.95	1.4	.74
Zn	8.4	4	31	7.6	1.5	13
Zr	60	13	150	49	1.9	20

Table 11d Descriptions for 20 bituminous coal samples from Alabama

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w191070	alabama	fayette	333630n	873630w	pottsville	pratt-corona	run of mine	55.0
w191071	alabama	fayette	335025n	873540w	pottsville	pratt-corona	channel	10.0
w191072	alabama	walker	334215n	871730w	pottsville	pratt-corona	channel	24.0
w191073	alabama	jefferson	333923n	865830w	pottsville	pratt-corona	channel	36.0
w191074	alabama	walker	334133n	871115w	pottsville	pratt-corona	channel	26.0
w191075	alabama	walker	333823n	871113w	pottsville	pratt-corona	channel	24.0
w191076	alabama	jefferson	333823n	870538w	pottsville	pratt-corona	channel	48.0
w191077	alabama	jefferson	333900n	870010w	pottsville	pratt-corona	channel	30.0
w191078	alabama	jefferson	333802n	865020w	pottsville	pratt-corona	channel	24.0
w191290	alabama	walker	334720n	871022w	pottsville	mary lee	channel	24.0
w191291	alabama	walker	334714n	871022w	pottsville	new castle	channel	2.0
w191292	alabama	walker	334558n	871435w	pottsville	mary lee	channel	24.0
w191293	alabama	walker	334558n	871435w	pottsville	mary lee	channel	24.0
w191294	alabama	walker	334138n	871720w	pottsville	america	channel	33.0
w191936	alabama	walker	333940n	871250w	pottsville	pratt	channel	34.0
w191937	alabama	walker	334226n	871105w	pottsville	american	channel	28.0
w191938	alabama	walker	334226n	871105w	pottsville	nickle plate	channel	13.0
w191939	alabama	walker	333815n	871054w	pottsville	pratt	channel	24.0
w191940	alabama	walker	333939n	870830w	pottsville	pratt	channel	28.0
w191941	alabama	walker	333928n	870830w	pottsville	american	channel	31.0

Table 11e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 18 coal samples from Alabama

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in percent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section Department of Energy, Pittsburgh, Pa. B means not determined. O for ash fusion temperature means greater than 1600°C.

		Proximate Analysis			Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191070	1.7	30.1	44.3	23.9	4.4	60.3	1.4	8.1	1.9	6,040	10,870
	---	30.6	45.1	24.3	4.3	61.3	1.4	6.7	1.9	6,140	11,060
	---	40.5	59.5	---	5.7	81.0	1.9	8.9	2.6	8,120	14,610
w191071	2.4	39.4	50.7	7.5	5.6	73.3	1.4	10.2	2.0	7,380	13,290
	---	40.4	51.9	7.7	5.5	75.1	1.4	8.3	2.0	7,560	13,620
	---	43.7	56.3	---	5.9	81.4	1.6	9.0	2.2	8,190	14,750
w191072	1.8	31.7	47.5	19.0	4.8	64.6	1.2	9.1	1.3	6,440	11,600
	---	32.3	48.4	19.3	4.7	65.8	1.2	7.6	1.3	6,560	11,810
	---	40.0	60.0	---	5.8	81.6	1.5	9.5	1.6	8,140	14,650
w191073	5.3	28.9	55.2	10.6	4.6	67.1	1.0	15.8	.9	6,430	11,570
	---	30.5	58.3	11.2	4.2	70.9	1.1	11.7	1.0	6,790	12,220
	---	34.4	65.6	---	4.8	79.8	1.2	13.2	1.1	7,640	13,760
w191074	1.5	37.0	55.7	5.8	5.4	77.1	1.5	8.2	2.0	7,770	13,980
	---	37.6	56.5	5.9	5.3	78.3	1.5	7.0	2.0	7,880	14,190
	---	39.9	60.1	---	5.6	83.2	1.6	7.4	2.2	8,380	15,080
w191075	1.4	30.6	50.1	17.9	4.9	67.1	1.3	7.2	1.6	6,690	12,040
	---	31.0	50.8	18.2	4.8	68.1	1.3	6.0	1.6	6,780	12,210
	---	37.9	62.1	---	5.9	83.1	1.6	7.4	2.0	8,290	14,920
w191076	.9	25.0	68.7	5.4	5.1	82.0	1.4	5.0	1.1	8,080	14,550
	---	25.2	69.3	5.4	5.0	82.7	1.4	4.2	1.1	8,160	14,680
	---	26.7	73.3	---	5.3	87.5	1.5	4.5	1.2	8,630	15,530
w191077	.9	30.0	56.5	12.6	5.0	73.4	1.3	4.6	3.1	7,370	13,260
	---	30.3	57.0	12.7	4.9	74.1	1.3	3.8	3.1	7,430	13,380
	---	34.7	65.3	---	5.7	84.9	1.5	4.4	3.6	8,520	15,330
w191078	1.1	29.7	62.0	7.2	5.2	78.7	1.6	5.9	1.4	7,830	14,100
	---	30.0	62.7	7.3	5.1	79.6	1.6	5.0	1.4	7,920	14,260
	---	32.4	67.6	---	5.5	85.8	1.7	5.4	1.5	8,540	15,380
w191290	2.8	30.3	54.3	12.6	5.0	70.2	1.6	10.2	.4	6,880	12,390
	---	31.2	55.9	13.0	4.8	72.2	1.6	7.9	.4	7,080	12,750
	---	35.8	64.2	---	5.5	83.0	1.9	9.1	.5	8,140	14,650
w191291	1.9	36.9	51.5	9.7	5.3	72.8	1.7	9.0	1.5	7,300	13,140
	---	37.6	52.5	9.9	5.2	74.2	1.7	7.5	1.5	7,440	13,390
	---	41.7	58.3	---	5.8	82.4	1.9	8.3	1.7	8,260	14,860
w191292	2.4	31.0	50.9	15.7	4.9	67.2	1.6	9.7	.9	6,660	11,990
	---	31.8	52.2	16.1	4.7	68.9	1.6	7.8	.9	6,820	12,280
	---	37.9	62.1	---	5.7	82.1	2.0	9.2	1.1	8,130	14,640

Table 11e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 18 coal samples from Alabama--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191070	0.0	0.02	1.01	0.86	4.0	1,365	1,430	1,490
	---	.02	1.03	.87				
	---	.03	1.36	1.16				
w191071	.0	.07	1.03	.92	5.0	1,110	1,180	1,240
	---	.07	1.06	.94				
	---	.08	1.14	1.02				
w191072	.0	.07	.57	.66	4.5	1,540	0	0
	---	.07	.58	.67				
	---	.09	.72	.83				
w191073	.0	.10	.17	.64	1.0	1,120	1,195	1,255
	---	.11	.18	.68				
	---	.12	.20	.76				
w191074	.0	.02	.85	1.08	8.5	1,180	1,245	1,350
	---	.02	.86	1.10				
	---	.02	.92	1.17				
w191075	.0	.02	.94	.68	8.5	1,515	1,540	0
	---	.02	.95	.69				
	---	.02	1.16	.84				
w191076	.0	.02	.42	.71	9.0	1,540	0	0
	---	.02	.42	.72				
	---	.02	.45	.76				
w191077	.0	.09	2.11	.90	9.0	1,145	1,265	1,365
	---	.09	2.13	.91				
	---	.10	2.44	1.04				
w191078	.0	.02	.67	.75	8.5	1,405	1,475	1,530
	---	.02	.68	.76				
	---	.02	.73	.82				
w191290	.0	.02	.29	.13	1.5	1,540	0	0
	---	.02	.30	.13				
	---	.02	.34	.15				
w191291	.0	.02	.64	.80	5.0	1,420	1,480	1,530
	---	.02	.65	.82				
	---	.02	.72	.90				
w191292	.0	.02	.51	.40	1.5	1,540	0	0
	---	.02	.52	.41				
	---	.02	.62	.49				

Table 11e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 18 coal samples from Alabama--continued

		Proximate Analysis			Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191293	2.3	31.3	52.1	14.3	5.0	68.7	1.7	9.5	0.8	6,790	12,230
	---	32.0	53.3	14.6	4.9	70.3	1.7	7.6	.8	6,950	12,520
	---	37.5	62.5	---	5.7	82.4	2.0	8.9	1.0	8,150	14,660
w191294	1.9	33.0	51.7	13.4	5.0	70.0	1.6	8.5	1.5	6,940	12,490
	---	33.6	52.7	13.7	4.9	71.4	1.6	6.9	1.5	7,070	12,730
	---	39.0	61.0	---	5.7	82.6	1.9	8.0	1.8	8,190	14,750
w191936	2.5	29.3	52.6	15.6	5.0	68.2	1.2	9.1	.9	6,760	12,160
	---	30.1	53.9	16.0	4.8	69.9	1.2	7.1	.9	6,930	12,470
	---	35.8	64.2	---	5.8	83.3	1.5	8.4	1.1	8,250	14,850
w191937	1.8	26.8	51.0	20.4	4.6	63.8	.8	8.6	1.8	6,310	11,350
	---	27.3	51.9	20.8	4.5	65.0	.8	7.1	1.8	6,420	11,560
	---	34.4	65.6	---	5.7	82.0	1.0	9.0	2.3	8,100	14,590
w191938	1.7	34.3	56.4	7.6	5.6	76.0	.9	8.3	1.6	7,570	13,630
	---	34.9	57.4	7.7	5.5	77.3	.9	6.9	1.6	7,700	13,870
	---	37.8	62.2	---	6.0	83.8	1.0	7.5	1.8	8,350	15,030
w191939	1.2	34.2	55.9	8.7	5.3	76.7	1.4	5.8	2.1	7,630	13,740
	---	34.6	56.6	8.8	5.2	77.6	1.4	4.8	2.1	7,730	13,910
	---	38.0	62.0	---	5.7	85.1	1.6	5.3	2.3	8,470	15,250
w191940	1.7	33.1	51.3	13.9	5.2	70.9	1.1	7.1	1.8	7,110	12,800
	---	33.7	52.2	14.1	5.1	72.1	1.1	5.7	1.8	7,230	13,020
	---	39.2	60.8	---	5.9	84.0	1.3	6.6	2.1	8,430	15,170
w191941	1.4	28.3	56.9	13.4	4.9	72.0	1.4	6.5	1.8	7,140	12,850
	---	28.7	57.7	13.6	4.8	73.0	1.4	5.3	1.8	7,240	13,030
	---	33.2	66.8	---	5.6	84.5	1.6	6.2	2.1	8,380	15,080

Table 11e.-- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 18 coal samples from Alabama--continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°.		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191293	0.0	0.02	0.38	0.39	2.0	1,540	0	0
	---	.02	.39	.40				
	---	.02	.46	.47				
w191294	.0	.02	.67	.77	4.5	1,505	1,540	0
	---	.02	.68	.78				
	---	.02	.79	.91				
w191936	.0	.02	.30	.63	7.5	1,540	0	0
	---	.02	.31	.65				
	---	.02	.37	.77				
w191937	.0	.02	1.13	.69	3.0	1,540	0	0
	---	.02	1.15	.70				
	---	.03	1.45	.89				
w191938	.0	.02	.79	.81	7.5	1,320	1,390	1,450
	---	.02	.80	.82				
	---	.02	.87	.89				
w191939	.0	.02	1.21	.90	9.0	1,195	1,315	1,415
	---	.02	1.22	.91				
	---	.02	1.34	1.00				
w191940	.0	.02	.75	1.01	9.0	1,400	1,470	1,540
	---	.02	.76	1.03				
	---	.02	.89	1.20				
w191941	.0	.02	1.02	.74	8.5	1,505	1,540	0
	---	.02	1.03	.75				
	---	.02	1.20	.87				

Table 11f.-- Major and minor oxide and trace element composition of the laboratory ash of 20 coal samples from Alabama

[Values in percent or parts-per-million. Coal ashed at 525°C. L means less than the value shown; N, not detected; B, not determined; S after element title indicates determinations by automatic plate reading computer assisted, emission spectographic analyses. The standard deviation of any single answer should be taken as plus 50% and minus 35%. Methods of analyses for other elements as shown in figures.]

Sample number	Ash (percent)	SiO_2 (percent)	Al_2O_3 (percent)	CaO (percent)	MgO (percent)	Na_2O (percent)	K_2O (percent)	Fe_2O_3 (percent)	TiO_2 (percent)	P_2O_5 (percent)	Sample number
w191070	27.9	52	29	2.3	1.5	1.0	2.9	8.6	1.4	0.30	w191070
w191071	8.0	41	24	1.2	1.2	.63	1.3	26	1.5	1.6	w191071
w191072	21.2	56	31	.90	1.1	.65	1.3	5.5	1.8	.90	w191072
w191073	11.4	43	25	2.2	.81	.61	2.4	22	1.3	.10	w191073
w191074	5.1	32	30	3.1	1.0	1.4	.90	22	1.1	2.4	w191074
w191075	17.4	51	29	.80	.94	.74	1.5	13	1.7	.30	w191075
w191076	6.2	47	34	.90	.91	1.0	2.1	12	1.4	.40	w191076
w191077	14.1	43	25	1.9	1.1	.66	.90	23	1.7	1.2	w191077
w191078	7.4	44	29	1.7	1.1	.65	1.7	16	1.4	.70	w191078
w191290	13.0	57	31	.30	1.0	.24	2.5	2.8	1.5	.20	w191290
w191291	11.3	54	29	.70	.61	.37	2.7	9.8	1.5	.20	w191291
w191292	16.5	55	28	.40	1.0	.39	2.3	6.4	1.4	.20	w191292
w191293	14.6	57	30	.60	.46	.25	2.3	5.7	1.4	.50	w191293
w191294	14.4	41	35	1.8	.51	.30	1.5	9.3	1.9	2.9	w191294
w191936	20.8	56	31	.50	.56	.30	1.4	5.8	1.5	.40	w191936
w191937	22.0	46	35	.70	.90	.23	2.4	10	1.7	1.0	w191937
w191938	7.9	47	29	.70	.60	.43	1.8	17	1.2	.20	w191938
w191939	9.3	44	28	1.5	.66	.40	1.4	20	1.5	.50	w191939
w191940	13.7	52	29	.80	.76	.25	1.4	11	1.8	.30	w191940
w191941	15.1	48	33	.50	.66	.25	2.0	11	2.0	.80	w191941

Table 11f.-- Major and minor oxide and trace element composition of the laboratory ash of 20 coal samples from Alabama--continued

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Sample number
w191070	2.4	0.37	330	1,100	11	0.50	170	23	140	10	w191070
w191071	2.2	.35	1,000G	570	31	.84	180	43	260	18	w191071
w191072	1.4	.48	270	1,700	13	.38	190	31	140	8.5	w191072
w191073	4.0	.38	130	1,400	16	.60	180	21	150	9.6	w191073
w191074	5.4	.86	680	2,200	11	1.4	290	110	180	20	w191074
w191075	1.6	.54	180	990	14	.56	160	30	130	8.6	w191075
w191076	1.7	2.7	120	1,600	35	2.4	320	69	200	11	w191076
w191077	1.9	.37	120	2,100	12	.70	210	26	130	5.7	w191077
w191078	1.8	.89	150	1,200	21	1.1	280	55	180	11	w191078
w191290	1.1	.11L	290	720	17	.28	220	83	140	18	w191290
w191291	1.4	.11L	360	860	29	.40	140	36	130	19	w191291
w191292	1.5	.11L	330	740	11	.24	150	44	120	15	w191292
w191293	1.3	.11L	260	400	13	.32	180	52	130	14	w191293
w191294	2.0	.71	330	2,500	25	.94	280	53	220	9.0	w191294
w191936	1.1	.31	220	1,200	14	.16	180	19	120	8.7	w191936
w191937	1.2	.95	160	2,900	17	.44	210	36	160	12	w191937
w191938	1.6	.94	330	1,700	48	.82	190	110	130	10	w191938
w191939	2.6	.49	290	1,300	25	.94	200	55	130	6.5	w191939
w191940	1.8	.46	210	1,600	21	.52	170	36	140	7.3	w191940
w191941	1.1	1.7	170	1,600	23	.74	210	44	170	11	w191941

Table 11f.-- Major and minor oxide and trace element composition of the laboratory ash of 20 coal samples from Alabama--continued

Sample number	Cu (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Sample number
w191070	160	10L	3.4	47	13	4.6L	7.2	86	360	0.7	w191070
w191071	160	12	2.6	140	6.8L	440	8.8	75	140	3	w191071
w191072	130	10L	3.2	62	12	5.1	9.9	99	460	.9	w191072
w191073	100	10L	2.6	48	6.8L	58	8.8	96	260	.9	w191073
w191074	280	11	5.1	36	18	5.5	9.8	180	210	2	w191074
w191075	160	11	3.1	55	14	6.9	9.2	80	410	1	w191075
w191076	670	22	7.3	73	39	22	8.1	160	290	3	w191076
w191077	120	10L	3.7	64	19	18	9.2	110	330	1	w191077
w191078	360	18	5.5	76	27	12	9.5	160	170	1	w191078
w191290	98	11L	3.1	31	7.8L	5.2L	10	120	270	.8	w191290
w191291	130	11L	3.0	52	7.8L	40	8.0	80	220	2	w191291
w191292	65	11L	2.8	33	7.8L	5.2L	8.5	85	340	1	w191292
w191293	78	11L	3.0	34	7.8L	5.2L	8.9	96	320	1	w191293
w191294	320	13	5.3	46	14	8.8	8.3	150	340	1	w191294
w191936	68	18L	2.6	43	12L	8.4L	8.7	110	490	1	w191936
w191937	220	18L	3.9	70	16	16	7.7	120	560	1	w191937
w191938	270	18L	3.9	86	16	110	5.1	89	130	3	w191938
w191939	210	18L	4.6	44	17	8.4L	8.6	120	120	1	w191939
w191940	110	18L	2.6	65	12L	38	10	88	320	1	w191940
w191941	310	18L	3.8	72	22	8.4L	9.9	130	360	1	w191941

Table 11f.-- Major and minor oxide and trace element composition of the laboratory ash of 20 coal samples from Alabama--continued

Sample number	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sample number
w191070	110	26	27	130	74	40	68L	180L	31	11	w191070
w191071	130	100	42	120	87	34	68L	290L	60	15	w191071
w191072	60	15	47	230	98	43	68L	150L	30	16	w191072
w191073	100	30	50	140	36	28	72	170L	32	15	w191073
w191074	230	45	16	140	150	22	68L	490L	33	27	w191074
w191075	64	23	49	140	81	37	68L	140L	30	13	w191075
w191076	44	48	31	310	180	73	68L	260L	68	35	w191076
w191077	140	15	26	81	75	30	68L	160L	29	17	w191077
w191078	130	90	37	280	140	63	68L	260L	46	27	w191078
w191290	77	2.5L	18	110	58	40	78L	210	28	17	w191290
w191291	120	6.6	24	100	54	26	78L	210	36	14	w191291
w191292	120	9.8	27	110	54	35	78L	150	25	13	w191292
w191293	90	13	27	130	62	35	78L	180	26	14	w191293
w191294	77	39	32	260	110	74	78L	190L	45	24	w191294
w191936	63	14	23	85L	69	36	120L	120	26	13	w191936
w191937	81	23	17	140	110	72	120L	130	43	17	w191937
w191938	97	51	10	85L	180	46	120L	190	65	18	w191938
w191939	75	29	35	140	90	40	120L	240L	32	17	w191939
w191940	120	21	35	86	82	32	120L	160L	33	13	w191940
w191941	90	87	27	160	160	70	120L	150L	44	18	w191941

Table 11f.-- Major and minor oxide and trace element composition of the laboratory ash of 20 coal samples from Alabama--continued

Sample number	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w191070	6.8L	1,300	1.8	35	9.3	250	86	5.0	110	430	w191070
w191071	13	660	2.5	38L	81	360	110	7.5	63	890	w191071
w191072	12	2,200	1.9	37	13	230	100	6.1	30	670	w191072
w191073	6.8L	2,800	1.8	26	15	190	74	6.1	66	790	w191073
w191074	6.8L	3,200L	2.0	59L	15	180	90	9.8	78	250	w191074
w191075	6.8L	930	1.7	23	14	230	97	6.3	58	870	w191075
w191076	6.8L	1,200	4.8	48L	21	390	220	15	89	470	w191076
w191077	13	1,800	2.1	21	14	160	55	7.1	44	440	w191077
w191078	6.8L	1,600	4.1	41L	20	320	160	9.5	130	850	w191078
w191290	7.8L	440	2.3	35	9.2	180	51	6.2	56	220	w191290
w191291	9.9	500	1.8	27L	8.8	160	130	8.8	54	330	w191291
w191292	9.0	420	1.8	32	7.1	170	51	4.8	51	310	w191292
w191293	9.2	790	3.4	30	7.8	170	60	6.2	57	310	w191293
w191294	13	3,600L	3.5	61	19	250	110	10	35	300	w191294
w191936	12L	1,200	1.9	37	8.7	210	60	6.3	42	270	w191936
w191937	12L	2,100	2.7	42	15	310	77	6.8	48	180	w191937
w191938	12L	790	3.8	51	20	210	110	11	120	170	w191938
w191939	12L	2,100	2.2	44	9.0	210	110	7.5	55	530	w191939
w191940	12L	1,000	2.2	22L	28	260	75	7.3	51	260	w191940
w191941	16	1,200	3.3	35	19	350	130	9.3	50	330	w191941

Table 11g.-- Content of 22 trace elements in 20 coal samples from Alabama

[Analysis performed on whole coal. Values in parts-per-million (ppm). L, less than the value shown, B, not determined.]

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w191070	19	48	6.3	40	2.8	0.96	160	2.0	0.16	24	w191070
w191071	44	14	3.4	21	1.4	.21	48	.7	.29	6	w191071
w191072	11	41	6.6	31	1.8	.68	130	2.1	.14	21	w191072
w191073	60	20	2.4	17	1.1	.30	78	1.0	.71	11	w191073
w191074	18	15	5.7	9.1	1.0	.26	74	.5	.22	9	w191074
w191075	12	27	5.2	23	1.5	.54	38	1.6	.31	14	w191075
w191076	10	20	4.3	12	.7	.45	86	.5	.080	10	w191076
w191077	63	29	3.6	18	.8	.52	190	1.3	.27	16	w191077
w191078	41	21	4.1	13	.8	.41	70	.7	.22	12	w191078
w191290	2.3	28	11	19	2.3	.40	90	1.3	.11	16	w191290
w191291	96	16	4.1	15	2.1	.34	170	.9	.10	9	w191291
w191292	10	25	7.2	20	2.5	.47	82	1.4	.22	14	w191292
w191293	7.1	27	7.6	19	2.1	.44	100	1.3	.28	14	w191293
w191294	8.1	41	7.7	32	1.3	.77	190	1.2	.11	21	w191294
w191936	20	38	3.9	25	1.8	.54	110	1.8	.22	22	w191936
w191937	40	47	7.9	35	2.7	.86	150	1.7	.39	26	w191937
w191938	20	15	9.0	10	.8	.31	28	.4	.23	7	w191938
w191939	7.8	19	5.1	12	.6	.43	58	.8	.21	11	w191939
w191940	5.6	23	4.9	20	1.0	.36	71	1.4	.018	12	w191940
w191941	18	31	6.7	25	1.6	.58	100	1.5	.24	19	w191941

Table 11g.-- Content of 22 trace elements in 20 coal samples from Alabama--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w191070	0.2	2,100	370	50L	1.3	8.7	5.5	3.2	0.5	9.7	w191070
w191071	.2	370	560	23L	2.6	4.8	2.6	1.2	.2	3.0L	w191071
w191072	.2	1,000	830	31L	.61	6.4	5.2	3.3	.4	7.9	w191072
w191073	.1	520	50	19L	1.4	3.7	3.7	1.7	.2	3.0	w191073
w191074	.1	510	530	25L	.31	1.7	3.0	1.4	.1	3.0L	w191074
w191075	.2	950	230	25L	1.3	5.2	6.0	2.3	.3	4.0	w191075
w191076	.2	470	110	16L	1.5	4.2	2.2	2.2	.3	3.0L	w191076
w191077	.2	690	740	23L	.87	4.1	5.1	2.4	.3	3.0	w191077
w191078	.1	360	230	19L	7.8	3.4	5.8	2.0	.3	3.0L	w191078
w191290	.1	230	110	27	.39	3.7	1.5	2.2	.3	4.5	w191290
w191291	.2	310	99	24	1.5	4.1	1.4	1.6	.2	3.0L	w191291
w191292	.2	480	140	24	.53	4.2	1.0	2.1	.3	5.2	w191292
w191293	.2	270	320	27	.39	3.8	1.5	2.1	.5	4.4	w191293
w191294	.2	320	1,800	27L	1.8	6.5	6.8	3.4	.5	8.8	w191294
w191936	.2	460	360	25	.74	5.4	4.5	2.6	.4	7.7	w191936
w191937	.3	370	960	28	3.0	9.4	6.3	3.8	.6	9.2	w191937
w191938	.2	250	69	15	3.1	5.1	2.1	1.4	.3	4.0	w191938
w191939	.1	280	200	22L	.67	3.0	2.7	1.6	.2	4.1	w191939
w191940	.2	250	180	22L	.56	4.5	4.9	1.8	.3	3.0L	w191940
w191941	.2	280	530	23L	2.0	6.7	6.0	2.7	.5	5.3	w191941

Table 11g.-- Content of 22 trace elements in 20 coal samples from Alabama--continued

Sample number	U (ppm)	Yb (ppm)
w191070	2.6	1.4
w191071	6.5	.6
w191072	2.7	1.3
w191073	1.8	.7
w191074	.76	.5
w191075	2.4	1.1
w191076	1.3	.9
w191077	1.9	1.0
w191078	1.5	.7
w191290	1.2	.8
w191291	1.0	1.0
w191292	1.2	.8
w191293	1.1	.9
w191294	2.7	1.5
w191936	1.8	1.3
w191937	3.3	1.5
w191938	1.6	.9
w191939	.84	.7
w191940	3.8	1.0
w191941	2.8	1.4

Table 11h.-- Major, minor, and trace element composition of 20 coal samples from Alabama reported on whole coal basis

[Values in percent or parts-per-million. 22 values are from direct determinations on whole coal; all other values calculated from analyses of ash. S means analysis by emission spectrography; L, less than the value shown; N, not detected; B, not determined.]

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w191070	6.8	4.3	0.46	0.26	0.21	0.23	1.7	0.23	0.10	19	w191070
w191071	1.5	1.0	.069	.059	.037	.067	1.5	.072	.03	44	w191071
w191072	5.5	3.5	.14	.14	.10	.18	.82	.23	.10	11	w191072
w191073	2.3	1.5	.18	.056	.052	.095	1.8	.089	.04	60	w191073
w191074	.76	.81	.11	.031	.051	.042	.78	.034	.04	18	w191074
w191075	4.1	2.7	.099	.098	.095	.14	1.6	.18	.09	12	w191075
w191076	1.4	1.1	.040	.034	.047	.052	.52	.052	.17	10	w191076
w191077	2.8	1.9	.19	.089	.069	.12	2.3	.14	.05	63	w191077
w191078	1.5	1.1	.090	.047	.036	.062	.83	.062	.07	41	w191078
w191290	3.5	2.1	.028	.079	.023	.11	.25	.12	.01L	2.3	w191290
w191291	2.8	1.7	.056	.042	.031	.094	.77	.10	.01L	96	w191291
w191292	4.2	2.4	.047	.099	.048	.14	.74	.14	.02L	10	w191292
w191293	3.9	2.3	.063	.040	.027	.12	.58	.12	.02L	7.1	w191293
w191294	2.8	2.7	.19	.044	.032	.12	.94	.16	.10	8.1	w191294
w191936	5.4	3.4	.074	.070	.046	.17	.84	.19	.06	20	w191936
w191937	4.7	4.1	.11	.12	.037	.18	1.5	.22	.21	40	w191937
w191938	1.7	1.2	.039	.029	.025	.066	.94	.057	.07	20	w191938
w191939	1.9	1.4	.10	.037	.028	.077	1.3	.084	.05	7.8	w191939
w191940	3.3	2.1	.078	.063	.025	.11	1.1	.15	.06	5.6	w191940
w191941	3.4	2.6	.054	.060	.028	.13	1.2	.18	.26	18	w191941

Table 11h.-- Major, minor, and trace element composition of 20 coal samples from Alabama reported on whole coal basis--continued

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Er-S (ppm)	Sample number
w191070	92	310	3.1	0.14	48	6.3	40	2.8	45	2.8L	w191070
w191071	80G	46	2.5	.07	14	3.4	21	1.4	13	1.0	w191071
w191072	57	360	2.8	.08	41	6.6	31	1.8	28	2.1L	w191072
w191073	15	160	1.8	.07	20	2.4	17	1.1	11	1.1L	w191073
w191074	35	110	.6	.07	15	5.7	9.1	1.0	14	.6	w191074
w191075	31	170	2.4	.10	27	5.2	23	1.5	28	1.9	w191075
w191076	7.4	99	2.2	.15	20	4.3	12	.7	42	1.4	w191076
w191077	17	300	1.7	.10	29	3.6	18	.8	17	1.4L	w191077
w191078	11	89	1.6	.08	21	4.1	13	.8	27	1.3	w191078
w191290	38	94	2.2	.04	28	11	19	2.3	13	1.4L	w191290
w191291	41	97	3.3	.05	16	4.1	15	2.1	15	1.2L	w191291
w191292	54	120	1.8	.04	25	7.2	20	2.5	11	1.8L	w191292
w191293	38	58	1.9	.05	27	7.6	19	2.1	11	1.6L	w191293
w191294	48	360	3.6	.14	41	7.7	32	1.3	46	1.9	w191294
w191936	46	250	2.9	.03	38	3.9	25	1.8	14	3.7L	w191936
w191937	35	640	3.7	.10	47	7.9	35	2.7	48	4.0L	w191937
w191938	26	130	3.8	.06	15	9.0	10	.8	21	1.4L	w191938
w191939	27	120	2.3	.09	19	5.1	12	.6	20	1.7L	w191939
w191940	29	220	2.9	.07	23	4.9	20	1.0	15	2.5L	w191940
w191941	26	240	3.5	.11	31	6.7	25	1.6	47	2.7L	w191941

Table 11h.-- Major, minor, and trace element composition of 20 coal samples from Alabama reported on whole coal basis--continued

Sample number	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Li (ppm)	Lu (ppm)	Sample number
w191070	0.96	160	13	3.6	1.3L	2.0	0.16	24	100	0.2	w191070
w191071	.21	48	11	.54L	35	.7	.29	6	11	.2	w191071
w191072	.68	130	13	2.5	1.1	2.1	.14	21	98	.2	w191072
w191073	.30	78	5.5	.78L	6.6	1.0	.71	11	30	.1	w191073
w191074	.26	74	1.8	.92	.28	.5	.22	9	11	.1	w191074
w191075	.54	38	9.6	2.4	1.2	1.6	.31	14	71	.2	w191075
w191076	.45	86	4.5	2.4	1.4	.5	.080	10	18	.2	w191076
w191077	.52	190	9.0	2.7	2.5	1.3	.27	16	47	.2	w191077
w191078	.41	70	5.6	2.0	.89	.7	.22	12	13	.1	w191078
w191290	.40	90	4.0	1.0L	.68L	1.3	.11	16	35	.1	w191290
w191291	.34	170	5.9	.88L	4.5	.9	.10	9	25	.2	w191291
w191292	.47	82	5.4	1.3L	.86L	1.4	.22	14	56	.2	w191292
w191293	.44	100	5.0	1.1L	.76L	1.3	.28	14	47	.2	w191293
w191294	.77	190	6.6	2.0	1.3	1.2	.11	21	49	.2	w191294
w191936	.54	110	8.9	2.5L	1.7L	1.8	.22	22	100	.2	w191936
w191937	.86	150	15	3.5	3.5	1.7	.39	26	120	.3	w191937
w191938	.31	28	6.8	1.3	8.7	.4	.23	7	10	.2	w191938
w191939	.43	58	4.1	1.6	.78L	.8	.21	11	11	.1	w191939
w191940	.36	71	8.9	1.6L	5.2	1.4	.018	12	44	.2	w191940
w191941	.58	100	11	3.3	1.3L	1.5	.24	19	54	.2	w191941

Table 11h.-- Major, minor, and trace element composition of 20 coal samples from Alabama reported on whole coal basis--continued

Sample number	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Pr-S (ppm)	Rb (ppm)	Sb (ppm)	Sample number
w191070	31	7.3	7.5	36	21	370	11	19L	50L	1.3	w191070
w191071	10	8.0	3.4	9.6	7.0	560	2.7	5.4L	23L	2.6	w191071
w191072	13	3.2	10	49	21	830	9.1	14L	31L	.61	w191072
w191073	11	3.4	5.7	16	4.1	50	3.2	8.2	19L	1.4	w191073
w191074	12	2.3	.82	7.1	7.7	530	1.1	3.5L	25L	.31	w191074
w191075	11	4.0	8.5	24	14	230	6.4	12L	25L	1.3	w191075
w191076	2.7	3.0	1.9	19	11	110	4.5	4.2L	16L	1.5	w191076
w191077	20	2.1	3.7	11	11	740	4.2	9.6L	23L	.87	w191077
w191078	9.6	6.7	2.7	21	10	230	4.7	5.0L	19L	7.8	w191078
w191290	10	.33L	2.3	14	7.5	110	5.2	10L	27	.39	w191290
w191291	14	.75	2.7	11	6.1	99	2.9	8.8L	24	1.5	w191291
w191292	20	1.6	4.5	18	8.9	140	5.8	13L	24	.53	w191292
w191293	13	1.9	3.9	19	9.1	320	5.1	11L	27	.39	w191293
w191294	11	5.6	4.6	37	16	1,800	11	11L	27L	1.8	w191294
w191936	13	2.9	4.8	18L	14	360	7.5	25L	25	.74	w191936
w191937	18	5.1	3.7	31	24	960	16	26L	28	3.0	w191937
w191938	7.7	4.0	.79	6.7L	14	69	3.6	9.5L	15	3.1	w191938
w191939	7.0	2.7	3.3	13	8.4	200	3.7	11L	22L	.67	w191939
w191940	16	2.9	4.8	12	11	180	4.4	16L	22L	.56	w191940
w191941	14	13	4.1	24	24	530	11	18L	23L	2.0	w191941

Table 11h.-- Major, minor, and trace element composition of 20 coal samples from Alabama reported on whole coal basis--continued

Sample number	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Sample number
w191070	8.7	5.5	3.2	1.9L	360	0.5	9.7	2.6	70	24	w191070
w191071	4.8	2.6	1.2	1.0	53	.2	3.0L	6.5	29	8.8	w191071
w191072	6.4	5.2	3.3	2.5	470	.4	7.9	2.7	49	21	w191072
w191073	3.7	3.7	1.7	.78L	320	.2	3.0	1.8	22	8.4	w191073
w191074	1.7	3.0	1.4	.35L	160L	.1	3.0L	.76	9.2	4.6	w191074
w191075	5.2	6.0	2.3	1.2L	160	.3	4.0	2.4	40	17	w191075
w191076	4.2	2.2	2.2	.42L	74	.3	3.0L	1.3	24	14	w191076
w191077	4.1	5.1	2.4	1.8	250	.3	3.0	1.9	23	7.8	w191077
w191078	3.4	5.8	2.0	.50L	120	.3	3.0L	1.5	24	12	w191078
w191290	3.7	1.5	2.2	1.0L	57	.3	4.5	1.2	23	6.6	w191290
w191291	4.1	1.4	1.6	1.1	57	.2	3.0L	1.0	18	15	w191291
w191292	4.2	1.0	2.1	1.5	69	.3	5.2	1.2	28	8.4	w191292
w191293	3.8	1.5	2.1	1.3	120	.5	4.4	1.1	25	8.8	w191293
w191294	6.5	6.8	3.4	1.9	520L	.5	8.8	2.7	36	16	w191294
w191936	5.4	4.5	2.6	2.5L	250	.4	7.7	1.8	44	12	w191936
w191937	9.4	6.3	3.8	2.6L	460	.6	9.2	3.3	68	17	w191937
w191938	5.1	2.1	1.4	.95L	62	.3	4.0	1.6	17	8.7	w191938
w191939	3.0	2.7	1.6	1.1L	200	.2	4.1	.84	20	10	w191939
w191940	4.5	4.9	1.8	1.6L	140	.3	3.0L	3.8	36	10	w191940
w191941	6.7	6.0	2.7	2.4	180	.5	5.3	2.8	53	20	w191941

Table 11h.-- Major, minor, and trace element composition of 20 coal samples from Alabama reported on whole coal basis--continued

Sample number	Yb (ppm)	Zn (ppm)	Zr-S (ppm)
w191070	1.4	31	120
w191071	.6	5.0	71
w191072	1.3	6.4	140
w191073	.7	7.5	90
w191074	.5	4.0	13
w191075	1.1	10	150
w191076	.9	5.5	29
w191077	1.0	6.2	62
w191078	.7	9.6	63
w191290	.8	7.3	29
w191291	1.0	6.1	37
w191292	.8	8.4	51
w191293	.9	8.3	45
w191294	1.5	5.0	43
w191936	1.3	8.7	56
w191937	1.5	11	40
w191938	.9	9.5	13
w191939	.7	5.1	49
w191940	1.0	7.0	36
w191941	1.4	7.6	50

Summary of analytical data from 108 Indiana bituminous coal samples

Data on 22 Indiana coal samples were reported by Swanson and others (1976). The generalized distribution of the 108 samples of this report is shown on figure 10. Seventy eight of the samples were obtained from 9 different coal beds (table 12d). The Springfield coal bed represented by 22 samples is the most intensively sampled bed. Complete descriptive data on 30 of the samples has not yet been received. Statistical data on 108 Indiana coal samples is presented in tables 12a, b, and c, the analytical data in tables 12e, f, g, and h.

In the following three paragraphs the geometric means of the analytical data on Indiana coal samples are compared to the means for all samples of this report.

Comparisons of the geometric means in table 12a show that Indiana coals have higher average moisture, volatile matter, hydrogen oxygen and sulfur contents and lower fixed carbon, carbon, Btu and free swelling index than the average coal of this report. Most parameters indicate these coals have a lower average rank than all the coals of this report.

The geometric means for the major oxides in ash, such as, SiO_2, Al_2O_3, and Na_2O are significantly lower and the Fe_2O_3 (table 12b) content higher for Indiana coal ash. The means for other oxides are about equal. The low SiO_2 and Al_2O_3 and high Fe_2O_3 means are reflected in the low fusion temperatures of Indiana coal ash.

The geometric means for trace elements (table 12c) show only Ba, Li, Hf and Sr to be lower in Indiana coals compared to all samples of this report. The means for Ce, Cr, Cu, Eu, F, Ga, Hg, La, Se, Sm, Tb and Yb are about equal whereas all other elements are significantly higher in Indiana coals. The trace element distribution in Indiana coals is similar to this of Ohio coals. The coals from these states are high in sulfur.

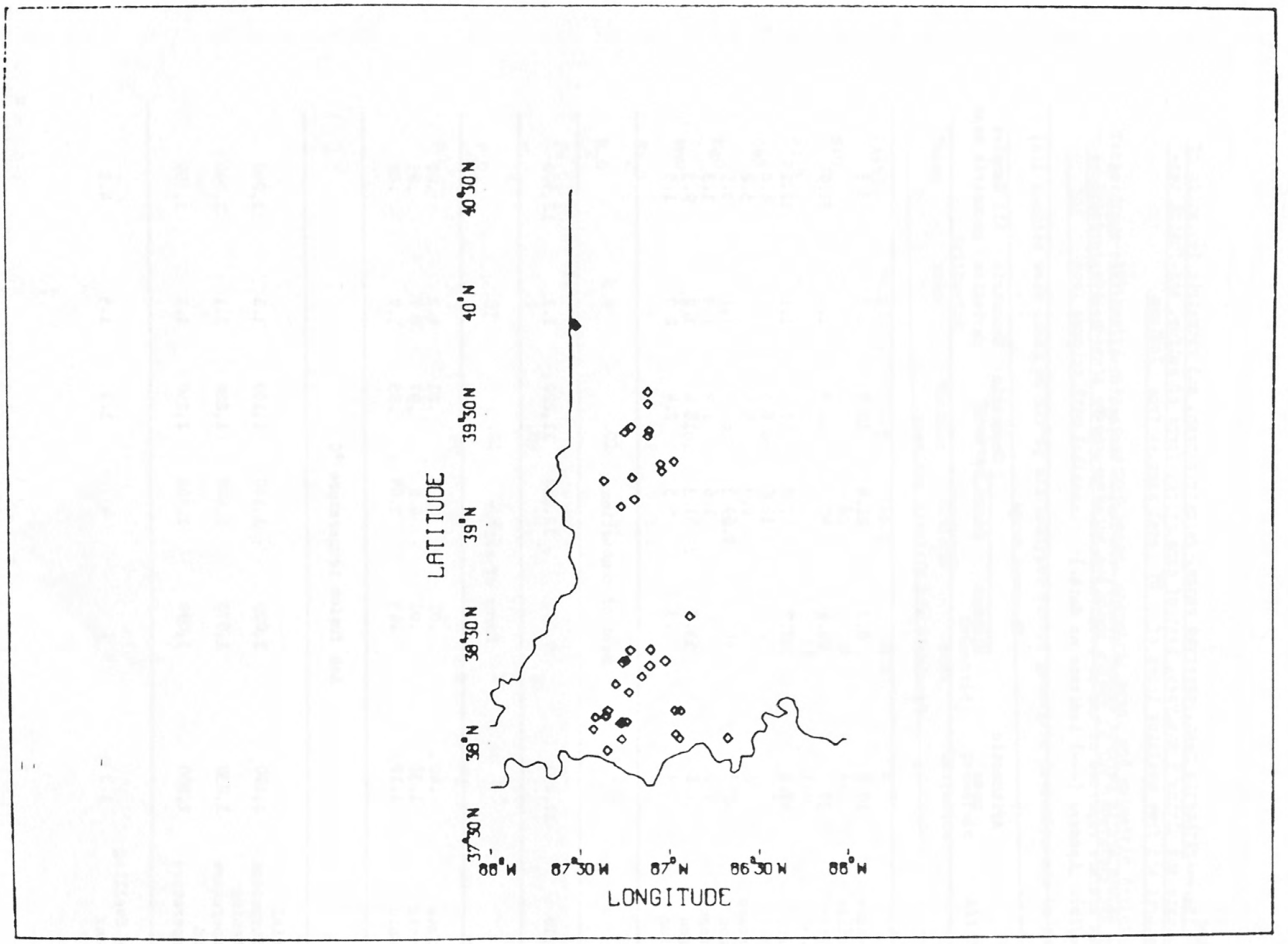

Figure 10 -- Distribution of Indiana coal samples.

Table 12a.--Arithmetic mean, observed range, geometric mean, and geometric deviation of proximate and ultimate analyses, heat of combustion, forms of sulfur, ash-fusion temperatures and free swelling index of 85 coal samples from Indiana

[All values are in percent except Btu/lb, ash-fusion temperatures, and free swelling index and are reported on the as-received basis. °F = 9/5°C + 32; Kcal/kg = 0.556 (Btu/lb). Leaders (---) indicate no data.]

	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Proximate and ultimate analyses						
Moisture	10.8	6.3	21.4	10.5	1.3	3.3
Volatile matter	33	22.4	40.7	32.8	1.1	31.9
Fixed carbon	47.2	37.7	57.8	47.1	1.1	52.2
Ash	9	2	18.6	8.5	1.4	8.8
Hydrogen	5.6	5	6.3	5.6	1.0	5.2
Carbon	62.8	54	69.3	62.7	1.1	70.5
Nitrogen	1.2	.6	1.6	1.2	1.2	1.3
Oxygen	18.6	13.7	31.3	18.4	1.2	9.3
Sulfur	2.9	.3	5.5	2.4	2.0	1.5
Heat of combustion						
Btu/lb	11,230	9,020	12,260	11,220	1.1	12,590
Forms of sulfur						
Sulfate	.40	.01	1.28	.21	4.2	.07
Pyritic	1.38	.06	4.2	.97	2.7	.65
Organic	1.12	.15	2.65	.95	1.9	.80
Ash fusion temperature °C						
Initial deformation	1,190	1,029	1,540	1,180	1.1	1,240
Softening temperature	1,230	1,070	1,600	1,220	1.1	1,290
Fluid temperature	1,260	1,090	1,540	1,250	1.1	1,350
Free Swelling Index	1.3	1	4	1.2	1.5	4.3

Table 12b.--Arithmetic mean, observed range, geometric mean, and geometric deviation of ash content and contents of eleven major and minor oxides in the laboratory ash of 108 coal samples from Indiana.

[All samples were ashed at 525°C; all analyses except geometric deviation are in percent.]

Oxide	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
(Ash)	14.2	4.5	48.1	11.9	1.8	9.46
SiO_2	38	5.9	60	36	1.5	42
Al_2O_3	20	.7	45	18	1.8	23
CaO	3.7	.06	78	1.3	4.2	1.3
MgO	.79	.07	1.7	.71	1.6	.78
MnO	.03	.01	.21	.03	2	.02
Na_2O	.33	.02	1.1	.27	2	.44
K_2O	1.8	.01	4.3	1.5	2.2	1.6
Fe_2O_3	26	2	83	19	2.4	11
TiO_2	.9	.09	1.7	.82	1.6	1.13
P_2O_5	.37	.01	3.9	.17	3.5	.17
SO_3	3.1	.28	18	2.2	2.2	2.03

Table 12c.--Arithmetic mean, observed range, geometric mean, and geometric deviation of 38 elements in 108 coal samples from Indiana.

[All analyses are in percent or parts per million and are reported on a whole-coal basis. Leaders (---) indicate means could not be calculated because an insufficient number of analyses were above the detection limit.]

Element	Arithmetic mean	Observed range		Geometric mean	Geometric deviation	All Samples geometric mean
		Minimum	Maximum			
Ag	.12	.01	1.4	.07	2.5	.05
As	25	1	950	10	3.1	7.4
B	100	27	210	95	1.6	21
Ba	67	7.3	660	39	2.6	56
Be	3.9	.83	16	3.6	1.5	2.4
Cd	.44	.02	5.7	.2	3.2	.08
Ce	23	2	300	14	2.4	15
Co	8.3	.9	43	6.3	2	5.5
Cr	19	3.1	81	15	1.9	14
Cs	1.3	.2	7.5	.93	2.2	.75
Cu	18	4.1	240	14	1.9	14
Eu	.44	.07	2.6	.31	2.1	.31
F	100	20	780	69	2.3	64
Ga	6.2	1.4	22	5.2	1.8	5.1
Ge	14	1.2	160	11	2	2.9
Hf	.76	.1	5.8	.58	2	.65
Hg	.16	.01	2.4	.11	2.3	.10
La	12	1	141	7.6	2.5	7.8
Li	19	.76	143	10	2.7	12
Lu	.16	.1	.5	.14	1.6	.14
Mn	36	3.4	500	23	2.5	14
Mo	5.4	.39	46	3.1	2.7	1.8
Nb	3.4	.51	14	2.6	2	1.9
Nd	20	3.9	100	14	2.1	9.8
Ni	36	5	520	24	2.2	12
Pb	26	.85	240	14	3.4	5.9
Sb	1.5	.2	15	1.1	2.2	.69
Sc	4.2	.5	25	3.4	1.9	3.1
Se	3.5	.7	11	2.9	1.9	2.9
Sm	3	.2	67	1.6	2.4	1.5
Sr	74	3.4	730	36	3.2	57
Tb	.38	.1	2.1	.28	2	.26
U	2.4	.2	41	1.5	2.5	1.2
V	31	3.2	150	23	2.1	17
Y	11	1.9	69	8.7	1.9	7.2
Yb	1	.3	9	.76	2	.74
Zn	110	4.3	3300	40	3.4	13
Zr	47	5.8	270	34	2.2	20

Table 12d Descriptions for 108 bituminous coal samples from Indiana

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w190528	indiana	pike	381606n	871736w	petersburg	springfield	channel	72.0
w190529	indiana	pike	381606n	871736w	petersburg	springfield	channel	50.0
w190530	indiana	warrick	381352n	871312w	petersburg	springfield	channel	50.0
w190531	indiana	warrick	381352n	871312w	petersburg	springfield	channel	50.0
w190532	indiana	pike	382528n	871236w	petersburg	springfield	channel	48.0
w190533	indiana	pike	382528n	871236w	petersburg	springfield	channel	48.0
w190534	indiana	owen	391710n	865736w	brazil	upper block	channel	15.0
w190535	indiana	owen	391710n	865736w	brazil	upper block	channel	16.0
w190536	indiana	clay	393603n	870613w	brazil	upper block	channel	50.0
w190537	indiana	clay	393603n	870613w	brazil	upper block	channel	48.0
w190538	indiana	owen	391634n	870205w	brazil	lower block	channel	16.0
w190539	indiana	owen	391634n	870205w	brazil	lower block	channel	12.0
w190540	indiana	owen	391634n	870205w	brazil	lower block	channel	16.0
w190541	indiana	owen	391634n	870205w	brazil	lower block	channel	16.0
w190542	indiana	clay	392407n	870614w	brazil	upper block	channel	29.0
w190543	indiana	clay	392407n	870614w	brazil	upper block	channel	34.0
w190544	indiana	clay	393256n	870618w	brazil	upper block	channel	46.0
w190545	indiana	clay	393256n	870618w	brazil	upper block	channel	46.0
w190546	indiana	clay	392504n	871400w	staunton	seelyville	channel	30.0
w190547	indiana	clay	392504n	871400w	staunton	seelyville	channel	29.0
w190548	indiana	clay	392635n	871150w	staunton	seelyville	channel	39.0
w190929	indiana	pike	382109n	870609w	linton	survant	channel	30.0
w190930	indiana	pike	382109n	870609w	linton	survant	channel	22.0
w190931	indiana	pike	382210n	871512w	petersburg	springfield	channel	34.0
w190932	indiana	warrick	380047n	871539w	petersburg	springfield	channel	52.0
w190933	indiana	warrick	380047n	871539w	petersburg	springfield	channel	47.0
w190934	indiana	clay	391245n	871142w	linton	survant	channel	52.0
w191034	indiana	spencer	380835n	865554w	brazil	no data entered	channel	23.0
w191035	indiana	spencer	380847n	865751w	brazil	no data entered	channel	22.0
w191036	indiana	spencer	380847n	865752w	brazil	no data entered	channel	22.0
w191037	indiana	spencer	380835n	865555w	brazil	no data entered	channel	19.0
w191038	indiana	spencer	380102n	865624w	mansfield	no data entered	channel	25.0
w191039	indiana	warrick	375738n	872046w	petersburg	springfield	channel	41.0
w191040	indiana	warrick	375738n	872046w	petersburg	springfield	channel	40.0
w191041	indiana	spencer	380208n	865732w	brazil	buffaloville	channel	35.0

Table 12d Descriptions for 108 bituminous coal samples from Indiana continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w191042	indiana	greene	390654n	871050w	linton	survant	channel	36.0
w191043	indiana	vermillion	395437n	873046w	dugger	bucktown	channel	60.0
w191044	indiana	warrick	380514n	871544w	petersburg	springfield	channel	102.0
w191045	indiana	warrick	380514n	871545w	petersburg	springfield	channel	102.0
w191046	indiana	sullivan	390447n	871523w	dugger	danville	channel	44.0
w191047	indiana	spencer	380102n	865624w	mansfield	no data entered	channel	28.0
w191048	indiana	spencer	380212n	865731w	brazil	no data entered	channel	22.0
w191049	indiana	sullivan	390447n	871522w	dugger	danville	channel	18.0
w191050	indiana	spencer	380213n	865731w	brazil	no data entered	channel	18.0
w191051	indiana	greene	390654n	871050w	linton	survant	channel	35.0
w191052	indiana	warrick	380654n	872432w	dugger	danville	channel	64.0
w191053	indiana	warrick	380654n	872432w	dugger	danville	channel	29.0
w191054	indiana	vermillion	395344n	873018w	dugger	bucktown	channel	40.0
w191055	indiana	pike	382239n	871405w	petersburg	springfield	channel	53.0
w191056	indiana	pike	382239n	871405w	petersburg	springfield	channel	48.0
w191057	indiana	warrick	380516n	871615w	petersburg	springfield	channel	75.0
w191058	indiana	warrick	380517n	871615w	petersburg	springfield	channel	86.0
w191059	indiana	vermillion	395344n	873018w	dugger	bucktown	channel	40.0
w191060	indiana	warrick	380654n	872432w	dugger	hymera	channel	80.0
w191061	indiana	warrick	380654n	872432w	dugger	danville	channel	
w191062	indiana	spencer	380208n	865732w	brazil	buffaloville	channel	41.0
w191204	indiana	owen	391710n	865736w	brazil	no data entered	channel	2.0
w191205	indiana	clay	393603n	870613w	brazil	no data entered	channel	2.0
w191207	indiana	owen	391634n	870205w	brazil	no data entered	channel	53.0
w191208	indiana	owen	391634n	870205w	brazil	no data entered	channel	6.0
w191209	indiana	owen	391634n	870205w	brazil	no data entered	channel	5.0
w191211	indiana	owen	391634n	870205w	brazil	no data entered	channel	4.0
w191212	indiana	owen	391634n	870205w	brazil	no data entered	channel	2.0
w191213	indiana	owen	391634n	870205w	brazil	no data entered	channel	53.0
w191215	indiana	clay	392407n	870614w	brazil	no data entered	channel	11.0
w191216	indiana	clay	392407n	870614w	brazil	no data entered	channel	53.0
w191220	indiana	clay	392635n	871150w	linton	seelyville	channel	1.0
w191222	indiana	clay	392635n	871150w	staunton	seelyville	channel	53.0
w191224	indiana	pike	382109n	870609w	linton	survant	channel	3.0
w191225	indiana	pike	382109n	870609w	linton	survant	channel	3.0
w191227	indiana	pike	382109n	870609w	linton	survant	channel	3.0
w191228	indiana	pike	382109n	870609w	linton	survant	channel	1.0
w191233	indiana	warrick	380047n	871532w	petersburg	springfield no 5	channel	6.0
w191239	indiana	warrick	380654n	872432w	dugger	hymera	grab	6.0
w191245	indiana	sullivan	390447n	871523w	dugger	danville	channel	4.0

Table 12d Descriptions for 108 coal samples from Indiana continued

sample no.	state	county	latitude	longitude	formation	coal bed	sample type	sampled thickness (inches)
w191243	indiana	sullivan	390447n	871522w	dugger	danville	channel	4.0
w191276	indiana	warrick	375738n	872046w	petersburg	no data entered	channel	1.0
w191277	indiana	greene	390654n	871050w	petersburg	survant	channel	2.0
w191279	indiana	greene	390654n	871050w	petersburg	survant	channel	1.0
w192614	indiana	warrick	380345n	872512w	dugger	hymera	channel	30.0
w192615	indiana	warrick	380345n	872512w	dugger	hymera	channel	19.0
w192616	indiana	perry	380105n	864000w	mansfield	no data entered	channel	16.0
w192617	indiana	perry	380105n	864000w	mansfield	no data entered	channel	18.0
w192618	indiana	perry	380105n	864000w	mansfield	no data entered	channel	19.0
w192619	indiana	perry	380105n	864000w	mansfield	no data entered	channel	19.0
w192620	indiana	dubois	382225n	870058w	staunton	no data entered	channel	25.0
w192621	indiana	dubois	382225n	870058w	staunton	no data entered	channel	22.0
w192622	indiana	dubois	382225n	870058w	staunton	no data entered	channel	50.0
w192623	indiana	dubois	382225n	870058w	staunton	no data entered	channel	50.0
w192624	indiana	warrick	380716n	872102w	dugger	hymera	channel	36.0
w192625	indiana	warrick	380716n	872102w	dugger	hymera	channel	16.0
w192626	indiana	warrick	380718n	872057w	dugger	danville	channel	19.0
w192627	indiana	warrick	380718n	872057w	dugger	danville	channel	13.0
w192628	indiana	martin	383446n	865235w	mansfield	uncorrelated	channel	43.0
w192629	indiana	martin	383446n	865235w	mansfield	uncorrelated	channel	28.0
w192630	indiana	pike	381810n	870846w	linton	survant	channel	27.0
w192631	indiana	pike	381810n	870847w	linton	survant	channel	28.0
w192632	indiana	clay	392530n	870552w	brazil	upper block	channel	36.0
w192633	indiana	clay	392530n	870552w	brazil	upper block	channel	25.0
w192634	indiana	clay	392530n	870552w	brazil	upper block	channel	25.0
w192635	indiana	sullivan	391148n	872106w	dugger	hymera	channel	41.0
w192636	indiana	sullivan	391148n	872106w	dugger	hymera	channel	12.0
w193119	indiana	owen	391434n	870136w	brazil	no data entered	channel	24.0
w193120	indiana	sullivan	380949n	872023w	dugger	danville	channel	42.0
w193121	indiana	vermillion	395344n	873017w	petersburg	springfield	channel	42.0
w193122	indiana	warrick	380534n	871544w	petersburg	springfield	channel	23.0
w193123	indiana	warrick	380534n	871544w	petersburg	springfield	channel	54.0
w193124	indiana	warrick	380542n	871403w	petersburg	springfield	channel	1.0

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.

[All analyses except Kcal/kg, Btu, free-swelling-index and ash fusion temperatures in percent. For each sample number, the analyses are reported three ways; first, as received, second, moisture free, and third, moisture and ash free. All analyses by Coal Analysis Section, Department of Energy, Pittsburgh, Pa. 0 for ash fusion temperatures means greater than 1600°C.

	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
Sample number	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190528	6.3	39.4	45.7	8.6	5.7	65.4	1.1	15.0	4.2	6,610	11,890
	---	42.0	48.8	9.2	5.3	69.8	1.2	10.0	4.5	7,050	12,690
	---	46.3	53.7	---	5.9	76.9	1.3	11.0	4.9	7,760	13,970
w190529	6.4	35.9	46.6	11.1	5.3	63.2	.9	14.1	5.4	6,370	11,470
	---	38.4	49.8	11.9	4.9	67.5	1.0	9.0	5.8	6,810	12,250
	---	43.5	56.5	---	5.6	76.6	1.1	10.2	6.5	7,720	13,900
w190530	9.8	32.5	48.6	9.1	5.5	61.4	.9	18.8	4.3	6,130	11,030
	---	36.0	53.9	10.1	4.9	68.1	1.0	11.2	4.8	6,790	12,230
	---	40.1	59.9	---	5.4	75.7	1.1	12.4	5.3	7,560	13,600
w190531	9.1	34.6	48.2	8.1	5.8	64.3	1.0	17.5	3.3	6,400	11,520
	---	38.1	53.0	8.9	5.3	70.7	1.1	10.4	3.6	7,040	12,670
	---	41.8	58.2	---	5.8	77.7	1.2	11.4	4.0	7,730	13,910
w190532	7.6	35.4	49.0	8.0	5.8	65.9	1.0	15.9	3.4	6,580	11,840
	---	38.3	53.0	8.7	5.4	71.3	1.1	9.9	3.7	7,120	12,810
	---	41.9	58.1	---	5.9	78.1	1.2	10.8	4.0	7,790	14,030
w190533	15.3	22.8	57.7	4.2	5.5	65.8	1.1	22.9	.5	6,440	11,590
	---	26.9	68.1	5.0	4.5	77.7	1.3	11.0	.6	7,600	13,680
	---	28.3	71.7	---	4.7	81.7	1.4	11.6	.6	8,000	14,400
w190534	15.6	27.1	48.7	8.6	5.5	59.6	.9	23.7	1.7	5,810	10,450
	---	32.1	57.7	10.2	4.5	70.6	1.1	11.7	2.0	6,880	12,380
	---	35.8	64.2	---	5.0	78.6	1.2	13.0	2.2	7,660	13,790
w190535	13.6	28.0	50.0	8.4	5.6	60.5	.9	22.1	2.5	5,920	10,650
	---	32.4	57.9	9.7	4.7	70.0	1.0	11.6	2.9	6,850	12,330
	---	35.9	64.1	---	5.2	77.6	1.2	12.8	3.2	7,590	13,650
w190536	13.1	32.2	48.5	6.2	5.6	64.3	1.0	21.4	1.5	6,340	11,420
	---	37.1	55.8	7.1	4.8	74.0	1.2	11.2	1.7	7,300	13,140
	---	39.9	60.1	---	5.1	79.7	1.2	12.1	1.9	7,860	14,150
w190537	14.0	30.1	45.4	10.5	5.6	58.5	.9	22.4	2.1	5,680	10,230
	---	35.0	52.8	12.2	4.7	68.0	1.0	11.6	2.4	6,610	11,900
	---	39.9	60.1	---	5.4	77.5	1.2	13.2	2.8	7,530	13,550
w190538	21.4	27.0	43.8	7.8	5.6	54.0	.9	31.3	.4	5,010	9,020
	---	34.4	55.7	9.9	4.1	68.7	1.1	15.6	.5	6,380	11,480
	---	38.1	61.9	---	4.6	76.3	1.3	17.3	.6	7,080	12,740
w190539	15.3	29.4	46.5	8.8	5.6	61.4	1.1	22.3	.8	5,970	10,740
	---	34.7	54.9	10.4	4.6	72.5	1.3	10.3	.9	7,040	12,680
	---	38.7	61.3	---	5.1	80.9	1.4	11.5	1.1	7,860	14,150

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 89 coal samples from Indiana.--Continued

Sample number	Air-dried loss	Forms of sulfur: Sulfate	Forms of sulfur: Pyritic	Forms of sulfur: Organic	Free swelling	Ash fusion temperature (°): Initial deform.	Ash fusion temperature (°): soften.	Ash fusion temperature (°): fluid
w190528	0.0	0.48	1.38	2.31	4.0	1,045	1,075	1,100
	---	.51	1.47	2.47				
	---	.56	1.62	2.71				
w190529	.0	.75	2.99	1.70	3.0	1,100	1,175	1,210
	---	.80	3.19	1.82				
	---	.91	3.62	2.06				
w190530	.0	1.28	1.49	1.50	1.0	1,075	1,140	1,180
	---	1.42	1.65	1.66				
	---	1.58	1.84	1.85				
w190531	.0	.66	1.08	1.56	1.0	1,115	1,175	1,240
	---	.73	1.19	1.72				
	---	.80	1.30	1.88				
w190532	.0	.52	1.42	1.46	1.5	1,050	1,120	1,155
	---	.56	1.54	1.58				
	---	.62	1.68	1.73				
w190533	.0	.01	.06	.42	.0	1,540	1,600	0
	---	.01	.07	.50				
	---	.01	.07	.52				
w190534	.0	.02	.42	1.30	.0	1,430	1,470	1,495
	---	.02	.50	1.54				
	---	.03	.55	1.72				
w190535	.0	.71	.85	.90	.0	1,430	1,505	1,540
	---	.82	.98	1.04				
	---	.91	1.09	1.15				
w190536	.0	.46	.67	.41	1.0	1,120	1,205	1,270
	---	.53	.77	.47				
	---	.57	.83	.51				
w190537	.0	.12	.47	1.53	.0	1,065	1,120	1,155
	---	.14	.55	1.78				
	---	.16	.62	2.03				
w190538	.0	.04	.06	.35	.0	1,540	0	0
	---	.05	.08	.45				
	---	.06	.08	.49				
w190539	.0	.02	.08	.70	.0	1,540	0	0
	---	.02	.09	.83				
	---	.03	.11	.92				

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190540	14.4	29.3	48.8	7.5	5.9	62.9	0.9	22.2	0.6	6,160	11,080
	---	34.2	57.0	8.8	5.0	73.5	1.1	11.0	.7	7,190	12,940
	---	37.5	62.5	---	5.5	80.5	1.2	12.0	.8	7,860	14,190
w190541	14.5	28.5	44.8	12.2	5.8	58.5	.9	21.5	1.1	5,740	10,340
	---	33.3	52.4	14.3	4.9	68.4	1.1	10.1	1.3	6,720	12,090
	---	38.9	61.1	---	5.7	79.8	1.2	11.7	1.5	7,840	14,110
w190542	15.6	30.8	48.8	4.8	6.2	64.9	1.2	22.2	.7	6,390	11,510
	---	36.5	57.8	5.7	5.3	76.9	1.4	9.9	.8	7,580	13,640
	---	38.7	61.3	---	5.6	81.5	1.5	10.5	.9	8,030	14,460
w190543	9.0	34.9	47.5	8.6	5.5	64.7	1.1	16.4	3.7	6,400	11,520
	---	38.4	52.2	9.5	4.9	71.1	1.2	9.2	4.1	7,030	12,660
	---	42.4	57.6	---	5.5	78.5	1.3	10.2	4.5	7,770	13,980
w190544	13.0	23.4	57.7	5.9	5.7	65.1	1.1	20.8	1.4	6,460	11,620
	---	26.9	66.3	6.8	4.9	74.8	1.3	10.6	1.6	7,420	13,360
	---	28.9	71.1	---	5.2	80.3	1.4	11.4	1.7	7,960	14,330
w190545	10.4	33.6	46.1	9.9	5.5	61.0	.6	19.2	3.8	6,130	11,040
	---	37.5	51.5	11.0	4.8	68.1	.7	11.1	4.2	6,850	12,320
	---	42.2	57.8	---	5.5	76.5	.8	12.5	4.8	7,700	13,850
w190546	13.7	22.4	57.8	6.1	5.6	65.0	.9	21.5	.9	6,390	11,500
	---	26.0	67.0	7.1	4.7	75.3	1.0	10.8	1.0	7,400	13,330
	---	27.9	72.1	---	5.1	81.0	1.1	11.6	1.1	7,970	14,340
w190547	8.5	34.3	45.8	11.4	5.5	60.9	.8	16.3	5.1	6,140	11,060
	---	37.5	50.1	12.5	5.0	66.6	.9	9.6	5.6	6,720	12,090
	---	42.8	57.2	---	5.7	76.0	1.0	10.9	6.4	7,670	13,810
w190548	12.0	30.8	43.6	13.6	5.5	58.0	.9	19.5	2.5	5,820	10,470
	---	35.0	49.5	15.5	4.7	65.9	1.0	10.0	2.8	6,610	11,900
	---	41.4	58.6	---	5.6	78.0	1.2	11.9	3.4	7,820	14,070
w190929	6.7	32.8	52.7	7.8	5.7	66.4	1.4	16.0	2.7	6,630	11,940
	---	35.2	56.5	8.4	5.3	71.2	1.5	10.8	2.9	7,110	12,790
	---	38.4	61.6	---	5.8	77.7	1.6	11.7	3.2	7,760	13,960
w190930	7.6	35.9	48.5	8.0	5.6	65.3	1.4	16.1	3.6	6,510	11,720
	---	38.9	52.5	8.7	5.1	70.7	1.5	10.1	3.9	7,040	12,680
	---	42.5	57.5	---	5.6	77.4	1.7	11.1	4.3	7,710	13,880
w190931	10.0	29.9	53.2	6.9	5.5	64.4	1.4	19.3	2.5	6,350	11,420
	---	33.2	59.1	7.7	4.9	71.6	1.6	11.6	2.8	7,050	12,690
	---	36.0	64.0	---	5.3	77.5	1.7	12.5	3.0	7,640	13,740

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w190540	0.0	0.02	0.13	0.42	1.0	1,525	1,540	0
	---	.02	.15	.49				
	---	.03	.17	.54				
w190541	.0	.03	.41	.65	1.0	1,540	0	0
	---	.04	.48	.76				
	---	.04	.56	.89				
w190542	.0	.07	.30	.31	1.0	1,540	0	0
	---	.08	.36	.37				
	---	.09	.38	.39				
w190543	.0	.45	1.20	2.01	1.5	1,110	1,140	1,195
	---	.49	1.32	2.21				
	---	.55	1.46	2.44				
w190544	.0	.28	.39	.69	2.0	1,290	1,315	1,370
	---	.32	.45	.79				
	---	.35	.48	.85				
w190545	.0	.67	1.17	1.95	1.5	1,110	1,140	1,165
	---	.75	1.31	2.18				
	---	.84	1.47	2.45				
w190546	.0	.14	.22	.59	1.5	1,300	1,325	1,440
	---	.16	.25	.68				
	---	.17	.27	.74				
w190547	.0	.92	2.15	2.04	1.0	0	0	0
	---	1.01	2.35	2.23				
	---	1.15	2.68	2.55				
w190548	.0	.12	1.52	.90	1.0	1,350	1,425	1,440
	---	.14	1.73	1.02				
	---	.16	2.04	1.21				
w190929	.0	.75	.79	1.18	1.0	1,120	1,180	1,240
	---	.80	.85	1.26				
	---	.88	.92	1.38				
w190930	.0	1.04	1.27	1.27	1.0	1,095	1,155	1,215
	---	1.13	1.37	1.37				
	---	1.23	1.50	1.50				
w190931	.0	.93	.49	1.06	1.0	1,150	1,215	1,270
	---	1.03	.54	1.18				
	---	1.12	.59	1.28				

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w190932	8.4	31.7	47.4	12.5	5.1	60.4	1.2	16.1	4.8	6,000	10,800
	---	34.6	51.7	13.6	4.5	65.9	1.3	9.4	5.2	6,550	11,790
	---	40.1	59.9	---	5.3	76.4	1.5	10.9	6.1	7,580	13,650
w190933	9.0	32.6	48.0	10.4	5.4	62.0	1.3	17.7	3.2	6,150	11,060
	---	35.8	52.7	11.4	4.8	68.1	1.4	10.7	3.5	6,750	12,160
	---	40.4	59.6	---	5.5	76.9	1.6	12.0	4.0	7,630	13,730
w190934	9.1	32.5	51.0	7.4	5.6	64.9	1.4	18.1	2.6	6,470	11,640
	---	35.8	56.1	8.1	5.0	71.4	1.5	11.0	2.9	7,120	12,810
	---	38.9	61.1	---	5.5	77.7	1.7	12.0	3.1	7,750	13,940
w191034	10.1	32.1	49.0	8.8	5.6	63.6	1.3	18.2	2.5	6,290	11,330
	---	35.7	54.5	9.8	5.0	70.7	1.4	10.3	2.8	7,000	12,600
	---	39.6	60.4	---	5.5	78.4	1.6	11.4	3.1	7,760	13,970
w191035	8.8	32.3	48.9	10.0	5.5	63.6	1.3	17.4	2.2	6,330	11,390
	---	35.4	53.6	11.0	5.0	69.7	1.4	10.5	2.4	6,940	12,490
	---	39.8	60.2	---	5.6	78.3	1.6	11.8	2.7	7,790	14,030
w191036	8.4	32.4	46.5	12.7	5.3	62.0	1.2	16.6	2.2	6,110	10,990
	---	35.4	50.8	13.9	4.8	67.7	1.3	10.0	2.4	6,670	12,000
	---	41.1	58.9	---	5.5	78.6	1.5	11.6	2.8	7,740	13,930
w191037	15.9	30.2	47.3	6.6	5.7	60.0	1.2	25.8	.7	5,760	10,360
	---	35.9	56.2	7.8	4.7	71.3	1.4	13.9	.8	6,840	12,320
	---	39.0	61.0	---	5.1	77.4	1.5	15.1	.9	7,430	13,370
w191038	11.0	33.2	51.4	4.4	5.9	67.6	1.6	19.1	1.4	6,640	11,960
	---	37.3	57.8	4.9	5.3	76.0	1.8	10.5	1.6	7,470	13,440
	---	39.2	60.8	---	5.5	79.9	1.9	11.0	1.7	7,850	14,140
w191039	8.7	32.9	46.8	11.6	5.3	60.7	1.4	16.5	4.5	6,090	10,960
	---	36.0	51.3	12.7	4.7	66.5	1.5	9.6	4.9	6,670	12,000
	---	41.3	58.7	---	5.4	76.2	1.8	11.0	5.6	7,640	13,750
w191040	10.0	33.9	48.0	8.1	5.7	64.6	1.4	17.9	2.3	6,410	11,530
	---	37.7	53.3	9.0	5.1	71.8	1.6	10.0	2.6	7,120	12,810
	---	41.4	58.6	---	5.6	78.9	1.7	11.0	2.8	7,820	14,080
w191041	7.8	35.9	49.4	6.9	5.6	65.2	1.3	16.8	4.2	6,580	11,840
	---	38.9	53.6	7.5	5.1	70.7	1.4	10.7	4.6	7,130	12,840
	---	42.1	57.9	---	5.5	76.4	1.5	11.6	4.9	7,710	13,880
w191042	9.7	35.6	45.4	9.3	5.7	63.4	1.4	17.7	2.5	6,320	11,380
	---	39.4	50.3	10.3	5.1	70.2	1.6	10.1	2.8	7,000	12,600
	---	44.0	56.0	---	5.7	78.3	1.7	11.2	3.1	7,810	14,050

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w190932	0.0	0.91	2.40	1.54	0.0	1,040	1,090	1,145
	---	.99	2.62	1.68				
	---	1.15	3.03	1.95				
w190933	.0	.69	.91	1.62	1.0	1,130	1,180	1,235
	---	.76	1.00	1.78				
	---	.86	1.13	2.01				
w190934	.0	.75	1.09	.79	1.0	1,070	1,125	1,180
	---	.83	1.20	.87				
	---	.90	1.31	.95				
w191034	.0	.72	2.00	.19	1.0	1,080	1,125	1,195
	---	.80	2.22	.21				
	---	.89	2.47	.23				
w191035	.0	.04	1.14	1.04	1.0	1,115	1,255	1,325
	---	.04	1.25	1.14				
	---	.05	1.40	1.28				
w191036	.0	.03	1.26	.95	1.0	1,125	1,250	1,290
	---	.03	1.38	1.04				
	---	.04	1.60	1.20				
w191037	.0	.02	.11	.57	.0	1,175	1,240	1,305
	---	.02	.13	.68				
	---	.03	.14	.74				
w191038	.0	.43	1.16	.15	1.0	1,130	1,220	1,315
	---	.48	1.30	.17				
	---	.51	1.37	.18				
w191039	.0	.06	1.77	2.65	1.0	1,075	1,120	1,135
	---	.07	1.94	2.90				
	---	.08	2.22	3.32				
w191040	.0	.30	.59	1.40	1.0	1,185	1,230	1,250
	---	.33	.66	1.56				
	---	.37	.72	1.71				
w191041	.0	.49	2.39	1.36	1.0	0	0	0
	---	.53	2.59	1.48				
	---	.57	2.80	1.59				
w191042	.0	.42	1.79	.26	1.0	0	0	0
	---	.47	1.98	.29				
	---	.52	2.21	.32				

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191043	9.2	36.6	43.7	10.5	5.7	60.8	1.2	17.4	4.4	6,130	11,040
	---	40.3	48.1	11.6	5.2	67.0	1.3	10.2	4.8	6,750	12,160
	---	45.6	54.4	---	5.8	75.7	1.5	11.5	5.5	7,640	13,750
w191044	7.8	35.7	48.7	7.8	5.4	66.1	1.4	16.1	3.2	6,630	11,930
	---	38.7	52.8	8.5	4.9	71.7	1.5	9.9	3.5	7,190	12,940
	---	42.3	57.7	---	5.4	78.3	1.7	10.9	3.8	7,850	14,140
w191045	8.2	35.8	47.0	9.0	5.5	64.1	1.4	16.6	3.4	6,450	11,610
	---	39.0	51.2	9.8	5.0	69.8	1.5	10.1	3.7	7,030	12,650
	---	43.2	56.8	---	5.5	77.4	1.7	11.2	4.1	7,790	14,020
w191046	11.5	32.9	44.8	10.8	5.7	61.9	1.3	18.7	1.6	6,120	11,010
	---	37.2	50.6	12.2	5.0	69.9	1.5	9.6	1.8	6,910	12,440
	---	42.3	57.7	---	5.7	79.7	1.7	10.9	2.1	7,870	14,170
w191047	12.4	31.3	51.7	4.6	5.7	66.0	1.4	20.7	1.6	6,520	11,740
	---	35.7	59.0	5.3	4.9	75.3	1.6	11.0	1.8	7,450	13,400
	---	37.7	62.3	---	5.2	79.5	1.7	11.7	1.9	7,860	14,140
w191048	9.8	32.8	50.8	6.6	5.5	63.9	1.4	18.7	3.9	6,370	11,470
	---	36.4	56.3	7.3	4.9	70.8	1.6	11.1	4.3	7,060	12,720
	---	39.2	60.8	---	5.3	76.4	1.7	11.9	4.7	7,620	13,720
w191049	12.7	31.3	46.9	9.1	6.1	62.2	1.0	20.2	1.4	6,190	11,140
	---	35.9	53.7	10.4	5.4	71.2	1.1	10.2	1.6	7,090	12,760
	---	40.0	60.0	---	6.0	79.5	1.3	11.4	1.8	7,910	14,250
w191050	10.7	31.7	51.4	6.2	5.7	64.6	1.0	18.5	4.0	6,430	11,570
	---	35.5	57.6	6.9	5.1	72.3	1.1	10.1	4.5	7,200	12,960
	---	38.1	61.9	---	5.4	77.7	1.2	10.8	4.8	7,730	13,920
w191051	9.3	32.8	47.8	10.1	5.2	62.8	1.1	18.0	2.8	6,280	11,310
	---	36.2	52.7	11.1	4.6	69.2	1.2	10.7	3.1	6,930	12,470
	---	40.7	59.3	---	5.2	77.9	1.4	12.1	3.5	7,800	14,030
w191052	8.9	36.4	41.5	13.2	5.2	61.3	1.0	16.2	3.1	6,070	10,930
	---	40.0	45.6	14.5	4.6	67.3	1.1	9.1	3.4	6,670	12,000
	---	46.7	53.3	---	5.4	78.7	1.3	10.6	4.0	7,790	14,030
w191053	8.6	34.2	43.6	13.6	5.3	58.8	.9	16.3	5.1	5,940	10,700
	---	37.4	47.7	14.9	4.8	64.3	1.0	9.5	5.6	6,500	11,710
	---	44.0	56.0	---	5.6	75.6	1.2	11.1	6.6	7,640	13,750
w191054	11.6	31.9	45.0	11.5	5.4	59.7	.9	19.3	3.2	5,920	10,660
	---	36.1	50.9	13.0	4.7	67.5	1.0	10.2	3.6	6,700	12,060
	---	41.5	58.5	---	5.3	77.6	1.2	11.7	4.2	7,700	13,860

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191043	0.0	0.98	2.74	0.71	1.0	1,045	1,085	1,120
	---	1.08	3.02	.78				
	---	1.22	3.41	.88				
w191044	.0	.02	1.18	2.00	3.5	1,055	1,105	1,140
	---	.02	1.28	2.17				
	---	.02	1.40	2.37				
w191045	.0	.22	1.23	1.90	2.0	1,100	1,155	1,180
	---	.24	1.34	2.07				
	---	.27	1.49	2.29				
w191046	.0	.02	.85	.71	1.0	1,195	1,305	1,340
	---	.02	.96	.80				
	---	.03	1.09	.91				
w191047	.0	.02	.72	.88	1.0	1,075	1,120	1,190
	---	.02	.82	1.00				
	---	.02	.87	1.06				
w191048	.0	.08	2.36	1.45	1.0	1,090	1,145	1,170
	---	.09	2.62	1.61				
	---	.10	2.82	1.73				
w191049	.0	.13	.83	.45	1.0	1,175	1,315	1,370
	---	.15	.95	.52				
	---	.17	1.06	.58				
w191050	.0	.72	2.46	.86	1.0	1,095	1,150	1,195
	---	.81	2.75	.96				
	---	.87	2.96	1.03				
w191051	.0	.75	1.46	.62	1.0	0	0	0
	---	.83	1.61	.68				
	---	.93	1.81	.77				
w191052	.0	.35	1.54	1.17	1.0	1,195	1,245	1,300
	---	.38	1.69	1.28				
	---	.45	1.98	1.50				
w191053	.0	.62	3.14	1.35	1.0	1,040	1,070	1,090
	---	.68	3.44	1.48				
	---	.80	4.04	1.74				
w191054	.0	.63	1.66	.93	1.0	1,090	1,130	1,165
	---	.71	1.88	1.05				
	---	.82	2.16	1.21				

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w191055	9.2	34.3	48.4	8.1	5.6	64.2	1.4	17.7	3.0	6,360	11,440
	---	37.8	53.3	8.9	5.0	70.7	1.5	10.5	3.3	7,000	12,600
	---	41.5	58.5	---	5.5	77.6	1.7	11.5	3.6	7,690	13,830
w191056	9.0	36.0	48.9	6.1	5.8	67.5	1.0	18.2	1.4	6,650	11,970
	---	39.6	53.7	6.7	5.3	74.2	1.1	11.2	1.5	7,310	13,150
	---	42.4	57.6	---	5.7	79.5	1.2	12.0	1.6	7,830	14,100
w191057	8.0	37.5	45.6	8.9	5.4	63.8	.9	16.7	4.3	6,440	11,600
	---	40.8	49.6	9.7	4.9	69.3	1.0	10.4	4.7	7,000	12,610
	---	45.1	54.9	---	5.4	76.8	1.1	11.5	5.2	7,760	13,960
w191058	9.0	35.8	46.6	8.6	5.7	64.0	1.0	16.9	3.8	6,430	11,570
	---	39.3	51.2	9.5	5.2	70.3	1.1	9.8	4.2	7,060	12,710
	---	43.4	56.6	---	5.7	77.7	1.2	10.8	4.6	7,800	14,040
w191059	11.0	32.1	43.6	13.3	5.3	56.8	.8	19.0	4.8	5,720	10,290
	---	36.1	49.0	14.9	4.6	63.8	.9	10.4	5.4	6,420	11,560
	---	42.4	57.6	---	5.4	75.0	1.1	12.2	6.3	7,550	13,590
w191060	7.3	36.4	37.7	18.6	5.0	57.4	1.2	13.7	4.1	5,670	10,200
	---	39.3	40.7	20.1	4.5	61.9	1.3	7.8	4.4	6,110	11,000
	---	49.1	50.9	---	5.7	77.5	1.6	9.7	5.5	7,650	13,770
w191061	8.8	35.8	46.3	9.1	5.6	63.5	1.0	17.7	3.1	6,370	11,460
	---	39.3	50.8	10.0	5.1	69.6	1.1	10.8	3.4	6,980	12,570
	---	43.6	56.4	---	5.6	77.3	1.2	12.0	3.8	7,750	13,960
w191062	8.5	37.3	47.5	6.7	5.7	65.0	1.0	17.8	3.8	6,580	11,850
	---	40.8	51.9	7.3	5.2	71.0	1.1	11.2	4.2	7,190	12,950
	---	44.0	56.0	---	5.6	76.7	1.2	12.1	4.5	7,760	13,970
w192614	9.6	34.8	44.6	11.0	5.4	61.6	1.4	16.6	4.0	6,160	11,080
	---	38.5	49.3	12.2	4.8	68.1	1.5	8.9	4.4	6,810	12,260
	---	43.8	56.2	---	5.5	77.6	1.8	10.2	5.0	7,750	13,960
w192615	9.7	34.5	44.0	11.8	5.4	60.6	1.4	17.1	3.7	6,040	10,870
	---	38.2	48.7	13.1	4.8	67.1	1.6	9.4	4.1	6,690	12,030
	---	43.9	56.1	---	5.5	77.2	1.8	10.8	4.7	7,690	13,840
w192616	8.1	36.1	46.7	9.1	5.4	63.5	1.2	15.3	5.5	6,450	11,610
	---	39.3	50.8	9.9	4.9	69.1	1.3	8.8	6.0	7,020	12,630
	---	43.6	56.4	---	5.4	76.7	1.4	9.8	6.6	7,790	14,020
w192617	9.7	38.4	46.8	5.1	5.8	67.0	1.3	17.8	2.9	6,730	12,120
	---	42.5	51.8	5.6	5.2	74.2	1.4	10.2	3.2	7,460	13,420
	---	45.1	54.9	---	5.5	78.6	1.5	10.8	3.4	7,900	14,230

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 89 coal samples from Indiana.--Continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w191055	0.0	0.20	2.26	0.54	1.0	1,050	1,125	1,200
	---	.22	2.49	.59				
	---	.24	2.73	.65				
w191056	.0	.25	.28	.89	1.0	1,360	1,415	1,445
	---	.27	.31	.98				
	---	.29	.33	1.05				
w191057	.0	.53	1.90	1.91	1.0	0	0	0
	---	.58	2.07	2.08				
	---	.64	2.29	2.30				
w191058	.0	.44	1.34	1.97	2.0	1,035	1,080	1,105
	---	.48	1.47	2.16				
	---	.53	1.63	2.39				
w191059	.0	1.08	2.60	1.09	1.0	1,040	1,090	1,105
	---	1.21	2.92	1.22				
	---	1.43	3.43	1.44				
w191060	.0	.24	3.34	.52	1.0	1,145	1,190	1,240
	---	.26	3.60	.56				
	---	.32	4.51	.70				
w191061	.0	.44	1.07	1.61	1.0	0	0	0
	---	.48	1.17	1.77				
	---	.54	1.30	1.96				
w191062	.0	.77	1.55	1.52	1.0	1,040	1,090	1,165
	---	.84	1.69	1.66				
	---	.91	1.83	1.79				
w192614	.0	.50	2.00	1.40	1.0	1,095	1,160	1,185
	---	.55	2.21	1.55				
	---	.63	2.52	1.76				
w192615	.0	.60	1.40	1.60	1.0	1,110	1,165	1,190
	---	.66	1.55	1.77				
	---	.76	1.78	2.04				
w192616	.0	.60	3.90	.90	1.0	1,320	1,375	1,400
	---	.65	4.24	.98				
	---	.72	4.71	1.09				
w192617	.0	.40	1.80	.70	.0	1,120	1,155	1,190
	---	.44	1.99	.78				
	---	.47	2.11	.82				

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w192618	9.5	36.3	45.5	8.7	5.6	63.3	1.2	15.9	5.3	6,410	11,540
	---	40.1	50.3	9.6	5.0	69.9	1.3	8.2	5.9	7,080	12,750
	---	44.4	55.6	---	5.6	77.4	1.5	9.1	6.5	7,840	14,110
w192619	11.7	36.1	46.2	6.0	5.7	64.4	1.3	19.2	3.4	6,440	11,600
	---	40.9	52.3	6.8	5.0	72.9	1.5	10.0	3.9	7,300	13,130
	---	43.9	56.1	---	5.3	78.3	1.6	10.7	4.1	7,830	14,090
w192620	11.1	31.6	42.9	14.4	5.2	59.7	1.2	16.7	2.9	5,930	10,670
	---	35.5	48.3	16.2	4.5	67.2	1.3	7.7	3.3	6,670	12,010
	---	42.4	57.6	---	5.3	80.1	1.6	9.2	3.9	7,960	14,330
w192621	10.8	35.3	41.6	12.3	5.4	59.1	1.1	17.6	4.5	5,940	10,690
	---	39.6	46.6	13.8	4.7	66.3	1.2	9.0	5.0	6,660	11,980
	---	45.9	54.1	---	5.5	76.9	1.4	10.4	5.9	7,720	13,900
w192622	9.7	32.4	50.0	7.9	5.6	65.4	1.3	17.3	2.5	6,500	11,700
	---	35.9	55.4	8.7	5.0	72.4	1.4	9.6	2.8	7,200	12,960
	---	39.3	60.7	---	5.5	79.4	1.6	10.5	3.0	7,890	14,200
w192623	8.8	31.0	47.2	13.0	5.3	59.8	1.1	15.8	5.0	6,010	10,820
	---	34.0	51.8	14.3	4.7	65.6	1.2	8.7	5.5	6,590	11,860
	---	39.6	60.4	---	5.5	76.5	1.4	10.2	6.4	7,680	13,830
w192624	10.0	34.8	44.7	10.5	5.5	61.2	1.4	17.2	4.2	6,120	11,010
	---	38.7	49.7	11.7	4.9	68.0	1.6	9.2	4.7	6,800	12,230
	---	43.8	56.2	---	5.5	77.0	1.8	10.5	5.3	7,690	13,850
w192625	10.6	32.4	42.4	14.6	5.1	56.9	1.3	17.5	4.7	5,700	10,270
	---	36.2	47.4	16.3	4.4	63.6	1.5	9.0	5.3	6,380	11,480
	---	43.3	56.7	---	5.2	76.1	1.7	10.8	6.3	7,620	13,720
w192626	9.4	37.0	45.1	8.5	5.5	64.0	1.4	17.2	3.3	6,370	11,460
	---	40.8	49.8	9.4	4.9	70.6	1.5	9.8	3.6	7,030	12,650
	---	45.1	54.9	---	5.4	78.0	1.7	10.8	4.0	7,760	13,960
w192627	9.3	36.0	43.4	11.3	5.4	61.6	1.3	16.9	3.4	6,120	11,020
	---	39.7	47.9	12.5	4.8	67.9	1.4	9.5	3.7	6,750	12,150
	---	45.3	54.7	---	5.5	77.6	1.6	10.9	4.3	7,710	13,880
w192628	12.1	32.2	40.7	15.0	5.5	57.9	1.2	19.4	1.0	5,720	10,300
	---	36.6	46.3	17.1	4.7	65.9	1.4	9.8	1.1	6,510	11,720
	---	44.2	55.8	---	5.7	79.4	1.6	11.9	1.4	7,850	14,130
w192629	11.1	34.6	50.6	3.7	5.8	69.3	1.4	19.0	.9	6,810	12,260
	---	38.9	56.9	4.2	5.1	78.0	1.6	10.3	1.0	7,660	13,790
	---	40.6	59.4	---	5.4	81.3	1.6	10.7	1.1	7,990	14,390

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w192618	0.0	0.60	4.20	0.40	1.5	1,375	1,435	1,460
	---	.66	4.64	.44				
	---	.73	5.13	.49				
w192619	.0	.60	1.90	.90	1.0	1,105	1,150	1,180
	---	.68	2.15	1.02				
	---	.73	2.31	1.09				
w192620	.0	.50	1.50	.90	1.0	1,130	1,165	1,190
	---	.56	1.69	1.01				
	---	.67	2.01	1.21				
w192621	.0	.03	2.31	2.13	1.0	1,055	1,100	1,420
	---	.03	2.59	2.39				
	---	.04	3.00	2.77				
w192622	.0	.50	1.00	1.00	1.0	1,320	1,375	1,400
	---	.55	1.11	1.11				
	---	.61	1.21	1.21				
w192623	.0	.80	2.70	1.50	1.0	1,150	1,205	1,230
	---	.88	2.96	1.64				
	---	1.02	3.45	1.92				
w192624	.0	.70	2.10	1.40	1.0	1,255	1,320	1,340
	---	.78	2.33	1.56				
	---	.88	2.64	1.76				
w192625	.0	.70	2.80	1.20	1.0	1,210	1,265	1,290
	---	.78	3.13	1.34				
	---	.94	3.74	1.60				
w192626	.0	.50	1.30	1.50	1.0	1,100	1,150	1,210
	---	.55	1.43	1.66				
	---	.61	1.58	1.83				
w192627	.0	.55	1.35	1.53	1.0	1,175	1,230	1,265
	---	.61	1.49	1.69				
	---	.69	1.70	1.93				
w192628	.0	.02	.21	.81	1.0	1,540	0	0
	---	.02	.24	.92				
	---	.03	.29	1.11				
w192629	.0	.20	.13	.52	1.0	1,100	1,145	1,195
	---	.22	.15	.58				
	---	.23	.15	.61				

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w192630	8.0	40.7	43.1	8.2	5.7	65.5	1.5	15.5	3.6	6,640	11,960
	---	44.2	46.8	8.9	5.2	71.2	1.6	9.1	3.9	7,220	13,000
	---	48.6	51.4	---	5.7	78.2	1.8	10.0	4.3	7,930	14,270
w192631	9.4	39.2	42.7	8.7	5.6	63.5	1.4	16.6	4.2	6,440	11,590
	---	43.3	47.1	9.6	5.0	70.1	1.5	9.1	4.6	7,110	12,790
	---	47.9	52.1	---	5.6	77.5	1.7	10.1	5.1	7,860	14,150
w192632	15.4	30.5	48.7	5.4	6.0	64.8	1.3	21.7	.8	6,410	11,530
	---	36.1	57.6	6.4	5.1	76.6	1.5	9.5	.9	7,570	13,630
	---	38.5	61.5	---	5.4	81.8	1.6	10.1	1.0	8,090	14,560
w192633	16.1	30.1	49.2	4.6	6.3	65.3	1.3	21.7	.8	6,380	11,480
	---	35.9	58.6	5.5	5.4	77.8	1.5	8.8	1.0	7,600	13,680
	---	38.0	62.0	---	5.7	82.3	1.6	9.3	1.0	8,040	14,480
w192634	16.2	32.8	49.0	2.0	6.1	67.1	1.4	22.4	.8	6,600	11,890
	---	39.1	58.5	2.4	5.1	80.1	1.7	9.5	1.0	7,880	14,180
	---	40.1	59.9	---	5.3	82.0	1.7	9.8	1.0	8,070	14,530
w192635	13.8	31.2	46.1	8.9	5.6	60.2	1.3	20.7	3.3	5,970	10,750
	---	36.2	53.5	10.3	4.7	69.8	1.5	9.8	3.8	6,930	12,470
	---	40.4	59.6	---	5.3	77.9	1.7	10.9	4.3	7,730	13,910
w192636	15.6	30.5	44.8	9.1	5.8	59.4	1.2	21.6	2.9	5,910	10,630
	---	36.1	53.1	10.8	4.8	70.4	1.4	9.2	3.4	7,000	12,590
	---	40.5	59.5	---	5.4	78.9	1.6	10.3	3.9	7,840	14,120
w193119	13.9	28.7	49.1	8.3	5.6	63.3	1.2	20.0	1.7	6,220	11,200
	---	33.3	57.0	9.6	4.7	73.5	1.4	8.9	2.0	7,230	13,010
	---	36.9	63.1	---	5.2	81.4	1.5	9.8	2.2	8,000	14,390
w193120	15.0	28.4	49.5	7.1	5.8	63.7	1.4	21.5	.3	6,230	11,220
	---	33.4	58.2	8.4	4.9	74.9	1.6	9.6	.4	7,330	13,200
	---	36.5	63.5	---	5.3	81.8	1.8	10.5	.4	8,000	14,400
w193121	10.0	35.2	44.5	10.3	5.6	60.2	1.2	17.6	5.1	6,150	11,070
	---	39.1	49.4	11.4	5.0	66.9	1.3	9.7	5.7	6,830	12,300
	---	44.2	55.8	---	5.6	75.5	1.5	10.9	6.4	7,710	13,880
w193122	8.6	34.4	47.6	9.4	5.5	65.1	1.3	16.0	2.6	6,510	11,720
	---	37.6	52.1	10.3	5.0	71.2	1.4	9.1	2.8	7,130	12,830
	---	42.0	58.0	---	5.5	79.4	1.6	10.2	3.2	7,940	14,300
w193123	8.9	34.9	46.9	9.3	5.5	64.0	1.4	15.9	4.0	6,430	11,580
	---	38.3	51.5	10.2	5.0	70.3	1.5	8.8	4.4	7,060	12,710
	---	42.7	57.3	---	5.5	78.2	1.7	9.8	4.9	7,960	14,160

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 65 coal samples from Indiana.--Continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w192630	0.0	0.32	1.79	1.59	4.0	1,045	1,100	1,150
	---	.35	1.95	1.73				
	---	.38	2.14	1.90				
w192631	.0	.02	2.27	1.92	1.0	1,030	1,090	1,140
	---	.02	2.51	2.12				
	---	.02	2.77	2.34				
w192632	.0	.02	.32	.44	1.0	1,470	1,530	1,540
	---	.02	.38	.52				
	---	.03	.40	.56				
w192633	.0	.02	.22	.55	1.0	1,470	1,520	1,540
	---	.02	.26	.66				
	---	.03	.28	.69				
w192634	.0	.10	.30	.50	1.0	1,240	1,290	1,345
	---	.12	.36	.60				
	---	.12	.37	.61				
w192635	.0	.64	1.77	.89	1.0	1,120	1,165	1,225
	---	.74	2.05	1.03				
	---	.83	2.29	1.15				
w192636	.0	.02	1.48	1.36	1.0	1,065	1,110	1,145
	---	.02	1.75	1.61				
	---	.03	1.97	1.81				
w193119	.0	.22	.98	.46	1.0	1,180	1,230	1,295
	---	.26	1.14	.53				
	---	.28	1.26	.59				
w193120	.0	.01	.09	.23	1.0	1,505	1,540	1,540
	---	.01	.11	.27				
	---	.01	.12	.30				
w193121	.0	.79	2.42	1.89	1.0	1,070	1,125	1,165
	---	.88	2.69	2.10				
	---	.99	3.04	2.37				
w193122	.0	.15	.58	1.89	4.0	1,210	1,275	1,325
	---	.16	.63	2.07				
	---	.18	.71	2.30				
w193123	.0	.23	1.75	1.98	4.0	1,165	1,210	1,255
	---	.25	1.92	2.17				
	---	.28	2.14	2.42				

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Proximate Analysis				Ultimate Analysis					Heat of Combustion	
	Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulfur	Kcal/kg	Btu/lb
w193124	14.6	28.8	50.9	5.7	5.7	64.4	1.6	21.6	0.9	6,310	11,350
	---	33.7	59.6	6.7	4.8	75.4	1.9	10.1	1.1	7,380	13,290
	---	36.1	63.9	---	5.1	80.8	2.0	10.8	1.1	7,910	14,240

Table 12e -- Proximate and ultimate analyses, heat content, forms-of-sulfur, free-swelling index and ash fusion temperature determinations for 85 coal samples from Indiana.--Continued

Sample number	Air-dried loss	Forms of sulfur			Free swelling	Ash fusion temperature C°		
		Sulfate	Pyritic	Organic		Initial deform.	soften.	fluid
w193124	0.0	0.02	0.29	0.62	1.0	1,405	1,455	1,490
	---	.02	.34	.73				
	---	.03	.36	.78				

Table 12f.— Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana

[Values in percent or parts-per-million. Coal ashed at 525°C. L means less than the value shown; N, not detected; B, not determined; S after element title indicates determinations by automatic plate reading computer assisted, emission spectographic analyses. The standard deviation of any single answer should be taken as plus 50% and minus 35%. Methods of analyses for other elements as shown in figures.]

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w190528	8.8	36	14	3.4	0.66	1.1	1.6	25	0.61	1.0L	w190528
w190529	11.9	26	12	3.6	.66	.70	1.4	35	.56	1.0L	w190529
w190530	9.4	29	13	4.2	.78	.38	1.4	28	.55	1.0L	w190530
w190531	8.3	29	15	5.6	.80	.47	1.5	20	.60	1.0L	w190531
w190532	8.6	40	16	3.6	.66	.20	1.8	21	.75	1.0L	w190532
w190533	9.2	31	14	1.3	.65	.20	1.6	26	.66	1.0L	w190533
w190534	9.2	45	24	.34	.63	.16	1.1	15	.86	1.0L	w190534
w190535	9.2	40	25	.27	.37	.15	1.0	18	.87	1.0L	w190535
w190536	7.4	35	16	.95	.51	.22	.95	20	.99	1.0L	w190536
w190537	10.5	41	13	1.4	.91	.31	1.5	16	.86	1.0L	w190537
w190538	7.9	50	24	1.8	1.3	.54	2.0	3.9	1.0	1.0L	w190538
w190539	8.9	50	32	1.2	.65	.22	2.3	2.4	1.2	1.4	w190539
w190540	7.4	54	26	1.4	.86	.27	2.0	3.8	1.1	1.0L	w190540
w190541	13.0	48	31	.71	.81	.27	2.4	5.0	1.2	1.0L	w190541
w190542	5.3	52	25	.68	.33	.20	1.2	7.0	1.4	1.2	w190542
w190543	4.5	52	28	1.6	.73	.27	1.4	3.6	1.4	1.0L	w190543
w190544	6.0	41	17	1.0	.30	.18	.77	15	1.2	1.0L	w190544
w190545	5.9	50	21	.85	.63	.20	1.1	9.7	1.3	1.0L	w190545
w190546	10.6	36	20	2.6	.73	.26	1.9	21	.73	1.0L	w190546
w190547	12.5	33	17	4.0	.48	.26	.82	21	.43	1.0L	w190547
w190548	14.8	43	25	.52	.90	.26	2.5	13	1.1	1.0L	w190548
w190929	8.7	33	20	.80	1.0	.22	1.4	36	.90	.49	w190929
w190930	8.7	30	18	.50	.90	.19	1.4	44	.80	.20	w190930
w190931	7.7	41	21	.50	1.2	.20	2.1	31	1.1	.03	w190931
w190932	13.9	30	14	6.4	.96	.21	1.6	38	.70	.20	w190932
w190933	11.9	36	17	7.6	1.4	.31	2.1	24	.80	.60	w190933
w190934	8.6	35	22	.80	.76	.21	1.6	36	.90	.30	w190934
w191034	9.5	42	23	.50	.81	.39	1.3	29	1.3	.20	w191034
w191035	10.3	46	25	.60	.76	.42	1.5	23	1.2	.50	w191035
w191036	13.5	48	23	.50	.76	.55	1.1	22	1.3	.80	w191036
w191037	7.3	45	26	1.4	1.2	.62	1.3	17	1.6	1.1	w191037
w191038	4.6	45	24	.80	1.0	.39	1.6	22	1.1	.30	w191038
w191039	12.5	35	16	5.8	.83	.46	1.6	37	.80	.08	w191039
w191040	9.2	42	21	9.5	.98	.61	1.9	13	1.0	.07	w191040
w191041	7.7	23	14	.80	.63	.78	.60	55	.40	.19	w191041
w191042	10.6	36	22	3.2	.98	.53	2.1	25	1.0	1.6	w191042
w191043	11.9	38	16	3.3	.86	.42	1.5	33	.80	.10	w191043
w191044	8.6	44	19	4.6	1.1	.66	2.3	19	.90	.20	w191044
w191045	10.1	49	21	2.9	1.2	.67	2.6	20	.90	.30	w191045
w191046	11.9	54	24	.50	1.4	.58	2.8	14	1.1	.06	w191046

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w190528	2.5	0.54	460G	370	21	5L	14	110	31	110	w190528
w190529	2.9	.60	460G	270	24	5L	3.1	84	21	100	w190529
w190530	6.2	.50L	460G	190	20	5L	1.7	96	32	93	w190530
w190531	3.9	.63	460G	310	30	5L	3.6	180	35	130	w190531
w190532	2.5	.72	460G	330	37	5L	3.2	93	48	120	w190532
w190533	1.1	.80	460G	250	30	5L	2.2	120	42	110	w190533
w190534	.78	1.2	460G	450	64	5L	1.5	140	50	140	w190534
w190535	.75	1.6	460G	330	65	11	2.6	150	89	170	w190535
w190536	1.5	1.4	460G	370	37	5L	1.9	240	74	140	w190536
w190537	1.9	1.1	460G	370	31	5	3.4	200	62	130	w190537
w190538	2.6	.68	460G	710	45	5L	.50	340	80	170	w190538
w190539	.59	.62	460G	1,300	48	5L	5.0	380	43	180	w190539
w190540	1.6	.48	460G	660	61	5L	2.1	350	76	160	w190540
w190541	.59	.84	460G	830	31	5L	3.7	250	35	240	w190541
w190542	.69	.74	460G	1,600	100	5L	.94	740	160	190	w190542
w190543	2.1	.59	460G	980	89	5L	2.1	620	180	200	w190543
w190544	.51	1.7	460G	550	63	5L	.86	300	110	150	w190544
w190545	.77	1.6	460G	390	60	5L	2.4	240	110	130	w190545
w190546	1.3	.81	460G	320	29	5L	.67	170	28	130	w190546
w190547	2.2	.65	460G	320	38	5L	3.1	180	27	220	w190547
w190548	.85	.87	460G	810	47	5L	1.5	300	28	160	w190548
w190929	2.0	.54	1,000G	560	40	22L	1.0	210	40	130	w190929
w190930	1.8	.51	1,000G	190	35	22L	1.1	100	41	110	w190930
w190931	1.9	.50	1,000G	210	24	22L	1.8	120	120	140	w190931
w190932	7.5	.52	650	200	22	22L	8.4	72	22	150	w190932
w190933	7.8	.97	1,000G	310	26	22L	23	100	28	240	w190933
w190934	2.2	.68	1,000G	360	40	22L	4.7	240	43	120	w190934
w191034	1.6	1.2	1,000G	270	44	22L	2.3	200	280	170	w191034
w191035	1.8	.81	1,000G	490	42	22L	2.2	330	210	170	w191035
w191036	1.3	.86	1,000G	600	37	22L	.66	340	100	180	w191036
w191037	3.6	1.8	1,000G	840	61	22L	.38	660	67	250	w191037
w191038	2.0	2.3	1,000G	320	72	22L	2.8	200	250	180	w191038
w191039	3.3	.19	1,000G	190	19	22L	1.2	88	26	90	w191039
w191040	3.9	.11	1,000G	310	25	22L	1.8	130	40	140	w191040
w191041	2.4	.44	1,000G	250	42	22L	14	140	120	100	w191041
w191042	2.6	1.3	1,000G	460	35	22L	1.0	170	63	140	w191042
w191043	3.6	.88	1,000G	150	21	22L	4.7	59	46	210	w191043
w191044	3.0	.15	1,300G	390	16	29L	2.0	100	24	120	w191044
w191045	2.7	.32	1,300G	360	17	29L	.96	120	28	750	w191045
w191046	1.5	.32	1,300G	340	36	29L	2.3	84	59	120	w191046

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w190528	6.8	98	15L	18	2.7	32	24	74	4.5	3.2L	w190528
w190529	7.6	61	15L	4.6L	1.8	36	26	82	3.4	3.2L	w190529
w190530	6.4	97	15L	4.6L	2.3	25	24	56	3.2	3.2L	w190530
w190531	9.6	130	15L	15	4.8	37	32L	69	4.8	3.2L	w190531
w190532	9.3	90	15L	4.6L	1.9	38	22L	120	4.7	3.2L	w190532
w190533	9.8	90	15L	14	1.8	38	22L	150	4.3	3.2L	w190533
w190534	7.6	230	15L	22	2.9	70	22L	230	5.4	3.2L	w190534
w190535	6.5	240	15L	17	2.9	71	22L	260	5.4	3.2L	w190535
w190536	4.1	170	15L	4.6L	5.4	49	22L	130	6.8	3.2L	w190536
w190537	4.8	130	15L	4.6L	3.7	43	22L	110	7.6	3.2L	w190537
w190538	10	140	29	8.7	5.7	82	22L	200	8.9	6.8	w190538
w190539	15	270	48	32	9.4	86	22L	360	6.7	12	w190539
w190540	8.1	170	26	12	6.2	83	22L	250	8.1	7.9	w190540
w190541	13	220	15L	16	5.2	78	22L	160	4.6	15L	w190541
w190542	5.7	300	73	35	17	120	22L	540	7.5	15	w190542
w190543	6.7	270	46	31	15	100	22L	430	11	12	w190543
w190544	5.0	180	15L	4.6L	5.0	66	22L	280	8.3	32L	w190544
w190545	5.1	150	15L	11	3.9	50	22L	230	6.8	3.2L	w190545
w190546	10	250	15L	13	3.3	69	22L	12	4.7	3.2L	w190546
w190547	5.6	100	15L	51	8.2	83	64	34	8.0	3.2L	w190547
w190548	17	270	15L	18	8.0	54	22L	120	6.8	3.2L	w190548
w190929	14	130	32L	14	4.8	42	29	170	4.6	6.8L	w190929
w190930	13	90	32L	10L	2.4	39	22	160	4.6	6.8L	w190930
w190931	9.1	85	32L	10L	1.7	33	6.8L	140	6.5	6.8L	w190931
w190932	7.2	48	32L	10L	1.3	22	21	73	3.6	6.8L	w190932
w190933	10	58	32L	10L	1.5	26	19	100	4.2	6.8L	w190933
w190934	9.3	170	32L	10L	5.9	45	31	45	5.8	6.8L	w190934
w191034	9.5	290	32L	20	3.6	54	27	150	6.3	6.8L	w191034
w191035	7.8	220	32L	15	8.9	58	48	220	6.8	6.8L	w191035
w191036	6.7	280	32L	12	6.9	47	38	190	8.1	10L	w191036
w191037	5.5	300	41	27	13	77	51	240	8.2	6.8L	w191037
w191038	8.7	170	32L	12	3.9	67	17	300	8.7	6.8L	w191038
w191039	6.4	50	32L	10L	1.6	23	23	69	4.0	6.8L	w191039
w191040	71.6	69	32L	10L	2.3	27	16	130	5.4	6.8L	w191040
w191041	3.9	87	32L	10L	3.0	31	6.8L	76	6.5	6.8L	w191041
w191042	12	200	32L	10L	3.6	54	20	130	5.7	6.8L	w191042
w191043	5.9	95	32L	10L	1.1	29	6.8L	47	4.2	6.8L	w191043
w191044	9.3	69	43L	13L	1.9	36	20	62	4.7	9.1L	w191044
w191045	9.9	87	43L	13L	2.0	32	20	46	5.0	9.1L	w191045
w191046	12	79	43L	13L	2.4	52	9.1L	160	5.9	9.1L	w191046

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Sample number
w190528	57	51	1	270	100	15L	68L	130	12	17	w190528
w190529	42	36	.8	600	H	15L	68L	100	10L	18	w190529
w190530	53	45	1	320	38	15L	68L	94	11	14	w190530
w190531	96	66	1	480	54	15L	68L	140	20	21	w190531
w190532	47	47	1	420	100	25	68L	140	18	17	w190532
w190533	65	51	1	170	130	17	68L	120	53	19	w190533
w190534	87	180	1	150	21	25	68L	230	130	20	w190534
w190535	98	140	1	120	24	18	100L	540	190	20	w190535
w190536	150	140	1	150	38	26	170	660	250	32L	w190536
w190537	120	100	1	400	46	21	68L	530	340	22	w190537
w190538	200	110	1	180	6.6	15L	190	230	100	31	w190538
w190539	210	410	2	110	8.8	15L	270	440	86	62	w190539
w190540	200	120	1	240	11	24	240	230	88	47	w190540
w190541	150	210	2	86	8.3	15L	160	280	88	24	w190541
w190542	400	110	2	130	24	30	600	1,000G	260	140	w190542
w190543	330	110	2	170	15	33	520	1,000G	320	98	w190543
w190544	170	160	2	180	15	25	150	950	390	30	w190544
w190545	140	150	2	170	8.0	21	93	630	250	24	w190545
w190546	94	160	2	220	43	15L	68L	210	53	20	w190546
w190547	88	150	2	450	31	20	200	140	17	27	w190547
w190548	160	240	1	100	21	15L	68L	160	220	24	w190548
w190929	100	99	1	210	29	34	200	130	310	68L	w190929
w190930	57	73	1	100	32	35	78	140	500	100L	w190930
w190931	65	89	1	140	16	29	51	270	390	68L	w190931
w190932	36	64	.7	400	110	23	49	80	30	68L	w190932
w190933	50	62	.8L	430	120	28	89	120	44	68L	w190933
w190934	140	98	1	150	27	30	210	160	200	68L	w190934
w191034	110	150	1	62	26	44	210	380	600	68L	w191034
w191035	180	140	2	64	17	36	300	310	360	100	w191035
w191036	190	170	1	71	23	49	330	240	400	110	w191036
w191037	410	110	3	140	26	56	480	290	570	110	w191037
w191038	150	60	2	120	27	32	150	480	170	110	w191038
w191039	48	90	.8	400	48	24	79	62	53	68L	w191039
w191040	65	100	1	700	32	25	110	130	63	68L	w191040
w191041	91	40	1	360	55	25	150	220	11	68L	w191041
w191042	100	110	.9	260	32	29	140	270	230	68L	w191042
w191043	34	52	.8	400	67	15	56	210	86	68L	w191043
w191044	58	56	1	300	98	17	82	110	15	91L	w191044
w191045	59	60	1	200	120	28	100	110	16	91L	w191045
w191046	42	100	.8	100	19	20	62L	250	170	91L	w191046

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	Pt-S (ppm)	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm (ppm)	Sample number
w190528	7L	180L	20	11	15L	140	2.3	34L	4.6L	3.2L	w190528
w190529	7L	130	18	9.2	15L	140	1.7	25L	4.6L	3.2L	w190529
w190530	7L	220L	19	9.6	15L	120	2.1	32L	4.6L	3.2L	w190530
w190531	7L	180	33	23	15L	150	3.6	60	4.6L	3.2L	w190531
w190532	7L	160	22	8.1	15L	150	1.2	47	4.6L	3.2L	w190532
w190533	7L	180	21	9.8	15L	120	2.2	76	4.6L	3.2L	w190533
w190534	7L	170L	43	14	19	380	2.2	76	4.6L	3.2L	w190534
w190535	8	220L	52	14	15L	340	3.3	98	4.6L	3.2L	w190535
w190536	7L	260L	34	30	15L	1,100	2.7	81	4.6L	3.2L	w190536
w190537	7L	110	31	22	15L	850	.95	76	4.6L	3.2	w190537
w190538	7L	190	43	32	15L	1,100	2.5	76	4.6L	3.2L	w190538
w190539	7L	180	54	46	15L	3,600	7.9	110	4.6L	3.2	w190539
w190540	7L	260L	43	36	15L	1,800	2.7	68	4.6L	3.2L	w190540
w190541	7L	150	43	24	15L	2,300	3.8	54	4.6L	3.2L	w190541
w190542	7L	360L	62	87	15L	2,600	7.5	57L	4.6L	3.2L	w190542
w190543	7L	380L	71	73	15L	2,100G	6.7	67L	4.6L	3.2L	w190543
w190544	7L	270L	47	28	15L	600	5.0	67	4.6L	4.9	w190544
w190545	7L	220L	42	22	15L	470	3.4	68	4.6L	3.2L	w190545
w190546	7L	170	35	15	15L	240	2.8	28	4.6L	3.2L	w190546
w190547	7L	160L	52	30	15L	1,200	7.2	40	4.6L	3.2L	w190547
w190548	7L	240	52	37	15L	2,700	4.7	110	4.6L	3.2L	w190548
w190929	7L	150	34	24	9.4	1,100	2.3	34L	10L	4.6L	w190929
w190930	7L	200	29	10	6.8L	300	2.3	34L	10L	4.6L	w190930
w190931	7L	190	25	9.1	7.5	44	5.2L	39L	10L	4.6L	w190931
w190932	7L	140	15	6.5	8.4	100	.72	22L	10L	4.6L	w190932
w190933	7L	180	19	10	9.9	180	.84	25L	10L	4.6L	w190933
w190934	7L	150	36	31	6.8L	880	4.7	35L	10L	4.6L	w190934
w191034	7L	310L	40	19	11	430	2.1	32L	10L	4.6L	w191034
w191035	7L	290L	46	48	6.8L	940	4.9	39	10L	4.6L	w191035
w191036	7L	270L	40	45	6.8L	1,600	4.4	30	10L	4.6L	w191036
w191037	7L	400L	63	71	6.8L	2,400	8.2	41L	10L	4.6L	w191037
w191038	7L	460L	43	22	11	550	4.3L	65L	10L	4.6L	w191038
w191039	7L	180L	17	8.0	6.8L	94	1.6	24L	10L	4.6L	w191039
w191040	7L	240L	23	12	6.8L	200	2.2L	33L	10L	4.6L	w191040
w191041	7L	300L	26	17	6.8L	270	2.6	39L	10L	4.6L	w191041
w191042	7L	260L	37	19	9.8	1,200	1.9	38	10L	4.6L	w191042
w191043	7L	210L	20	6.7	12	480	.84	25L	10L	4.6L	w191043
w191044	9L	240L	20	10	9.1L	200	1.2	35L	13L	6.2L	w191044
w191045	9L	230L	20	11	9.1L	240	.99	30L	15	6.2L	w191045
w191046	9L	220L	32	10	9.1L	150	1.7	25L	13L	6.2L	w191046

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w190528	31	170	80	6.8	1,000	590	w190528
w190529	14	150	78	5.0	170	580	w190529
w190530	15	140	69	6.4	200	110	w190530
w190531	13	240	95	11	280	370	w190531
w190532	4.7	180	94	5.8	560	550	w190532
w190533	6.5	140	78	6.5	310	450	w190533
w190534	4.3	400	140	6.5	840	590	w190534
w190535	7.6	520	120	8.7	960	400	w190535
w190536	5.4	160	89	5.4	250	690	w190536
w190537	22	190	73	4.8	170	560	w190537
w190538	11	250	87	7.6	190	670	w190538
w190539	16	340	230	19	540	630	w190539
w190540	12	250	110	6.8	520	700	w190540
w190541	15	340	110	9.2	290	470	w190541
w190542	15	510	220	19	310	810	w190542
w190543	8.9	340	200	16	840	780	w190543
w190544	6.7	220	120	10	280	790	w190544
w190545	3.4L	160	110	6.8	580	600	w190545
w190546	41	330	82	9.4	120	450	w190546
w190547	35	780	270	19	230	820	w190547
w190548	18	300	100	12	200	400	w190548
w190929	9.2	190	84	6.9	140	370	w190929
w190930	11	130	77	5.7	200	260	w190930
w190931	3.9	140	42	5.2	230	370	w190931
w190932	49	250	35	2.9	200	240	w190932
w190933	73	550	56	4.2	750	380	w190933
w190934	12	170	99	8.1	600	330	w190934
w191034	6.3	190	120	7.4	410	470	w191034
w191035	7.8	190	130	11	760	360	w191035
w191036	8.1	200	120	10	76	740	w191036
w191037	9.6	240	180	14	130	520	w191037
w191038	11	190	110	8.7	2,500	390	w191038
w191039	9.6	130	47	4.0	76	340	w191039
w191040	7.6	170	86	5.4	180	430	w191040
w191041	21	140	110	6.5	3,500	170	w191041
w191042	18	220	64	6.6	87	340	w191042
w191043	44	170	52	4.2	960	240	w191043
w191044	33	200	50	3.5	120	210	w191044
w191045	50	280	67	4.0	100	360	w191045
w191046	12	150	54	5.0	1,900	190	w191046

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w191047	5.1	39	21	0.80	1.0	0.57	1.5	30	1.0	0.10	w191047
w191048	7.5	16	10	.60	.61	.50	.50	66	.50	.60	w191048
w191049	10.0	56	23	.50	1.4	.31	2.9	14	1.2	.10	w191049
w191050	6.5	14	8.0	1.8	.56	.58	.40	69	.50	.09	w191050
w191051	11.3	37	22	3.2	1.0	.73	1.9	29	1.1	1.3	w191051
w191052	15.7	17	9.0	27	.80	.45	.70	15	.40	.10	w191052
w191053	14.5	31	14	4.5	1.1	.45	1.9	34	.70	.50	w191053
w191054	13.0	37	18	7.1	.98	.49	1.4	25	.80	.07	w191054
w191055	9.0	37	20	.60	.86	.57	1.6	35	.90	.20	w191055
w191056	7.2	50	28	.30	.98	.40	2.2	13	1.2	.31	w191056
w191057	9.8	23	13	8.9	.81	.39	1.4	35	.60	.30	w191057
w191058	9.5	39	18	4.6	1.1	.69	1.9	27	.90	.29	w191058
w191059	14.5	31	16	6.2	.81	.67	1.1	36	.70	.02	w191059
w191060	21.4	21	11	23	.76	.23	.80B	18	.40	.30	w191060
w191061	10.0	42	19	4.8	1.1	.73	2.2	23	.90	.70	w191061
w191062	7.3	28	19	.60	.58	.63	.50	47	.40	.30	w191062
w191204	47.7	46	31	.06	.83	.22	2.9	10	1.3	.02	w191204
w191205	17.9	52	24	.40	.43	.17	1.6	16	1.5	.03	w191205
w191207	27.8	54	33	.10	.61	.25	2.7	2.1	1.4	.10	w191207
w191208	31.7	54	34	.20	.96	.25	3.1	2.0	1.3	.10	w191208
w191209	25.7	47	32	.30	.73	.21	2.6	8.3	1.4	.40	w191209
w191211	19.2	53	36	.30	.56	.22	2.5	2.4	1.4	.30	w191211
w191212	43.7	52	33	.20	.96	.26	3.1	2.1	1.2	.30	w191212
w191213	35.1	48	31	.30	.45	.20	2.5	11	1.2	.30	w191213
w191215	44.7	57	29	.10	.83	.23	3.6	4.4	1.3	.02	w191215
w191216	38.7	58	29	.20	1.0	.22	3.4	3.9	1.3	.01	w191216
w191220	28.5	39	24	.20	.78		2.7	28	.90	.05	w191220
w191222	29.7	47	30	.20	1.0	.30	3.8	14	1.1	.03	w191222
w191224	5.4	13	5.4	.70	.51	.32	.80	73	.70	.41	w191224
w191225	48.1	6.0	.9	B	.07	.02	.07	75	.09	B	w191225
w191227	5.4	15	8.2	.60	.28	.21	.60	69	.60	.20	w191227
w191228	33.2	60	24	.10	1.3	.65	2.8	5.6	1.2	.40	w191228
w191233	19.5	21	7.8	3.7	.33	.13	.80	58	.50	.05	w191233
w191239	31.2	26	9.9	17	.51	.39	1.2	23	.40	2.2	w191239
w191245	30.2	52	23	.20	1.7	.52	4.3	8.2	1.0	.02	w191245
w191248	34.7	40	16	.20	1.2	.18	2.8	31	.70	.30	w191248
w191276	45.9	5.9	.7	.07	.10	.02	.01	83	.10	B	w191276
w191277	20.5	36	18	7.2	1.2	.23	2.2	24	.80	3.9	w191277
w191279	19.7	59	22	.30	.98	.25	3.9	3.7	1.2	.02	w191279
w192614	12.1	30	13	8.8	.56	.30	1.4	31	.68	.04	w192614

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w191047	1.8	3.8	1,300G	250	72	29L	4.6	160	270	140	w191047
w191048	1.9	1.7	1,300G	160	62	29L	2.4	40	140	170	w191048
w191049	1.5	.36	1,300G	360	40	29L	1.2	100	65	140	w191049
w191050	3.2	1.3	1,300G	170	72	29	2.2	31	78	91	w191050
w191051	3.0	1.3	1,300G	680	38	29L	.86	160	49	150	w191051
w191052	15	.13L	910	240	12	29L	.48	32	14	55	w191052
w191053	3.2	.31	1,300G	320	19	29L	1.9	83	39	110	w191053
w191054	3.3	.39	1,300G	200	24	29L	.74	46	65	120	w191054
w191055	2.1	.62	1,300G	240	36	29L	13	120	90	110	w191055
w191056	1.1	.56	1,300G	340	48	29L	27	120	90	160	w191056
w191057	5.6	.38	840	240	27	29L	8.2	71	22	91	w191057
w191058	4.7	.21	1,300G	270	25	29L	1.6	84	26	120	w191058
w191059	4.9	.47	1,300G	170	21	29L	1.2	41	70	110	w191059
w191060	16	.13L	600	280	12	29L	1.5	56	20	70	w191060
w191061	4.0	.13L	1,300G	440	31	29L	2.3	80	35	160	w191061
w191062	2.1	.47	1,300G	210	46	29L	22	160	100	120	w191062
w191204	2.7	.23	190	450	10	40L	2.7	94	43	120	w191204
w191205	1.5	.76	650	440	32	40L	.34	95	53	210	w191205
w191207	.80	.21	350	600	21	40L	.14	150	33	150	w191207
w191208	.70	.19L	360	700	17	40L	.20	100	21	140	w191208
w191209	1.5	1.7	400	980	17	40L	.90	250	90	160	w191209
w191211	1.0	.29	520	760	37	40L	.10L	200	47	190	w191211
w191212	.70	.19L	230	570	11	40L	.10L	96	16	140	w191212
w191213	2.2	2.7	320	630	15	40L	1.9	160	120	140	w191213
w191215	1.2	.36	240	740	11	40L	.62	130	58	150	w191215
w191216	1.1	.35	230	690	12	40L	.18	120	57	150	w191216
w191220	3.8	1.5	550	440	31	40L	1.3	190	47	190	w191220
w191222	1.9	.36	700	1,900	21	43L	5.5	110	15	140	w191222
w191224	5.0	6.2	1,400	330	100	52L	1.0	56	150	340	w191224
w191225	18	.64	57	33	4.5	52L	.22	4.2	55	8.5	w191225
w191227	2.6	4.5	500	210	130	52L	1.1	56	170	130	w191227
w191228	1.6	.29	200	2,000	15	52L	.38	370	45	240	w191228
w191233	5.1	1.2	200	210	31	52L	2.5	36	13	66	w191233
w191239	14	.24L	480	350	15	52L	.62	150	26	77	w191239
w191245	2.8	.27	450	540	20	38L	15	89	28	130	w191245
w191248	4.9	.39	310	400	12	38L	4.9	66	34	91	w191248
w191276	8.4	.97	25L	18	1.8	36L	1.3	4.4	2.0	6.8	w191276
w191277	4.4	3.0	580	680	19	36L	28	170	93	120	w191277
w191279	2.2	.79	650	530	25	36L	.52	120	16	120	w191279
w192614	5.5	.20	1,000G	240	26	22L	2.3	58	42	100	w192614

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w191047	7.8	160	43L	13	3.1	86	25	400	5.9	9.1L	w191047
w191048	4.0	140	43L	13L	1.5	92	9.1L	280	4.0	9.1L	w191048
w191049	13	66	43L	13L	2.1	48	19	170	6.0	9.1L	w191049
w191050	11L	90	43L	13L	2.0	120	9.1L	280	6.2L	9.1L	w191050
w191051	13	170	43L	13L	2.7	50	40	120	5.3	9.1L	w191051
w191052	2.5	49	43L	13L	.76	21	19	13	2.5	9.1L	w191052
w191053	7.6	76	43L	13L	1.5	38	9.1L	17	4.1	9.1L	w191053
w191054	6.9	65	43L	13L	.92	34	25	110	3.8	9.1L	w191054
w191055	8.9	78	43L	17	2.8	38	9.1L	100	4.4	9.1L	w191055
w191056	9.7	100	43L	15	2.4	38	13	150	5.6	9.1L	w191056
w191057	6.1	51	43L	13L	1.6	35	9.1L	43	3.1	9.1L	w191057
w191058	7.4	71	43L	13L	1.5	34	9.1L	60	4.2	9.1L	w191058
w191059	4.1	97	43L	13L	.83	34	9.1L	87	3.4	9.1L	w191059
w191060	3.7	64	43L	13L	1.4	19	20	13	2.8	9.1L	w191060
w191061	9.0	110	43L	13L	2.0	43	9.1L	64	6.0	9.1L	w191061
w191062	4.1	80	51	13L	4.2	36	36	80	2.7	9.1L	w191062
w191204	13	55	59L	19L	1.5	35	13L	8.6L	4.6	13L	w191204
w191205	8.4	210	59L	19L	1.5	29	13	55	11	13L	w191205
w191207	13	160	59L	19L	1.9	43	13L	11	5.4	13L	w191207
w191208	16	86	59L	19L	1.9	47	13L	27	5.4	13L	w191208
w191209	14	210	59L	19L	5.4	48	21	35	6.6	13L	w191209
w191211	9.9	220	59L	19L	3.0	44	16	19	5.7	13L	w191211
w191212	17	69	59L	19L	1.4	44	13L	8.6L	4.8	13L	w191212
w191213	9.4	160	59L	19L	6.4	45	16	36	4.3	13L	w191213
w191215	13	62	59L	19L	2.0	43	13L	8.6L	6.0	13L	w191215
w191216	11	60	59L	19L	1.7	36	13L	8.9	5.9	13L	w191216
w191220	12	840	59L	19L	1.9	44	13L	40	7.0	13L	w191220
w191222	18	200	63L	20L	2.2	60	14L	76	6.1	14L	w191222
w191224	17L	330	76L	24L	2.6	110	16L	900	20	24L	w191224
w191225	.8	41	76L	110L	.33	29	24L	21	.4	16L	w191225
w191227	3.7	160	76L	24L	2.6	140	33	1,100	3.7	16L	w191227
w191228	14	70	76L	24L	7.8	33	18	11L	17	16L	w191228
w191233	5.6	21	76L	24L	.77	45	16L	50	2.1	16L	w191233
w191239	4.5	100	76L	24L	3.3	33	24L	140	3.8	16L	w191239
w191245	12	37	55L	18L	1.6	45	12L	51	7.9	12L	w191245
w191248	6.9	29	55L	18L	1.2	34	12L	45	7.2	12L	w191248
w191276	2.2L	14	53L	17L	.15	26	11L	7.8L	1.1L	11L	w191276
w191277	7.3	96	53L	26	11	66	72	28	4.9	17L	w191277
w191279	17	100	53L	17L	1.1	32	11L	34	6.6	11L	w191279
w192614	6.6	100	32L	10L	1.3	35	10L	80	4.1	7.0L	w192614

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Sample number
w191047	98	57	2	140	44	39	130	910	550	91L	w191047
w191048	27	31	1	170	94	40	62L	950	400	91L	w191048
w191049	50	78	1	100	23	31	62L	320	120	91L	w191049
w191050	15	19	2	200	27	31	76	760	610	91L	w191050
w191051	97	120	.9	220	47	46	160	250	270	110	w191051
w191052	19	31	.6	260	13	7	62L	52	10	91L	w191052
w191053	41	110	.7	270	31	34	62L	72	10	91L	w191053
w191054	23	180	.8	690	24	29	62L	210	120	91L	w191054
w191055	67	90	1	110	63	32	110	310	150	91L	w191055
w191056	69	110	1	71	67	29	94	380	89	91L	w191056
w191057	41	38	1	420	70	17	75	92	10L	91L	w191057
w191058	42	45	1	330	95	32	62L	96	10	91L	w191058
w191059	21	160	.7	620	31	27	62L	210	560	91L	w191059
w191060	28	61	.5	720	24	12	88	71	13	91L	w191060
w191061	40	68	1L	340	21	46	110	98	15	91L	w191061
w191062	82	60	1	320	34	15	130	250	10L	120	w191062
w191204	57	300	.6	90	4.0L	13	86L	190	61	130L	w191204
w191205	50	210	1	70	19	49	110	350	160	130L	w191205
w191207	94	250	.7	50	4.0L	24	97	74	110	130L	w191207
w191208	66	270	.9	100	4.0L	24	86L	73	74	130L	w191208
w191209	150	290	1	38	11	23	270	490	130	130L	w191209
w191211	120	210	1	120	4.0L	31	150	10	120	130L	w191211
w191212	59	320	.9	60	4.0L	21	86L	60	65	130L	w191212
w191213	91	300	1	25	11	19	170	370	94	130L	w191213
w191215	69	180	.9	85	4.0L	32	94	240	90	130L	w191215
w191216	65	190	.8	170	4.0L	27	86L	280	74	130L	w191216
w191220	B	180	.4L	120	39	35	100	270	440	130L	w191220
w191222	67	250	1	100	10	12	93L	120	150	140L	w191222
w191224	19	14	2	300	150	160	110L	880	3,500	240L	w191224
w191225	21	11	.2	250	74	8L	110L	90	180	160L	w191225
w191227	19	28	2	140	190	110	110L	1,500	4,300	160L	w191227
w191228	210	170	2	210	5.2L	40	310	120	40	160L	w191228
w191233	21	41	.5	270	230	21	110L	60	14	160L	w191233
w191239	71	29	2	1,600	130	15	210	170	36	160L	w191239
w191245	53	52	.7	280	3.8L	41	81L	120	36	120L	w191245
w191248	20	43	.6	200	6.4	10	81L	130	81	120L	w191248
w191276	4	10L	.2L	18	100	8	78L	11	10L	110L	w191276
w191277	68	62	2	170	14	23	190	230	230	110L	w191277
w191279	76	330	.5	82	29	16	78L	74	130	110L	w191279
w192614	25	100	.8	490	26	23	46L	160	55	68L	w192614

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	Pt-S (ppm)	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm (ppm)	Sample number
w191047	9L	390L	37	16	15	400	3.9	59L	13L	6.2L	w191047
w191048	9L	270L	61	5.3	17	52	2.7	40L	13L	6.2L	w191048
w191049	9L	250L	33	9.0	9.1L	190	2.0	30L	13L	6.2L	w191049
w191050	9L	290L	52	7.7	13	56	1.5	46L	13L	6.2L	w191050
w191051	9L	200L	28	15	9.1L	1,600	1.8	27L	13L	6.2L	w191051
w191052	9L	150L	15	3.8	9.1L	420	.64	19L	13L	6.2L	w191052
w191053	9L	100	17	6.9	9.1L	250	.69	21L	13L	6.2L	w191053
w191054	9L	120	25	4.6	9.1L	160	1.5	23L	13L	6.2L	w191054
w191055	9L	220L	22	12	9.2	390	2.2	33L	13L	6.2L	w191055
w191056	9L	150	28	11	17	250	2.8	56	13L	6.2L	w191056
w191057	9L	170L	15	8.2	9.1L	130	1.0	31L	13L	6.2L	w191057
w191058	9L	95	17	7.4	9.4	160	2.1L	32L	13L	6.2L	w191058
w191059	9L	100	20	3.4	9.1L	120	1.4	28	13L	6.2L	w191059
w191060	9L	100	16	6.5	9.1L	520	1.4	14L	13L	6.2L	w191060
w191061	9L	170	22	10	9.1L	310	1.0	30L	13L	6.2L	w191061
w191062	9L	220L	37	21	9.1L	280	2.7	41L	13L	6.2L	w191062
w191204	10L	170	27	8.2	13L	130	1.5	15	19L	8.6L	w191204
w191205	10L	120	39	8.9	13L	280	1.7	39	19L	8.6L	w191205
w191207	10L	130	41	11	13L	490	1.4	50	19L	8.6L	w191207
w191208	10L	170	30	9.5	13L	400	1.6	28	19L	8.6L	w191208
w191209	10L	180	41	27	13L	1,500	3.5	35	19L	8.6L	w191209
w191211	10L	160	51	16	13L	1,000	2.1	57	19L	8.6L	w191211
w191212	10L	150	29	7.1	13L	250	1.6	30	19L	8.6L	w191212
w191213	10L	110	32	25	13L	670	4.0	34	19L	8.6L	w191213
w191215	10L	200	27	9.4	13L	210	1.8	22	19L	8.6L	w191215
w191216	10L	160	29	8.5	13L	170	1.3	26	19L	8.6L	w191216
w191220	10L	14L	18	B	13L	400	1.4	63	28L	8.6L	w191220
w191222	10L	240	38	9.8	14L	340	1.7	37	20L	9.3L	w191222
w191224	20L	410L	78	9.3	50	220	1.9	93	24L	11L	w191224
w191225	20L	64	1.5	.42	16L	18	2.1	6.2L	24L	11L	w191225
w191227	20L	410L	76	13	16L	400	3.7	56L	24L	11L	w191227
w191228	20L	250	42	39	16L	2,200	4.2	45	24L	11L	w191228
w191233	20L	170L	9.2	3.1	16L	93	3.1	15L	24L	11L	w191233
w191239	20L	87	15	20	16L	1,500	2.6	58	24L	11L	w191239
w191245	10L	190	29	7.3	12L	180	.99	15	18L	8.1L	w191245
w191248	10L	150	14	5.2	12L	100	.86	12	18L	8.1L	w191248
w191276	10L	78L	1.1	.65	11L	16	1.5L	6.5L	17L	7.8L	w191276
w191277	10L	140	41	36	11L	530	10	20	17L	7.8L	w191277
w191279	10L	170	20	7.1	11L	950	1.0	36	17L	7.8L	w191279
w192614	7L	83	25	B	7.0L	210	1.7	25L	10L	5.0L	w192614

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w191047	14	210	130	7.8	3,300	280	w191047
w191048	17	420	90	6.7	900	720	w191048
w191049	10	160	72	5.0	560	350	w191049
w191050	11	170	86	4.6	1,500	240	w191050
w191051	19	270	86	4.4	70	630	w191051
w191052	13	100	40	3.2	120	150	w191052
w191053	4.1	150	48	2.1	240	430	w191053
w191054	5.4	160	51	3.1	150	320	w191054
w191055	7.8	150	98	5.6	420	310	w191055
w191056	9.7	170	87	5.6	500	320	w191056
w191057	18	240	48	3.1	350	150	w191057
w191058	38	700	47	3.2	200	390	w191058
w191059	3.4	160	46	2.8	270	290	w191059
w191060	18	160	62	3.3	300	290	w191060
w191061	4.0	240	80	4.0	1,400	630	w191061
w191062	33	160	130	6.8	2,100	130	w191062
w191204	6.5	190	40	3.8	1,400	150	w191204
w191205	7.8	310	80	4.5	290	1,200	w191205
w191207	15	280	48	4.7	110	250	w191207
w191208	9.5	230	55	4.4	140	240	w191208
w191209	18	320	98	7.0	200	230	w191209
w191211	19	360	76	5.2	74	310	w191211
w191212	8.7	210	44	3.9	100	200	w191212
w191213	14	250	94	6.8	580	160	w191213
w191215	5.8	210	65	4.7	620	270	w191215
w191216	6.2	190	48	4.4	280	250	w191216
w191220	21	530	47	3.9	250	530	w191220
w191222	9.8	310	50	4.7	780	200	w191222
w191224	78	1,100	100	9.3	85	2,600	w191224
w191225	.42L	15	3.6L	17	21	12	w191225
w191227	100	290	160	7.4	110	740	w191227
w191228	11	310	95	9.6	140	710	w191228
w191233	7.7	190	38	2.1	72	290	w191233
w191239	130	260	220	6.7	54	230	w191239
w191245	6.0	280	60	5.3	11,000	890	w191245
w191248	4.9	180	33	4.0	3,000	480	w191248
w191276	.44L	7.0	4.2	.9L	23	7.8L	w191276
w191277	12	130	310	15	5,200	180	w191277
w191279	11	160	29	4.1	22	170	w191279
w192614	12	160	74	6.6	870	340	w192614

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	Ash (percent)	SiO2 (percent)	Al2O3 (percent)	CaO (percent)	MgO (percent)	Na2O (percent)	K2O (percent)	Fe2O3 (percent)	TiO2 (percent)	P2O5 (percent)	Sample number
w192615	12.7	37	15	7.8	0.70	0.32	1.7	24	0.81	0.07	w192615
w192616	9.6	14	8.6	.75	.23	.07	.35	70	.23	.04	w192616
w192617	9.2	12	8.7	.74	.25	.05	.38	71	.23	.05	w192617
w192618	7.3	20	14	1.2	.41	.13	.80	56	.44	.10	w192618
w192619	7.1	21	14	1.3	.45	.12	.93	55	.45	.11	w192619
w192620	15.2	42	15	8.4	.83	.24	1.5	19	.69	.06	w192620
w192621	14.1	41	14	1.2	.65	.14	1.4	35	.75	.34	w192621
w192622	8.7	42	17	.78	.81	.25	2.0	28	.90	.05	w192622
w192623	14.1	38	17	.60	.46	.09	1.0	37	.64	.20	w192623
w192624	11.7	32	14	5.6	.45	.46	1.3	36	.69	.04	w192624
w192625	15.7	35	12	7.3	.51	.43	1.4	31	.67	.04	w192625
w192626	9.4	35	14	6.1	.90	.51	2.1	29	.80	.26	w192626
w192627	12.9	35	15	10	.93	.49	2.1	22	.75	.24	w192627
w192628	16.5	53	26	.56	1.1	.28	4.2	6.9	1.2	.26	w192628
w192629	4.5	45	27	1.2	.83	.19	2.1	11	1.0	.33	w192629
w192630	9.4	30	17	2.7	.58	.18	1.4	40	.90	.09	w192630
w192631	10.0	26	15	4.1	1.1	.14	1.4	46	.78	.11	w192631
w192632	6.0	55	28	.67	.43	.16	1.3	8.5	1.7	.42	w192632
w192633	5.6	53	28	.75	.43	.16	1.1	9.2	1.6	.63	w192633
w192634	16.9	B	B	B	.51	.03	B	B	B	B	w192634
w192635	9.8	38	16	.77	.66	.17	2.3	36	.91	1.6	w192635
w192636	10.1	35	14	5.2	.80	.17	1.8	33	.76	.05	w192636
w193119	9.3	45	21	.92	.60	.15	1.6	20	1.3	1.1	w193119
w193120	8.0	60	26	.51	1.2	.38	3.1	3.5	1.3	.05	w193120
w193121	11.9	25	11	6.4	.51	.20	1.1	38	.64	.14	w193121
w193122	10.2	47	19	6.1	1.0	.30	2.6	10	.96	.06	w193122
w193123	11.4	32	16	9.1	.80	.17	2.2	23	.83	.07	w193123
w193124	6.3	51	27	1.4	1.1	.28	3.1	9.0	1.3	.68	w193124

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	SO3 (percent)	Ag-S (ppm)	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Sample number
w192615	5.1	0.10L	1,000G	280	19	22L	2.0	63	48	91	w192615
w192616	1.4	.90	1,000G	80	44	22L	.25	63	85	73	w192616
w192617	1.4	.90	1,000G	84	48	22L	.32	110	180	75	w192617
w192618	2.1	.70	1,000G	100	32	22L	3.1	110	130	99	w192618
w192619	2.0	.70	1,000G	120	32	22L	3.1	130	380	130	w192619
w192620	7.2	.10L	1,000G	640	25	22L	7.7	170	24	86	w192620
w192621	1.9	.40	1,000G	140	25	22L	.46	110	65	100	w192621
w192622	1.5	.80	1,000G	160	40	22L	7.2	100	56	170	w192622
w192623	1.4	.20	1,000G	220	30	22L	.40	860	230	87	w192623
w192624	3.6	.40	1,000G	190	24	22L	2.7	77	45	96	w192624
w192625	4.2	.20	1,000G	170	17	22L	5.2	70	55	90	w192625
w192626	3.3	.20	1,000G	270	26	22L	1.1	53	32	160	w192626
w192627	3.5	.10L	1,000G	410	20	22L	1.2	54	40	130	w192627
w192628	.65	.50	1,000G	430	21	22L	.10	170	79	150	w192628
w192629	.91	1.3	1,000G	380	70	22L	1.4	240	240	130	w192629
w192630	2.5	.30	1,000G	190	41	22L	.39	110	30	110	w192630
w192631	2.9	.30	1,000G	130	40	22L	.57	90	33	93	w192631
w192632	.65	.90	1,000G	360	70	22L	.38	330	190	220	w192632
w192633	.97	1.4	1,000G	350	69	22L	3.6	500	180	200	w192633
w192634	B	8.3	1,000G	110	92	22L	3.0	12	60	20	w192634
w192635	.89	.50	1,000G	190	32	22L	.56	100	49	130	w192635
w192636	5.0	.20	1,000G	140	26	22L	.88	50	32	110	w192636
w193119	.84	.50	1,000G	920	45	22L	1.2	250	35	130	w193119
w193120	.28	.20	1,000G	350	43	22L	3.5	110	110	150	w193120
w193121	5.0	.60	1,000G	120	23	22L	7.2	76	53	99	w193121
w193122	4.1	.10	1,000G	350	23	22L	1.9	88	23	130	w193122
w193123	5.0	.20	1,000G	350	19	22L	2.2	88	18	93	w193123
w193124	.99	.40	1,000G	410	38	22L	1.5	190	33	160	w193124

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	Cs (ppm)	Cu (ppm)	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Ho-S (ppm)	Sample number
w192615	7.1	97	32L	10L	1.5	29	10L	84	4.7	7.0L	w192615
w192616	5.2L	180	32L	10L	2.9	57	11	45	1.0	7.0L	w192616
w192617	5.4L	170	32	13	3.3	63	19	82	2.2	7.0L	w192617
w192618	5.5	150	32L	10L	4.0	85	13	210	4.1	7.0L	w192618
w192619	7.0L	150	32L	10L	3.9	97	11	220	4.2	7.0L	w192619
w192620	4.6	73	32L	10L	4.1	25	10L	87	4.6	7.0L	w192620
w192621	9.2	120	32L	10L	3.9	29	15	91	2.8	7.0L	w192621
w192622	8.0	120	32L	10L	2.2	32	15	90	4.6	7.0L	w192622
w192623	8.5	120	62	32	17	24	86	120	3.5	20	w192623
w192624	6.0	130	32L	10L	2.1	30	7.0L	59	4.3	7.0L	w192624
w192625	5.7	110	32L	10L	1.8	24	10L	71	3.8	7.0L	w192625
w192626	7.4	72	32L	10L	1.2	32	7.0L	77	6.4	7.0L	w192626
w192627	7.8	63	32L	10L	.85	33	7.0L	95	4.7	7.0L	w192627
w192628	16	150	32L	10L	2.5	40	7.0L	79	6.1	7.0L	w192628
w192629	6.7	250	32L	10	3.8	63	19	280	4.4	7.0L	w192629
w192630	11	110	32L	10L	2.6	45	17	170	5.3	7.0L	w192630
w192631	9.0	85	32L	10L	1.9	45	10L	180	4.0	7.0L	w192631
w192632	5.0	260	32L	15	9.5	49	35	190	8.3	7.0L	w192632
w192633	5.4	300	32L	15	16	54	38	170	8.9	10L	w192633
w192634	1.8L	190	32L	10L	.59	130	7.0L	920	.6	7.0L	w192634
w192635	7.1	76	32L	10L	1.6	39	7.0L	100	5.1	100L	w192635
w192636	5.9	100	32L	10L	1.6	31	7.0L	89	4.0	7.0L	w192636
w193119	7.5	200	32L	12	7.3	44	36	150	6.5	7.0L	w193119
w193120	13	120	32L	10	2.3	45	8.0	230	6.3	7.0L	w193120
w193121	5.0	62	32L	10L	1.7	12	10L	81	3.4	7.0L	w193121
w193122	11	71	32L	10L	1.9	26	14	43	4.9	7.0L	w193122
w193123	7.9	96	32L	12	2.0	19	10L	43	3.5	7.0L	w193123
w193124	11	190	32L	13	3.7	39	18	140	6.3	7.0L	w193124

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	Pb (ppm)	Pr-S (ppm)	Sample number
w192615	31	87	2	360	7.0	11	46L	150	49	68L	w192615
w192616	21	58	1	130	16	13	54	230	260	68L	w192616
w192617	43	68	1	140	21	16	140	240	250	68L	w192617
w192618	41	110	3	200	14	7	46L	430	240	68L	w192618
w192619	56	120	1	200	15	11	70	480	230	68L	w192619
w192620	86	48	.7	620	15	8	81	160	60	68L	w192620
w192621	57	58	1	230	30	13	81	190	130	68L	w192621
w192622	46	55	2	280	65	17	46L	220	320	68L	w192622
w192623	440	58	3	190	19	14	390	350	160	130	w192623
w192624	43	97	2	390	21	14	46L	140	45	68L	w192624
w192625	38	71	1	460	19	9	46L	170	60	68L	w192625
w192626	32	58	1	600	24	22	46L	60	55	68L	w192626
w192627	31	69	.8	660	10	18	46L	59	28	68L	w192627
w192628	100	170	1	140	7.0	10	69	190	110	68L	w192628
w192629	180	140	2	120	21	13	160	500	170	68L	w192629
w192630	53	78	1	270	19	20	77	110	400	68L	w192630
w192631	40	54	1	250	11	7	46L	95	510	68L	w192631
w192632	180	170	2	56	8.0	9	280	1,100	350	71	w192632
w192633	250	140	2	67	7.0	24	300	1,300	410	68L	w192633
w192634	6	87	.6	130	19	25	46L	3,100	1,400	68L	w192634
w192635	61	65	1	200	19	25	54	230	290	68L	w192635
w192636	20	47	1	560	23	9	46L	86	300	68L	w192636
w193119	130	130	1	91	5.0	22L	170	210	65	68L	w193119
w193120	62	85	1	140	10	28	57	510	490	68L	w193120
w193121	25	33	.8	1,000	77	22L	46L	320	120	68L	w193121
w193122	49	47	1	490	90	20	65	100	31	68L	w193122
w193123	44	51	.9	570	34	22L	46L	77	31	68L	w193123
w193124	95	90	2	120	84	22	130	230	120	68L	w193124

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	Pt-S (ppm)	Rb (ppm)	Sc (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Th (ppm)	Tl-S (ppm)	Tm (ppm)	Sample number
w192615	7L	94	18	B	7.0L	130	1.6	24L	10L	5.0L	w192615
w192616	7L	100L	44	B	8.0	45	3.1	31L	10L	5.0L	w192616
w192617	7L	98L	33	B	7.0L	90	2.2	33L	10L	5.0L	w192617
w192618	7L	150L	60	B	11	130	4.1	41L	10L	5.0L	w192618
w192619	7L	150L	55	B	12	120	4.2	42L	10L	5.0L	w192619
w192620	7L	66	21	B	7.0L	140	2.0	20L	10L	5.0L	w192620
w192621	7L	110	18	B	7.0L	88	2.8	21L	10L	5.0L	w192621
w192622	7L	110	23	B	7.0L	89	3.4	34L	10L	5.0L	w192622
w192623	7L	160L	16	B	7.0L	40	13	21L	10L	5.0L	w192623
w192624	7L	120L	29	B	7.0L	110	4.3L	26L	10L	5.0L	w192624
w192625	7L	110	20	B	7.0L	95	3.2L	25	10L	5.0L	w192625
w192626	7L	130	22	B	7.0L	140	4.3L	32L	10L	5.0L	w192626
w192627	7L	160	22	B	7.0L	180	3.1L	23L	10L	5.0L	w192627
w192628	7L	200	33	B	7.0L	680	1.8	18L	10L	5.0L	w192628
w192629	7L	180	36	B	21	970	8.9L	67L	10L	5.0L	w192629
w192630	7L	110	33	B	7.0L	170	3.2	32L	10L	5.0L	w192630
w192631	7L	110	33	B	7.0L	140	4.0L	30L	10L	5.0L	w192631
w192632	7L	100	58	B	7.0L	1,300	5.0	50L	10L	5.0L	w192632
w192633	7L	180L	66	B	12	1,700	5.4	54L	10L	5.0L	w192633
w192634	7L	36L	14	B	7.0L	120	1.8L	18L	10L	5.0L	w192634
w192635	7L	140	24	B	34	260	3.1L	31L	10L	5.0L	w192635
w192636	7L	89	25	B	7.0L	140	2.0	30L	10L	5.0L	w192636
w193119	7L	240L	37	35	7.0L	2,200	4.3	32L	10L	5.0L	w193119
w193120	7L	210	39	10	7.0L	160	1.3	38L	10L	5.0L	w193120
w193121	7L	170	19	10	7.0L	150	1.7	34	10L	5.0L	w193121
w193122	7L	160	25	11	7.0L	200	2.0	39	10L	5.0L	w193122
w193123	7L	180L	20	9.6	7.0L	190	1.8	26L	10L	5.0L	w193123
w193124	7L	190	33	19	7.0L	550	3.2	48L	10L	5.0L	w193124

Table 12f.-- Major and minor oxide and trace element composition of the laboratory ash of 108 coal samples from Indiana--continued

Sample number	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w192615	15	130	54	7.1	750	190	w192615
w192616	8.3	98	81	8.3	140	69	w192616
w192617	6.5	100	100	5.4	310	76	w192617
w192618	14	120	53	12	830	95	w192618
w192619	9.9	130	61	8.5	830	93	w192619
w192620	11	91	48	4.6	3,000	110	w192620
w192621	18	98	67	6.4	97	86	w192621
w192622	130	260	63	6.9	710	160	w192622
w192623	8.5	74	270	21	180	140	w192623
w192624	17	170	61	7.7	1,400	270	w192624
w192625	8.3	110	43	5.1	940	140	w192625
w192626	15	220	35	4.3	330	360	w192626
w192627	11	150	27	3.1	340	230	w192627
w192628	10	150	34	5.5	150	70	w192628
w192629	8.9	140	87	8.9	470	130	w192629
w192630	9.6	130	65	6.4	110	170	w192630
w192631	7.0	71	36	6.0	100	77	w192631
w192632	12	240	130	10	150	310	w192632
w192633	13	220	130	13	1,100	190	w192633
w192634	1.8	140	170	2.4	1,600	200	w192634
w192635	4.1	180	49	4.1	110	260	w192635
w192636	23	140	39	5.0	120	170	w192636
w193119	6.5	140	95	8.6	250	280	w193119
w193120	8.8	190	63	6.3	990	330	w193120
w193121	78	150	64	5.0	1,600	200	w193121
w193122	32	190	55	4.9	140	250	w193122
w193123	15	150	54	4.4	280	180	w193123
w193124	35	260	78	7.9	230	150	w193124

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana

[Analysis performed on whole coal. Values in parts-per-million (ppm). L, less than the value shown, B, not determined.]

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w190528	6.0	10	2.7	9.3	0.6	0.20	29	0.4	0.069	5	w190528
w190529	9.2	10	2.5	12	.9	.21	33	.4	.11	5	w190529
w190530	4.7	9.0	3.0	8.7	.6	.22	24	.3	.080	5	w190530
w190531	2.3	15	2.9	11	.8	.40	34	.4	.080	8	w190531
w190532	3.7	8.0	4.1	9.9	.8	.16	28	.4	.070	4	w190532
w190533	4.8	11	3.9	9.7	.9	.17	36	.4	.050	6	w190533
w190534	10	310	4.6	13	.7	.27	31	.5	.042	140	w190534
w190535	18	14	8.2	16	.6	.27	28	.5	.070	9	w190535
w190536	11	18	5.5	11	.3	.40	24	.5	.17	11	w190536
w190537	29	21	6.5	13	.5	.39	36	.8	.33	13	w190537
w190538	1.4	26	6.3	13	.8	.45	42	.7	.010L	15	w190538
w190539	2.4	34	3.8	16	1.3	.84	87	.6	.080	19	w190539
w190540	1.0	26	5.6	12	.6	.46	58	.6	.069	15	w190540
w190541	17	32	4.6	31	.6	.67	60	.6	.20	19	w190541
w190542	1.0	39	8.3	10	.3	.89	22	.4	.020	21	w190542
w190543	1.0L	28	8.2	8.8	.3	.66	26	.5	.010	15	w190543
w190544	8.0	18	6.5	9.0	.3	.30	18	.5	.20	10	w190544
w190545	4.5	14	6.2	7.6	.3	.23	26	.4	.13	8	w190545
w190546	6.3	17	3.0	14	1.1	.35	50	.5	.069	10	w190546
w190547	3.3	22	3.4	27	.7	1.0	54	1.0	.069	11	w190547
w190548	20	45	4.2	24	2.4	1.2	87	1.0	.10	23	w190548
w190929	32	18	3.5	11	1.2	.42	160	.4	.28	9	w190929
w190930	37	9.0	3.6	9.5	1.1	.21	150	.4	.30	5	w190930
w190931	14	9.0	9.2	11	.7	.13	45	.5	.088	5	w190931
w190932	11	10	3.0	21	1.0	.18	140	.5	.19	5	w190932
w190933	7.0	12	3.3	28	1.2	.18	170	.5	.15	6	w190933
w190934	12	21	3.7	10	.8	.51	120	.5	.14	12	w190934
w191034	30	19	26	17	.9	.34	48	.6	.070	10	w191034
w191035	37	34	22	17	.8	.92	88	.7	.15	19	w191035
w191036	36	46	14	25	.9	.93	52	1.1	.13	26	w191036
w191037	23	48	4.9	18	.4	.93	44	.6	.050	30	w191037
w191038	6.7	9.0	11	8.2	.4	.18	28	.4	.060	7	w191038
w191039	13	11	3.3	11	.8	.20	60	.5	.15	6	w191039
w191040	3.9	12	3.7	13	.7	.21	56	.5	.071	6	w191040
w191041	15	11	9.4	7.9	.3	.23	37	.5	.050	7	w191041
w191042	33	18	6.7	15	1.3	.38	96	.6	.14	11	w191042
w191043	15	7.0	5.5	25	.7	.13	40	.5	.080	4	w191043
w191044	2.8	9.0	2.1	11	.8	.16	160	.4	.063	5	w191044
w191045	3.2	12	2.8	75	1.0	.20	120	.5	.060	6	w191045
w191046	12	10	7.0	14	1.4	.28	76	.7	.055	5	w191046

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w190528	0.1	720	380L	16L	1.4	1.6	2.1	1.0	0.2	3.0L	w190528
w190529	.1	620	520L	16	1.9	2.1	2.3	1.1	.2	3.0L	w190529
w190530	.1	260	410L	21L	.48	1.8	1.8	.90	.2	3.0L	w190530
w190531	.1	290	360L	13	.60	2.7	2.0	1.9	.3	5.4	w190531
w190532	.1	130	380L	14	.78	1.9	2.3	.70	.1	4.6	w190532
w190533	.1	140	400L	17	.59	1.9	2.1	.90	.2	6.7	w190533
w190534	.1	110	400L	16	.45	4.0	3.4	1.2	.2	7.3	w190534
w190535	.1	100	400L	20L	1.0	4.8	4.9	1.3	.3	8.8	w190535
w190536	.1	120	320L	19L	.69	2.5	3.4	2.2	.2	5.8	w190536
w190537	.1	240	460L	12	.92	3.3	4.8	2.3	.1	7.9	w190537
w190538	.1	320	350L	15	1.0	3.4	2.3	2.5	.2	6.3	w190538
w190539	.2	150	530	16	1.1	4.8	1.6	4.1	.7	10	w190539
w190540	.1	150	320L	19L	1.1	3.2	2.2	2.7	.2	5.4	w190540
w190541	.2	260	570L	19	1.1	3.2	2.2	3.1	.5	6.9	w190541
w190542	.1	79	280	19L	1.4	3.3	2.7	4.6	.4	3.0L	w190542
w190543	.1	90	200L	17L	1.4	3.2	2.5	3.3	.3	3.0L	w190543
w190544	.1	80	260L	16L	.80	2.8	3.5	1.7	.3	4.0	w190544
w190545	.1	87	260L	13L	.65	2.5	2.4	1.3	.2	4.4	w190545
w190546	.2	200	460L	18	.80	3.7	3.0	1.6	.3	3.0	w190546
w190547	.3	240	550L	20L	.30	6.5	2.8	3.8	.9	5.0	w190547
w190548	.2	290	650L	35	2.1	7.6	3.1	5.5	.7	17	w190548
w190929	.1	140	190	13	.90	3.0	2.7	2.1	.2	3.0L	w190929
w190930	.1L	120	76	17	1.2	2.5	2.0	.90	.2	3.0L	w190930
w190931	.1L	110	10	15	.70	1.9	1.4	.70	.4L	3.0L	w190931
w190932	.1L	220	120	19	1.7	2.1	5.2	.90	.1	3.0L	w190932
w190933	.1L	270	310	21	1.7	2.3	5.9	1.2	.1	3.0L	w190933
w190934	.1	130	110	13	.70	3.1	2.2	2.7	.4	3.0L	w190934
w191034	.1	270	83	29L	3.2	3.8	4.4	1.8	.2	3.0L	w191034
w191035	.2L	320	230	30L	3.2	4.7	4.9	67	.5	3.6	w191035
w191036	.2	550	470	36L	4.2	5.4	6.8	6.1	.6	4.0	w191036
w191037	.2L	340	350	29L	3.3	4.6	6.4	5.2	.6	3.0L	w191037
w191038	.1L	130	60	21L	1.6	2.0	1.5	1.0	.2L	3.0L	w191038
w191039	.1L	430	44	23L	.80	2.1	2.0	1.0	.2	3.0L	w191039
w191040	.1L	420	24	22L	.80	2.1	1.8	1.1	.2L	3.0L	w191040
w191041	.1L	450	67	23L	.50	2.0	2.4	1.3	.2L	3.0L	w191041
w191042	.1	420	740	28L	4.3	3.9	4.1	2.0	.2	4.3	w191042
w191043	.1	370	52	25L	1.4	25	6.9	.80	.1	3.0L	w191043
w191044	.1L	420	75	21L	.70	1.7	1.8	.90	.1	3.0L	w191044
w191045	.1	500	130	23L	.81	1.9	2.0	1.1	.1	3.0L	w191045
w191046	.1	510	31	26L	15	3.8	.8	1.2	.2	3.0L	w191046

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana--continued

Sample number	U (ppm)	Yb (ppm)
w190528	2.7	0.6
w190529	1.7	.6
w190530	1.4	.6
w190531	1.1	.9
w190532	.44	.5
w190533	.63	.6
w190534	.39	.6
w190535	.69	.8
w190536	.40	.4
w190537	2.3	.5
w190538	1.0	.6
w190539	1.4	1.7
w190540	.87	.5
w190541	1.9	1.2
w190542	.80	1.0
w190543	.40	.7
w190544	.40	.5
w190545	.20	.4
w190546	4.3	1.0
w190547	4.4	2.4
w190548	2.7	1.8
w190929	.80	.6
w190930	1.0	.5
w190931	.30	2.9
w190932	6.8	.4
w190933	8.7	.5
w190934	1.0	.7
w191034	.60	.7
w191035	.75	1.1
w191036	1.1	1.4
w191037	.73	1.0
w191038	.53	.4
w191039	1.2	.5
w191040	.65	.5
w191041	1.6	.5
w191042	1.9	.7
w191043	5.2	4.5
w191044	2.8	.3
w191045	5.1	.4
w191046	1.4	.6

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana--continued

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w191047	8.2	8.0	14	7.3	0.4	0.16	100	0.3	0.060	5	w191047
w191048	28	3.0	10	13	.3	.11	56	.3	.060	2	w191048
w191049	9.0	10	6.5	14	1.3	.21	72	.6L	.045	5	w191049
w191050	44	2.0	5.1	5.9	.7	.13	40	.4	.095	1	w191050
w191051	51	18	5.5	17	1.5	.30	80	.6	.25	11	w191051
w191052	2.4	5.0	2.2	8.6	.4	.12	24	.4	.063	3	w191052
w191053	17	12	5.7	17	1.1	.22	180	.6	.13	6	w191053
w191054	17	6.0	8.5	15	.9	.12	56	.5	.050	3	w191054
w191055	12	11	8.1	9.6	.8	.25	60	.4	.14	6	w191055
w191056	4.5	9.0	6.5	11	.7	.17	68	.4	.055	5	w191056
w191057	4.1	7.0	2.2	8.9	.6	.16	68	.3	.10	4	w191057
w191058	5.0	8.0	2.5	12	.7	.14	80	.4	.055	4	w191058
w191059	100L	6.0	10	16	.6	.12	32	.5	.15	3	w191059
w191060	10	12	4.3	15	.8	.31	140	.6	.073	6	w191060
w191061	4.6L	8.0	3.5	17	.9	.20	100	.6	.065	4	w191061
w191062	5.6	12	7.4	9.1	.3	.31	56	.2	.058	6	w191062
w191204	40	45	21	59	6.2	.73	340	2.2	.21	27	w191204
w191205	8.1	17	9.5	37	1.5	.26	92	2.0	.13	9	w191205
w191207	2.0	43	9.3	43	3.6	.54	150	1.5	.28	26	w191207
w191208	1.9	33	6.5	45	5.0	.60	200	1.7	.050	21	w191208
w191209	25	64	23	42	3.5	1.4	150	1.7	.30	38	w191209
w191211	1.9	39	9.0	37	1.9	.58	120	1.1	.025	23	w191211
w191212	1.6	42	7.1	61	7.5	.60	320	2.1	.016	26	w191212
w191213	27	55	43	47	3.3	2.2	200	1.5	.35	32	w191213
w191215	11	56	26	65	5.6	.88	240	2.7	.055	31	w191215
w191216	9.0	45	22	59	4.4	.64	240	2.3	.083	25	w191216
w191220	.1L	54	13	54	3.5	.53	200	2.0	.26	B	w191220
w191222	17	32	4.5	41	5.4	.64	320	1.8	.13	20	w191222
w191224	57	3.0	8.3	18	.9L	.14	40	1.1	.25	1	w191224
w191225	950	2.0	26	4.1	.4	.16	20L	.2	2.4	1	w191225
w191227	59	3.0	9.3	6.8	.2	.14	56	.2	.47	1	w191227
w191228	9.8	120	15	81	4.7	2.6	780	5.8	.098	70	w191228
w191233	23	7.0	2.6	13	1.1	.15	54	.4	.22	4	w191233
w191239	1.0L	47	8.2	24	1.4	1.0	780	1.2	.24	22	w191239
w191245	15	27	8.6	39	3.6	.48	420	2.4	.085	16	w191245
w191248	11	23	12	32	2.4	.41	260	2.5	.11	7	w191248
w191276	50	2.0	.9	3.1	1.0L	.07	130	.5L	1.2	2	w191276
w191277	32	34	19	24	1.5	2.2	780	1.0	.28	14	w191277
w191279	32	24	3.1	24	3.4	.22	150	1.3	.23	15	w191279
w192614	13	7.0	5.1	12	.8	.16	42	.5	.080	3	w192614

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w191047	0.1L	220	22	20L	1.5	1.9	2.9	0.80	0.2	3.0L	w191047
w191048	.1L	280	200	20L	1.9	4.6	5.5	.40	.2	3.0L	w191048
w191049	.1L	230	44	25L	1.9	3.3	.7	.90	.2	3.0L	w191049
w191050	.1	280	28	19L	1.2	3.4	4.4	.50	.1	3.0L	w191050
w191051	.1	610	640	23L	2.3	3.2	4.5	1.7	.2	3.0L	w191051
w191052	.1	520	69	24L	.29	2.3	1.1	.60	.1	3.0L	w191052
w191053	.1L	480	320	15	.30	2.5	1.7	1.0	.1	3.0L	w191053
w191054	.1L	470	40	15	3.1	3.2	1.4	.60	.2L	3.0L	w191054
w191055	.1L	380	79	20L	.72	2.0	2.0	1.1	.2L	3.0L	w191055
w191056	.1L	210	94	11	.76	2.0	2.1	.80	.2L	4.0	w191056
w191057	.1L	280	130	17L	1.2	1.5	2.7	.80	.1	3.0L	w191057
w191058	.1L	490	120	9	1.2	1.6	2.6	.70	.2L	3.0L	w191058
w191059	.1L	720	13	15	3.8	2.9	2.2	.50	.2L	4.3	w191059
w191060	.1	360	280	22	.34	3.5	2.2	1.4	.3L	3.0L	w191060
w191061	.1L	540	310	17	.25	2.2	1.1	1.0	.1	3.0L	w191061
w191062	.1	340	96	16L	.38	2.7	2.1	1.5	.2L	3.0L	w191062
w191204	.3	780	42	79	1.1	13	5.4	3.9	.7	7.3	w191204
w191205	.2	230	23	22	1.4	6.9	6.8	1.6	.3	6.7	w191205
w191207	.2	510	120	37	.68	12	8.1	3.1	.4	14	w191207
w191208	.3	590	140	55	.92	9.5	5.1	3.0	.5	9.2	w191208
w191209	.3	400	450	45	1.8	11	7.5	7.0	.9	9.2	w191209
w191211	.2	310	250	30	.58	9.7	7.3	3.1	.4	11	w191211
w191212	.4	840	570	66	.60	13	6.9	3.1	.7	13	w191212
w191213	.4	520	460	40	1.8	11	8.5	8.7	1	12	w191213
w191215	.4	760	39	89	.76	12	7.6	4.2	.8	10	w191215
w191216	.3	630	17	63	1.0	11	8.2	3.3	.5	10	w191216
w191220	.1L		62	4L	.10L	5.2	6.6	B	.4	18	w191220
w191222	.3	660	39	72	1.6	11	2.8	2.9	.5	11	w191222
w191224	.1	130	94	22L	7.1	4.2	3.2	.50	.1	5.0	w191224
w191225	.1	71	B	31	6.6	.70	11	.20	1	3.0L	w191225
w191227	.1	84	47	22L	6.8	4.1	2.5	.70	.2	3.0L	w191227
w191228	.5	1,600	580	83	.91	14	4.5	13	1	15	w191228
w191233	.1	190	43	33L	1.4	1.8	5.5	.60	.6	3.0L	w191233
w191239	.1L	900	3,000	27	.60L	4.6	6.0	6.3	.8	18	w191239
w191245	.2	1,200	26	56	1.0	8.9	1.2	2.2	.3	4.4	w191245
w191248	.2	460	450	51	1.3	5.0	1.1	1.8	.3	4.3	w191248
w191276	.1L	68	B	36L	.35	.50	6.0	.30	.7L	3.0L	w191276
w191277	.4	350	3,500	28	3.8	8.4	9.0	7.4	2	4.0	w191277
w191279	.1	360	17	33	1.7	3.9	5.9	1.4	.2	7.4	w191279
w192614	.1	270	21	10	.30	3.0	1.6	B	.2	3.0L	w192614

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana--continued

Sample number	U (ppm)	Yb (ppm)
w191047	0.68	0.4
w191048	1.3	.5
w191049	.99	.5
w191050	.68	.3
w191051	2.2	.5
w191052	2.0	.5
w191053	.55	.3
w191054	.71	.4
w191055	.69	.5
w191056	.68	.4
w191057	1.8	.3
w191058	3.6	.3
w191059	.53	.4
w191060	3.9	.7
w191061	.40	.4
w191062	2.4	.5
w191204	3.1	1.8
w191205	1.4	.8
w191207	4.3	1.3
w191208	3.0	1.4
w191209	4.6	1.8
w191211	3.6	1.0
w191212	3.8	1.7
w191213	4.9	2.4
w191215	2.6	2.1
w191216	2.4	1.7
w191220	6.1	1.1
w191222	2.9	1.4
w191224	4.2	.5
w191225	.20L	8.1
w191227	5.5	.4
w191228	3.8	3.2
w191233	1.5	.4
w191239	41	2.1
w191245	1.8	1.6
w191248	1.7	1.4
w191276	.20	.4L
w191277	2.5	3.0
w191279	2.1	.8
w192614	1.4	.8

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana--continued

Sample number	As (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Eu (ppm)	F (ppm)	Hf (ppm)	Hg (ppm)	La (ppm)	Sample number
w192615	4.0	8.0	6.1	12	0.9	0.19	57	0.6	0.060	4	w192615
w192616	37	6.0	8.2	7.0	.5L	.28	21	.1	.28	2	w192616
w192617	25	10	16	6.9	.5L	.30	20L	.2	.21	4	w192617
w192618	47	8.0	9.3	7.2	.4	.29	20L	.3	.49	3	w192618
w192619	28	9.0	27	9.4	.5L	.28	22	.3	.28	4	w192619
w192620	4.0	26	3.7	13	.7	.62	64	.7	.080	13	w192620
w192621	9.0	15	9.2	15	1.3	.55	80	.4	.11	8	w192621
w192622	6.0	9.0	4.9	15	.7	.19	46	.4	.11	4	w192622
w192623	7.0	120	32	12	1.2	2.4	57	.5	.080	62	w192623
w192624	9.0	9.0	5.3	11	.7	.24	48	.5	.11	5	w192624
w192625	9.0	11	8.6	14	.9	.28	46	.6	.080	6	w192625
w192626	12	5.0	3.0	15	.7	.11	46	.6	.10	3	w192626
w192627	10	7.0	5.1	17	1.0	.11	45	.6	.090	4	w192627
w192628	5.0	28	13	25	2.6	.42	89	1.0	.14	17	w192628
w192629	9.0	11	11	5.8	.3	.17	20	.2	.090	8	w192629
w192630	35	10	2.8	11	1.0	.24	20L	.5	.25	5	w192630
w192631	54	9.0	3.3	9.3	.9	.19	20	.4	.25	4	w192631
w192632	2.0	20	11	13	.3	.57	20L	.5	.040	11	w192632
w192633	3.0	28	10	11	.3	.92	20	.5	.040	14	w192633
w192634	5.0	2.0	10	3.3	.3L	.10	20L	.1	.13	1	w192634
w192635	20	10	4.8	13	.7	.16	29	.5	.15	6	w192635
w192636	27	5.0	3.2	11	.6	.16	37	.4	.090	2	w192636
w193119	5.0	23	3.3	12	.7	.68	81	.6	.070	12	w193119
w193120	1.0	9.0	9.0	12	1.0	.18	48	.5	.010	5	w193120
w193121	20	9.0	6.3	12	.6	.20	43	.4	.23	3	w193121
w193122	1.0	9.0	2.3	13	1.1	.19	61	.5	.070	5	w193122
w193123	4.0	10	2.0	11	.9	.23	48	.4	.090	5	w193123
w193124	7.0	12	2.1	10	.7	.23	61	.4	.060	6	w193124

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana--continued

Sample number	Lu (ppm)	Na (ppm)	P (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Tb (ppm)	Th (ppm)	Sample number
w192615	0.2	300	39	12	0.40	2.3	1.4	B	0.2	3.0L	w192615
w192616	.1	50	17	10L	1.3	4.2	3.5	B	.3	3.0L	w192616
w192617	.1	34	20	9L	1.4	3.0	2.1	B	.2	3.0L	w192617
w192618	.2	70	29	11L	1.1	4.4	3.2	B	.3	3.0L	w192618
w192619	.1	63	34	11L	1.9	3.9	2.3	B	.3	3.0L	w192619
w192620	.1	270	40	10	.50	3.2	3.3	B	.3	3.0L	w192620
w192621	.2	150	210	15	.30	2.6	4.4	B	.4	3.0L	w192621
w192622	.2	160	19	10	.40	2.0	11	B	.3	3.0L	w192622
w192623	.4	94	120	22L	.20	2.3	3.3	B	2	3.0L	w192623
w192624	.2	400	20	14L	.30	3.4	1.6	B	.5L	3.0L	w192624
w192625	.2	500	27	17	.40	3.2	1.9L	B	.5L	4.0	w192625
w192626	.1	360	110	12	.40	2.1	1.1	B	.4L	3.0L	w192626
w192627	.1	470	140	21	.50	2.9	1.3	B	.4L	3.0L	w192627
w192628	.2	340	190	33	1.1	5.5	1.9	B	.3	3.0L	w192628
w192629	.1	63	67	8	.70	1.6	1.5	B	.4L	3.0L	w192629
w192630	.1	130	33	10	1.1	3.1	1.8	B	.3	3.0L	w192630
w192631	.1	100	48	11	1.7	3.3	1.8	B	.4L	3.0L	w192631
w192632	.1	71	110	6	.90	3.5	4.0	B	.3	3.0L	w192632
w192633	.1	66	150	10L	1.2	3.7	4.0	B	.3	3.0L	w192633
w192634	.1	38		6L	1.5	2.4	3.4	B	.3L	3.0L	w192634
w192635	.1	120	690	14	1.7	2.4	1.8	B	.3L	3.0L	w192635
w192636	.1	130	22	9	.50	2.5	2.3	B	.2	3.0L	w192636
w193119	.1	100	450	22L	.60	3.4	2.1	3.3	.4	3.0L	w193119
w193120	.1	230	17	17	4.5	3.1	.9	.80	.1	3.0L	w193120
w193121	.1	180	73	20	1.1	2.3	3.9	1.2	.2	4.0	w193121
w193122	.1	230	27	16	1.5	2.5	1.7	1.1	.2	4.0	w193122
w193123	.1	140	35	20L	.50	2.3	2.0	1.1	.2	3.0L	w193123
w193124	.1	130	190	12	.80	2.1	1.2	1.2	.2	3.0L	w193124

Table 12g.-- Content of 22 trace elements in 108 coal samples from Indiana--continued

Sample number	U (ppm)	Yb (ppm)
w192615	1.9	0.9
w192616	.80	.8
w192617	.60	.5
w192618	1.0	.9
w192619	.70	.6
w192620	1.7	.7
w192621	2.6	.9
w192622	12	.6
w192623	1.2	3.0
w192624	2.0	9.0
w192625	1.3	.8
w192626	1.4	.4
w192627	1.4	.4
w192628	1.7	.9
w192629	.40	.4
w192630	.90	.6
w192631	.70	.6
w192632	.70	.6
w192633	.70	.7
w192634	.30	.4
w192635	.40	.4
w192636	2.3	.5
w193119	.60	.8
w193120	.70	.5
w193121	9.3	.6
w193122	3.3	.5
w193123	1.7	.5
w193124	2.2	.5

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis

[Values in percent or parts-per-million. 22 values are from direct determinations on whole coal; all other values calculated from analyses of ash. S means analysis by emission spectrography; L, less than the value shown; N, not detected; B, not determined.]

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w190528	1.5	0.67	0.21	0.035	0.072	0.073	1.5	0.032	0.05	6.0	w190528
w190529	1.5	.75	.31	.047	.062	.099	2.9	.040	.07	9.2	w190529
w190530	1.3	.66	.28	.044	.026	.078	1.8	.031	.05L	4.7	w190530
w190531	1.1	.67	.33	.040	.029	.069	1.1	.030	.05	2.3	w190531
w190532	1.6	.72	.22	.034	.013	.072	1.3	.039	.06	3.7	w190532
w190533	1.3	.66	.085	.036	.014	.077	1.7	.036	.07	4.8	w190533
w190534	1.9	1.1	.022	.035	.011	.077	.95	.047	.11	10	w190534
w190535	1.7	1.2	.018	.020	.010	.077	1.1	.048	.15	18	w190535
w190536	1.2	.64	.050	.023	.012	.062	1.1	.044	.10	11	w190536
w190537	2.0	.71	.10	.058	.024	.087	1.2	.054	.12	29	w190537
w190538	1.9	.99	.10	.061	.032	.066	.21	.047	.05	1.4	w190538
w190539	2.1	1.5	.078	.035	.015	.074	.15	.063	.06	2.4	w190539
w190540	1.9	1.0	.073	.038	.015	.062	.20	.048	.04	1.0	w190540
w190541	2.9	2.2	.066	.063	.026	.11	.45	.090	.11	17	w190541
w190542	1.3	.71	.026	.011	.008	.044	.26	.045	.04	1.0	w190542
w190543	1.1	.66	.051	.020	.009	.037	.11	.037	.03	1.0L	w190543
w190544	1.1	.54	.043	.011	.008	.050	.63	.044	.10	8.0	w190544
w190545	1.4	.64	.036	.022	.009	.049	.40	.045	.09	4.5	w190545
w190546	1.8	1.1	.20	.047	.020	.088	1.6	.046	.09	6.3	w190546
w190547	1.9	1.1	.36	.036	.024	.10	1.9	.032	.08	3.3	w190547
w190548	3.0	1.9	.055	.080	.029	.12	1.4	.094	.13	20	w190548
w190929	1.3	.92	.050	.053	.014	.072	2.2	.047	.05	32	w190929
w190930	1.2	.83	.031	.047	.012	.072	2.7	.042	.04	37	w190930
w190931	1.5	.86	.027	.056	.011	.064	1.7	.051	.04	14	w190931
w190932	1.9	1.0	.64	.080	.022	.12	3.7	.058	.07	11	w190932
w190933	2.0	1.1	.65	.10	.027	.099	2.0	.057	.12	7.0	w190933
w190934	1.4	1.0	.049	.039	.013	.072	2.2	.046	.06	12	w190934
w191034	1.9	1.2	.034	.046	.027	.079	2.0	.074	.11	30	w191034
w191035	2.2	1.4	.044	.047	.032	.086	1.6	.074	.08	37	w191035
w191036	3.0	1.6	.048	.062	.055	.11	2.1	.11	.12	36	w191036
w191037	1.5	1.7	.073	.053	.034	.061	.88	.070	.13	23	w191037
w191038	.97	.58	.026	.028	.013	.038	.70	.030	.11	6.7	w191038
w191039	2.0	1.1	.52	.062	.043	.10	3.2	.060	.02	13	w191039
w191040	1.8	1.0	.62	.054	.042	.077	.86	.055	.01	3.9	w191040
w191041	.83	.57	.044	.029	.045	.064	3.0	.018	.03	15	w191041
w191042	1.8	2.1	.24	.063	.042	.088	1.9	.063	.14	33	w191042
w191043	2.1	1.0	.28	.062	.037	.099	2.8	.057	.10	15	w191043
w191044	1.8	.86	.28	.059	.042	.072	1.2	.046	.01	2.8	w191044
w191045	2.3	1.1	.21	.075	.050	.084	1.4	.054	.03	3.2	w191045
w191046	3.0	1.5	.042	.10	.051	.099	1.2	.078	.04	12	w191046

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w190528	41G	32	1.8	0.4L	1.2	10	2.7	9.3	0.6	8.6	w190528
w190529	55G	32	2.8	.6L	.37	10	2.5	12	.9	7.3	w190529
w190530	44G	18	1.8	.4L	.16	9.0	3.0	8.7	.6	9.1	w190530
w190531	39G	25	2.5	.4L	.30	15	2.9	11	.8	11	w190531
w190532	40G	28	3.2	.4L	.28	8.0	4.1	9.9	.8	7.7	w190532
w190533	43G	23	2.8	.4L	.20	11	3.9	9.7	.9	8.3	w190533
w190534	43G	42	5.9	.4L	.14	310	4.6	13	.7	21	w190534
w190535	43G	31	6.0	1.0	.24	14	8.2	16	.6	22	w190535
w190536	34G	27	2.8	.3L	.14	18	5.5	11	.3	13	w190536
w190537	49G	39	3.3	.6	.36	21	6.5	13	.5	14	w190537
w190538	37G	56	3.6	.4L	.04	26	6.3	13	.8	11	w190538
w190539	41G	120	4.2	.4L	.45	34	3.8	16	1.3	24	w190539
w190540	34G	49	4.5	.3L	.16	26	5.6	12	.6	13	w190540
w190541	60G	110	4.1	.6L	.48	32	4.6	31	.6	29	w190541
w190542	25G	85	5.3	.2L	.05	39	8.3	10	.3	16	w190542
w190543	21G	44	4.0	.2L	.09	28	8.2	8.8	.3	12	w190543
w190544	28G	33	3.8	.3L	.05	18	6.5	9.0	.3	11	w190544
w190545	27G	23	3.5	.3L	.14	14	6.2	7.6	.3	8.9	w190545
w190546	49G	34	3.1	.5L	.07	17	3.0	14	1.1	27	w190546
w190547	58G	40	4.7	.6L	.39	22	3.4	27	.7	13	w190547
w190548	69G	120	7.0	.7L	.22	45	4.2	24	2.4	40	w190548
w190929	87G	49	3.5	1.9L	.09	18	3.5	11	1.2	11	w190929
w190930	87G	17	3.0	1.9L	.10	9.0	3.6	9.5	1.1	7.8	w190930
w190931	77G	16	1.8	1.7L	.14	9.0	9.2	11	.7	6.5	w190931
w190932	90	28	3.1	3.1L	1.2	10	3.0	21	1.0	6.7	w190932
w190933	120G	37	3.1	2.6L	2.7	12	3.3	28	1.2	6.9	w190933
w190934	86G	31	3.4	1.9L	.40	21	3.7	10	.8	15	w190934
w191034	95G	26	4.2	2.1L	.22	19	26	17	.9	28	w191034
w191035	100G	50	4.3	2.3L	.23	34	22	17	.8	23	w191035
w191036	140G	81	5.0	3.0L	.09	46	14	25	.9	38	w191036
w191037	73G	61	4.5	1.6L	.03	48	4.9	18	.4	22	w191037
w191038	46G	15	3.3	1.0L	.13	9.0	11	8.2	.4	7.8	w191038
w191039	130G	24	2.4	2.8L	.15	11	3.3	11	.8	6.3	w191039
w191040	92G	29	2.3	2.0L	.17	12	3.7	13	.7	6.3	w191040
w191041	77G	19	3.2	1.7L	1.1	11	9.4	7.9	.3	6.7	w191041
w191042	110G	49	3.7	2.3L	.11	18	6.7	15	1.3	21	w191042
w191043	120G	18	2.5	2.6L	.56	7.0	5.5	25	.7	11	w191043
w191044	110G	34	1.4	2.5L	.17	9.0	2.1	11	.8	5.9	w191044
w191045	130G	36	1.7	2.9L	.10	12	2.8	75	1.0	8.8	w191045
w191046	150G	40	4.3	3.5L	.27	10	7.0	14	1.4	9.4	w191046

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w190528	1.3L	1.6	0.20	29	2.8	2.1	6.5	0.4	0.069	0.28L	w190528
w190529	1.7L	.6L	.21	33	4.2	3.1	9.8	.4	.11	.38L	w190529
w190530	1.4L	.4L	.22	24	2.4	2.2	5.2	.3	.080	.30L	w190530
w190531	1.2L	1.3	.40	34	3.0	2.6L	5.7	.4	.080	.26L	w190531
w190532	1.3L	.4L	.16	28	3.3	1.8L	10	.4	.070	.27L	w190532
w190533	1.4L	1.3	.17	36	3.5	2.0L	13	.4	.050	.29L	w190533
w190534	1.4L	2.0	.27	31	6.5	2.0L	21	.5	.042	.29L	w190534
w190535	1.4L	1.5	.27	28	6.5	2.0L	24	.5	.070	.29L	w190535
w190536	1.1L	.3L	.40	24	3.6	1.6L	9.5	.5	.17	.23L	w190536
w190537	1.5L	.5L	.39	36	4.5	2.3L	12	.8	.33	.33L	w190537
w190538	2.3	.7	.45	42	6.5	1.7L	16	.7	.010L	.54	w190538
w190539	4.2	2.9	.84	87	7.6	1.9L	32	.6	.080	1.0	w190539
w190540	1.9	.9	.46	58	6.1	1.6L	18	.6	.069	.59	w190540
w190541	1.9L	2.0	.67	60	10	2.8L	21	.6	.20	1.9L	w190541
w190542	3.8	1.8	.89	22	6.6	1.1L	29	.4	.020	.77	w190542
w190543	2.1	1.4	.66	26	4.6	.97L	19	.5	.010	.52	w190543
w190544	.9L	.3L	.30	18	4.0	1.3L	17	.5	.20	1.9L	w190544
w190545	.9L	.6	.23	26	3.0	1.3L	13	.4	.13	.19L	w190545
w190546	1.6L	1.4	.35	50	7.3	2.3L	1.2	.5	.069	.33L	w190546
w190547	1.8L	6.4	1.0	54	10	8.1	4.3	1.0	.069	.40L	w190547
w190548	2.2L	2.6	1.2	87	8.0	3.2L	17	1.0	.10	.47L	w190548
w190929	2.8L	1.2	.42	160	3.7	2.5	15	.4	.28	.59L	w190929
w190930	2.8L	.9L	.21	150	3.4	1.9	14	.4	.30	.59L	w190930
w190931	2.5L	.8L	.13	45	2.5	.52L	11	.5	.088	.52L	w190931
w190932	4.4L	1.4L	.18	140	3.1	2.9	10	.5	.19	.95L	w190932
w190933	3.8L	1.2L	.18	170	3.1	2.3	12	.5	.15	.81L	w190933
w190934	2.8L	.9L	.51	120	3.9	2.7	3.9	.5	.14	.58L	w190934
w191034	3.0L	1.9	.34	48	5.1	2.6	14	.6	.070	.65L	w191034
w191035	3.3L	1.5	.92	88	6.0	4.9	23	.7	.15	.70L	w191035
w191036	4.3L	1.6	.93	52	6.3	5.1	26	1.1	.13	1.4L	w191036
w191037	3.0	2.0	.93	44	5.6	3.7	18	.6	.050	.50L	w191037
w191038	1.5L	.6	.18	28	3.1	.78	14	.4	.060	.31L	w191038
w191039	4.0L	1.3L	.20	60	2.9	2.9	8.6	.5	.15	.85L	w191039
w191040	2.9L	.9L	.21	56	2.5	1.5	12	.5	.071	.63L	w191040
w191041	2.5L	.8L	.23	37	2.4	.52L	5.9	.5	.050	.52L	w191041
w191042	3.4L	1.1L	.38	96	5.7	2.1	14	.6	.14	.72L	w191042
w191043	3.8L	1.2L	.13	40	3.5	.81L	5.6	.5	.080	.81L	w191043
w191044	3.7L	1.1L	.16	160	3.1	1.7	5.3	.4	.063	.78L	w191044
w191045	4.3L	1.3L	.20	120	3.2	2.0	4.6	.5	.060	.92L	w191045
w191046	5.1L	1.5L	.28	76	6.2	1.1L	19	.7	.055	1.1L	w191046

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Sample number
w190528	5	4.5	0.1	24	8.8	1.3L	6.0L	11	380L	1.1	w190528
w190529	5	4.3	.1	72	H	1.7L	8.1L	12	520L	1.2L	w190529
w190530	5	4.2	.1	30	3.6	1.4L	6.4L	8.8	410L	1.0	w190530
w190531	8	5.5	.1	40	4.5	1.2L	5.7L	12	360L	1.7	w190531
w190532	4	4.0	.1	36	8.9	2.2	5.9L	12	380L	1.5	w190532
w190533	6	4.7	.1	16	12	1.6	6.3L	11	400L	4.9	w190533
w190534	140	17	.1	14	1.9	2.3	6.3L	21	400L	12	w190534
w190535	9	13	.1	11	2.2	1.7	9.2L	50	400L	17	w190535
w190536	11	10	.1	11	2.8	1.9	13	49	320L	19	w190536
w190537	13	11	.1	42	4.9	2.2	7.2L	56	460L	36	w190537
w190538	15	8.7	.1	14	.52	1.2L	15	18	350L	7.9	w190538
w190539	19	36	.2	9.7	.78	1.3L	24	39	530	7.7	w190539
w190540	15	8.9	.1	18	.79	1.8	17	17	320L	6.5	w190540
w190541	19	27	.2	11	1.1	1.9L	21	37	570L	11	w190541
w190542	21	5.8	.1	6.8	1.3	1.6	32	53G	280	14	w190542
w190543	15	5.0	.1	7.9	.68	1.5	23	45G	200L	14	w190543
w190544	10	9.6	.1	11	.92	1.5	8.9	57	260L	23	w190544
w190545	8	8.9	.1	9.2	.47	1.2	5.5	37	260L	15	w190545
w190546	10	17	.2	23	4.5	1.6L	7.2L	22	460L	5.6	w190546
w190547	11	19	.3	56	3.9	2.5	25	18	550L	2.1	w190547
w190548	23	36	.2	15	3.1	2.2L	10L	24	650L	33	w190548
w190929	9	8.6	.1	18	2.5	3.0	17	11	190	27	w190929
w190930	5	6.4	.1L	8.7	2.8	3.0	6.8	12	76	44	w190930
w190931	5	6.9	.1L	11	1.2	2.2	3.9	21	10	30	w190931
w190932	5	8.9	.1L	56	15	3.2	6.8	11	120	4.2	w190932
w190933	6	7.4	.1L	51	14	3.3	11	14	310	5.2	w190933
w190934	12	8.4	.1	13	2.3	2.6	18	14	110	17	w190934
w191034	10	14	.1	5.9	2.5	4.2	20	36	83	57	w191034
w191035	19	14	.2L	6.6	1.8	3.7	31	32	230	37	w191035
w191036	26	23	.2	9.6	3.1	6.6	45	32	470	54	w191036
w191037	30	8.0	.2L	10	1.9	4.1	35	21	350	42	w191037
w191038	7	2.8	.1L	5.5	1.2	1.5	6.9	22	60	7.8	w191038
w191039	6	11	.1L	50	6.0	3.0	9.9	7.8	44	6.6	w191039
w191040	6	9.2	.1L	64	2.9	2.3	10	12	24	5.8	w191040
w191041	7	3.1	.1L	28	4.2	1.9	12	17	67	.85	w191041
w191042	11	12	.1	28	3.4	3.1	15	29	740	29	w191042
w191043	4	6.2	.1	48	8.0	1.8	6.7	25	52	10	w191043
w191044	5	4.8	.1L	26	8.4	1.5	7.1	9.5	75	1.3	w191044
w191045	6	6.1	.1	20	12	2.8	10	11	130	1.6	w191045
w191046	5	12	.1	12	2.3	2.4	7.4L	30	31	20	w191046

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Pr-S (ppm)	Pt-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Sample number
w190528	1.5	0.60L	16L	1.4	1.6	2.1	1.0	1.3L	12	0.2	w190528
w190529	2.2	.81L	16	1.9	2.1	2.3	1.1	1.7L	17	.2	w190529
w190530	1.3	.64L	21L	.48	1.8	1.8	.90	1.4L	11	.2	w190530
w190531	1.7	.57L	13	.60	2.7	2.0	1.9	1.2L	12	.3	w190531
w190532	1.4	.59L	14	.78	1.9	2.3	.70	1.3L	13	.1	w190532
w190533	1.7	.63L	17	.59	1.9	2.1	.90	1.4L	11	.2	w190533
w190534	1.8	.63L	16	.45	4.0	3.4	1.2	1.7	35	.2	w190534
w190535	1.8	.75	20L	1.0	4.8	4.9	1.3	1.4L	31	.3	w190535
w190536	2.3L	.50L	19L	.69	2.5	3.4	2.2	1.1L	79	.2	w190536
w190537	2.3	.72L	12	.92	3.3	4.8	2.3	1.5L	90	.1	w190537
w190538	2.5	.54L	15	1.0	3.4	2.3	2.5	1.2L	83	.2	w190538
w190539	5.5	.61L	16	1.1	4.8	1.6	4.1	1.3L	320	.7	w190539
w190540	3.5	.50L	19L	1.1	3.2	2.2	2.7	1.1L	130	.2	w190540
w190541	3.1	.89L	19	1.1	3.2	2.2	3.1	1.9L	300	.5	w190541
w190542	7.6	.36L	19L	1.4	3.3	2.7	4.6	.78L	140	.4	w190542
w190543	4.4	.31L	17L	1.4	3.2	2.5	3.3	.66L	97G	.3	w190543
w190544	1.8	.41L	16L	.80	2.8	3.5	1.7	.88L	36	.3	w190544
w190545	1.4	.40L	13L	.65	2.5	2.4	1.3	.87L	28	.2	w190545
w190546	2.1	.72L	18	.80	3.7	3.0	1.6	1.6L	25	.3	w190546
w190547	3.3	.85L	20L	.30	6.5	2.8	3.8	1.8L	160	.9	w190547
w190548	3.6	1.0L	35	2.1	7.6	3.1	5.5	2.2L	410	.7	w190548
w190929	5.9L	.59L	13	.90	3.0	2.7	2.1	.82	96	.2	w190929
w190930	8.7L	.59L	17	1.2	2.5	2.0	.90	.59L	26	.2	w190930
w190931	5.2L	.52L	15	.70	1.9	1.4	.70	.58	3.4	.4L	w190931
w190932	9.5L	.95L	19	1.7	2.1	5.2	.90	1.2	14	.1	w190932
w190933	8.1L	.81L	21	1.7	2.3	5.9	1.2	1.2	21	.1	w190933
w190934	5.8L	.58L	13	.70	3.1	2.2	2.7	.58L	76	.4	w190934
w191034	6.5L	.65L	29L	3.2	3.8	4.4	1.8	1.0	41	.2	w191034
w191035	10	.70L	30L	3.2	4.7	4.9	67	.50	97	.5	w191035
w191036	15	.92L	36L	4.2	5.4	6.8	6.1	.92L	220	.6	w191036
w191037	8.0	.50L	29L	3.3	4.6	6.4	5.2	.50L	180	.6	w191037
w191038	5.1	.31L	21L	1.6	2.0	1.5	1.0	.51	25	.2L	w191038
w191039	8.5L	.85L	23L	.80	2.1	2.0	1.0	.85L	12	.2	w191039
w191040	6.3L	.63L	22L	.80	2.1	1.8	1.1	.63L	18	.2L	w191040
w191041	5.2L	.52L	23L	.50	2.0	2.4	1.3	.52L	21	.2L	w191041
w191042	7.2L	.72L	28L	4.3	3.9	4.1	2.0	1.0	130	.2	w191042
w191043	8.1L	.81L	25L	1.4	25	6.9	.80	1.4	57	.1	w191043
w191044	7.8L	.78L	21L	.70	1.7	1.8	.90	.78L	17	.1	w191044
w191045	9.2L	.92L	23L	.81	1.9	2.0	1.1	.92L	24	.1	w191045
w191046	11L	1.1L	26L	15	3.8	.8	1.2	1.1L	18	.2	w191046

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w190528	3.0L	0.41L	0.28L	2.7	15	7.0	0.6	88	52	w190528
w190529	3.0L	.55L	.38L	1.7	18	9.3	.6	20	69	w190529
w190530	3.0L	.44L	.30L	1.4	13	6.5	.6	19	10	w190530
w190531	5.4	.39L	.26L	1.1	20	7.9	.9	23	31	w190531
w190532	4.6	.40L	.27L	.44	15	8.0	.5	48	47	w190532
w190533	6.7	.43L	.29L	.63	13	7.2	.6	29	41	w190533
w190534	7.3	.43L	.29L	.39	36	13	.6	77	54	w190534
w190535	8.8	.43L	.29L	.69	48	11	.8	88	36	w190535
w190536	5.8	.34L	.23L	.40	12	6.6	.4	19	51	w190536
w190537	7.9	.49L	.34	2.3	20	7.6	.5	18	59	w190537
w190538	6.3	.37L	.25L	1.0	20	6.9	.6	15	53	w190538
w190539	10	.41L	.29	1.4	30	21	1.7	48	56	w190539
w190540	5.4	.34L	.23L	.87	18	8.0	.5	38	52	w190540
w190541	6.9	.60L	.41L	1.9	44	14	1.2	38	61	w190541
w190542	3.0L	.25L	.17L	.80	27	12	1.0	16	43	w190542
w190543	3.0L	.21L	.14L	.40	15	9.0	.7	38	35	w190543
w190544	4.0	.28L	.30	.40	13	7.5	.5	17	47	w190544
w190545	4.4	.27L	.19L	.20	9.6	6.7	.4	34	35	w190545
w190546	3.0	.49L	.33L	4.3	35	8.7	1.0	13	48	w190546
w190547	5.0	.58L	.40L	4.4	98	33	2.4	29	100	w190547
w190548	17	.69L	.47L	2.7	44	15	1.8	30	59	w190548
w190929	3.0L	.87L	.40L	.80	17	7.3	.6	12	32	w190929
w190930	3.0L	.87L	.40L	1.0	11	6.7	.5	17	23	w190930
w190931	3.0L	.77L	.35L	.30	11	3.2	2.9	18	28	w190931
w190932	3.0L	1.4L	.64L	6.8	35	4.9	.4	28	33	w190932
w190933	3.0L	1.2L	.55L	8.7	65	6.7	.5	89	45	w190933
w190934	3.0L	.86L	.40L	1.0	15	8.5	.7	52	28	w190934
w191034	3.0L	.95L	.44L	.60	18	11	.7	39	45	w191034
w191035	3.6	1.0L	.47L	.75	20	13	1.1	78	37	w191035
w191036	4.0	1.4L	.62L	1.1	27	16	1.4	10	100	w191036
w191037	3.0L	.73L	.34L	.73	18	13	1.0	9.5	38	w191037
w191038	3.0L	.46L	.21L	.53	8.7	5.1	.4	120	18	w191038
w191039	3.0L	1.3L	.58L	1.2	16	5.9	.5	9.5	43	w191039
w191040	3.0L	.92L	.42L	.65	16	7.9	.5	17	40	w191040
w191041	3.0L	.77L	.35L	1.6	11	8.5	.5	270	13	w191041
w191042	4.3	1.1L	.49L	1.9	23	6.8	.7	9.2	36	w191042
w191043	3.0L	1.2L	.55L	5.2	20	6.2	4.5	110	29	w191043
w191044	3.0L	1.1L	.53L	2.8	17	4.3	.3	10	18	w191044
w191045	3.0L	1.5	.63L	5.1	28	6.8	.4	10	36	w191045
w191046	3.0L	1.5L	.74L	1.4	18	6.4	.6	230	23	w191046

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w191047	0.93	0.57	0.029	0.031	0.022	0.042	1.1	0.031	0.19	8.2	w191047
w191048	.56	.40	.032	.028	.028	.062	3.5	.022	.13	28	w191048
w191049	2.6	1.2	.036	.086	.023	.083	.96	.072	.04	9.0	w191049
w191050	.42	.28	.084	.022	.028	.054	3.1	.019	.08	44	w191050
w191051	2.0	1.3	.26	.069	.061	.094	2.3	.074	.15	51	w191051
w191052	1.2	.75	3.0	.076	.052	.13	1.6	.038	.02L	2.4	w191052
w191053	2.1	1.1	.47	.095	.048	.12	3.5	.061	.04	17	w191053
w191054	2.2	1.2	.66	.077	.047	.11	2.3	.062	.05	17	w191054
w191055	1.6	.95	.039	.047	.038	.075	2.2	.049	.06	12	w191055
w191056	1.7	1.1	.015	.042	.021	.060	.64	.052	.04	4.5	w191056
w191057	1.1	.67	.62	.048	.028	.082	2.4	.035	.04	4.1	w191057
w191058	1.7	.90	.31	.060	.049	.079	1.8	.051	.02	5.0	w191058
w191059	2.1	1.2	.48	.071	.072	.12	3.7	.061	.07	100L	w191059
w191060	2.1	1.2	3.5	.098	.036	B	2.6	.051	.03L	10	w191060
w191061	2.0	1.0	.34	.069	.054	.083	1.6	.054	.01L	4.6L	w191061
w191062	.95	.73	.031	.025	.034	.061	2.4	.017	.03	5.6	w191062
w191204	10	7.8	.020	.24	.078	.40	3.3	.37	.11	40	w191204
w191205	4.3	2.3	.051	.046	.023	.15	2.0	.16	.14	8.1	w191205
w191207	7.0	4.9	.020	.10	.052	.23	.41	.23	.06	2.0	w191207
w191208	8.0	5.7	.045	.18	.059	.26	.44	.25	.06L	1.9	w191208
w191209	5.6	4.4	.055	.11	.040	.21	1.5	.22	.44	25	w191209
w191211	4.8	3.7	.041	.065	.031	.16	.32	.16	.06	1.9	w191211
w191212	11	7.6	.062	.25	.084	.36	.64	.31	.08L	1.6	w191212
w191213	7.9	5.8	.075	.095	.052	.29	2.7	.25	.95	27	w191213
w191215	12	6.9	.032	.22	.076	.37	1.4	.35	.16	11	w191215
w191216	10	5.9	.055	.24	.063	.32	1.1	.30	.14	9.0	w191216
w191220	5.2	3.6	.041	.13		.24	5.6	.15	.43	.1L	w191220
w191222	6.5	4.7	.042	.18	.066	.25	2.9	.20	.11	17	w191222
w191224	.33	.15	.027	.017	.013	.045	2.8	.023	.33	57	w191224
w191225	1.3	.23	.034	.020	.007	.40	25	.026	.31	950	w191225
w191227	.38	.23	.023	.009	.008	.045	2.6	.019	.24	59	w191227
w191228	9.3	4.2	.024	.25	.16	.28	1.3	.24	.10	9.8	w191228
w191233	1.9	.80	.52	.039	.019	.16	7.9	.058	.23	23	w191233
w191239	3.8	1.6	3.8	.096	.090	.26	5.0	.075	.07L	1.0L	w191239
w191245	.713	3.7	.043	.30	.12	.25	1.7	.18	.08	15	w191245
w191248	6.5	2.9	.050	.26	.046	.29	7.5	.15	.14	11	w191248
w191276	1.3	.17	.023	.028	.007	.38	27	.027	.45	50	w191276
w191277	3.4	2.0	1.1	.15	.035	.17	3.4	.098	.62	32	w191277
w191279	5.4	2.3	.042	.12	.036	.16	.51	.14	.16	32	w191279
w192614	1.7	.83	.76	.041	.027	.10	2.6	.049	.02	13	w192614

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w191047	66G	13	3.7	1.5L	0.23	8.0	14	7.3	0.4	8.2	w191047
w191048	98G	12	4.7	2.2L	.18	3.0	10	13	.3	11	w191048
w191049	130G	36	4.0	2.9L	.12	10	6.5	14	1.3	6.6	w191049
w191050	85G	11	4.7	1.9	.14	2.0	5.1	5.9	.7	5.9	w191050
w191051	150G	77	4.3	3.3L	.10	18	5.5	17	1.5	19	w191051
w191052	140	38	1.9	4.6L	.08	5.0	2.2	8.6	.4	7.7	w191052
w191053	190G	46	2.8	4.2L	.28	12	5.7	17	1.1	11	w191053
w191054	170G	26	3.1	3.8L	.10	6.0	8.5	15	.9	8.5	w191054
w191055	120G	22	3.2	2.6L	1.2	11	8.1	9.6	.8	7.0	w191055
w191056	94G	24	3.5	2.1L	1.9	9.0	6.5	11	.7	7.2	w191056
w191057	82	24	2.6	2.8L	.80	7.0	2.2	8.9	.6	5.0	w191057
w191058	120G	26	2.4	2.8L	.15	8.0	2.5	12	.7	6.7	w191058
w191059	190G	25	3.0	4.2L	.17	6.0	10	16	.6	14	w191059
w191060	130	60	2.6	6.2L	.32	12	4.3	15	.8	14	w191060
w191061	130G	44	3.1	2.9L	.23	8.0	3.5	17	.9	11	w191061
w191062	95G	15	3.4	2.1L	1.6	12	7.4	9.1	.3	5.8	w191062
w191204	91	210	4.8	19L	1.3	45	21	59	6.2	26	w191204
w191205	120	79	5.7	7.2L	.06	17	9.5	37	1.5	38	w191205
w191207	97	170	5.8	11L	.04	43	9.3	43	3.6	44	w191207
w191208	110	220	5.4	13L	.06	33	6.5	45	5.0	27	w191208
w191209	100	250	4.4	10L	.23	64	23	42	3.5	54	w191209
w191211	100	150	7.1	7.7L	.02L	39	9.0	37	1.9	42	w191211
w191212	100	250	4.8	17L	.04L	42	7.1	61	7.5	30	w191212
w191213	110	220	5.3	14L	.67	55	43	47	3.3	56	w191213
w191215	110	330	4.9	18L	.28	56	26	65	5.6	28	w191215
w191216	89	270	4.6	15L	.07	45	22	59	4.4	23	w191216
w191220	160	130	8.8	11L	.37	54	13	54	3.5	240	w191220
w191222	210	560	6.2	13L	1.6	32	4.5	41	5.4	59	w191222
w191224	76	18	5.4	2.8L	.05	3.0	8.3	18	.9L	18	w191224
w191225	27	16	2.2	25L	.11	2.0	26	4.1	.4	20	w191225
w191227	27	11	7.0	2.8L	.06	3.0	9.3	6.8	.2	8.6	w191227
w191228	66	660	5.0	17L	.13	120	15	81	4.7	23	w191228
w191233	39	41	6.0	10L	.49	7.0	2.6	13	1.1	4.1	w191233
w191239	150	110	4.7	16L	.19	47	8.2	24	1.4	31	w191239
w191245	140	160	6.0	11L	4.5	27	8.6	39	3.6	11	w191245
w191248	110	140	4.2	13L	1.7	23	12	32	2.4	10	w191248
w191276	11L	8	.8	17L	.60	2.0	.9	3.1	1.0L	6.4	w191276
w191277	120	140	3.9	7.4L	5.7	34	19	24	1.5	20	w191277
w191279	130	100	4.9	7.1L	.10	24	3.1	24	3.4	20	w191279
w192614	120G	29	3.1	2.7L	.28	7.0	5.1	12	.8	12	w192614

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w191047	2.2L	0.7	0.16	100	4.4	1.3	20	0.3	0.060	0.46L	w191047
w191048	3.2L	1.0L	.11	56	6.9	.68L	21	.3	.060	.68L	w191048
w191049	4.3L	1.3L	.21	72	4.8	1.9	17	.6L	.045	.91L	w191049
w191050	2.8L	.8L	.13	40	7.8	.59L	18	.4	.095	.59L	w191050
w191051	4.9L	1.5L	.30	80	5.7	4.5	14	.6	.25	1.0L	w191051
w191052	6.8L	2.0L	.12	24	3.3	3.0	2.0	.4	.063	1.4L	w191052
w191053	6.2L	1.9L	.22	180	5.5	1.3L	2.5	.6	.13	1.3L	w191053
w191054	5.6L	1.7L	.12	56	4.4	3.3	14	.5	.050	1.2L	w191054
w191055	3.9L	1.5	.25	60	3.4	.82L	9.0	.4	.14	.82L	w191055
w191056	3.1L	1.1	.17	68	2.7	.94	11	.4	.055	.66L	w191056
w191057	4.2L	1.3L	.16	68	3.4	.89L	4.2	.3	.10	.89L	w191057
w191058	4.1L	1.2L	.14	80	3.2	.86L	5.7	.4	.055	.86L	w191058
w191059	6.2L	1.9L	.12	32	4.9	1.3L	13	.5	.15	1.3L	w191059
w191060	9.2L	2.8L	.31	140	4.1	4.3	2.8	.6	.073	1.9L	w191060
w191061	4.3L	1.3L	.20	100	4.3	.91L	6.4	.6	.065	.91L	w191061
w191062	3.7	.9L	.31	56	2.6	2.6	5.8	.2	.058	.66L	w191062
w191204	28L	9.1L	.73	340	17	6.2L	4.1L	2.2	.21	6.2L	w191204
w191205	11L	3.4L	.26	92	5.2	2.3	9.8	2.0	.13	2.3L	w191205
w191207	16L	5.3L	.54	150	12	3.6L	3.1	1.5	.28	3.6L	w191207
w191208	19L	6.0L	.60	200	15	4.1L	8.6	1.7	.050	4.1L	w191208
w191209	15L	4.9L	1.4	150	12	5.4	9.0	1.7	.30	3.3L	w191209
w191211	11L	3.6L	.58	120	8.4	3.1	3.6	1.1	.025	2.5L	w191211
w191212	26L	8.3L	.60	320	19	5.7L	3.8L	2.1	.016	5.7L	w191212
w191213	21L	6.7L	2.2	200	16	5.6	13	1.5	.35	4.6L	w191213
w191215	26L	8.5L	.88	240	19	5.8L	3.8L	2.7	.055	5.8L	w191215
w191216	23L	7.4L	.64	240	14	5.0L	3.4	2.3	.083	5.0L	w191216
w191220	17L	5.4L	.53	200	13	3.7L	11	2.0	.26	3.7L	w191220
w191222	19L	5.9L	.64	320	18	4.2L	23	1.8	.13	4.2L	w191222
w191224	4.1L	1.3L	.14	40	5.9	.86L	49	1.1	.25	1.3L	w191224
w191225	37L	53L	.16	20L	14	12L	10	.2	2.4	7.7L	w191225
w191227	4.1L	1.3L	.14	56	7.6	1.8	59	.2	.47	.86L	w191227
w191228	25L	8.0L	2.6	780	11	6.0	3.7L	5.8	.098	5.3L	w191228
w191233	15L	4.7L	.15	54	8.8	3.1L	9.8	.4	.22	3.1L	w191233
w191239	24L	7.5L	1.0	780	10	7.5L	44	1.2	.24	5.0L	w191239
w191245	17L	5.4L	.48	420	14	3.6L	15	2.4	.085	3.6L	w191245
w191248	19L	6.2L	.41	260	12	4.2L	16	2.5	.11	4.2L	w191248
w191276	24L	7.8L	.07	130	12	5.0L	3.6L	.5L	1.2	5.0L	w191276
w191277	11L	5.3	2.2	780	14	15	5.7	1.0	.28	3.5L	w191277
w191279	10L	3.3L	.22	150	6.3	2.2L	6.7	1.3	.23	2.2L	w191279
w192614	3.9L	1.2L	.16	42	4.2	1.2L	9.7	.5	.080	.85L	w192614

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Sample number
w191047	5	2.9	0.1L	7.1	2.2	2.0	6.6	46	22	28	w191047
w191048	2	2.3	.1L	13	7.1	3.0	4.7L	71	200	30	w191048
w191049	5	7.8	.1L	10	2.3	3.1	6.2L	32	44	12	w191049
w191050	1	1.2	.1	13	1.8	2.0	4.9	49	28	40	w191050
w191051	11	14	.1	25	5.3	5.2	18	28	640	31	w191051
w191052	3	4.9	.1	41	2.0	1.1	9.7L	8.2	69	1.6	w191052
w191053	6	16	.1L	39	4.5	4.9	9.0L	10	320	1.5	w191053
w191054	3	23	.1L	90	3.1	3.8	8.1L	27	40	16	w191054
w191055	6	8.1	.1L	9.9	5.7	2.9	9.9	28	79	14	w191055
w191056	5	7.9	.1L	5.1	4.8	2.1	6.8	27	94	6.4	w191056
w191057	4	3.7	.1L	41	6.9	1.7	7.4	9.0	130	.98L	w191057
w191058	4	4.3	.1L	31	9.0	3.0	5.9L	9.1	120	.95	w191058
w191059	3	23	.1L	90	4.5	3.9	9.0L	30	13	81	w191059
w191060	6	13	.1	150	5.1	2.6	19	15	280	2.8	w191060
w191061	4	6.8	.1L	34	2.1	4.6	11	9.8	310	1.5	w191061
w191062	6	4.4	.1	23	2.5	1.1	9.5	18	96	.73L	w191062
w191204	27	140	.3	43	1.9L	6.2	41L	91	42	29	w191204
w191205	9	38	.2	13	3.4	8.8	20	63	23	29	w191205
w191207	26	70	.2	14	1.1L	6.7	27	21	120	31	w191207
w191208	21	86	.3	32	1.3L	7.6	27L	23	140	23	w191208
w191209	38	75	.3	9.8	2.8	5.9	69	130	450	33	w191209
w191211	23	40	.2	23	.77L	6.0	29	19	250	23	w191211
w191212	26	140	.4	26	1.7L	9.2	38L	26	570	28	w191212
w191213	32	110	.4	8.8	3.9	6.7	60	130	460	33	w191213
w191215	31	80	.4	38	1.8L	14	42	110	39	40	w191215
w191216	25	74	.3	66	1.5L	10	33L	110	17	29	w191216
w191220	B	51	.1L	34	11	10	29	77	62	130	w191220
w191222	20	74	.3	30	3.0	3.6	28L	36	39	45	w191222
w191224	1	.8	.1	16	8.1	8.6	5.9L	48	94	190	w191224
w191225	1	5.3	.1	120	36	3.7L	53L	43	B	87	w191225
w191227	1	1.5	.1	7.6	10	5.9	5.9L	81	47	230	w191227
w191228	70	56	.5	70	1.7L	13	100	40	580	13	w191228
w191233	4	8.0	.1	53	45	4.1	21L	12	43	2.7	w191233
w191239	22	9.0	.1L	500	41	4.7	66	53	3,000	11	w191239
w191245	16	16	.2	85	1.1L	12	24L	36	26	11	w191245
w191248	7	15	.2	69	2.2	3.5	28L	45	450	28	w191248
w191276	2	4.6L	.1L	8.3	46	3.5	36L	5.0	B	4.6L	w191276
w191277	14	13	.4	35	2.9	4.7	39	47	3,500	47	w191277
w191279	15	65	.1	16	5.7	3.2	15L	15	17	26	w191279
w192614	3	12	.1	59	3.1	2.8	5.6L	19	21	6.7	w192614

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Pr-S (ppm)	Pt-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Sample number
w191047	4.6L	0.46L	20L	1.5	1.9	2.9	0.80	0.77	20	0.2	w191047
w191048	6.8L	.68L	20L	1.9	4.6	5.5	.40	1.3	3.9	.2	w191048
w191049	9.1L	.91L	25L	1.9	3.3	.7	.90	.91L	19	.2	w191049
w191050	5.9L	.59L	19L	1.2	3.4	4.4	.50	.85	3.6	.1	w191050
w191051	12	1.0L	23L	2.3	3.2	4.5	1.7	1.0L	180	.2	w191051
w191052	14L	1.4L	24L	.29	2.3	1.1	.60	1.4L	66	.1	w191052
w191053	13L	1.3L	15	.30	2.5	1.7	1.0	1.3L	36	.1	w191053
w191054	12L	1.2L	15	3.1	3.2	1.4	.60	1.2L	21	.2L	w191054
w191055	8.2L	.82L	20L	.72	2.0	2.0	1.1	.83	35	.2L	w191055
w191056	6.6L	.66L	11	.76	2.0	2.1	.80	1.2	18	.2L	w191056
w191057	8.9L	.89L	17L	1.2	1.5	2.7	.80	.89L	13	.1	w191057
w191058	8.6L	.86L	9	1.2	1.6	2.6	.70	.89	15	.2L	w191058
w191059	13L	1.3L	15	3.8	2.9	2.2	.50	1.3L	17	.2L	w191059
w191060	19L	1.9L	22	.34	3.5	2.2	1.4	1.9L	110	.3L	w191060
w191061	9.1L	.91L	17	.25	2.2	1.1	1.0	.91L	31	.1	w191061
w191062	8.8	.66L	16L	.38	2.7	2.1	1.5	.66L	20	.2L	w191062
w191204	62L	6.2L	79	1.1	13	5.4	3.9	6.2L	62	.7	w191204
w191205	23L	2.3L	22	1.4	6.9	6.8	1.6	2.3L	50	.3	w191205
w191207	36L	3.6L	37	.68	12	8.1	3.1	3.6L	140	.4	w191207
w191208	41L	4.1L	55	.92	9.5	5.1	3.0	4.1L	130	.5	w191208
w191209	33L	3.3L	45	1.8	11	7.5	7.0	3.3L	390	.9	w191209
w191211	25L	2.5L	30	.58	9.7	7.3	3.1	2.5L	190	.4	w191211
w191212	57L	5.7L	66	.60	13	6.9	3.1	5.7L	110	.7	w191212
w191213	46L	4.6L	40	1.8	11	8.5	8.7	4.6L	240	1	w191213
w191215	58L	5.8L	89	.76	12	7.6	4.2	5.8L	94	.8	w191215
w191216	50L	5.0L	63	1.0	11	8.2	3.3	5.0L	66	.5	w191216
w191220	37L	3.7L	4L	.10L	5.2	6.6	B	3.7L	110	.4	w191220
w191222	42L	4.2L	72	1.6	11	2.8	2.9	4.2L	100	.5	w191222
w191224	13L	.86L	22L	7.1	4.2	3.2	.50	2.7	12	.1	w191224
w191225	77L	7.7L	31	6.6	.70	11	.20	7.7L	8.7	1	w191225
w191227	8.6L	.86L	22L	6.8	4.1	2.5	.70	.86L	22	.2	w191227
w191228	53L	5.3L	83	.91	14	4.5	13	5.3L	730	1	w191228
w191233	31L	3.1L	33L	1.4	1.8	5.5	.60	3.1L	18	.6	w191233
w191239	50L	5.0L	27	.60L	4.6	6.0	6.3	5.0L	470	.8	w191239
w191245	36L	3.6L	56	1.0	8.9	1.2	2.2	3.6L	54	.3	w191245
w191248	42L	4.2L	51	1.3	5.0	1.1	1.8	4.2L	35	.3	w191248
w191276	50L	5.0L	36L	.35	.50	6.0	.30	5.0L	7.3	.7L	w191276
w191277	23L	2.3L	28	3.8	8.4	9.0	7.4	2.3L	110	2	w191277
w191279	22L	2.2L	33	1.7	3.9	5.9	1.4	2.2L	190	.2	w191279
w192614	8.2L	.85L	10	.30	3.0	1.6	B	.85L	25	.2	w192614

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w191047	3.0L	0.66L	0.32L	0.68	11	6.6	0.4	170	14	w191047
w191048	3.0L	.98L	.47L	1.3	32	6.8	.5	68	54	w191048
w191049	3.0L	1.3L	.62L	.99	16	7.2	.5	56	35	w191049
w191050	3.0L	.85L	.40L	.68	11	5.6	.3	98	16	w191050
w191051	3.0L	1.5L	.70L	2.2	31	9.7	.5	7.9	71	w191051
w191052	3.0L	2.0L	.97L	2.0	16	6.3	.5	19	24	w191052
w191053	3.0L	1.9L	.90L	.55	22	7.0	.3	35	62	w191053
w191054	3.0L	1.7L	.81L	.71	21	6.6	.4	20	42	w191054
w191055	3.0L	1.2L	.56L	.69	14	8.8	.5	38	28	w191055
w191056	4.0	.94L	.45L	.68	12	6.3	.4	36	23	w191056
w191057	3.0L	1.3L	.61L	1.8	24	4.7	.3	34	15	w191057
w191058	3.0L	1.2L	.59L	3.6	67	4.5	.3	19	37	w191058
w191059	4.3	1.9L	.90L	.53	23	6.7	.4	39	42	w191059
w191060	3.0L	2.8L	1.3L	3.9	34	13	.7	64	62	w191060
w191061	3.0L	1.3L	.62L	.40	24	8.0	.4	140	63	w191061
w191062	3.0L	.95L	.45L	2.4	12	9.5	.5	150	9.5	w191062
w191204	7.3	9.1L	4.1L	3.1	91	19	1.8	670	72	w191204
w191205	6.7	3.4L	1.5L	1.4	55	14	.8	52	210	w191205
w191207	14	5.3L	2.4L	4.3	78	13	1.3	31	70	w191207
w191208	9.2	6.0L	2.7L	3.0	73	17	1.4	44	76	w191208
w191209	9.2	4.9L	2.2L	4.6	82	25	1.8	51	59	w191209
w191211	11	3.6L	1.7L	3.6	69	15	1.0	14	60	w191211
w191212	13	8.3L	3.8L	3.8	92	19	1.7	44	87	w191212
w191213	12	6.7L	3.0L	4.9	88	33	2.4	200	56	w191213
w191215	10	8.5L	3.8L	2.6	94	29	2.1	280	120	w191215
w191216	10	7.4L	3.3L	2.4	74	19	1.7	110	97	w191216
w191220	18	8.0L	2.5L	6.1	150	13	1.1	71	150	w191220
w191222	11	5.9L	2.8L	2.9	92	15	1.4	230	59	w191222
w191224	5.0	1.3L	.59L	4.2	59	5.4	.5	4.6	140	w191224
w191225	3.0L	12L	5.3L	.20L	7.2	1.7L	8.1	10	5.8	w191225
w191227	3.0L	1.3L	.59L	5.5	16	8.6	.4	5.9	40	w191227
w191228	15	8.0L	3.7L	3.8	100	32	3.2	46	240	w191228
w191233	3.0L	4.7L	2.1L	1.5	37	7.4	.4	14	57	w191233
w191239	18	7.5L	3.4L	41	81	69	2.1	17	72	w191239
w191245	4.4	5.4L	2.4L	1.8	85	18	1.6	3,300	270	w191245
w191248	4.3	6.2L	2.8L	1.7	62	11	1.4	1,000	170	w191248
w191276	3.0L	7.8L	3.6L	.20	3.2	1.9	.4L	11	3.6L	w191276
w191277	4.0	3.5L	1.6L	2.5	27	64	3.0	1,100	37	w191277
w191279	7.4	3.3L	1.5L	2.1	32	5.7	.8	4.3	33	w191279
w192614	3.0L	1.2L	.61L	1.4	19	9.0	.8	110	41	w192614

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Si (percent)	Al (percent)	Ca (percent)	Mg (percent)	Na (percent)	K (percent)	Fe (percent)	Ti (percent)	Ag-S (ppm)	As (ppm)	Sample number
w192615	2.2	1.0	0.71	0.054	0.030	0.11	2.1	0.062	0.01L	4.0	w192615
w192616	.63	.44	.051	.013	.005	.080	4.7	.013	.09	37	w192616
w192617	.52	.42	.049	.014	.003	.077	4.6	.013	.08	25	w192617
w192618	.68	.54	.063	.018	.007	.061	2.9	.019	.05	47	w192618
w192619	.70	.53	.066	.019	.006	.059	2.7	.019	.05	28	w192619
w192620	3.0	1.2	.91	.076	.027	.13	2.0	.063	.02L	4.0	w192620
w192621	2.7	1.0	.12	.055	.015	.12	3.4	.063	.06	9.0	w192621
w192622	1.7	.78	4.8	.042	.016	.072	1.7	.047	.07	6.0	w192622
w192623	2.5	1.3	.060	.039	.009	.12	3.6	.054	.03	7.0	w192623
w192624	1.7	.87	.47	.032	.040	.097	2.9	.048	.05	9.0	w192624
w192625	2.6	1.0	.82	.048	.050	.13	3.4	.063	.03	9.0	w192625
w192626	1.5	.70	.41	.051	.036	.078	1.9	.045	.02	12	w192626
w192627	2.1	1.0	.92	.072	.047	.11	2.0	.058	.01L	10	w192627
w192628	4.1	2.3	.066	.11	.034	.14	.80	.12	.08	5.0	w192628
w192629	.95	.64	.039	.022	.006	.037	.35	.027	.06	9.0	w192629
w192630	1.3	.85	.18	.033	.013	.078	2.6	.051	.03	35	w192630
w192631	1.2	.79	.29	.065	.010	.083	3.2	.047	.03	54	w192631
w192632	1.5	.89	.029	.016	.007	.050	.36	.061	.05	2.0	w192632
w192633	1.4	.83	.030	.015	.007	.047	.36	.054	.08	3.0	w192633
w192634				.052	.004	.14			1.4	5.0	w192634
w192635	1.7	.83	.054	.039	.012	.082	2.5	.053	.05	20	w192635
w192636	1.7	.75	.37	.049	.013	.084	2.3	.046	.02	27	w192636
w193119	2.0	1.0	.061	.034	.010	.077	1.3	.072	.05	5.0	w193119
w193120	2.2	1.1	.029	.059	.023	.067	.20	.062	.02	1.0	w193120
w193121	1.4	.69	.54	.037	.018	.099	3.2	.046	.07	20	w193121
w193122	2.2	1.0	.44	.062	.023	.085	.71	.059	.01	1.0	w193122
w193123	1.7	.96	.74	.055	.014	.095	1.8	.057	.02	4.0	w193123
w193124	1.5	.90	.063	.043	.013	.052	.40	.049	.03	7.0	w193124

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	B-S (ppm)	Ba-S (ppm)	Be-S (ppm)	Bi-S (ppm)	Cd (ppm)	Ce (ppm)	Co (ppm)	Cr (ppm)	Cs (ppm)	Cu (ppm)	Sample number
w192615	130G	36	2.4	2.8L	0.25	8.0	6.1	12	0.9	12	w192615
w192616	96G	8	4.2	2.1L	.02	6.0	8.2	7.0	.5L	17	w192616
w192617	92G	8	4.4	2.0L	.03	10	16	6.9	.5L	16	w192617
w192618	73G	7	2.3	1.6L	.23	8.0	9.3	7.2	.4	11	w192618
w192619	71G	9	2.3	1.6L	.22	9.0	27	9.4	.5L	11	w192619
w192620	150G	97	3.8	3.3L	1.2	26	3.7	13	.7	11	w192620
w192621	140G	20	3.5	3.1L	.06	15	9.2	15	1.3	17	w192621
w192622	87G	14	3.5	1.9L	.63	9.0	4.9	15	.7	10	w192622
w192623	140G	31	4.2	3.1L	.06	120	32	12	1.2	17	w192623
w192624	120G	22	2.8	2.6L	.32	9.0	5.3	11	.7	15	w192624
w192625	160G	27	2.7	3.5L	.82	11	8.6	14	.9	17	w192625
w192626	94G	25	2.4	2.1L	.10	5.0	3.0	15	.7	6.8	w192626
w192627	130G	53	2.6	2.8L	.15	7.0	5.1	17	1.0	8.1	w192627
w192628	170G	71	3.5	3.6L	.02	28	13	25	2.6	25	w192628
w192629	45G	17	3.2	1.0L	.06	11	11	5.8	.3	11	w192629
w192630	94G	18	3.9	2.1L	.04	10	2.8	11	1.0	10	w192630
w192631	100G	13	4.0	2.2L	.06	9.0	3.3	9.3	.9	8.5	w192631
w192632	60G	22	4.2	1.3L	.02	20	11	13	.3	16	w192632
w192633	56G	20	3.9	1.2L	.20	28	10	11	.3	17	w192633
w192634	170G	19	16	3.7L	.51	2.0	10	3.3	.3L	32	w192634
w192635	98G	19	3.1	2.2L	.05	10	4.8	13	.7	7.4	w192635
w192636	100G	14	2.6	2.2L	.09	5.0	3.2	11	.6	10	w192636
w193119	93G	86	4.2	2.0L	.11	23	3.3	12	.7	19	w193119
w193120	80G	28	3.4	1.8L	.28	9.0	9.0	12	1.0	9.6	w193120
w193121	120G	14	2.7	2.6L	.86	9.0	6.3	12	.6	7.4	w193121
w193122	100G	36	2.3	2.2L	.19	9.0	2.3	13	1.1	7.2	w193122
w193123	110G	40	2.2	2.5L	.25	10	2.0	11	.9	11	w193123
w193124	63G	26	2.4	1.4L	.09	12	2.1	10	.7	12	w193124

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Dy-S (ppm)	Er-S (ppm)	Eu (ppm)	F (ppm)	Ga-S (ppm)	Gd-S (ppm)	Ge-S (ppm)	Hf (ppm)	Hg (ppm)	Ho-S (ppm)	Sample number
w192615	4.1L	1.3L	0.19	57	3.7	1.3L	11	0.6	0.060	0.89L	w192615
w192616	3.1L	1.0L	.28	21	5.5	1.1	4.3	.1	.28	.67L	w192616
w192617	2.9	1.2	.30	20L	5.8	1.7	7.5	.2	.21	.64L	w192617
w192618	2.3L	.7L	.29	20L	6.2	.95	15	.3	.49	.51L	w192618
w192619	2.3L	.7L	.28	22	6.9	.78	16	.3	.28	.50L	w192619
w192620	4.9L	1.5L	.62	64	3.8	1.5L	13	.7	.080	1.1L	w192620
w192621	4.5L	1.4L	.55	80	4.1	2.1	13	.4	.11	.99L	w192621
w192622	2.8L	.9L	.19	46	2.8	1.3	7.8	.4	.11	.61L	w192622
w192623	8.7	4.5	2.4	57	3.4	12	17	.5	.080	2.8	w192623
w192624	3.7L	1.2L	.24	48	3.5	.82L	6.9	.5	.11	.82L	w192624
w192625	5.0L	1.6L	.28	46	3.8	1.6L	11	.6	.080	1.1L	w192625
w192626	3.0L	.9L	.11	46	3.0	.66L	7.2	.6	.10	.66L	w192626
w192627	4.1L	1.3L	.11	45	4.3	.90L	12	.6	.090	.90L	w192627
w192628	5.3L	1.7L	.42	89	6.6	1.2L	13	1.0	.14	1.2L	w192628
w192629	1.4L	.5	.17	20	2.8	.86	13	.2	.090	.32L	w192629
w192630	3.0L	.9L	.24	20L	4.2	1.6	16	.5	.25	.66L	w192630
w192631	3.2L	1.0L	.19	20	4.5	1.0L	18	.4	.25	.70L	w192631
w192632	1.9L	.9	.57	20L	2.9	2.1	11	.5	.040	.42L	w192632
w192633	1.8L	.8	.92	20	3.0	2.1	9.5	.5	.040	.56L	w192633
w192634	5.4L	1.7L	.10	20L	22	1.2L	160	.1	.13	1.2L	w192634
w192635	3.1L	1.0L	.16	29	3.8	.69L	9.8	.5	.15	9.8L	w192635
w192636	3.2L	1.0L	.16	37	3.1	.71L	9.0	.4	.090	.71L	w192636
w193119	3.0L	1.1	.68	81	4.1	3.3	14	.6	.070	.65L	w193119
w193120	2.6L	.8	.18	48	3.6	.64	18	.5	.010	.56L	w193120
w193121	3.8L	1.2L	.20	43	1.4	1.2L	9.6	.4	.23	.83L	w193121
w193122	3.3L	1.0L	.19	61	2.7	1.4	4.4	.5	.070	.71L	w193122
w193123	3.6L	1.4	.23	48	2.2	1.1L	4.9	.4	.090	.80L	w193123
w193124	2.0L	.8	.23	61	2.5	1.1	8.8	.4	.060	.44L	w193124

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis-continued

Sample number	La (ppm)	Li (ppm)	Lu (ppm)	Mn (ppm)	Mo-S (ppm)	Nb-S (ppm)	Nd-S (ppm)	Ni-S (ppm)	P (ppm)	Pb (ppm)	Sample number
w192615	4	11	0.2	46	0.89	1.4	5.8L	19	39	6.2	w192615
w192616	2	5.6	.1	12	1.5	1.2	5.2	22	17	25	w192616
w192617	4	6.3	.1	13	1.9	1.5	13	22	20	23	w192617
w192618	3	8.0	.2	15	1.0	.51	3.4L	31	29	18	w192618
w192619	4	8.5	.1	14	1.1	.78	5.0	34	34	16	w192619
w192620	13	7.3	.1	94	2.3	1.2	12	24	40	9.1	w192620
w192621	8	8.2	.2	32	4.2	1.8	11	27	210	18	w192621
w192622	4	4.8	.2	24	5.7	1.5	4.0L	19	19	28	w192622
w192623	62	8.2	.4	27	2.7	2.0	55	49	120	23	w192623
w192624	5	11	.2	46	2.5	1.6	5.4L	16	20	5.3	w192624
w192625	6	11	.2	72	3.0	1.4	7.2L	27	27	9.4	w192625
w192626	3	5.5	.1	56	2.3	2.1	4.3L	5.6	110	5.2	w192626
w192627	4	8.9	.1	85	1.3	2.3	5.9L	7.6	140	3.6	w192627
w192628	17	28	.2	23	1.2	1.7	11	31	190	18	w192628
w192629	8	6.3	.1	5.4	.95	.59	7.2	23	67	7.7	w192629
w192630	5	7.3	.1	25	1.8	1.9	7.2	10	33	38	w192630
w192631	4	5.4	.1	25	1.1	.70	4.6L	9.5	48	51	w192631
w192632	11	10	.1	3.4	.48	.54	17	66	110	21	w192632
w192633	14	7.8	.1	3.8	.39	1.3	17	73	150	23	w192633
w192634	1	15	.1	22	3.2	4.2	7.8L	520		240	w192634
w192635	6	6.4	.1	20	1.9	2.5	5.3	23	690	28	w192635
w192636	2	4.7	.1	57	2.3	.91	4.6L	8.7	22	30	w192636
w193119	12	12	.1	8.5	.47	2.0L	16	20	450	6.0	w193119
w193120	5	6.8	.1	11	.80	2.2	4.6	41	17	39	w193120
w193121	3	3.9	.1	120	9.2	2.6L	5.5L	38	73	14	w193121
w193122	5	4.8	.1	50	9.2	2.0	6.6	10	27	3.2	w193122
w193123	5	5.8	.1	65	3.9	2.5L	5.2L	8.8	35	3.5	w193123
w193124	6	5.7	.1	7.6	5.3	1.4	8.2	14	190	7.6	w193124

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Pr-S (ppm)	Pt-S (ppm)	Rb (ppm)	Sb (ppm)	Sc (ppm)	Se (ppm)	Sm (ppm)	Sn-S (ppm)	Sr-S (ppm)	Tb (ppm)	Sample number
w192615	8.6L	0.89L	12	0.40	2.3	1.4	B	0.89L	17	0.2	w192615
w192616	6.5L	.67L	10L	1.3	4.2	3.5	B	.77	4.3	.3	w192616
w192617	6.3L	.64L	9L	1.4	3.0	2.1	B	.64L	8.3	.2	w192617
w192618	5.0L	.51L	11L	1.1	4.4	3.2	B	.80	9.5	.3	w192618
w192619	4.8L	.50L	11L	1.9	3.9	2.3	B	.85	8.5	.3	w192619
w192620	10L	1.1L	10	.50	3.2	3.3	B	1.1L	21	.3	w192620
w192621	9.6L	.99L	15	.30	2.6	4.4	B	.99L	12	.4	w192621
w192622	5.9L	.61L	10	.40	2.0	11	B	.61L	7.7	.3	w192622
w192623	18	.99L	22L	.20	2.3	3.3	B	.99L	5.6	2	w192623
w192624	8.0L	.82L	14L	.30	3.4	1.6	B	.82L	13	.5L	w192624
w192625	11L	1.1L	17	.40	3.2	1.9L	B	1.1L	15	.5L	w192625
w192626	6.4L	.66L	12	.40	2.1	1.1	B	.66L	13	.4L	w192626
w192627	8.8L	.90L	21	.50	2.9	1.3	B	.90L	23	.4L	w192627
w192628	11L	1.2L	33	1.1	5.5	1.9	B	1.2L	110	.3	w192628
w192629	3.1L	.32L	8	.70	1.6	1.5	B	.95	44	.4L	w192629
w192630	6.4L	.66L	10	1.1	3.1	1.8	B	.66L	16	.3	w192630
w192631	6.8L	.70L	11	1.7	3.3	1.8	B	.70L	14	.4L	w192631
w192632	4.3	.42L	6	.90	3.5	4.0	B	.42L	78	.3	w192632
w192633	3.8L	.39L	10L	1.2	3.7	4.0	B	.67	95	.3	w192633
w192634	11L	1.2L	6L	1.5	2.4	3.4	B	1.2L	20	.3L	w192634
w192635	6.7L	.69L	14	1.7	2.4	1.8	B	3.3	25	.3L	w192635
w192636	6.9L	.71L	9	.50	2.5	2.3	B	.71L	14	.2	w192636
w193119	6.3L	.65L	22L	.60	3.4	2.1	3.3	.65L	200	.4	w193119
w193120	5.4L	.56L	17	4.5	3.1	.9	.80	.56L	13	.1	w193120
w193121	8.1L	.83L	20	1.1	2.3	3.9	1.2	.83L	18	.2	w193121
w193122	6.9L	.71L	16	1.5	2.5	1.7	1.1	.71L	20	.2	w193122
w193123	7.8L	.80L	20L	.50	2.3	2.0	1.1	.80L	22	.2	w193123
w193124	4.3L	.44L	12	.80	2.1	1.2	1.2	.44L	35	.2	w193124

Table 12h.-- Major, minor, and trace element composition of 108 coal samples from Indiana reported on whole coal basis--continued

Sample number	Th (ppm)	Tl-S (ppm)	Tm-S (ppm)	U (ppm)	V-S (ppm)	Y-S (ppm)	Yb (ppm)	Zn (ppm)	Zr-S (ppm)	Sample number
w192615	3.0L	1.3L	0.64L	1.9	17	6.9	0.9	95	24	w192615
w192616	3.0L	.96L	.48L	.80	9.4	7.8	.8	13	6.6	w192616
w192617	3.0L	.92L	.46L	.60	9.2	9.2	.5	29	7.0	w192617
w192618	3.0L	.73L	.37L	1.0	8.8	3.9	.9	61	6.9	w192618
w192619	3.0L	.71L	.36L	.70	9.2	4.3	.6	59	6.6	w192619
w192620	3.0L	1.5L	.76L	1.7	14	7.3	.7	460	17	w192620
w192621	3.0L	1.4L	.71L	2.6	14	9.4	.9	14	12	w192621
w192622	3.0L	.87L	.44L	12	23	5.5	.6	62	14	w192622
w192623	3.0L	1.4L	.71L	1.2	10	38	3.0	25	20	w192623
w192624	3.0L	1.2L	.59L	2.0	20	7.1	9.0	160	32	w192624
w192625	4.0	1.6L	.79L	1.3	17	6.8	.8	150	22	w192625
w192626	3.0L	.94L	.47L	1.4	21	3.3	.4	31	34	w192626
w192627	3.0L	1.3L	.65L	1.4	19	3.5	.4	44	30	w192627
w192628	3.0L	1.7L	.83L	1.7	25	5.6	.9	25	12	w192628
w192629	3.0L	.45L	.23L	.40	6.3	3.9	.4	21	5.9	w192629
w192630	3.0L	.94L	.47L	.90	12	6.1	.6	10	16	w192630
w192631	3.0L	1.0L	.50L	.70	7.1	3.6	.6	10	7.7	w192631
w192632	3.0L	.60L	.30L	.70	14	7.8	.6	9.0	19	w192632
w192633	3.0L	.56L	.28L	.70	12	7.3	.7	62	11	w192633
w192634	3.0L	1.7L	.85L	.30	24	29	.4	270	34	w192634
w192635	3.0L	.98L	.49L	.40	18	4.8	.4	11	25	w192635
w192636	3.0L	1.0L	.51L	2.3	14	3.9	.5	12	17	w192636
w193119	3.0L	.93L	.47L	.60	13	8.8	.8	23	26	w193119
w193120	3.0L	.80L	.40L	.70	15	5.0	.5	79	26	w193120
w193121	4.0	1.2L	.60L	9.3	18	7.6	.6	190	24	w193121
w193122	4.0	1.0L	.51L	3.3	19	5.6	.5	14	26	w193122
w193123	3.0L	1.1L	.57L	1.7	17	6.2	.5	32	21	w193123
w193124	3.0L	.63L	.32L	2.2	16	4.9	.5	14	9.5	w193124

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