DEPARTMENT OF THE INTERIOR

TEI-479

RADIOACTIVITY OF PART OF THE BITUMINOUS COAL REGION OF PENNSYLVANIA

By
E. D. Patterson

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

November 1954

United States Geological Survey
Washington, D. C.

Prepared by the Geological Survey for the
UNITED STATES ATOMIC ENERGY COMMISSION
Technical Information Service, Oak Ridge, Tennessee

Subject Category, GEOLOGY AND MINERALOGY.

This report concerns work done on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission.

Printed in USA, Price 30 cents. Available from the Office of Technical Services, Department of Commerce, Washington 25, D. C.

CONTENTS

TABLES

ILLUSTRATION

RADIOACTIVITY OF PART OF THE BITUMINOUS COAL REGION OF PENNSYLVANIA

By E. D. Patterson

ABSTRACT

Samples of the commercially important coal beds and associated rocks in the Pottsville, Allegheny, and Monongahela series of the Pennsylvanian system were collected from 104 localities in western Pennsylvania. The coal and associated rocks examined and sampled at 103 places are nearly nonradioactive and are interpreted to contain essentially no uranium. Radioactive coal was found at only one locality in Clearfield County where the upper 0.4 foot of the Lower Freeport coal bed (3.2 feet thick) contains an average of 0.019 percent uranium.

INTRODUCTION

The bituminous coal field of Pennsylvania covers an area of approximately 14,000 square miles in the western half of the state (fig. 1). This area is in the eastern edge of the Appalachian Plateau and is underlain by Pennsylvanian rocks which contain numerous coal beds of commercial quality and thickness. The rocks of the area are essentially horizontal except for several broad folds which die out westward.

About one-fifth of the bituminous coal mined in the United States comes from western Pennsylvania. This coal, mined as fuel, might be a source of uranium, even if the amount of uranium in coal were very small, providing the coal could be burned by large users and the uranium concentrated in the ash. Nelson and Brill (1948) reported on the coal beds at 18 localities in the bituminous coal field of Pennsylvania and J. C. Ferm (1954) prepared a report on Beaver, Clearfield, and Jefferson

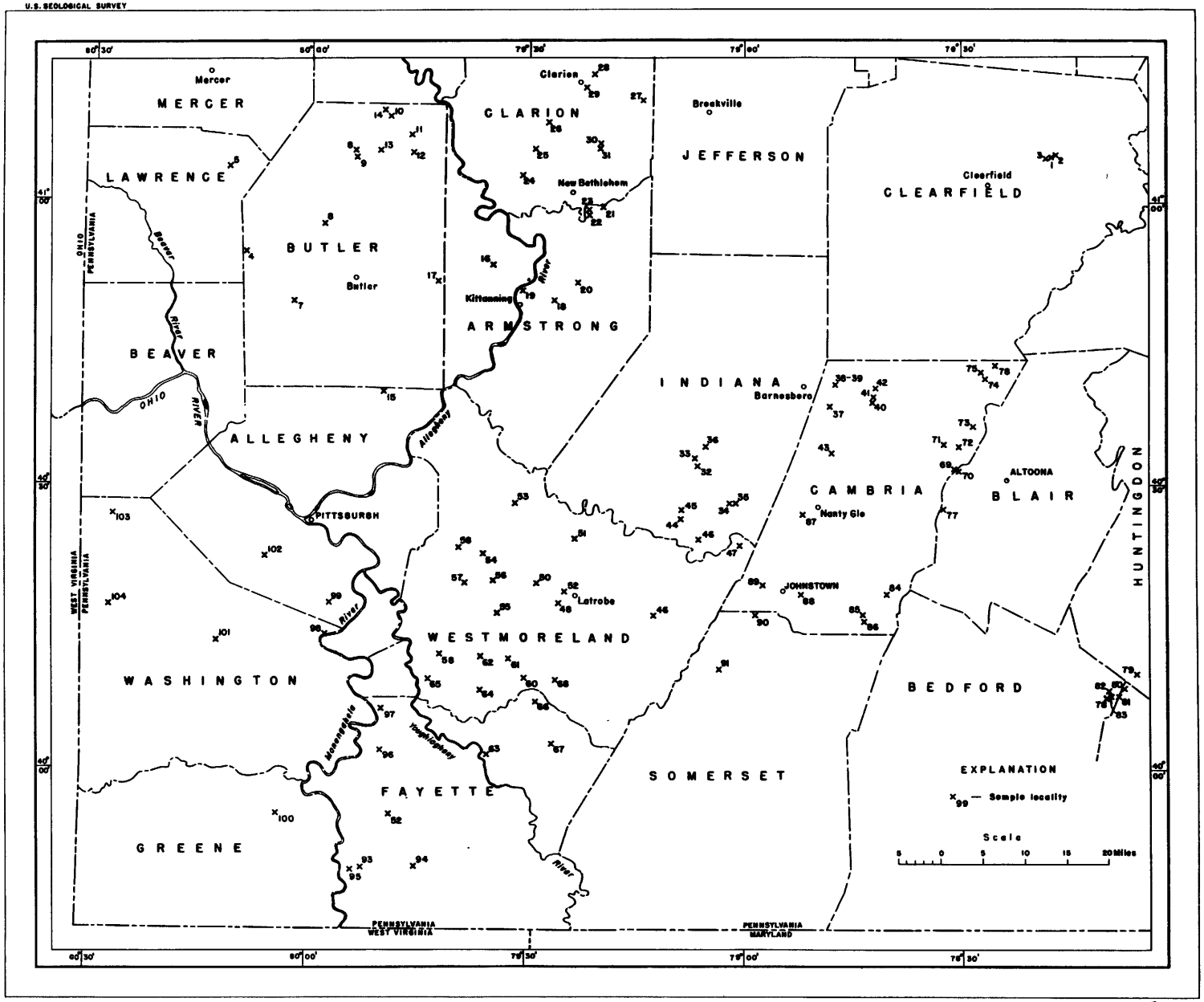

FIGURE 1. — SAMPLE LOCALITIES IN WESTERN PENNSYLVANIA COAL FIELD.

Counties, Pa.

Numerous publications describe the coal fields of Pennsylvania (Ashley, Keystone Coal Buyers' Manual, and numerous county reports of the Pennsylvania Geological Survey), and the area is covered by topographic maps, at a scale of 1:62,500, issued by the U. S. Geological Survey, dated from 1900 to 1925. Information about locations of active coal mines can be obtained from the Pennsylvania Department of Health, Mine Water Division, Greensburg, Pa.

SCOPE OF INVESTIGATION

The U. S. Geological Survey collected samples, and measured the radioactivity of coals and associated rocks in western Pennsylvania with a portable scintillation counter, on behalf of the Division of Raw Materials of the Atomic Energy Commission. E. D. Patterson and J. L. Snider did the field work for this report in the fall of 1953 and spring of 1954.

Sampling was confined to artificial exposures of coal in strip and underground mines. The sampling of all coals from all producing areas of western Pennsylvania was not possible due to time limitations, but an attempt was made to collect samples from each bed at three or four localities in each quadrangle visited. This procedure restricted the sampling to the thicker beds which are actively mined.

Samples were collected in one-foot increments, but partings thicker than three-eighths inch were excluded. Samples of overlying shale and clay underlying the coal were not collected unless a radioactivity comparable to more than 0.002 percent equivalent uranium was indicated by the scintillation counter readings.

The samples were crushed to minus one-fourth inch particle size and

the radioactivity measured by a portable scaler equipped with an assay cup and then shipped to the Washington laboratory of the U. S. Geological Survey for radioactivity determination and storage. Portable scaler measurements of radioactivity have agreed closely with the measurements made with laboratory scalers in previous investigations (TEI-347, 348, 404, and 409). The findings cited in this report are, for the most part, those of the portable scaler. Chemical analyses were made of the few more radioactive samples and these are shown in footnotes in table 2.

STRATIGRAPHY

The Pennsylvanian rocks in western Pennsylvania are divided into four series as follows, beginning with the oldest: Pottsville, Allegheny, Conemaugh, and Monongahela. The most important coal beds are in the Allegheny and Monongahela series. The following discussion is based almost entirely on Ashley's (1928) summary of "Bituminous coal fields of Pennsylvania." The series and relative position of coal beds are shown in table 1.

The rocks in these series include sandstone, shale, limestone, clay, and coal. The beds are irregular in thickness and lateral extent. According to Ashley (1928, p. 82), the succession most commonly found is, in ascending order: sandstone, limestone, clay, coal, shale, and sandstone. The bulk of the rocks are sandstones and shales. Limestone is said to be more numerous and thicker to the west, while the sandstones and shales are thicker to the east (Ashley, 1928).

Pottsville series

The Pottsville series in western Pennsylvania is relatively thin, 100 to 300 feet in thickness, and consists mainly of sandstone and

Table 1.--Stratigraphic table showing the relative positions of the Pennsylvanian series, coal beds, and localities at which coal beds were sampled.

Series	Coal bed	Locality number
Monongahela	Waynesburg	96, 100
	Little Waynesburg	None
	Uniontown	None
	Sewickley	95
	Redstone	48, 55, 59, 60, 61, 94
	Pittsburgh	49, 50, 51, 53, 54, 57, 58, 63, 64, 65, 91, 92, 93, 97, 98, 99, 101, 102, 103, 104
Conemaugh	Bakerstown	52
	Mahoning	56, 62, 82
Allegheny	Upper Freeport and rider	3, 4, 18, 22, 32, 36, 37, 41, 43, 45, 67, 70, 71, 74, 77, 78, 83, 84, 85, 90
	Lower Freeport	1, 2, 12, 15, 16, 21, 34, 35, 38, 39, 40, 44, 46, 47, 69, 75, 84
	Upper Kittanning	7, 14, 17, 20, 42, 88
	Middle Kittanning	6, 8, 10, 23, 73
	Lower Kittanning	5, 9, 19, 24, 26, 27, 29, 31, 33, 72, 76, 80, 81, 86, 87, 89
	Clarion (Upper, Middle, and Lower)	11, 13, 25, 28, 30, 79
	Brookville	13
Pottsville	Mercer	66, 68
	Quakertown	None
	Sharon	None

conglomerate with minor amounts of coal, iron ore, limestone, and refractory flint clay (Ashley, 1928, p. 116-117). The coal beds include, in ascending order, the Sharon, Quakertown, and Mercer. The Sharon was the thickest and cleanest coal, but it has been widely mined and no extensive reserves remain (Ashley, 1928). The Quakertown and Mercer coals are thin, discontinuous, and impure with large amounts of pyrites at many localities. The Mercer coal was sampled in this reconnaissance at Localities 66 and 68, but the other coals in the Pottsville series were not sampled.

Allegheny series

The Allegheny series contains a number of important coal seams, including the Brookville, Clarion, Kittanning, and Freeport coals, of which the Upper Freeport and the Lower Kittanning are most important. The series includes all rocks from the base of the Brookville coal to the top of the Upper Freeport coal. There is more shale and less sandstone in the Allegheny series than in the underlying Pottsville series, and thicker, more persistent coal beds than in the overlying Conemaugh series. The Van Port limestone between the Clarion and Lower Kittanning coal beds is an important key bed, aiding greatly in the correlation of the coal beds. As shown in table 1, samples were collected from all the important Allegheny coal beds but sampling was concentrated on the Lower Kittanning and Upper Freeport because these beds are more widely mined than the other beds. In general, this series thickens from west to east, and the number of coal beds increase in that direction also.

The Brookville coal is worked in a few places along the northern fringe of the bituminous coal fields, especially near Brookville, Jefferson County, and in Clearfield County. It has a high ash content and is known

locally as the "Dirty A" (Ashley, p. 114). The Brookville coal was sampled at Locality 13.

Six samples of Clarion coal were obtained in Butler, Clarion, and Huntingdon Counties. This coal is commonly thin and not of great commercial value, although locally it is of minable thickness, especially in the Clarion area where it is stripped.

The Kittanning coals, lower, middle, and upper, are widespread in western Pennsylvania. The Lower Kittanning is the most persistent and economically important. It ranges from two to four feet in thickness and includes partings which range from a knife edge to 6 inches in thickness. The bed was sampled at 16 localities, mainly strip mines in Armstrong, Bedford, Butler, Cambria, Clarion, Fulton, Indiana, and Lawrence Counties. There are at least three coals between the Lower Kittanning and Upper Kittanning, which are called Middle Kittanning. It is not known whether these beds are splits of the same bed or independent beds. Locally one or more of these beds are of minable thickness. Samples were collected in 6 localities in Butler, Armstrong, and Cambria Counties. The Upper Kittanning coal was sampled at 5 localities in Armstrong, Butler, and Cambria Counties. This bed, like the Middle Kittanning, is only of local importance.

The Lower Freeport coal lies 20 to 65 feet below the Upper Freeport and consists of several closely overlying and overlapping coal beds. The thickness of the coal changes rapidly within short distances, but large areas of thick coal at this horizon are present in Indiana, Cambria, Armstrong, Clearfield, and Jefferson Counties. It was sampled at 17 localities.

The Upper Freeport coal is the most persistent coal in the Allegheny series and ranges in thickness from a few inches to 10 feet and from 4 to

6 feet over wide areas. In places it has been cut out by stream erosion prior to deposition of the overlying rocks but must have been deposited originally over a wide area. It was sampled at 20 localities in Armstrong, Bedford, Blair, Butler, Cambria, Clearfield, Fayette, Indiana, and Somerset Counties during this study.

Conemaugh series

The Conemaugh series contains from 25 to 30 coal members, most of which are now unimportant economically. This series consists of shale, sandstone, conglomerate, limestone, and thin coals, and is 500 to 950 feet thick, extending from the top of the Upper Freeport coal to the base of the Pittsburgh coal. The series is distinguished from the series above and below by the relative importance of the coals and the abundance of red shale. Conemaugh coals were sampled in four mines: three working the Mahoning coal and one the Bakerstown coal, in Bedford and Westmoreland Counties.

Monongahela series

This series includes the rocks between the base of the Pittsburgh coal and the top of the Waynesburg coal. It ranges in thickness from 200 to 380 feet in the southwest portion of Pennsylvania, and according to Ashley (1928, p. 97) limestones make up nearly one-half of the thickness. The Monongahela series is overlain by the Dunkard series in Washington and Greene Counties; nevertheless, some deep shaft mines exploit the thick Pittsburgh seam at the base of the Monongahela. This series contains six coal beds, of which the most important is the Pittsburgh seam; the Waynesburg, Redstone, and Sewickley are of less importance; the Uniontown is of minable thickness locally, and the Little Waynesburg is too thin to

mine.

The Pittsburgh coal, one of the world's most famous coals, is responsible in a great part for the development of the steel industry in the Pittsburgh area because of its thickness and excellent coking qualities. A rider coal overlies the main seam, but at most places it is too impure to be recovered. Near Pittsburgh the coal, excluding roof coal, averages 5 feet thick and is thicker, 6 to 8 feet, in Greene and Fayette Counties. This coal was sampled at 20 localities in Allegheny, Fayette, Washington, and Westmoreland Counties.

The Redstone coal, due to the progressive exhaustion of the Pittsburgh seam, is becoming more important. The stratigraphic position of this coal ranges from 30 to 85 feet above the Pittsburgh coal. It has a thickness of 3 to 5 feet in Westmoreland, Fayette, and Somerset Counties. It was sampled at 6 localities in Fayette and Westmoreland Counties.

The Sewickley seam was sampled at a mine in Fayette County near Masontown, where it is 4.4 feet thick; elsewhere in southeastern Greene and Fayette Counties it is 5 to 6 feet thick.

The Uniontown coal, which lies 80 to 100 feet below the top of the series, is generally thin or wanting, but is about 3 feet thick near Uniontown. It was not sampled.

The Little Waynesburg coal is less than a foot thick at most localities and is represented by black shale elsewhere. It was not sampled.

The Waynesburg coal, at the top of the Monongahela series, is a thick coal, ranging from 5 to 10 feet in thickness, but one-fourth to one-half of the thickness consists of clay partings (Ashley, 1928, p. 98). The ash content ranges from 10 to 20 percent and it is not widely mined. This coal was sampled at two localities in Fayette and Greene Counties.

RADIOACTIVITY AND URANIUM CONTENT OF COAL BEDS AND CARBONACEOUS SHALE

Only one locality with radioactive coal was found in this reconnaissance. At this locality (No. 2), near LeContes Mills, the Lower Freeport coal is radioactive in the upper 0.4 foot of the bed. The sample of weathered bony coal, 0.1 foot thick, collected at the top of the bed contains 0.041 percent uranium; the weathered coal and pyrite, 0.3 foot thick, collected immediately below contains 0.012 percent uranium. The upper 0.4 foot of coal in the bed thus contains an average of 0.019 percent uranium. A three-inch block of coal found on the dump contained 0.040 percent uranium. A search of the immediate area in the mines and outcrops for a distance of several miles around the locality failed to find additional radioactivity. The source of uranium was not determined.

The black carbonaceous shales of southwestern Pennsylvania were examined at many localities with a portable scintillation meter, and a few samples were collected. No abnormal radioactivity was found.

DESCRIPTION OF ROCK EXPOSURES EXAMINED

Table 2 shows location, name of coal, thickness, radioactivity and uranium content of the coals examined in the area. The localities are listed by county and quadrangle, and the coals are listed in stratigraphic order beginning with the oldest. The locality numbers used in this table correspond to the ones shown on figure 1.

Although the coal beds were sampled in one-foot increments, and each sample tested, the sample units are not shown in the following table unless a variation in radioactivity requires each sample to be listed.

The coal bed names shown in the table are based on information from the mine operators and the county geologic reports of the Pennsylvania

Geological Survey. The name used on the county geologic map is used in this report in all cases in preference to the name reported by the mine operator.

Localities are difficult to describe in enough detail that they can be recovered by a later investigator in areas like western Pennsylvania, which have not been surveyed by the General Land Office. The coordinate figures given at the end of the locality descriptions in the table show locations by distances in feet north of the nearest latitude line and east of the nearest longitude line measured from the 1:62,500 series of topographic quadrangle maps of the U. S. Geological Survey.

Table 2.--Location, lithology, and radioactivity of samples.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Mercer	66	Recently abandoned strip mine 2 miles southeast of Laurelville. Donegal quadrangle, Fayette County. 12,500' N. 40°05' 7,300' E. 79°30'	10 1.1	Shale, gray Coal	 a 1/
	68	M. D. Hoyman's strip mine at Rodney. Donegal quadrangle, Westmoreland County. 24,200' N. 40°05' 23,200' E. 79°30'	0.5 1.1 0.5+	Shale Coal Shale, carbonaceous	 a
Brookville	13	Allison Engineering Company strip mine at Hilliards. Hilliards quadrangle, Butler County. 2,900' N. 41°05' 19,900' E. 79°55'	0.7 3.6 0.1	Siltstone, dark fissile Coal Siltstone, gray	 a
Lower Clarion	11	Allison Engineering Company strip mine, 1.5 miles south of Pennsylvania Highway 338, in a right fork of North Branch Bear Creek. Hilliards quadrangle, Butler County. 13,900' N.41°05' 17,100' E. 79°50'	1 3 0.5	Mudstone Coal Shale, gray, carbonaceous	 a

1/ a means less than 0.001 percent eU.

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Clarion	28	G. H. Styles Company strip mine on hill north of Clarion River, 2 miles east of Pennsylvania Highway 966 bridge. Clarion quadrangle, Clarion County. 20,300' N. 41°10' 18,100' E. 79°25'	3	Shale, medium-gray	
			3.9	Coal	a
			0.2	Coal, impure, pyritic	
	25	Wingert Construction Company strip mine at Sligo. Clarion quadrangle, Clarion County. 5,900' N. 41°05' 4,700' E. 79°30'	6	Shale, dark-gray	
			3.1	Coal	a
			0.1 ±	Coal, impure	
	13	Allison Engineering Company strip mine at Hilliards. Hilliards quadrangle, Butler County. 2,900' N. 41°05' 19,900' E. 79°55'	0.8	Siltstone, dark-gray, carbonaceous	
			1	Coal	a
			0.7	Siltstone	
	30	Mays Coal Company strip mine on Pennsylvania Highway 66, 1.3 miles south of Limestone. Clarion quadrangle, Clarion County. 9,200' N. 41°05' 1,200' E. 79°20'	1 +	Shale, gray	
			1.9	Coal	a
			0.2	Clay, gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Fulton (A Clarion correlative)	79	Rockhill Coal Company strip mine 0.5 mile southeast of Robertsdale. Broad Top quadrangle, Huntingdon County. 1,500' N. 40°10' 17,600' E. 78°10'	1 +	Shale, slightly contorted	
			2	Coal	a
			0.1	Coal	
			0.2	Shale parting	
			1.8	Coal	a
			0.1	Clay, gray	
Upper Clarion	13	Allison Engineering Company strip mine at Hilliards. Hilliards quadrangle, Butler County. 2,900' N. 41°05' 19,900' E. 79°55'	2	Mudstone	
			2.2	Coal	a
			0.8	Siltstone, dark, carbonaceous, pyrite concretions	
Lower Kittanning	19	M. & E. Coal Company strip mine on right bank of Allegheny River, 1 mile north of Kittanning. Kittanning quadrangle, Armstrong County. 4,800' N. 40°50' 18,900' E. 79°35'	4	Siltstone, gray	
			0.4	Mudstone, carbonaceous	
			1.1	Coal	a
			0.1	Clay, gray, rootlets	
	5	Pilgrim Coal Company strip mine on east side of U. S. Highway 19, 3.3 miles north of Harlansburg. Mercer quadrangle, Lawrence County. 24,700' N. 41°00' 15,700' E. 80°15'	6 +	Shale, dark-gray	
			3.4	Coal	a
			1 +	Siltstone, gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Kittanning	72	Dysart Coal Company drift mine 2.3 miles southeast of Dysart. Patton quadrangle, Cambria County. 23,600' N. 40°30' 21,600' E. 78°35'	0.5 + 4	Shale Coal, pyrite stringers	 a
	76	Powell Coal Company strip mine, 0.5 mile east of Glasgow. Altoona quadrangle, Cambria County. 17,600' N. 40°40' 19,900' E. 78°30'	2 4 0.1	Shale Coal Siltstone, gray, rootlets	 a
	33	Sipos Coal Company Mine No. 3, drift mine 2.5 miles east of Homer City. Indiana quadrangle, Indiana County. 18,900' N. 40°30' 14,400' E. 79°10'	0.3 4 0.5 +	Coal, bony Coal Shale	 a
	27	Grasso Coal Company strip mine at Day. Clarion quadrangle, Clarion County. 7,400' N. 41°10' 20,000' E. 79°20'	0.5 + 2.7 0.3 .2 .5 +	Shale Coal Shale, gray Coal Clay, light-gray, carbonaceous, fissile	 a

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Kittanning	29	Grasso Coal Company strip mine 0.5 mile east of Clarion. Clarion quadrangle, Clarion County. 15,500' N. 41°10' 12,700' E. 79°25'	7 0.8 .1 1.8 0.2	Shale, dark-gray Coal Coal, bony Coal Clay, carbonaceous	 a a
	26	Wingert Construction Company strip mine about 4 miles north of Curlsville on Pennsylvania High- way 854. Clarion quadrangle, Clarion County. 22,500' N. 41°05' 12,800' E. 79°30'	4 3 0.5 +	Mudstone, massive Coal Siltstone, light-gray, fissile	 a
	24	M.A.C. Coal Company strip mine 2 miles northwest of Rimmersburg. Foxberg quadrangle, Clarion County. 21,800' N. 41°00' 14,800' E. 79°35'	6 3.6 0.1	Shale, gray Coal Clay, light-gray	 a
	9	Tri County Coal Company strip mine on west side of Pennsylvania Highway 308, 4.5 miles south of Murrinsville. Hilliards quadrangle, Butler County. 29,700' N. 41°00' 5,800' E. 79°55'	10 30 0.65 .08 1.6 0.4	Sandstone Shale Coal Clay parting Coal Clay, gray, stigmarian	 a a

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Kittanning	87	G.B.T. Coal Company drift mine on old Highway 22, 2 3/4 miles southwest of Nanty Glo. Johnstown quadrangle, Cambria County. 11,500' N. 40°25' 11,900' E. 78°55'	1 +	Shale	
			3.7	Coal	a
			0.5 +	Clay, gray	
	86	Marion Coal Company drift mine 2.3 miles south of Dunlo. Ebensburg quadrangle, Cambria County. 3,400' N. 40°15' 4,000' E. 78°45'	1 +	Clay, gray	
			3.5	Coal	a
	31	Mays Coal Company strip mine on Pennsylvania Highway 66, 1.3 miles south of Limestone. Clarion quadrangle, Clarion County. 8,300' N. 41°05' 1,400' E. 79°20'	4	Siltstone, carbonaceous laminae, fissile	
			3.9	Coal, 0.1 foot cannel coal layer on top	a
			0.5 ±	Clay, gray	
Barnett (Correlative of L. Kittanning)	81	Rockhill Coal Company strip mine 1 mile south of Alvan. Broad Top quadrangle, Bedford County. 21,000' N. 40°05' 4,100' E. 78°10'	2	Shale, gray, platy	
			2.5	Coal	a
			4	Siltstone, gray, fissile, vitrain bands	
			2.6	Coal	a
			0.5 +	Clay	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Barnett Bastard (Lower Kittanning correlative)	80	Rockhill Coal Company strip mine at Alvan. Broad Top quadrangle, Fulton County. 24,300' N. 40°05' 8,100' E. 78°10'	2 +	Sandstone, gray, beds of conglomerate	
			1	Shale, gray, irregularly bedded	
			1	Coal	a
			0.4	Shale, gray	
			3.5	Coal	a
			0.1	Clay, gray	
Lower Kittanning Rider	89	Bill's C Prime Coal Company drift mine on St. Clair Run. Johnstown quadrangle, Cambria County. 29,900' N. 40°15' 7,200' E. 79°00'	10	Shale and sandstone interbedded	
			1	Shale, dark-gray	
			0.1	Coal, bony	
			2.3	Coal	a
			0.5 +	Clay	
Middle Kittanning	73	Grannas Brothers Coal Company strip mine, 0.5 miles southwest of Daugherty. Altoona quadrangle, Cambria County. 9,200' N. 40°35' 6,500' E. 78°30'	---	No cover in place	
			4	Coal	a
	6	Chutz Brothers strip mine on east side of Pennsylvania Highway 8, 2 miles north of Unionville, Butler quadrangle, Butler County. 18,000' N. 40°55' 9,100' E. 80°00'	3	Siltstone, dark-gray	
			1	Shale, carbonaceous	
			0.8	Coal	a
			0.3	Coal, bony, dull, sparse vitrain	
			1.4	Coal	a
			0.5	Clay, gray, stigmarian	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Middle Kittanning	23	Iseman Coal Company strip mine 1 mile east of South Bethlehem. Rural Valley quadrangle, Armstrong County. 29,000' N. 40°55' 16,500' E. 79°25'	2	Shale, dark-gray, fissile	
			0.7	Coal	a
			.1	Siltstone, gray, pyritic	
			.6	Coal	a
			.5 ±	Clay, gray, rootlets, coal streaks	
	10	Carbon Coal Company strip mine on the south side of Murrinsville, Cherry Valley road, 1.5 miles west of Cherry Valley. Hilliards quadrangle, Butler County. 25,000' N. 41°05' 2,800' E. 79°50'	10 +	Shale	
			0.09	Shale, fissile, carbonaceous	
			1	Coal	a
			0.09	Shale	
			1.4	Coal	a
			0.4	Clay, gray, stigmarian	
	8	Tri County Coal Company strip mine on west side of Pennsylvania Highway 308, 4 miles south of Murrinsville, Hilliards quadrangle, Butler County. 2,300' N. 41°05' 4,800' E. 79°55'	30	Shale, gray	
			1	Shale, black, fissile	
			0.45	Coal	a
			.2	Clay parting	
			2.2	Coal	a
			0.1	Clay, dark-gray, stigmarian	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Upper Kittanning	17	North Star Coal Company strip mine 4 miles west of Worthington on the north side of U. S. Highway 422. Kittanning quadrangle, Butler County. 8,100' N. 40°50' 13,100' E. 79°45'	1 +	Siltstone, dark-gray, fissile, calcite concretions	
			0.1	Coal	
			1.6	Coal	a
			0.1	Siltstone, gray, pyritic	
			1.6	Coal	a
			0.1	Clay, light-gray, plastic	
	7	Tasa Coal Company strip mine on Little Connoquenessing Creek, east side of Pennsylvania Highway 528, about 5 miles north of Evans City. Zelienople quadrangle, Butler County. 26,300' N. 40°45' 13,400' E. 80°05'	1 +	Shale, dark-gray	
			3.3	Coal	a
			1 +	Mudstone	
	88	A. C. Shank Coal Company drift mine on Solomen's Run, 2 miles east of Dale. Johnstown quadrangle, Cambria County. 23,800' N. 40°15' 14,700' E. 78°55'	1 +	Shale, gray	
			1.4	Shale, carbonaceous, fissile	
			3.3	Coal	a
			0.5 +	Clay	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Upper Kittanning	42	Greenbank Coal Company drift mine at Bonifacius. Patton quadrangle, Cambria County. 2,000' N. 40°40' 17,500' E. 78°45'	1 +	Sandstone, light-gray, very fine grained	
			3.5	Coal	a
	20	Harold Brewer's strip mine 1.3 miles south of Slabtown. Rural Valley quadrangle, Armstrong County. 9,000' N. 40°50' 7,700' E. 79°25'	5 +	Mudstone, gray, hard, in part fissile	
			2.2	Coal	a
			1 +	Siltstone, dark-gray, carbonaceous	
	14	Carbon Coal Company strip mine near Pisgah School. Hilliards quadrangle, Butler County. 26,100' N. 41°05' 22,200' E. 79°55'	6 +	Shale, gray, cut out by gray sandstone	
			4.2	Coal with pyrite stringers	a
			1	Mudstone, gray, fissile	
			1.3	Coal	a
			0.2	Siltstone, fissile, vitrain bands	
Lower Freeport	34	Raglani Coal Company strip mine 1 mile north of Armagh. New Florence quadrangle, Indiana County. 20,500' N. 40°25' 11,000' E. 79°05'	5 +	Shale, dark-gray	
			3.4	Coal	a
			0.5 ±	Clay, gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Freeport	21	Iseman Coal Company strip mine on hill south of South Bethlehem. Rural Valley quadrangle, Armstrong County. 27,200' N. 40°55' 21,300' E. 79°25'	4	Shale, dark-gray, fissile	
			2.4	Coal	a
			0.2	Clay, light-gray	
	16	Hepfelfinger Coal Company strip mine at Cowansville. Kittanning quadrangle, Armstrong County. 20,100' N. 40°50' 21,600' E. 79°40'	1 +	Siltstone, dark-gray, fissile	
			4.1	Coal	a
			0.5 ±	Shale, dark-gray, carbonaceous	
	69	Gibson Coal Company strip mine 3 miles east of Ashville. Altoona quadrangle, Cambria County. 19,700' N. 40°30' 4,300' E. 78°30'	4	Shale, gray	
			1	Coal, canneloid, blocky	.001
			0.5	Shale	
			.5	Coal, impure	.001
			1.8	Coal, pyrite at base	a
			0.1	Shale, gray	
	44	K. & D. Coal Company strip mine 2 miles southeast of Palmerton, New Florence quadrangle, Indiana County. 14,600' N. 41°25' 5,300' E. 79°10'	2 +	Shale, dark-gray	
			2.8	Coal	a
			0.5 ±	Clay, light-gray, rootlets	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Freeport	40	North Cambria Fuel Company strip mine 1 mile south of Hastings. Patton quadrangle, Cambria County. 21,000' N. 40°35' 8,400' E. 78°45'	3	Shale, gray	
			0.2	Shale, canneloid	
			3.5	Coal	a
	39	McCormick Coal Company drift mine at Barnesboro. Main "B" tramway. Barnesboro quadrangle, Cambria County. 2,800' N. 40°40' 16,100' E. 78°50'	1 +	Shale	
			0.2	Coal, bony	
			3.2	Coal	a
			0.1	Coal, bony	
			.6	Coal	a
			.5 ±	Clay, gray	
	38	McCormick Coal Company, same mine as Locality 39. Straight main tramway.	1 +	Siltstone	
			4	Coal	a
			0.5 ±	Clay, gray	
	35	Wm. H. Hutzel Coal Company drift mine 1.7 miles north of Armagh. New Florence quadrangle, Indiana County. 21,700' N. 40°25' 10,000' E. 79°05'	4.4	Coal	a
			1	Shale, gray, root slicks	
			1	Coal	a

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Freeport	2	Krolick Coal Company strip mine at LeContes Mills. Clearfield quadrangle, Clearfield County. 700' N. 41°05' 12,700' E. 78°20'	10	Siltstone, occasional thin bedded sandstone	
			2	Sandstone, dark, very fine-grained, micaceous	
			0.1	Coal, bony, irregular plates	.033 2/
			.3	Coal, pyritic, weathered	.009 3/
			.3	Coal, weathered	.001
			2.5	Coal, weathered	a
			0.1 +	Clay, medium gray	.003
	75	Reynolds Coal Company strip mine 2 miles northeast of Van Ormer. Altoona quadrangle, Cambria County. 9,600' N. 40°40' 11,500' E. 78°30'	1 +	Shale, gray, iron stained	
			2	Coal	a
			0.2	Shale, gray	
			.8	Coal	a
			.1	Clay, gray	
	47	Martin & Lewis Mine Company drift mine 1 mile south of Seward. New Florence quadrangle, Westmoreland County. 23,400' N. 40°20' 20,700' E. 79°05'	2 +	Shale, gray, plant fragments	
			0.35	Coal, bony	
			2.8	Coal	a
			0.5 +	Clay, gray	

2/ Percent ash 11.9, percent uranium in sample 0.041.
3/ Percent uranium in sample 0.012.

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Freeport	46	Lowhead Coal Company drift mine 2.2 miles east of Bolivar. New Florence quadrangle, Indiana County. 29,100' N. 40°20' 15,300' E. 79°10'	0.4	Shale, canneloid	
			2.8	Coal	a
			0.3	Coal, impure	
	12	Allison Engineering Company strip mine 1.5 miles east of Pennsylvania Highway 38 on road to Annisville. Hilliards quadrangle, Butler County. 800' N. 41°05' 18,200' E. 79°50'	8 +	Sandstone, gray, iron-stained	
			2	Coal	a
			1	Clay, light-gray	
	84	Lick Run Coal Company strip mine at Onnalinda. Ebensburg quadrangle, Cambria County. 23,400' N. 40°15' 20,800' E. 78°45'	3	Shale, gray, irregularly bedded	
			4	Coal	a
			0.1 +	Shale, light-gray, carbonaceous	
	15	Eden Coal Company strip mine at Culmerville. New Kensington quadrangle, Allegheny County. 26,800' N. 40°35' 21,600' E. 79°55'	20 +	Shale, gray	
			0.1	Shale, canneloid	
			.9	Coal	a
			.1	Shale	
			.1	Coal	a
			.5	Shale	
			3.2	Coal	a
			0.1 +	Coal, impure	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Lower Freeport	1	Krolick Coal Company drift mine at LeContes Mills. Clearfield quadrangle, Clearfield County. 700' N. 41°05' 12,700' E. 78°20'	3 +	Sandstone	
			2.4	Shale	
			1.7	Coal	a
			0.25	Pyrite-clay parting	
			1.45	Coal	a
			0.1	Clay, pyritic parting	.001
			.7	Coal, slightly weathered	a
			.5 +	Clay, light-gray	.003
Upper Freeport	84	Lick Run Coal Company strip mine at Onnalinda. Ebensburg quadrangle, Cambria County. 23,400' N. 40°15' 20,800' E. 78°45'	4 +	Shale, gray	
			2.4	Coal	a
			3	Shale, gray, irregularly bedded	
	77	Burkhart Coal & Lumber Co. strip mine 1 mile southeast Gallitzin. Ebensburg quadrangle, Blair County. 17,100' N. 40°25' 11,900' E. 78°35'	5 +	Siltstone, olive green, fissile	
			3.3	Coal, lower .3' dull, sparse vitrain	a
			0.1	Clay, gray	
	43	Sterling Coal Company drift mine southeast of Vetera. Barnesboro quadrangle, Cambria County. 23,000' N. 40°30' 10,300' E. 78°50'	0.4	Coal, bony	
			3.4	Coal	a
			0.5 +	Clay	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Upper Freeport	37	Barnes & Tucker Coal Company drift mine near Nicktown. Barnesboro quadrangle, Cambria County. 11,000' N. 40°35' 11,400' E. 78°50'	0.1	Coal, bony	
			3.5	Coal	a
			1	Clay, light-gray	
			1	Coal, impure, not sampled	
	85	H. C. Horner Coal Company drift mine 2.1 miles south of Dunlo. Ebensburg quadrangle, Cambria County. 5,200' N. 40°15' 4,000' E. 78°45'	3 +	Shale, dark-gray	
			3.3	Coal	a
			0.1	Clay, light-gray	
	90	Buhl B. Black Construction Company strip mine on north fork of Bens Creek near Mishler. Johnstown quadrangle, Somerset County. 9,700' N. 40°15' 6,200' E. 79°00'	20	Shale, gray	
			10	Shale, black to dark-gray, canneloid, lower 2' grades to gray	
			0.6	Coal	a
			.1	Coal, bony	
			2.1	Coal	a
			1 +	Clay, indurated, dark-gray to black	
	70	Gibson Coal Company strip mine 3 miles east of Ashville. Altoona quadrangle, Cambria County. 19,700' N. 40°30' 5,200' E. 78°30'	1 +	Shale	
			1	Coal	a
			0.1	Clay, light-gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Upper Freeport	32	George T. Brown Coal Company strip mine 2.2 miles east of Homer City. Indiana quadrangle, Indiana County. 14,700' N. 40°30' 16,500' E. 79°10'	0.5 +	Shale, iron-stained	
			1.5	Coal	a
			1	Coal, bony	
			4	Coal	a
			0.1 +	Shale, gray, carbonaceous	
	67	Pete Weynd's drift mine .6 mile south of Buchanan. Donegal quadrangle, Fayette County. 20,800' N. 40°00' 14,900' E. 79°30'	0.5 +	Shale, gray coal stringers at base	
			3	Coal	a
			0.1 +	Clay, light-gray	
	4	Kerry's Coal Company strip mine .5 mile south of Portersville on U. S. Highway 19. Zelienople quadrangle, Butler County. 29,000' N. 40°50' 6,000' E. 80°10'	0.5 +	Siltstone, gray, thin bedded	
			4	Coal	a
			0.1	Pyrite	
			1	Coal	a
			0.3	Clay, light-gray, silty	
	74	C. A. Hughes Coal Company strip mine at Blandburg. Altoona quadrangle, Cambria County. 7,800' N. 40°40' 16,300' E. 78°30'	4	Shale, gray, irregularly bedded	
			1	Coal	a
			0.5	Shale, gray	
			.3	Siltstone, gray, indurated	
			1	Coal	a
			0.1 +	Shale, gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Upper Freeport	45	Murphy Coal Company strip mine 1 mile east of Palmerton. New Florence quadrangle, Indiana County. 19,100' N. 40°25' 5,200' E. 79°10'	0.5 +	Sandstone, massive, light-gray, iron-stained, channels slightly into the coal	
			1	Coal	a
			0.3	Shale parting, discontinuous	
			3.7	Coal	a
			0.1	Clay, gray, carbonaceous	
	41	Susquehana Fuel Company drift mine 1 mile south of Hastings. Patton quadrangle, Cambria County. 22,800' N. 40°35' 8,400' E. 78°45'	1	Shale, gray	
			3.6	Coal	a
			0.1	Shale parting	
			.7	Coal	a
			.1	Clay, light-gray, rootlets	
	18	M. & E. Coal Company strip mine 4.5 miles east of Kittanning on Pennsylvania Highway 85. Rural Valley quadrangle. Armstrong County. 27,500' N. 40°45' 14,000' E. 79°30'	6 ±	Siltstone, massive to fissile	
			1.8	Coal	a
			0.3	Clay, light-gray, stigmarian	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Upper Freeport	22	Iseman Coal Company strip mine on a hill 1/4 mile south of New Bethlehem. Rural Valley quadrangle, Armstrong County. 26,600' N. 40°55' 16,300' E. 79°25'	10 +	Shale, dark-gray, carbonaceous	
			0.6	Coal, cannel	a
			.4	Coal and shale interbedded	
			5.8	Coal with thin partings of bony coal	a
			0.1 +	Clay, gray, plastic	
	36	Raglani Coal Company strip mine 2 miles north of Brush Valley. Indiana quadrangle, Indiana County. 24,000' N. 40°30' 20,800' E. 79°10'	5 +	Siltstone, gray, fissile	
			1	Coal	a
			0.1	Clay, gray, carbonaceous	
	71	W. A. Scanlon & Son Coal Company strip mine .5 mile north of Ashville. Patton quadrangle, Cambria County. 25,600' N. 40°30' 11,700' E. 78°35'	4	Shale, gray	
			2.2	Coal with pyritic lenses	a
			0.2	Shale, gray	
			1	Coal	a
			0.1	Shale, gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Upper Freeport	3	Abandoned strip mine at LeContes Mills. Lies 44 feet above Lower Freeport ("D" or Moshanon coal). Clearfield quadrangle, Clearfield County. 1,000' N. 41°05' 13,100' E. 78°20'	24	Sandstone, fine-grained, light-gray, 1' coal lens about 1' above base	
			6	Shale, thin bedded, dark-gray	
			2.6	Coal, weathered	a
			0.1	Coal, bony	a
			.5	Coal, weathered, appears bright	.001
			.5 +	Shale, dark-gray, indurated	
	83	Rockhill Coal Company strip mine 1 mile west of Alvan. Broad Top quadrangle, Bedford County. 22,200' N. 40°05' 2,100' E. 78°10'	0.5 +	Shale, gray	
			3.7	Coal	a
			0.1	Clay, gray	
Kelley (Upper Freeport correlative)	78	McIntyre Coal Company drift mine about .5 mile south of Finleyville. Broad Top quadrangle, Bedford County. 21,400' N. 40°05' 18,200' E. 78°15'	1	Siltstone	
			2.5	Coal, weathered	
			3	Siltstone, dark-gray	
			0.15	Coal, bony	
			2.2	Coal	a
			0.15	Claystone, irregular thickness	
			.3	Coal	a
			.3	Shale, gray	
			.1 +	Sandstone	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Mahoning	56	J. P. Coal Company drift mine 2 miles northeast of Jeanette. Greensburg quadrangle, Westmoreland County. 1,500' N. 40°20' 100' E. 79°35'	5 +	Shale	
			1	Coal	a
			0.2	Shale and pyrite	
			3	Coal	a
			0.5 +	Clay, light-gray	
	62	New Stanton Coal Company drift mine .5 mile east of New Stanton. Connellsville quadrangle, Westmoreland County. 16,000' N. 40°10' 20,500' E. 79°40'	0.5 +	Shale, gray	
			1.9	Coal	a
			0.2	Shale, gray	
			1.2	Coal	a
			0.05	Shale, gray	
			.25	Coal	a
Speer (Mahoning correlative)	82	Rockhill Coal Company strip mine at Finleyville. Broad Top quadrangle, Bedford County. 23,600' N. 40°05' 20,600' E. 78°15'	3	Shale, gray	
			1.4	Coal	a
			0.1	Shale, gray	
Bakerstown	52	C. F. Keck's drift mine 1.7 miles northwest of Latrobe. Latrobe quadrangle, Westmoreland County. 2,400' N. 40°20' 500' E. 79°25'	5	Shale	
			3.15	Coal	a
			0.05	Shale parting	
			.35	Coal	a
			.05	Shale parting	
			.4	Coal	a
			.5 +	Clay, light-gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Pittsburgh	101	Pittsburgh Coal Company, Lindley Mine, 4.9 miles northeast of Washington and .5 mile east of Carter's Creek. Amity quadrangle, Washington County. 24,200' N. 40°10' 13,900' E. 80°15'	3	Shale, gray, interbedded with coal	
			5	Coal	a
			0.1 +	Pyrite band	
				Underclay not seen	
	102	Jeff Mining Company drift mine in eastern edge of Rosevale. Carnegie quadrangle, Allegheny County. 15,600' N. 40°20' 14,400' E. 80°10'	4	Shale, gray, with thin coal lenses	
			4.7	Coal. Small shale partings 1.3 and 1.6 feet above base	a
			0.1 +	Clay, light-gray	
	103	Greensburg and Connelsville Coal and Coke Company strip mine 1.5 miles south of Frankfort. Burgettstown quadrangle, Washington County. 15,100' N. 40°25' 14,700' E. 80°30'	3 +	Shale, gray, interbedded with thin lenses of coal	
			4.5	Coal. Several thin partings of clay	a
			0.1	Clay, light-gray	
	104	Hofrichter Coal Company slope mine at Patterson's Mill. Burgettstown quadrangle, Washington County. 14,700' N. 80°15' 14,400' E. 80°30'	4	Sandstone, light-gray, very fine-grained	
			1.5	Shale, light-gray	
			4	Coal	a
			0.1	Shale, gray, pyritic	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Pittsburgh	92	Krewlach's strip mine 4.6 miles southeast of Republic and 7.3 miles northeast of Masontown. Masontown quadrangle, Fayette County. 3,000' N. 39°55' 6,400' E. 79°50'	1	Shale, gray, with coal stringers	
			7.5	Coal; pyrite stringers	a
			0.1	Clay, light-gray	a
	93	Ponteraro & Sons strip mine 2.5 miles southeast of Masontown and 3.3 miles northeast of Greensboro. Masontown quadrangle, Fayette County. 25,400' N. 39°45' 14,700' E. 79°55'	5	Sandstone, light-gray	
			4	Coal, interbedded with gray shale	a
			7	Coal	a
			0.1	Clay, gray	
	97	Vesely Brothers' drift mine at Gillespie. Brownsville quadrangle, Fayette County. 1,000' N. 40°05' 800' E. 79°50'	3 +	Siltstone, light-gray irregularly bedded	
			0.9	Coal	a
			.9	Clay, light-gray	
			7.6	Coal, 0.1 foot bone parting 2.8 feet above base	a
			0.1	Shale, light-gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Pittsburgh	98	Siler Coal Company's Coal Bluff Mine at Coal Bluff on the north bank of the Monongahela River. Brownsville quadrangle, Fayette County. 27,500' N. 40°10' 11,000' E. 80°00'	1 5.4 0.1	Shale, gray, and coal Coal Clay, light-gray	 a
	99	Bucar Coal Company strip mine 3.5 miles due west of Clairton. Pittsburgh quadrangle, Allegheny County. 16,000' N. 40°15' 14,000' E. 80°00'	4 6 0.1 .1 +	Shale, gray, and coal Coal Pyrite Clay, light-gray	 a
	63	Green Coal Company strip mine at Coldbrook. Connellsville quadrangle, Fayette County. 13,500' N. 40°00' 21,500' E. 79°40'	1 + 9 0.1	Shale Coal Coal, bony	 a
	64	Sants Coal Company strip mine 1 mile west of Alverton. Connellsville quadrangle, Westmoreland County. 21,500' N. 40°05' 16,000' E. 79°40'	2 7 0.1	Impure coal and shale Coal Clay, light-gray	 a

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Pittsburgh	65	Sager Coal Company drift mine 1 mile northeast of Smithton. Connellsville quadrangle, Westmoreland County. 28,500' N. 40°05' 7,100' E. 79°45'	0.5 ±	Shale	
			6.8	Coal	a
	91	Lester J. Lohr strip mine 15,000 feet north of center of Boswell and 16,200 feet north of center of Jennertown. Somerset quadrangle, Somerset County. 12,300' N. 40°10' 11,000' E. 79°05'	10 +	Shale, gray	
			5.5	Coal	a
			0.6	Coal, bony	
			.6	Clay, gray, stigmarian	
	57	Westmoreland Coal Company strip mine at Penn Station. Greensburg quadrangle, Westmoreland County. 300' N. 40°20' 5,100' E. 79°40'	3	Coal and clay, interbedded, thin lenses	
			1	Coal	a
			1	Clay, gray	
			7	Coal; thin pyrite and shale partings	a
			0.1	Shale, gray, carbonaceous	
	49	Ulishny Fuel Company drift mine at Beatty. Latrobe quadrangle, Westmoreland County. 17,100' N. 40°15' 22,600' E. 79°30'	1 +	Shale	
			7.8	Coal	a
			0.1	Clay, gray	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Pittsburgh	50	Franks Coal Company drift mine .3 mile west of Luxor. Latrobe quadrangle, Westmoreland County. 28,800' N. 40°15' 3,300' E. 79°30'	0.5 +	Shale, gray	
			7	Coal	a
			0.1 +	Clay, gray	
	51	Wray Coal Company strip mine 2 miles northeast of New Alexandria. Latrobe quadrangle, Westmoreland County. 29,100' N. 40°20' 7,700' E. 79°25'	3	Shale	
			0.5	Coal	a
			1	Shale, light-gray	
			4.4	Coal	a
			0.1	Shale, dark-gray	
	58	Galetti Coal Company strip mine at Pleasant Valley, Greensburg quadrangle, Westmoreland County. 16,600' N. 40°20' 21,400' E. 79°45'	4	Interbedded thin coal and clay lenses	
			1	Clay, gray	
			7	Coal	a
			0.5 ±	Clay, gray	
	53	J. E. Santella's Mine Company drift mine 5 miles north of Delmont. Greensburg quadrangle, Westmoreland County. 22,300' N. 40°25' 15,300' E. 79°35'	1	Shale, gray, carbonaceous	
			8	Coal	a
			0.1	Coal, bony	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Pittsburgh	54	Ebancho Brothers Coal Company strip mine at Bouquet. Greensburg quadrangle, Westmoreland County. 18,200' N. 40°20' 18,000' E. 79°40'	1	Clay	
			0.5	Coal	a
			.3	Shale	
			2	Coal	a
			1	Clay, gray	
			7	Coal	a
			0.5 ±	Clay, light-gray	
Redstone	94	Bridgeview Coal Company strip mine .6 mile northwest of center of Fairchance. Masontown quadrangle, Fayette County. 28,400' N. 39°45' 18,400' E. 79°50'	4	Shale, medium dark-gray	
			3.3	Coal; 0.3 foot parting of gray shale 1.4 feet above base	a
	48	E. P. Tosh strip mine 1.5 miles west of Wilpen. New Florence quadrangle, Westmoreland County. 12,000' N. 40°15' 8,800' E. 79°15'	1 +	Shale, gray	
			0.6	Coal	a
			.9	Shale	
			.2	Coal	a
			.2	Shale	
			3.8	Coal	a
			0.5 ±	Clay, light-gray, slicks	
	61	J. & C. Coal Company drift mine 1 mile west of Southwest. Connellsville quadrangle, Westmoreland County. 12,000' N. 40°10' 10,400' E. 79°35'	1	Shale	
			4	Coal; pyrite stringers	a
			1	Clay, light-gray, vitrain streaks	

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Redstone	60	Murphy Coal Company strip mine 0.5 mile north of Mt. Joy. Connellsville quadrangle, Westmoreland County. 29,500' N. 40°05' 21,100' E. 79°35'	4 + 2.5 0.2	Shale, gray Coal Coal, bony	 a
	59	John Thomas Coal Company drift mine 1 mile south of Bells Mills. Connellsville quadrangle, West- moreland County. 12,400' N. 40°10' 12,700' E. 79°45'	0.1 3.7	Shale, gray Coal	 a
	55	T. J. Ward strip mine at Swede Hill. Greensburg quadrangle, Westmoreland County. 11,200' N. 40°15' 1,900' E. 79°35'	1 + 4.6 0.1 +	Shale, gray, iron-stained Coal Clay, gray, rootlets	 a
Sewickley	95	Ponteraro & Sons strip mine 1.9 miles south of the center of Masontown. Masontown quadrangle, Fayette County. 25,500' N. 39°45' 6,000' E. 79°55'	5 + 4.4 0.1	Shale, dark-gray Coal Clay, light-gray	 a

Table 2.--Location, lithology, and radioactivity of samples--Continued.

Coal bed	Loc. No.	Location	Thickness (feet)	Lithology	Equivalent uranium (percent)
Waynesburg	96	Wilbur Kifer's drift mine 3.7 miles east of Brownsville and 1.1 miles northeast of Grindstone. Brownsville quadrangle, Fayette County. 10,800' N. 40°00' 6,100' E. 79°50'	5	Sandstone, light-gray, very fine-grained	
			0.3	Coal, bony	
			2.8	Coal	a
			0.1	Shale, gray	
	100	Edward Johnson's strip mine west-southwest of center of Jefferson and .4 mile due west of South Fork Ten Mile Creek. Waynesburg quadrangle, Greene County. 3,000' N. 39°55' 3,000' E. 80°05'	5 +	Sandstone, light-gray, very fine-grained, iron-stained, cross bedded	
			5	Shale, dark-gray	
			2.7	Coal	a
			1.2	Clay, light-gray	
			2.8	Coal	a
			0.1 +	Coal, impure	

LITERATURE CITED

Ashley, G. H., 1928, Bituminous coal fields of Pennsylvania, general information on coal: Pennsylvania Topog. and Geol. Survey, 4th ser., Bull. M 6, pt. 1, 241 p.

Keystone Coal Buyers Manual, 1951: McGraw Hill Publishing Co., Inc., New York, N. Y.

Snider, J. L., 1953a, Radioactivity of some coal and shale of Pennsylvanian age in Ohio: U. S. Geol. Survey TEI-404, U. S. Atomic Energy Comm., Tech. Inf. Service, Oak Ridge, Tenn.

_____, 1953b, Reconnaissance for uranium in coal and shale in southern West Virginia and southwestern Virginia: U. S. Geol. Survey. TEI-409, U. S. Atomic Energy Comm., Tech. Inf. Service, Oak Ridge, Tenn.

Stose, G. W., and Ljungstedt, C. A., Geologic map of Pennsylvania: Pennsylvania Geol. Survey.

Welch, S. W., 1953a, Radioactivity of coal and associated rocks in the coal fields of eastern Kentucky: U. S. Geol. Survey. TEI-347, U. S. Atomic Energy Comm., Tech. Inf. Service, Oak Ridge, Tenn.

_____, 1953b, Radioactivity of coal and associated rocks in the anthracite fields of eastern Pennsylvania: U. S. Geol. Survey. TEI-348, U. S. Atomic Energy Comm., Tech. Inf. Service, Oak Ridge, Tenn.

UNPUBLISHED REPORTS

Ferm, J. C., 1954, Radioactivity of coals and associated rocks in Beaver, Clearfield, and Jefferson Counties, Pennsylvania: U. S. Geol. Survey TEI-468.

Nelson, J. M., and Brill, K. G., Jr., 1948, Preliminary report on radioactivity of asphaltites, coals and shales, in Tennessee, Kentucky, West Virginia, and Pennsylvania: U. S. Geol. Survey. TEI-43.