RA NO. 105

RECLASSIFICATION AUTHORIZATION

In accordance with the authority delegated to me by memorandum from the General Manager, dated 12/6/48, subject, "Security Procedures and Policies relating to the Domestic Raw Materials Program," and based on criteria for determining classification, as outlined in Appendix A attached thereto, the documents listed below are reclassified as indicated.

Document and Title Description	Present Classification	Revised Classification
USGS REPORTS		
(1) TEI-241 "Uranium-bearing coal and carbonaceous shale in the La Ventana Mesa area, Sandoval County, New Mexico," by J. D. Vine, G.O.Bachman, C. B. Read, and G. W. Moore. Dated January 1953.	OFFICIAL USE ONLY	UNCLASSIFIED
(2) TEI-332 "Results of exploratory core drilling for uranium-bearing coal in the northern part of the Red Desert area, Sweetwater County, Wyoming," by H. Masursky, G.N.Pipiringos, and H. D. Gower. Dated May 1953	OFFICIAL USE ONLY	UNCLASSIFIED
(3) TEM-342 "Results of core drilling for uranium-bearing lignite in the Bar H area, Slim Buttes, Harding County, South Dakota," by H.D.Zeller. June 1953.	OFFICIAL USE ONLY	UNCLASSIFIED
(4) TEM-443 "Trace Elements reconnaissance investigations in New Mexico and adjoining states in 1951," by G.O.Bachman, and C.B.Read. Dated October 1952.	OFFICIAL USE ONLY	UNCLASSIFIED
(5) TEM-601 "Uranium-bearing coal in the Red Desert, Great Divide Basin, Sweetwater County, Wyoming," by H.Masursky and G.N.Pipiringos. Dated March 1953.	OFFICIAL USE ONLY	UNCLASSIFIED

R.O.K.
DJK
Sept 10, 1954

Jesse C. Johnson

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Jesse C. Johnson, Director
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Dr. Phillip L. Merritt, Assistant Director
Division of Raw Materials
U. S. Atomic Energy Commission
P. O. Box 30, Ansonia Station
New York 23, New York

Dear Phil:

Transmitted herewith are six copies of TEI-332, "Results of exploratory core drilling for uranium-bearing coal in the northern part of the Red Desert area, Sweetwater County, Wyoming," by Harold Masursky, George N. Pipiringos, and Howard D. Gower, May 1953.

Sincerely yours,

Andrew Bram

for W. H. Bradley
Chief Geologist

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UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

RESULTS OF EXPLORATORY CORE DRILLING FOR URANIUM-BEARING COAL IN THE NORTHERN PART OF THE RED DESERT AREA, SWEETWATER COUNTY, WYOMING*

By Harold Masursky, George N. Pipiringos, and Howard D. Gower

May 1953

Trace Elements Investigations Report 332

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RESULTS OF EXPLORATORY CORE DRILLING FOR URANIUM-BEARING COAL IN THE NORTHERN PART OF THE RED DESERT AREA, SWEETWATER COUNTY, WYOMING

By Harold Masursky, George N. Pipiringos, and Howard D. Gower

ABSTRACT

Eleven core holes, totalling 2,497 feet, were drilled during the fall of 1952 to determine the areal distribution, thickness, and uranium content of the coal in the northern part of the Red Desert area, Sweetwater County, Wyoming. Tonnage and grade estimates of uranium-bearing coal in the area drilled are based on 425 uranium determinations of the coal core, 245 analyses of the coal from 78 surface sections, and 14 auger holes. Heating values are calculated from 30 U. S. Bureau of Mines proximate and 12 ultimate analyses of the coal core.

Inferred reserves in the Luman zone - the principal target of the 1952 drilling program - are 21 million short tons of subbituminous coal containing 800 short tons of uranium in beds 2.5 feet or more in thickness and overlain by 75 feet or less overburden. The beds average 3.8 feet in thickness and contain 20 percent ash with a uranium content of 0.005 percent and 0.025 percent in the coal ash. The average "as received" heating value is 7,600 Btu.

A larger, lower grade reserve was outlined in the stratigraphically lower coals amounting to 142 million short tons of subbituminous coal containing 5,300 short tons of uranium.

The areal distribution and stratigraphic relations of the coal beds as well as the detailed distribution of uranium in coal and carbonaceous shale are shown as are the potentially strippable areas of coal and structure contours on a coal horizon.

Field evidence shows that the thickest coals were deposited along the ancient shore margins of the Eocene Green River lakes and that uranium distribution both areally and within a coal bed is dependent upon the proximity of the mineralized bed to intercalations of coarse-grained, permeable, fluviatile sandstone which were derived from the northeast.

The data from the drilling emphasize the importance of the hypothesis of origin as a prospecting guide since by means of it both areas of maximum coal deposition and maximum uranium concentration were predicted.

INTRODUCTION

The program of exploratory core drilling for uranium-bearing coal in the Red Desert area, Sweetwater County, Wyoming, was carried out by the U. S. Geological Survey on behalf of the Division of Raw Materials of the U. S. Atomic Energy Commission, to determine the areal distribution, thickness, and uranium content of coal in the northern part of the Red Desert area where rock exposures are few but where geologic conditions indicated that coal of minable thickness and of significant uranium content might occur.

Location of area

The area investigated lies 20 miles north of Wamsutter in Sweetwater County, Wyoming (fig. 1) in the northeastern part of the Great Divide Basin. The basin is a topographic and structural feature bounded by the Rawlins uplift on the east, the Rock Springs uplift on the west, the Green Mountains on the north, and the Laney Rim of the Washakie Basin on the south. The relief in the area is about 500 feet as the altitude ranges from 6,500 to 7,000 feet. The sparse rainfall in this semi-arid climate results in intermittent streams and lakes; the Sweetwater River on the north side of the Green Mountains 25 miles north of the area here described is the nearest perennial stream. The nearest rail head is at Wamsutter on the Union Pacific Railroad but numerous graded dirt roads and trails make most parts of the area easily accessible by automobile.

Field work

Approximately five months from June through November were spent in the field in 1952 by a four-man party mapping and sampling coal beds. A two-man party spent 6 months in the field in 1951 mapping on a reconnaissance scale. Surface sections were channel sampled with pick and shovel; a truck-mounted auger was used to confirm presence of coal beds in areas of poor exposures. Core drilling was begun on September 18, 1952, and completed on October 21, 1952.

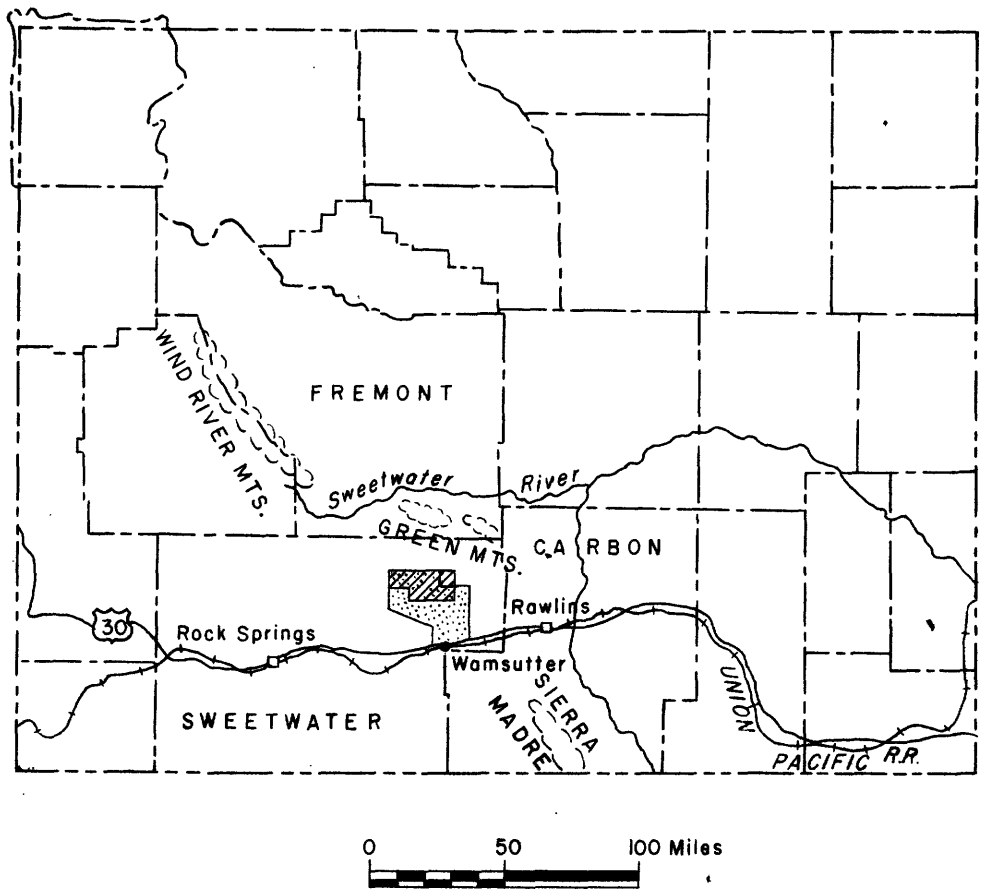


Figure 1.--Index map of Wyoming showing location of Red Desert area

Area of exploratory drilling for uranium-bearing coal 1952

Area mapped in 1951

Geology and recovered General Land Office section corners were plotted on aerial photographs at a scale of 1 to 48,000 and compiled at a scale of 1 to 31,680 on a grid constructed from township plats of the General Land Office resurvey of 1937.

Only the northern part of the Red Desert area in which the core drilling took place is discussed in this report (fig. 1).

Acknowledgments

The core drilling program was carried out under the general supervision of N. M. Denson. The writers were assisted in the field by Arthur E. Burford, George W. Moore, J. R. Pierson, Jr., and James Sindelar. During the course of the field work, the project was visited by Theodore Botinelly, Maurice Deul, Irving Breger, who contributed helpful discussions on the mineralogy of the coal, and Roland Brown, and Reed Chrisner, who collected and identified plant fossils in the field.

James M. Schopf, Geological Survey Coal Geology Laboratory, Columbus, Ohio, processed and provided detailed descriptions of all coal core. Chemical analyses for uranium and determination of equivalent uranium were made by the Trace Elements Section Washington Laboratory. Proximate and ultimate analyses of the coal cores were supplied by the U. S. Bureau of Mines, Central Experiment Station, Pittsburgh, Pennsylvania.

The writers are especially indebted to Raymond Larsen and Kaj Hansen for their hospitality in extending housing facilities to the Survey parties during the course of the field investigation.

DRILLING OPERATIONS

Purpose

The primary objective of the Red Desert core drilling program was to determine reserves of uranium-bearing coal based on analyses of unweathered samples of coal beds more than 2.5 feet thick in areas geologically most favorable for uranium mineralization.

A secondary objective was to determine the relation of uranium mineralization in the coal to permeable zones and to major and minor structures as a guide in the search for higher grade uranium deposits in the Red Desert area.

Areas drilled

Core holes were drilled in two adjacent areas (figs. 4 and 12). Nine holes penetrated the beds in the upper coal group in the vicinity of the Eagle's Nest Rim in the northern part of the area; two core holes were drilled about 8 miles to the southeast near the southern margin of Battle Springs Flat to test the lower coal group which lies some 250 feet stratigraphically lower. Hole No. 4 in the northern part of the area was drilled

to a depth of 600 feet in order to determine the interval between the two coal groups, to confirm the geologic mapping, and to provide data for estimates of coal reserves in this part of the mapped area.

Drilling contract

The drilling was done by the Minerals Engineering Company, Grand Junction, Colorado, under Contract No. 14-08-001-400, dated August 21, 1952.

Schedule of unit prices was as follows:

	NX core	NX solid bit	3 1/2" solid bit
Surface to 200 feet	$5.25	$5.10	$5.25
200 feet to 400 feet	5.75	5.50	5.75
400 feet to 600 feet	6.75	6.50	7.75
600 feet to 800 feet	8.75		

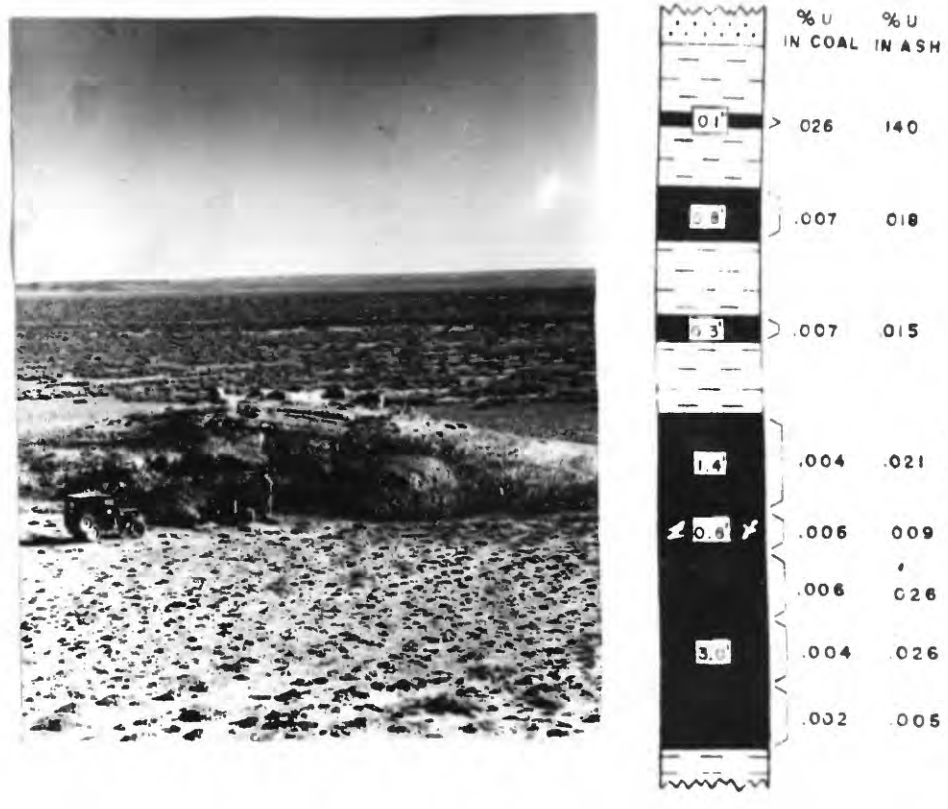
Reaming - NX hole to 3 1/2 inch $3.25 per foot.

The contract specified NX core (2 1/8") and a minimum core recovery of 80 percent or more for all coal beds drilled. The total footage drilled was 2,497 feet at a cost of about $15,000.

Equipment

The core drilling in the Red Desert area was done with two Sullivan 37 diamond drills mounted on Ford trucks (fig. 2A) each operating one 10-hr. shift per working day. Cores were cut with 2 1/8" (NX) diamond bits and a 10-foot core barrel. Although the drilling contract specified reaming to 3 1/2", a 4 1/4" Kale rock cutter bit was used for solid bit

A. Truck-mounted drill rig (Sullivan 37) used by Minerals Engineering Company of Grand Junction, Colo., in the core drilling program for uranium-bearing coal, Red Desert area, Sweetwater County, Wyoming.



B. Outcrop of Luman No. 1, the only known surface exposure of this coal bed (map locality 37, fig. 4). The adjacent columnar section shows thickness of coal and uranium content of the coal and coal ash. Outlining reserves of this bed was one of the principal objectives of the 1952 core drilling program.

Figure 2

drilling and for reaming to set casing at the top of the hole at no extra cost. At most of the drilling sites, casing was used in the upper 5 to 50 feet of each hole to retain circulation and prevent caving; no cementing was done. Two water trucks were used and averaged 22 miles per round trip for each water haul.

Drilling progress

Fair weather and the excellent working condition of the equipment contributed to the rapid progress of the drilling, which began September 18, 1952 and was completed October 23, 1952. Each of the two rigs drilled approximately 40 feet of hole per 10-hour shift using about 1,000 gallons of water.

The average drill hole depth was 227 feet, the deepest being 600 feet, the shallowest, 55 feet (Table 1). Four hours was the average moving and setting up time.

Core recovery was good with few exceptions. The coal core was removed by repeatedly jarring the core barrel against a solid wood block which resulted in fracturing and displacing the sample. A less disturbed coal sample could have been obtained by the use of a hydraulic pump to force the core from the barrel.

Table 1.--Statistical data on core holes, Red Desert area, Sweetwater County, Wyoming

Core Hole No.	Location Sec., T., R.	Elevation (feet)	Total depth (feet)	Coal thickness of beds penetrated (feet)
1	SWSW 24-24N-96W	6,645	142	6.9
2	SENW 16-24N-95W	6,630	266	9.5
3	NWSW 21-24N-95W	6,610	173	8.2
4	SENW 28-24N-95W	6,610	600	26.4
5	SENW 15-24N-95W	6,580	202	3.7
6	SWNE 10-24N-95W	6,605	263	6.2
7	NWSW 20-24N-95W	6,560	55	5.1
8	NESW 22-24N-96W	6,715	119	4.7
9	NESW 2-24N-95W	6,620	206	4.7
10	NESW 17-23N-94W	6,510	245	26.8
11	NWNW 27-23N-94W	6,660	226	26.1
		Totals	2,497	128.3

GEOLOGY

Previous work

The geology of the coal-bearing rocks in and adjacent to the Red Desert area has been studied and described by Smith (1907), Schultz (1907) and Ball (1907). Tertiary stratigraphy, especially the occurrence of oil shale, was investigated and described by Sears and Bradley (1924) and Bradley (1926, 1945). Oil and gas possibilities in the Red Desert area were discussed by Schultz (1920), Fath (1924) and Dobbin (1928, 1929).

Investigations relating to the uranium deposits of the area have been carried on by Slaughter and Nelson (1946), Wyant, Sharpe, and Sheridan (1951), Nelson, Sharpe, and Stead (1951), Sheridan, Collier, and Sears (1952), and Masursky and Pipiringos (1953). A preliminary report on the results of the core drilling has been issued earlier (Masursky, 1952).

Stratigraphy

The Wasatch and Green River formations of early Eocene age are the only stratigraphic units other than surficial deposits cropping out in the area described. They have an exposed thickness of about 1,200 feet. Large areas are masked by Pleistocene and Recent alluvium, gravels, lake deposits, and sand dunes.

The Wasatch formation is composed mostly of sandstone, siltstone, and sandy claystone of fluviatile origin which are finer grained, more

evenly bedded, and coal-bearing to the southwest where they intertongue with lacustrine deposits consisting of paper shale, laminated siltstone and calcareous sandstone of the Green River formation. The restored section on the geologic map (fig. 4) shows the stratigraphic relations of the interfingering units. Similar relationships in adjacent areas have been described by many workers, including Schultz (1907), Sears and Bradley (1924), Bradley (1926, 1945, and 1948), Nightingale (1930), and Nace (1939).

Structure

The Red Desert area is one of low structural relief. However, two major structural features are recognizable in the core drilling area. First is the basin, the southern limit of which is the Eagle's Nest Rim at the northern edge of the mapped area, and which is here called the Eagles Nest Basin. A structural depression continues southeastward from the basin and is referred to in this report as the Red Desert syncline. The syncline, whose axis trends N. 30° W., is shown on the structure contour map (fig. 12). The syncline may have been in existence at the time of deposition of the coal-bearing rocks as the thickest coals are along its axial trend.

Several minor folds trend N. 30° E. along the north shore of Lost Creek Flat and an anticline trends N. 75° E. at Chain Lakes Flat.

High angle faults of minor displacement trending N. 75° E. occur at many places; another group of faults of lesser importance trend N. 30° E.

Coal

The area of maximum coal deposition is along the transition zone between the Wasatch formation of fluviatile origin and the Green River formation of lacustrine origin. Each coal bed is lens-shaped in cross-section and thins within a few miles to the east and west of the area of maximum deposition. Not only are the coal beds thicker in this transition zone but the entire stratigraphic sequence thins considerably to the west and slightly to the east (fig. 4).

In the drilling area there are four uranium-bearing coal zones of potential economic interest: Sourdough, Monument, Battle, and Luman (corrected spelling; previously "Lumen," Masursky and Pipiringos, 1953), and several minor zones which contain thin coals and carbonaceous shale of little or only local commercial importance (fig. 3). In the central part of the area drilled the thickest carbonaceous zone is 21 feet and the thickest coal bed is 9 feet. The coal is hard, black, vitreous, thin to medium banded. The streak is brown and the coal slacks rapidly on weathering. At many places throughout the area the coal is burned for a short distance behind the outcrop.

U. S. Bureau of Mines proximate and ultimate analyses of coal cores are given in Appendix A. Calculations from these analyses using

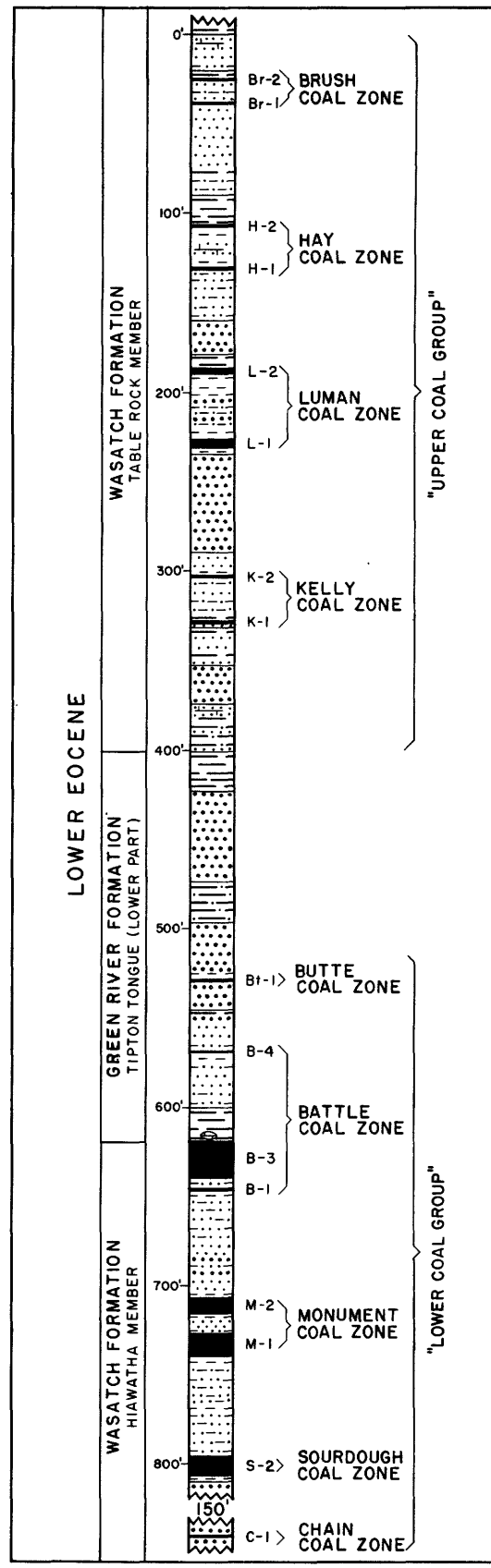


FIGURE 3.-COMPOSITE COLUMNAR SECTION SHOWING STRATIGRAPHIC POSITION OF THE COAL ZONES, NORTHERN PART OF THE RED DESERT AREA, SWEETWATER COUNTY, WYOMING. 1952.

the Parr formula (ASTM, 1938), indicate that the coal is subbituminous B with an average "as received" heating value of 7,600 Btu and a moist, mineral matter free heating value of 9,900 Btu. Average ash content is 15.5 percent; average sulfur content is 1.8 percent. Detailed descriptions of the coal cores by James M. Schopf of the U. S. Geological Survey Coal Geology Laboratory, Columbus, Ohio, are listed in Appendix B.

Distribution of uranium

The uranium content of the coal penetrated by the core holes is shown in detail in figure 6, which also shows the percent ash and the content of uranium in the coal ash. Figure 5 shows the generalized lithologic logs of the core holes. All surface sections and augered sections of coal beds in T. 24 N., Rs. 95 and 96 W. are plotted in figure 7, which also shows the uranium content of the coal, the percent ash, and the concentration of uranium in the coal ash. Similar data are shown for coal beds in T. 23 N., Rs. 93, 94, and 95 W. in figure 8. The graphs in figure 9 show the thickness of coal in the Luman zone, the uranium content of the coal, the percent ash, and the permeability of the rocks associated with the coal zone. These data show that the uranium content of the coal increases from west to east and closely coincides with the change in facies of the rocks from less permeable lacustrine shales in the western part of the area, to coarse-grained, more permeable, fluviatile sandstones in the eastern part of the area.

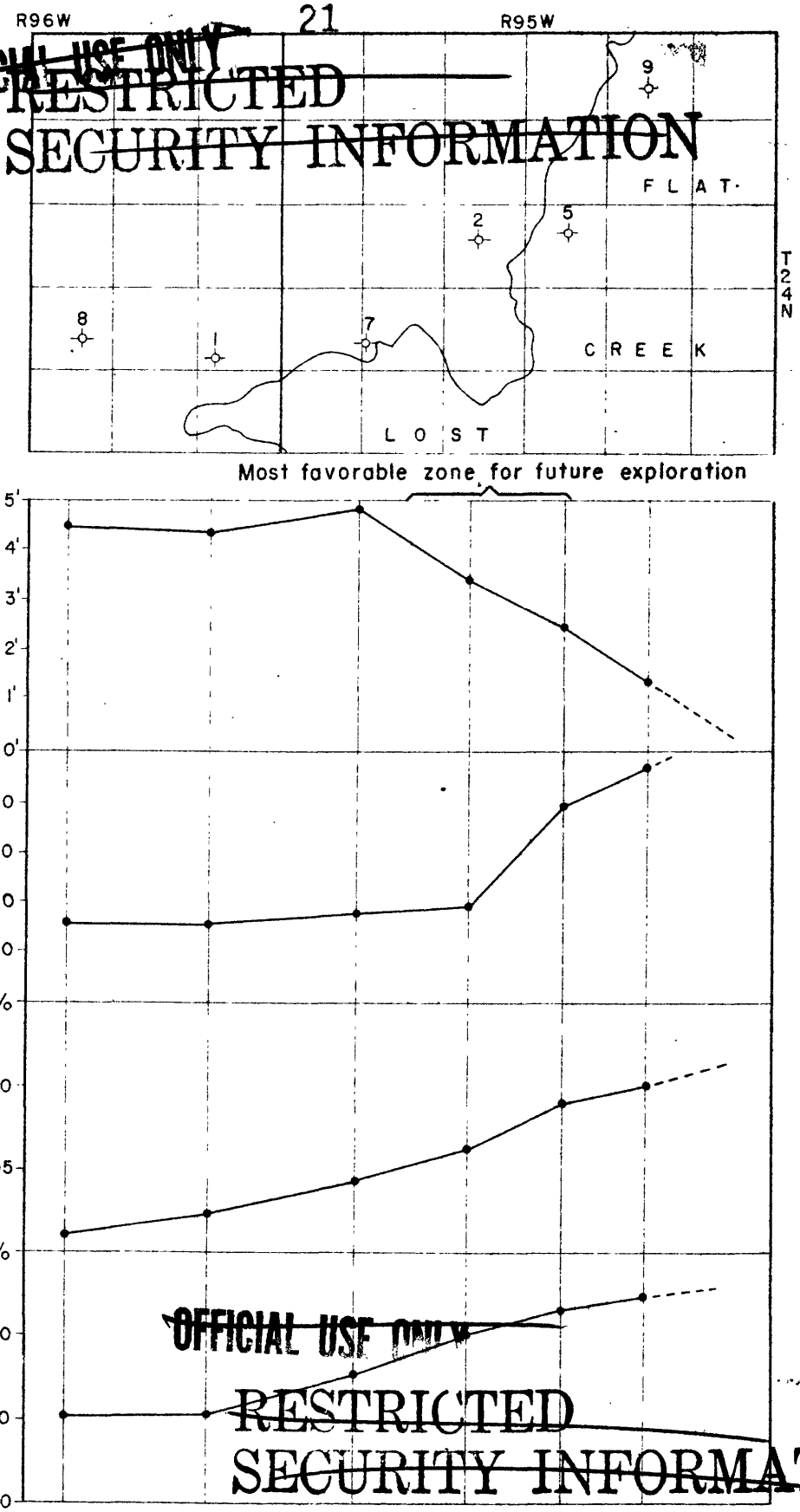


Figure 9.--Graph showing interrelation of thickness, ash and uranium content of coal and permeability of associated rocks in the Luman zone, Red Desert area, Sweetwater County, Wyoming.

The distribution of uranium within a coal bed as influenced by permeability of the adjacent rocks is shown in figure 10 in which the uranium content of Sourdough No. 2 is plotted at two localities. In core hole 11, where the coal bed is underlain by sandstone, the uranium content of the coal bed is greatest at the bottom. At map locality 97, the coal bed is underlain and overlain by sandstone, and the uranium content of the coal is greater at the bottom and top adjacent to the sandstone beds.

The two graphs illustrate a close relationship between permeability and uranium mineralization of coal that prevails as a general rule, both areally and in detail.

At Creston Ridge near U. S. Highway 30 a Miocene (?) conglomerate lies unconformably in contact with a thick impure coal bed in the Wasatch formation. This bed is altered, iron stained and has a uranium content of 0.051 percent whereas the coal beds only a dozen feet below are virtually inert.

From the above, it is suggested that favorable ground for exploratory drilling occurs not only where coal beds capable of being mineralized with uranium lie in contact with "source rocks" as in the case of the Dakota lignites (Denson, and others, 1950), but also where permeable sandstones can lead the solutions from the intake areas, laterally and downward, perhaps for miles, to the receptor beds (fig. 11).

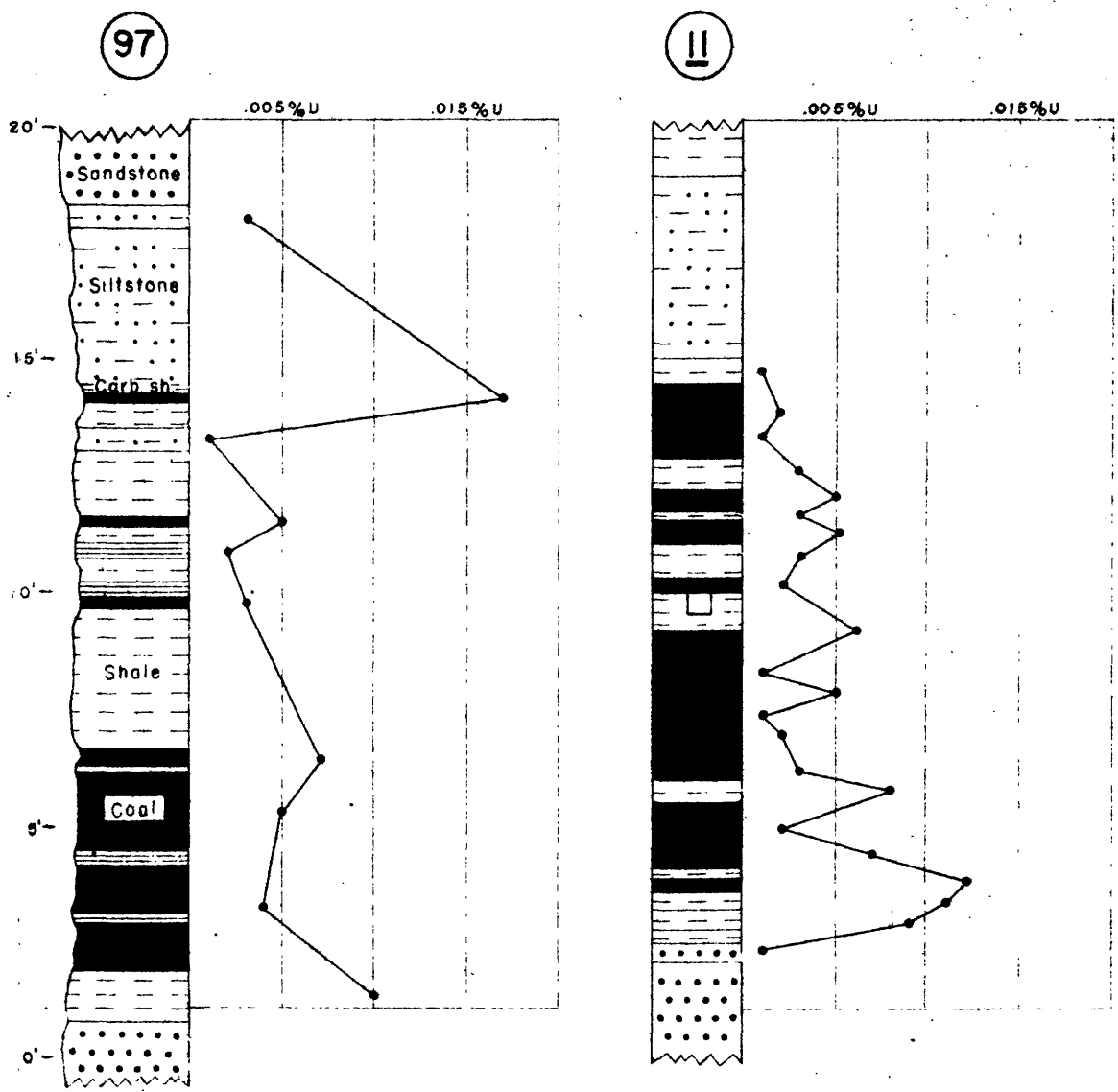


Figure 10.--Graphs showing influence of stratigraphic position and permeability of enclosing rocks on the distribution of uranium within the Sourdough No. 2 coal bed: where coal is overlain and underlain by coarse, permeable sandstone, the coal has a high uranium content at the top and bottom (surface section, map locality 97); where coal is underlain by sandstone, the uranium content is high only at the bottom (core hole 11).

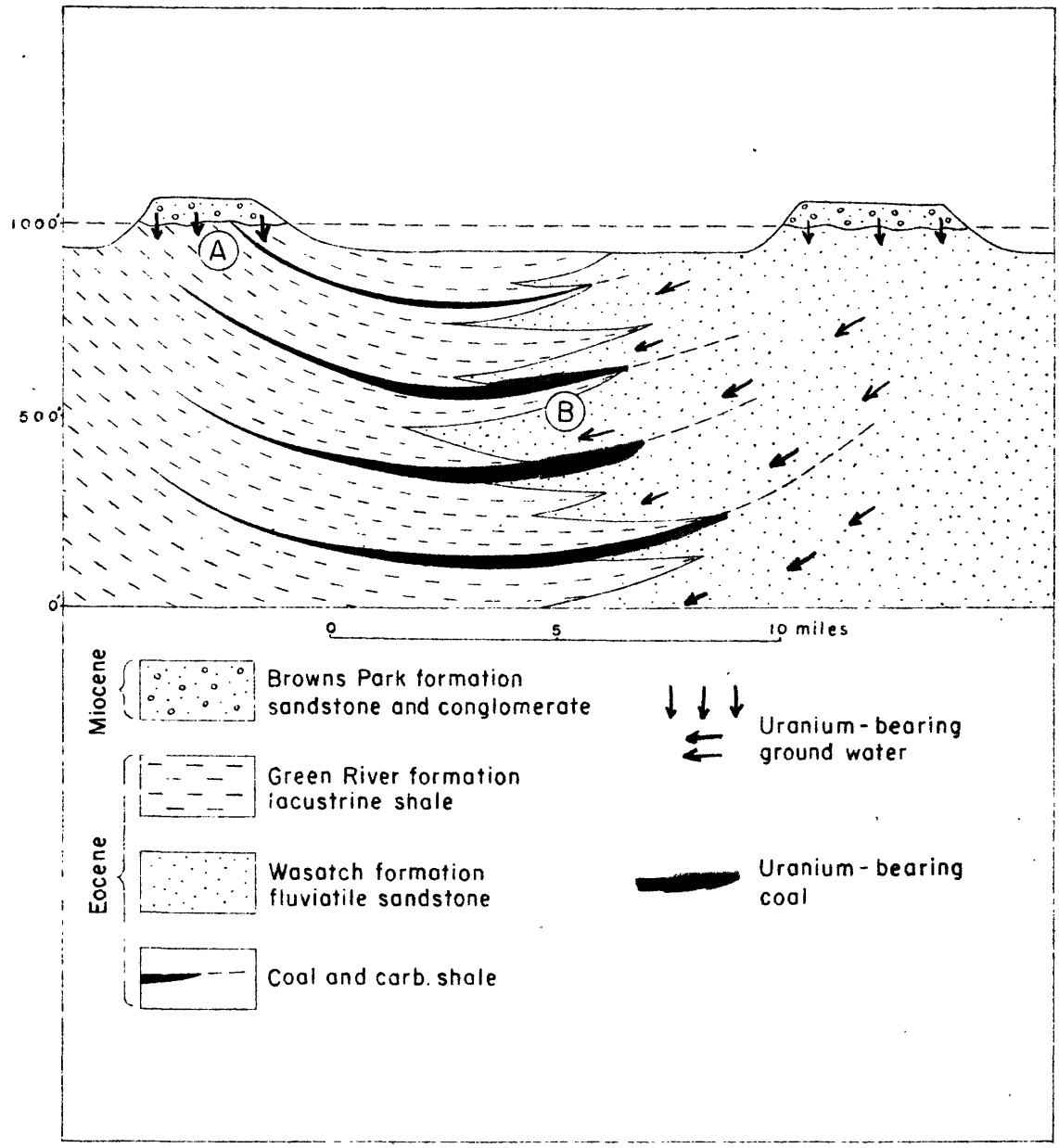


Figure 11.--Idealized geologic section showing two types of "favorable ground" in prospecting for uranium bearing coal in the Red Desert area, Wyoming. Type A (also typical of the lignites in the Dakotas): downward-percolating uranium-bearing ground water encounters the directly subjacent coal which takes on the uranium. Type B (more common in the Red Desert coals): uranium-bearing waters enter coarse grained, permeable sandstones and move downward and laterally for miles before encountering the receptor beds. The coal beds are more heavily mineralized adjacent to the overlying or underlying permeable sandstone. Types A and B may be prospected in outcrop or shallow drill holes; type B may also be found in deep drill holes where there is no surface indication of mineralization.

RESERVES

Reserves have been computed and tabulated for each bed on a township basis. Only coal beds 2.5 feet or more in thickness and overlain by 75 feet or less overburden are included in tonnage estimates which are based on 1,770 tons per acre foot for subbituminous coal. Thickness of coal and uranium grade are based on weighted averages from core holes and surface sections.

Inferred reserves for the entire area total 162,500,000 short tons of subbituminous coal containing 6,100 tons of uranium; in the Luman coal zone are 21 million short tons of coal containing 800 short tons of uranium. The coal beds in the Luman zone average 3.8 feet in thickness and contain 0.005 percent uranium in the coal and 0.025 percent uranium in the coal ash.

Reserves are classified as inferred but more data are available for some parts of the area than for others. Reserves in the northwestern part of the area are based on nine core holes and approximately 40 surface and auger sections. Reserves listed for the southeastern part of the mapped area are less reliable since they are based on only two core holes and approximately 50 surface and augered sections.

The coal and uranium reserves in the area drilled are summarized in Table 2. Potential strippable areas with 75 feet or less of overburden are shown in figure 12.

Table 2.--Inferred reserves of uranium-bearing coal, northern Red Desert area, Sweetwater County, Wyoming

Bed	Location of coal by section	Area (acres)	Thickness (feet)	Uranium (percent)	Coal 1/ (short tons)	Uranium (short tons)
		T. 23 N., R. 94 W.				
S-2	23, 24, 25, 26	299	3.3	0.007	1,718,670	120
S-2	14, 15, 23	139	3.5	0.008	860,220	69
S-2	3, 4, 9, 10, 15, 16	968	2.8	0.007	4,709,970	330
S-2	26, 34, 35	175	4.0	0.005	1,242,540	62
S-2	35	6	4.0	0.005	42,480	2
M-1	15, 16, 21, 22, 23, 26, 27, 34, 35	1206	5.2	0.006	10,991,700	660
M-1	3, 4, 5, 8, 9, 16, 17, 21	1261	5.2	0.005	11,497,920	575
M-1	21, 27, 28, 29, 32, 33, 34	1086	7.0	0.004	13,457,310	538
M-1	31	89	5.6	0.003	886,770	27
M-2	27	81	2.6	0.003	373,470	11
M-2	26, 27, 34, 35	391	2.8	0.004	1,938,150	78
M-2	27, 33, 34	12	2.5	0.004	53,100	2
M-2	33	15	2.5	0.004	67,260	3
B-3	21, 22, 27, 28	307	5.5	0.004	2,984,220	119
B-3	29, 32, 33	370	15.7	0.003	10,292,550	309
B-3	17, 18, 19, 20	174	15.7	0.003	4,837,410	145
B-3	17, 20, 21, 28, 29	561	12.9	0.003	12,747,540	382
B-3	4, 5, 8, 17	1110	10.9	0.004	21,312,570	853
B-3	34	61	4.7	0.004	499,140	20
				Subtotals	100,512,990	4304
		T. 23 N., R. 95 W.				
M-1	20, 21, 27, 28, 29	500	3.4	0.001	2,980,680	30
M-1	28, 29	51	2.8	<0.001	253,110	1
M-1	28, 29, 32, 33	401	3.0	<0.001	2,092,140	11

Table 2.--Inferred reserves of uranium-bearing coal, northern Red Desert area, Sweetwater County, Wyoming (Cont.)

Bed	Location of coal by section	Area (acres)	Thickness (feet)	Uranium (percent)	Coal 1/ (short tons)	Uranium (short tons)
		T. 23 N., R. 95 W. (Cont.)				
M-1	33	29	3.5	0.001	177,000	2
M-1	34	54	4.7	0.002	451,350	9
M-1	23, 25, 26, 27, 34, 35, 36	2051	5.6	0.003	20,324,910	610
M-1	8, 9, 14, 15, 16, 17, 18, 22, 23, 26, 27	2097	3.7	0.002	13,729,890	275
M-2	29	16	2.5	0.002	72,570	2
M-2	7, 18	136	4.3	0.002	1,033,680	21
				Subtotals	41,115,300	961
		T. 24 N., R. 95 W.				
L-1	19, 20, 21, 28, 29, 30	822	4.3	0.004	6,258,720	250
L-1	13, 14, 21, 22	883	3.5	0.007	5,471,070	383
				Subtotals	11,729,790	633
		T. 24 N., R. 96 W.				
L-2	21, 22, 23, 24, 25, 26, 27, 28	1477	3.5	0.002	9,150,900	183
				Totals (rounded)	162,500,000	6100

1/ Tonnage estimates based on 1770 tons of coal per acre foot. Estimates include only those beds 2.5 feet or more in thickness and overlain by 75 feet or less of overburden.

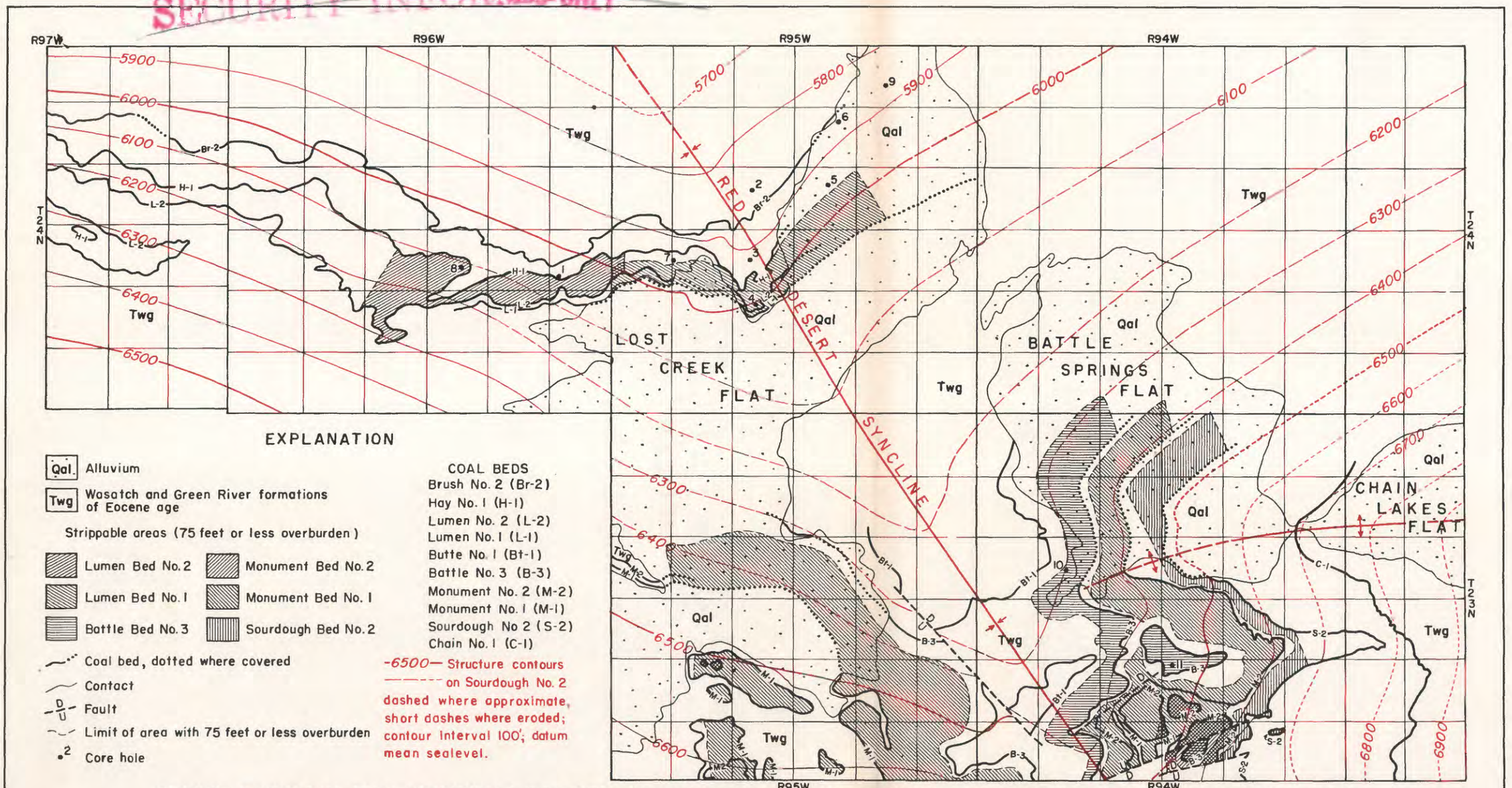


FIGURE 12. SKETCH MAP SHOWING LOCATION OF CORE HOLES AND STRIPPABLE AREAS OF URANIUM-BEARING COAL IN THE NORTHERN PART OF THE RED DESERT AREA, SWEETWATER COUNTY, WYOMING. 1952

PLANS

Additional core drilling, augering and geologic mapping is planned in the Red Desert to delimit more closely the reserves of uranium-bearing coal in the area between Battle Springs Flat and U. S. Highway 30, to confirm the inferred reserves of uranium-bearing coal underlying Battle Springs Flat, and to explore the areas in the vicinity of Bison Basin and Creston Ridge north and east of the mapped area. Samples of thin beds of carbonaceous rocks from Bison Basin and Creston Ridge contain 0.14 and 0.051 percent uranium in the coal ash, respectively, and these areas merit further study.

Core drilling tentatively scheduled for fiscal 1954 (Trace Elements Work Plan and Operating Budget-Fiscal Year, 1954) amounts to 8,000 feet in 40 holes of which one will be 8 inches in diameter to secure a sample adequate for bed moisture determinations and coal utilization studies.

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APPENDIX A

PROXIMATE AND ULTIMATE ANALYSES OF COAL CORES, RED DESERT AREA, SWEETWATER COUNTY, WYOMING. ANALYSES BY U. S. BUREAU OF MINES, PITTSBURGH, PENNSYLVANIA.

ANALYSES OF COAL CORES, RED DESERT AREA, SWEETWATER COUNTY, WYOMING 1/

Hole number	Lab. number	Thickness of coal	Condition 2/	PROXIMATE				ULTIMATE								
				Moisture	Volatile matter 3/	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulphur	Forms of sulphur: Sulfate	Pyritic	Organic	British thermal units
1	D-97526	1.1'	1	22.8	33.5	31.5	12.2									
			2	-	43.5	40.6	15.9									
			3	-	51.6	48.4	-									
	D-97527	4.5'	1	22.9	32.4	31.0	13.7	6.3	46.5	1.4	29.9	2.2	.07	1.39	.78	8430
	4/ S.G. 1.51		2	-	42.0	40.3	17.7	4.9	60.3	1.8	12.4	2.9	.09	1.80	1.01	10930
	S.T. 2260		3	-	51.1	48.9	-	5.9	73.3	2.2	15.1	3.5	.10	2.19	1.23	13280
	D-96784															
	S.G. 1.55	1.2'	1	23.8	29.7	34.2	12.3					1.7				8200
			2	-	39.0	44.9	16.1					2.3				10770
			3	-	46.5	53.5	-					2.7				12840
	D-96785	0.6'	1	22.7	30.7	28.2	18.4					1.9				7770
	S.G. 1.57		2	-	39.7	36.5	23.8					2.5				10060
			3	-	52.1	47.9	-					3.2				13200
	D-96786	1.7'	1	24.3	31.5	32.2	12.0					2.6	.05	1.74	.80	8480
	S.G. 1.52		2	-	41.6	42.5	15.9					3.4	.07	2.30	1.06	11210
			3	-	49.5	50.5	-					4.1	.09	2.73	1.26	13320

1/ Analyses supplied by U. S. Bureau of Mines, Central Experiment Station, Pittsburgh, Pa., Roy F. Abernethy, Chemist in Charge.

2/ Condition: 1 As received
2 Moisture free
3 Moisture and ash free

3/ Determined by modified method.

4/ S. G., real specific gravity; S. T., softening temperature.

ANALYSES OF COAL CORES, RED DESERT AREA, SWEETWATER COUNTY, WYOMING

Hole number	Lab. number	Thickness of coal	Condition	PROXIMATE				ULTIMATE								
				Moisture	Volatile matter	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulphur	Forms of sulphur: Sulfate	Pyritic	Organic	British thermal units
2	D-96787	0.7'	1	23.1	32.2	34.1	10.6					.8				8860
	S.G. 1.46		2	-	41.9	44.3	13.8					1.0				11520
			3	-	48.7	51.3	-					1.2				13360
	D-96788	2.7'	1	22.3	30.3	30.6	16.8	6.1	42.4	1.2	32.4	1.1	.03	.39	.71	7990
	S.G. 1.54		2	-	39.0	39.3	21.7	4.6	54.6	1.5	16.2	1.4	.04	.50	.91	10280
	S.T. 2630		3	-	49.8	50.2	-	5.9	69.7	1.9	20.7	1.8	.05	.64	1.17	13120
3	D-96781	1.7'	1	23.0	31.1	31.7	14.2					2.4				8190
	S.G. 1.54		2	-	40.3	41.3	18.4					3.2				10640
			3	-	49.4	50.6	-					3.9				13040
	D-96782	0.7'	1	21.2	30.6	30.0	18.2					1.2				7890
	S.G. 1.56		2	-	38.8	38.1	23.1					1.6				10010
			3	-	50.4	49.6	-					2.0				13010
	D-96783	3.9'	1	20.3	32.4	30.5	16.8	6.1	46.3	1.2	28.2	1.4	.02	.62	.72	8330
	S.G. 1.53		2	-	40.7	38.2	21.1	4.8	58.1	1.6	12.7	1.7	.03	.78	.91	10450
	S.T. 2580		3	-	51.5	48.5	-	6.0	73.6	2.0	16.2	2.2	.04	.98	1.15	13240
4	D-96789	4.1'	1	19.7	31.7	28.1	20.5	5.8	46.4	1.2	24.7	1.4	.04	.66	.67	7840
	S.G. 1.56		2	-	39.5	35.0	25.5	4.5	47.8	1.2	9.0	1.7	.05	.82	.84	9750
			3	-	53.0	47.0	-	6.0	77.6	2.0	12.1	2.3	.06	1.10	1.12	13100
	D-97235	9.2'	1	21.7	33.6	36.0	8.7	6.2	52.1	1.4	29.8	1.8	.06	1.10	.61	9240
	S.G. 1.47		2	-	42.8	46.1	11.1	4.8	66.6	1.7	13.5	2.3	.08	1.40	.77	11800
	S.T. 2140		3	-	48.2	51.8	-	5.4	74.9	1.9	15.3	2.5	.09	1.58	.87	13270

ANALYSES OF COAL CORES, RED DESERT AREA, SWEETWATER COUNTY, WYOMING

Hole number	Lab. number	Thickness of coal	Condition	PROXIMATE: Moisture	Volatile matter	Fixed carbon	Ash	ULTIMATE: Hydrogen	Carbon	Nitrogen	Oxygen	Sulphur	Forms of sulphur: Sulfate	Pyritic	Organic	British thermal units
4	D-97236	1.4'	1	23.4	30.3	30.7	15.6									
			2	-	39.5	40.1	20.4									
			3	-	49.6	50.4	-									
	D-97237	5.7'	1	24.2	29.1	37.8	8.9	6.3	50.1	1.3	31.8	1.6	.04	1.02	.59	8860
	S.G. 1.48		2	-	38.3	49.9	11.8	4.7	66.0	1.8	13.5	2.2	.05	1.34	.78	11690
	S.T. 2150		3	-	43.5	56.5	-	5.4	74.9	2.0	15.2	2.5	.06	1.52	.89	13250
5	D-96790	2.6'	1	18.9	26.8	24.7	29.6	5.3	36.7	.9	26.8	.7	.01	.18	.54	6560
	S.G. 1.69		2	-	33.0	30.5	36.5	3.9	45.3	1.2	12.2	.9	.02	.22	.67	8090
			3	-	52.0	48.0	-	6.1	71.4	1.8	19.3	1.4	.02	.34	1.05	12740
[illegible]	D-96791	4.0'	1	14.1	23.1	16.0	46.8	4.2	25.8	.6	21.9	.7	.02	.30	.38	4600
	S.G. 1.91		2	-	26.9	18.6	54.5	3.1	30.0	.7	10.9	.8	.02	.35	.45	5350
	S.T. 2800		3	-	59.1	40.9	-	6.8	65.9	1.6	23.9	1.8	.05	.78	.98	11750
[illegible]	D-97233	4.8'	1	22.1	33.3	40.4	4.2	6.3	48.5	1.5	38.4	1.1	.02	.37	.70	8710
	S.G. 1.48		2	-	42.8	51.9	5.3	5.0	62.3	1.9	24.1	1.4	.03	.48	.90	11190
	S.T. 2440		3	-	45.2	54.8	-	5.2	65.8	2.0	25.5	1.5	.03	.50	.95	11820
8	D-97528	4.0'	1	25.9	31.0	30.8	12.3					4.0				8100
	S.G. 1.54		2	-	41.9	41.6	16.5					5.4				10930
			3	-	50.2	49.8	-					6.4				13100
9	D-97530	1.1'	1	15.1	26.3	27.1	31.5					3.9				6590
			2	-	30.9	32.0	37.1					4.5				7750
			3	-	49.1	50.9	-					7.2				12320

ANALYSES OF COAL CORES, RED DESERT AREA, SWEETWATER COUNTY, WYOMING

Hole number	Lab. number	Thickness of coal	Condition	PROXIMATE Moisture	Volatile matter	Fixed carbon	Ash	ULTIMATE Hydrogen	Carbon	Nitrogen	Oxygen	Sulphur	Forms of sulphur: Sulfate	Pyritic	Organic	British thermal units
10	D-98226	6.9'	1	20.7	32.8	37.0	9.5					1.2				9180
	S.G. 1.49		2	-	41.3	46.7	12.0					1.5				11570
			3	-	47.0	53.0	-					1.8				13150
	D-98227	2.5'	1	18.3	30.9	35.8	15.0	5.6	49.0	.9	26.6	2.9	.10	2.10	.70	8660
	S.G. 1.56		2	-	37.8	43.9	18.3	4.4	60.0	1.1	12.7	3.5	.13	2.57	.85	10590
			3	-	46.3	53.7	-	5.3	73.4	1.3	15.7	4.3	.15	3.14	1.04	12970
	D-98228	2.2'	1	18.4	31.1	34.3	16.2					1.6				8500
	S.G. 1.55		2	-	38.2	42.0	19.8					1.9				10420
			3	-	47.6	52.4	-					2.4				13000
	D-98229	2.8'	1	21.9	29.9	37.0	11.2					1.9				8650
	S.G. 1.53		2	-	38.3	47.3	14.4					2.5				11080
			3	-	44.7	55.3	-					2.9				12930
	D-98230	2.5'	1	20.8	31.1	38.8	9.3					1.6				9190
	S.G. 1.52		2	-	39.2	49.0	11.8					2.0				11600
			3	-	44.5	55.5	-					2.2				13150
	D-98231	5.4'	1	20.2	32.4	37.6	9.8	6.1	52.5	1.1	29.1	1.4	.03	.65	.71	9290
	S.G. 1.48		2	-	40.6	47.1	12.3	4.8	65.9	1.4	13.9	1.7	.04	.82	.89	11650
			3	-	46.3	53.7	-	5.4	75.1	1.6	15.9	2.0	.04	.93	1.01	13280
11	D-98232	3.4'	1	23.2	30.6	33.4	12.8					2.8				8100
	S.G. 1.57		2	-	39.9	43.5	16.6					3.6				10550
			3	-	47.9	52.1	-					4.4				12660

ANALYSES OF COAL CORES, RED DESERT AREA, SWEETWATER COUNTY, WYOMING 1/

Hole number	Lab. number	Thickness of coal	Condition 2/	PROXIMATE				ULTIMATE								
				Moisture	Volatile matter 3/	Fixed carbon	Ash	Hydrogen	Carbon	Nitrogen	Oxygen	Sulphur	Forms of sulphur: Sulfate	Pyritic	Organic	British thermal units
11	D-98233	2.1'	1	22.1	30.9	33.9	13.1					1.5				8450
	4/ S.G. 1.53		2	-	39.7	43.4	16.9					1.9				10860
			3	-	47.7	52.3	-					2.2				13060
	D-98234	5.8'	1	12.2	27.6	28.8	31.4					1.8	.06	1.25	.53	6970
	S.G. 1.68		2	-	31.4	32.8	35.8					2.1	.07	1.43	.60	7940
			3	-	49.0	51.0	-					3.3	.10	2.23	.93	12370
	D-98235	1.8'	1	22.5	31.6	37.4	8.5					1.8				9040
	S.G. 1.49		2	-	40.7	48.4	10.9					2.4				11660
			3	-	45.7	54.3	-					2.7				13100
	D-98236	4.5'	1	10.1	41.6	36.4	11.9	5.8	50.4	1.0	27.9	3.0	.05	2.25	.73	8970
	S.G. 1.53		2	-	46.2	40.5	13.3	5.2	56.0	1.1	21.0	3.4	.06	2.51	.82	9980
			3	-	53.3	46.7	-	6.0	64.6	1.3	24.2	3.9	.07	2.89	.94	11510

1/ Analyses supplied by U. S. Bureau of Mines, Central Experiment Station, Pittsburgh, Pa., Roy F. Abernethy, Chemist in Charge.

2/ Condition: 1 As received
2 Moisture free
3 Moisture and ash free

3/ Determined by modified method.

4/ S. G., real specific gravity; S. T., softening temperature.

APPENDIX B

DESCRIPTIONS OF COAL CORE FROM THE RED DESERT AREA, SWEETWATER COUNTY, WYOMING, BY JAMES M. SCHOPF, U. S. GEOLOGICAL SURVEY COAL GEOLOGY LABORATORY, COLUMBUS, OHIO, SHOWING COMPARISON OF PMG VALUES, EQUIVALENT URANIUM, AND URANIUM CONTENT OF COAL.

General notes

Lithologic descriptions of coal cores and PMG determinations were made by James M. Schopf, U. S. Geological Survey Coal Geology Laboratory, Columbus, Ohio. Equivalent uranium and uranium determinations were made by U. S. Geological Survey Trace Elements Section Laboratory, Washington 25, D. C.

PMG values are a measure of the beta-gamma radiation in pulses per minute per gram made for all sample intervals using a cup mounted IB85 GM tube connected to an AEC CGM-3B scalar. The nature and significance of PMG values are more fully explained by Schopf (1952).

Equivalent uranium (eU) is an expression of percent uranium that a sample would contain if all the radioactivity were due only to uranium and its daughter products in equilibrium.

Uranium (U) is the chemically determined percent uranium in the coal.

Half the core, which was cut lengthwise by diamond saw, was retained as a reserve by the Coal Geology Laboratory. The remainder was crushed and halved in a riffle splitter in increments as shown.

The samples labeled "TE" were sent to Trace Elements Section Laboratory, Washington, D. C., for 1) calibrated radiometric determination of coal sample, 2) ash determination, 3) uranium determination on ash and 4) semi-quantitative spectrographic determinations on ash.

Units bracketed with a Bureau of Mines sample number were submitted to the U. S. Bureau of Mines laboratory at Pittsburgh, Pa. for proximate and ultimate analyses, forms of sulphur, ash fusion and specific gravity determinations.

Hole 1

DATES: Coal cored - 10/9/52
Shipment received at Columbus - 10/15/52
Described and sampled at Coal Geology Laboratory - 10/28/52

LOCATION: SWSW sec. 24-24N-96W SURFACE ELEVATION: 6645'

63'5-1/4"(Top of Box 1 and Top of Core Sent to Columbus Laboratory)
Shale, medium and dark gray, with abundant shell fragments; 1/2" slightly coaly below 63'9-1/2".
S1-TE PMG-0.4 eU-0.001 U-a
63'10"
Shale, coaly to coal shaley.
S2-TE PMG-2.4 eU-0.004 U-0.002
64' (Pull at this Depth)
Coal, moderately thin- and medium-banded; core slightly broken.
S3-TE PMG-1.6 eU-0.003 U-0.003
64'6"
Coal, moderately thin- and medium-banded.
S4-TE PMG-0.2 eU-a U-a
64'10-1/4"
Coal, abundantly thin- and medium-banded.
S5-TE PMG-0.4 eU-0.001 U-0.001
65'1-1/4"
3/4" loss in coring accumulated below 64'.

) Bureau of Mines Sample No. 570-1-S3 to S5 Analyses requested: Prox. only

65'2"
Shale, light gray to medium gray; carbonaceous in top1".
S6-Lab. PMG-0.5
65'11-1/2"
Shale, medium gray to light gray.
S7-Lab. PMG-0.4
66'4-3/4" (Bottom of Box 1 and Top of Box 2)
Shale, light to medium gray; 1/2" coal below 66'11-1/2".
S8-Lab. PMG-0.5

67' (Pull at this depth)
Shale, medium and dark gray, carbonaceous.
S9-TE PMG-0.9 eU-0.003 U-0.001
67'7"
Shale, medium and dark gray, coaly.
S10-TE PMG-1.9 eU-0.005 U-0.005
67'9-1/2"
Shale, medium gray, carbonaceous; 1" dark gray clay below 68'3-1/2"
S11-TE PMG-0.7 eU-0.004 U-0.001
68'4-1/2"
Coal, abundantly thin-banded.
S12-TE PMG-1.1 eU-0.003 U-0.002
68'10-1/2"
Coal abundantly thin- and medium-banded.
S13-TE PMG-1.4 eU-0.003 U-0.002
69'4-1/2"
Coal, abundantly thin-banded.
S14-TE PMG-0.7 eU-0.001 U-0.001
69'9-1/2"
Coal, moderately thin- and medium-banded.
S15-TE PMG-1.7 eU-0.004 U-0.003
70'3"
Coal, abundantly thin- and medium-banded, with 1/4" to 1" pyritic nodules; core broken.
S16-TE PMG-0.9 eU-0.001 U-0.001
70'9"
Coal, abundantly medium- and thin-banded; slightly pyritic throughout; core broken.
S17-TE PMG-0.8 eU-0.001 U-0.001
71'2-1/4"
Coal abundantly thin-banded; 1/4" pyritic lens below 71'2-3/4".
S18-TE PMG-0.9 eU-0.002 U-0.002
71'6-1/2"
Coal, abundantly thin-banded.
S19-TE PMG-0.8 eU-0.001 U-0.001
71'11-1/2"
Coal, abundantly thin- and medium banded.
S20-TE PMG-2.6 eU-0.005 U-0.005
72'4-3/4"
Coal, abundantly thin-banded.
S21-TE PMG-2.5 eU-0.004 U-0.003

) Bureau of Mines Sample No. 570-1-S12 to S21 Analyses requested: Sp. Gr. Prox. Ult. Btu. Forms of S Ash fusion

72'10-3/4"
Shale, light gray, with abundant disseminated pyrites; core broken and displaced, heavily pyritic above 73'2".
S22-TE PMG-1.0 eU-0.001 U-a

73'8-1/2"
7" loss in coring accumulated below 67'.

74'3-1/2" (Bottom of Box 2 and Bottom of Core Submitted to Columbus Laboratory)

NOTES

Core was slightly moist when unpacked and showed little breakage or displacement. Depths were clearly marked at "pull" levels and at top and bottom of the core boxes.

Eleven small coal specimens, taken from the core reserve, have been stored under water for later preparation of thin sections.

Hole 2

DATES: Coal cored - 9/18/52
Shipment received at Columbus - 9/23 and 29/52 and 10/2/52.
Described and sampled at Coal Geology Laboratory - 9/23, 24, 29, 30/52 and 10/2, 3, 4, 5/52

LOCATION: SENW sec. 16-24N-95W SURFACE ELEVATION: 6630'

38' (Top of Box 1 and core sent to Columbus Laboratory)
Sandstone, clayey, light to medium gray with abundant plant compressions; irregular yellow-brown stains; upper 1/4" includes coarse sand grains loosely cemented.
CGL 1 PMG-1.5

38'10-3/4"
Sandstone, clayey, as above, with zone of coarse sand grains, loosely cemented from 39'2-1/2" to 39'5-1/4".
CGL 2 PMG-1.1

40'
Sandstone, clayey, as above, with 1/4" gypsum lens in upper 1/2" and in the 1/2" coarse sand layer, loosely cemented, below 39'11-1/4".
CGL 3 PMG-1.4

41'
Sandstone, gray, down to 41'4", carbonaceous below 41'4"; lower 6" badly broken and dislocated.
CGL (and TE) 4 PMG-2.[illegible] eU-0.003

42'1"

Sandstone, clayey, down to 42'4", then grading to clay, sandy, light gray; core badly broken and dislocated above 42'11-1/2"; clay, sandy, highly carbonaceous, medium and dark gray; lower 3/4" clay, carbonaceous, dark gray with 1/16" coal streaks.

CGL (and TE) 5 PMG-1.4 eU-0.003 U-0.001

43'2"

4'10" loss in coring accumulated below 41'7"; probably greatest loss at about the 42'4" level indicated above. The 42'11-1/2" to 43'2" clay unit may directly overlie the coal.

48' (Bottom of Box No. 1 and Top of Box No. 2)

Coal, abundantly thin- and medium-banded, with 1/4" discontinuous fusain zone 1-1/2" below top.

TE 1 PMG-1.9 eU-0.004 U-0.003

48'6-1/4"

Coal, sparsely thin- and medium-banded, few thick vitrain bands, thin clay streaks at base.

TE 2 PMG-3.1 eU-0.005 U-0.005

) Bureau of Mines Sample 570-2-1 Analyses requested: Sp. Gr. Prox. Btu S

49'2-3/4"

Sandstone, clayey, and sandy clay, light buff, soft, irregularly bedded; sparse thin coaly streaks from 49'6-1/2".

CGL 6 PMG-0.4

50'0"

Clay, sandy, light gray to buff; 1/4" vitrain streak at top; 1/4" pyrite nodules at 50'5-1/2" and 50'7".

CGL 7 PMG-0.5

50'10"

Sandstone, clayey, light buff to light gray; crumbly, poorly cemented.

CGL 8 PMG-0.9

51'4"

2" loss in coring accumulated below 48'.

51'6" (Bottom of Box 2)

88'6" core not shipped to Columbus Laboratory.

140' (Top of Box 3)

Shale, clayey, medium gray, hard with abundant invertebrate fossils and occasional fish scales (?).

CGL 9 PMG-0.7

140'11"

Shale, clayey, dark gray, carbonaceous with minute shell fragments throughout and occasional fish scales; core somewhat broken but with little loss.

CGL 10 PMG-0.9

141'6-1/2"
Shale, black with abundant ostracodes and flattened large shell fragments (pieces sent for fossil identification and ecological interpretation).
141'8-1/2"
Shale, black, with fossil shells, as above.
CGL (and TE) 11 PMG-2.9 eU-0.003 U-0.001
141'10"
Limestone, hard, dark gray, highly fossiliferous.
CGL 12 PMG-0.04
141'11"
Shale, black, with large flattened shell fragments; sent for fossil identification.
142'0"
Shale, black, as above.
CGL (and TE) 13 PMG-0.8 eU-0.003 U-0.001
142'3-1/4"
Coal, moderately thin banded; 1/4" vitrain band at 142'6-3/4".
TE 3 PMG-1.7 eU-0.002 U-0.002
142'7-3/4"
Coal, abundantly medium-banded in upper 3/4", moderately thin-banded below.
TE 4 PMG-1.8 eU-0.003 U-0.002
142'11"
Claystone, brown with coaly streaks.
CGL 14 PMG-1.1
143'1/2"
Shale, clayey, light gray, scattered plant fragments.
CGL 15 PMG-0.8
143'9"
Shale, as above.
CGL 16 PMG-0.6
144'4-1/4"
1/2" loss in coring accumulated below 142'11".
144'4-3/4" (Bottom of Box 3)
21'9" core not shipped to Columbus laboratory.
144'1-3/4" (Top of Box 4)
Shale, clayey, light gray to light olive-brown.
CGL 17 PMG-0.7
166'4-3/4"
Shale, clayey, medium to dark gray, carbonaceous.
CGL 18 PMG-0.9

) Bureau of Mines Sample 570-2-2 Analyses requested: Sp. Gr. Prox. Btu S

166'8"
Coal, sparsely thin- to medium-banded; 1/4 of core in Bureau of Mines sample, 3/4 of core in TE sample; no reserve.
TE 5 PMG-0.2 eU-a U-a
166'9-1/2"
Clay, dark with coaly streaks; rejected from Bureau of Mines sample.
166'10-1/2"
Coal, moderately thin-banded.
TE 6 PMG-1.7 eU-0.002 U-0.001
167'3"
Coal, moderately thin-banded.
TE 7 PMG-1.7 eU-0.003 U-0.002
167'7-1/4"
Coal, abundantly medium-banded.
TE 8 PMG-1.3 eU-0.002 U-0.002
167'11-3/4"
Coal, moderately thin-banded.
TE 9 PMG-2.3 eU-0.003 U-0.002
168'4"
Clay parting, carbonaceous, medium gray with plant fragments; rejected from Bureau of Mines sample.
168'5"
Coal, sparsely thin-banded; 1/4 of core in Bureau of Mines sample, 3/4 of core in TE sample; no reserve.
TE 10 PMG-1.2 eU-a U-0.001

Bureau of Mines Sample 570-2-3 Analyses requested: Sp. Gr. Prox. Btu S Forms of S

168'6"
Shale, clayey, carbonaceous, medium chocolate brown with small plant fragments and a few thin coaly streaks.
CGL 19 PMG-0.7 eU-0.001 U-a
169'1-3/4"
Coal, dominantly thin- and medium-banded.
TE 11 PMG-1.0 eU-0.002 U-0.001
169'6-3/4"
Shale, clayey, carbonaceous, dark gray with thin and medium coaly streaks; 1/8" pyrite lens in middle.
CGL (and TE) 20 PMG-1.5 eU-0.004 U-0.003
169'9-3/4"
Claystone, light gray with carbonaceous streaks, soft and plastic.
CGL (and TE) 21 PMG-0.9 eU-0.003 U-0.001
170'3-3/4"
Shale, carbonaceous, dark gray, with numerous coaly streaks in upper 2".
CGL (and TE) 22 PMG-0.9 eU-0.003 U-0.002

170'7-1/4"
Shale, clayey, light gray.
CGL (and TE) 23 PMG-1.2 eU-0.002 U-a
171'2-1/2"
3-1/2" loss in coring accumulated below 166'1-3/4"; probably mostly in coal between 166'8" and 168'4".
171'6" (Bottom of Box 4)
25'3" core not shipped to Columbus Laboratory.
196'9" (Top of Box 5)
Sandstone, fine to medium-grained, light gray to light olive-brown, crumbly; grades below into sandy, carbonaceous, shale, dark gray, with occasional 1/4" pyritic nodules.
CGL 24 PMG-0.8
197'2-1/2"
Shale, sandy, carbonaceous, dark gray.
CGL 25 PMG-0.9
197'8-1/4"
Shale, carbonaceous, dark gray, with thin streaks of coal and black clay.
CGL (and TE) 26 PMG-3.0 eU-0.008 U-0.006
198'1/2"
Shale, carbonaceous, dark gray.
CGL (and TE) 27 PMG-3.2 eU-0.010 U-0.008
198'8-1/2"
Shale, black, clayey, highly carbonaceous.
CGL (and TE) 28 PMG-4.0 eU-0.013 U-0.011
199'3/4"
Shale, black as above.
CGL (and TE) 29 PMG-5.1 eU-0.015 U-0.012
199'6"
Coal, dominantly thin- to medium-banded.
TE 12 PMG-4.7 eU-0.009 U-0.008
199'7-3/4"
Shale, clayey, carbonaceous with coaly bands and thin sandy lenses; 1/2" pyritic zone in middle.
CGL (and TE) 30 PMG-2.4 eU-0.008 U-0.005
199'10-1/2"
Shale, medium gray, slightly carbonaceous in upper 1/3, lighter gray below.
CGL (and TE) 31 PMG-2.2 eU-0.008 U-0.005
200'6"
Shale, light gray.
CGL 32 PMG-1.7

201'5-1/2"
1'3" loss in coring accumulated below 196'9".
202'8-1/2" (Bottom of Box 5)
49'9-1/2" core not shipped to Columbus Laboratory.
252'6" (Top of Box 6)
Shale, medium gray, probably carbonaceous.
CGL (and TE) 33 PMG-2.3 eU-0.008 U-0.005
253'1"
Shale, black, clayey, with occasional thin light gray shale lenses.
CGL (and TE) 34 PMG-3.3 eU-0.007 U-0.006
253'8-1/4"
Coal, abundantly thin- and medium-banded.
TE 13 PMG-0.5 eU-0.001 U-0.001
254'
Coal, moderately thin- and medium-banded; lower inch sparsely thin-banded.
TE 14 PMG-1.7 eU-0.004 U-0.003
254'4-1/2"
Shale, carbonaceous with numerous thin coaly streaks in upper 1-1/4".
CGL (and TE) 35 PMG-4.1 eU-0.007 U-0.006
254'7-1/4"
Shale, dark gray, grades below 254'9" to black shale; core badly broken and somewhat mixed.
CGL (and TE) 36 PMG-3.8 eU-0.009 U-0.006
255'4-1/2"
Shale, black, badly broken and mixed.
CGL (and TE) 37 PMG-3.1 eU-0.007 U-0.005
255'10-1/4"
1" loss in coring accumulated below 254'7-1/4".
255'11-1/4"
Coal, dominantly thin- to thick-banded; pull at 256'.
TE 15 PMG-7.2 eU-0.011 U-0.010
256'3"
Coal, abundantly thin- to medium-banded.
TE 16 PMG-4.8 eU-0.011 U-0.009
256'8-1/2"
Coal, dominantly thick- and medium-banded.
TE 17 PMG-3.7 eU-0.006 U-0.005
257'1/2"
Coal, thick-banded.
TE 18 PMG-2.0 eU-0.004 U-0.003
257'6-3/4"
Coal, moderately thin-banded; lower 2" sparsely thin-banded.
TE 19 PMG-5.[illegible] eU-0.010 U-0.007

) Bureau of Mines Sample 570-2-4 Analyses requested: Sp. Gr. Prox. Btu S

) Bureau of Mines Sample 570-2-5 Analyses requested: Sp. Gr. Prox. Ult.

(Cont. on next page)

257'11-1/2") Btu
Coal, thin-banded; 1/4" carbonaceous clay parting) Forms of
below 258'1-1/4", rejected from B. of M. sample.) S
TE 20 PMG-5.2 eU-0.010 U-0.007) Ash fusion
258'4-1/4")
Coal, moderately (above) to abundantly (below) thin- and)
medium-banded.)
TE 21 PMG-5.0 eU-0.007 U-0.008)
258'7-1/2"
Shale, black, highly carbonaceous.
CGL (and TE) 38 PMG-1.0 eU-0.003 U-0.001
259'4-1/2"
Pyritic zone, a solid granular mass.
CGL (and TE) 39 PMG-0.5 eU-0.001 U-a
259'6-1/2"
Sandstone, medium- to fine-grained, light gray, crumbly; upper half broken, probably when core bit broke through hard pyritic zone above.
CGL 40 PMG-0.9
260'4-1/2"
Sandstone as above.
CGL 41 PMG-1.1
261'2"
2-3/4" loss in coring accumulated below 259'6-1/2".
261'4-3/4" (Bottom of Box 6 and bottom of core submitted to Columbus Laboratory)

NOTES

Core from 38' to 51'6" was received on 9/23/52 and when unpacked in the laboratory appeared dry with evident breakage and loss in coring as noted. Slight displacement may have occurred in shipment owing to loose wrapping.

Core from 140' to 171'6" was received on 9/29/52 and when unpacked in the laboratory was moist and in good condition with relatively slight loss in coring noted.

Core from 196'9" to 202'8-1/2" and 252'6" to 261'4-3/4" was received on 10/2/52 and when unpacked in laboratory was moist and in good condition with only slight loss in coring.

Hole 3

DATES: Coal cored - 9/18/52
Shipment received at Columbus - Box 1 - 9/23/52; Box 2 - 9/26/52; and Boxes 3, 4, and 5 - 10/2/52.
Described and sampled at Coal Geology Laboratory - 9/24 and 27/52 and 10/6/52.

LOCATION: NWSW sec. 21-24N-95W SURFACE ELEVATION: 6610'

24' (Top of Box 1 and top of core sent to Columbus Laboratory)
Shale, clayey, light buff to olive, pulverized.
CGL 1 PMG-0.6
24'6"
Shale, clayey, light buff, broken and displaced.
CGL 2 PMG-0.8
25'3"
1'9" loss in coring accumulated below 24'.
27'
Coal, badly broken and intermixed with dark carbonaceous clay; gypsum rosettes in lower 1-1/4" of clay (Note: this coal is reported to be 1.1' thick at a nearby outcrop.)
TE 1 PMG-1.7 eU-0.004 U-0.004
27'4-1/4"
9" loss in coring presumed to have accumulated below 27'; appearance of coal core suggests that the actual loss may not be so much.
28'1-1/4"
Clay, sandy at top, light buff to gray with plant fragments; gypsum crystals between 28'3" and 28'5-1/2"; 1/4" streak of jarosite below 28'9-1/2".
CGL (and TE) 3 PMG-2.2 eU-0.002 U-0.001
29'1/2"
Clay, gray with sandy streaks, grading below 29'4" into silty clay, ocherous with ferruginous veins and gypsiferous streaks; buff and more sandy below 29'8"; microfaults show on sandstone laminae.
CGL 4 PMG-0.5
29'10"
2'2" loss in coring accumulated below 28'1-1/4".
32' (Bottom of Box 1)
18'7-1/4" core not shipped to Columbus Laboratory; no description provided.
50'7-1/4" (Top of Box 2)
Clay, silty, light gray with light-yellow to brown stain.
CGL 5

51'4"
Clay, as above, with 1/4" pyrite lens at the top.
CGL 6 PMG-0.5
52'1-1/2"
Clay, as above.
CGL 7 PMG-0.6
52'9"
Shale, clayey, dark gray, platy, with plant fragments.
CGL (and TE) 8 PMG-1.4 eU-0.002 U-0.001
52'10-1/2"
Coal, dull, moderately thin-banded, somewhat broken.
TE 2 PMG-0.8 eU-0.002 U-0.001
53'1-1/2"
3/4" shale, clayey, light gray, sparsely banded with thin streaks of dull coal; rejected from Bureau of Mines and TE samples.
53'2-1/4"
Coal, attrital, moderately thin-banded in upper half.
TE 3 PMG-0.7 eU-0.002 U-0.001
53'6-1/4"
Coal, attrital to sparsely thin- and medium-banded; broken into 1/4" to 3/4" layers.
TE 4 PMG-1.4 eU-0.003 U-0.002
54'3/4"
1/4" carbonaceous clay parting; rejected from Bureau of Mines and TE samples.
54'1"
Coal, attrital to sparsely thin- and medium-banded; broken into irregular pieces.
TE 5 PMG-1.5 eU-0.001 U-0.002
54'5-1/2"
Coal, moderately thin-banded, broken into thin plates.
TE 6 PMG-2.2 eU-0.002 U-0.002

) Bureau of Mines Sample 570-3-1 Analyses requested: Sp Gr. Prox. Btu S

54'8"
Clay, slightly silty, medium gray with thin coaly bands.
54'8-1/2"
Clay, slightly silty, medium gray with flecks of mica and numerous plant fragments.
CGL 9 PMG-0.5
55'3-1/2"
Clay, same but more silty.
CGL 10 PMG-0.6
55'10-1/2"
9-3/4" loss in coring accumulated below 52' 10-1/2", probably mostly within the coal.

56'7-1/4" (Bottom of Box 2)
36'3" core not shipped to Columbus Laboratory.
92'10-1/4" (Top of Box 3)
Shale, black, with abundant mollusk and ostracod shells.
CGL 11 PMG-0.5
93'3"
Shale, black, as above.
CGL 12 PMG-0.5
93'8"
Shale, black carbonaceous and clayey.
CGL (and TE) 13 PMG-3.3 eU-0.007 U-0.009
93'11-1/2"
Coal, dominantly thin- and medium-banded; lower 1-3/4" sparsely thin-banded.
TE 7 PMG-3.4 eU-0.008 U-0.008
94'4-3/4" (Pull at this depth)
Shale, black, carbonaceous, with sparse thin coaly streaks down to 94'7".
CGL (and TE) 14 PMG-4.6 eU-0.014 U-0.013
94'9"
Shale, black, carbonaceous.
CGL (and TE) 15 PMG-5.8 eU-0.013 U-0.012
95'1"
Clay, medium gray, grades into shale below 95'4"; core badly broken and somewhat mixed.
CGL (and TE) 16 PMG-1.6 eU-0.006 U-0.004
95'11-1/2"
Shale, clayey, medium gray.
CGL (and TE) 17 PMG-1.4 eU-0.005 U-0.004
96'9"
Shale, carbonaceous, medium gray with thin light gray laminae; carbonaceous below 97'1-1/2" with thin coaly streaks.
CGL (and TE) 18 PMG-2.2 eU-0.007 U-0.005
97'2"
Shale, clayey, light to medium gray.
CGL (and TE) 19 PMG-1.2 eU-0.005 U-0.004
97'6-1/2"
1-1/4" loss in coring accumulated below 95'1".
97'7-3/4"
3'3" core not shipped to Columbus Laboratory.
100'10-3/4"
Shale, medium gray, slightly carbonaceous
CGL (and TE) 20 PMG-1.4 eU-0.004 U-0.004
101'4-1/2"

101'4-1/2"

Shale, medium gray with occasional thin streaks of vitrain; darker and carbonaceous below 101'6-3/4" with scattered coarse quartz grains.

CGL (and TE) 21 PMG-3.2 eU-0.006 U-0.007

101'9"

Shale, gray to light brown, silty; grades to sandstone below 102'.

CGL (and TE) 22 PMG-1.3 eU-0.005 U-0.003

102'1"

27-3/4" loss in coring apparently accumulated below 100'10-3/4".

104'4-3/4" (Depth as marked for bottom of Box 3)

24'4-3/4" core not shipped to Columbus Laboratory.

128'9-1/2" (Depth as marked for top of Box 4)

3-1/2" core apparently omitted from shipment.

129'1"

Shale, gray, with light gray streaks.

CGL (and TE) 23 PMG-1.5 eU-0.005 U-0.004

129'6-1/2"

Shale, dark gray, carbonaceous with lighter streaks at top; lowest 1/8" coaly.

CGL (and TE) 24 PMG-3.1 eU-0.006 U-0.005

129'8-1/2"

Coal, sparsely thin-banded above and abundantly banded below) 129'10".) Bureau of

TE 8 PMG-1.4 eU-0.003 U-0.002) Mines

130'1/2") Sample

Coal, moderately thin- and medium-banded.) 570-3-2

TE 9 PMG-4.3 eU-0.007 U-0.006) Analyses requested:

130'4-1/2" Sp. Gr.

Shale, black; upper 1-1/2" coaly. Prox.

CGL (and TE) 25 PMG-3.0 eU-0.008 U-0.007 Btu

130'7-3/4" S

Shale, carbonaceous, dark gray.

CGL (and TE) 26 PMG-1.4 eU-0.004 U-0.003

131'1/4"

Shale, black, with thin coaly streaks

CGL (and TE) 27 PMG-2.9 eU-0.007 U-0.005

131'2-1/2"

Shale, carbonaceous, dark gray; core somewhat broken and displaced.

CGL (and TE) 28 PMG-1.5 eU-0.005 U-0.003

131'6-1/4"

Coaly and carbonaceous shale; core badly broken and mixed.

CGL (and TE) 29 PMG-2.3 eU-0.006 U-0.006

132'1/4"
Shale, medium gray; core badly broken and mixed.
CGL (and TE) 30 PMG-1.9 eU-0.006 U-0.004
132'4-3/4" (Bottom of Box 4; Top of Box 5)
Shale, carbonaceous to light gray; core badly broken and mixed.
CGL (and TE) 31 PMG-2.5 eU-0.006 U-0.004
132'9"
Coal and carbonaceous shale; core badly broken and mixed.
TE 10 PMG-2.2 eU-0.004 U-0.004
133'1-3/4"
Coal, moderately thin- and thick-banded.
TE 11 PMG-0.1 eU-a U-a
133'4-3/4" (Pull marked at this depth; in spite of breakage above, no loss apparent)
Coal, sparsely thin- and thick-banded; core somewhat broken.
TE 12 PMG-1.5 eU-0.003 U-0.002
133'10"
Coal, sparsely thin banded.
TE 13 PMG-4.2 eU-0.006 U-0.005
134'
6-3/4" shale, carbonaceous, clayey, dark and medium gray with sparse thin coal streaks; excluded from Bureau of Mines sample.
CGL (and TE) 32 PMG-2.8 eU-0.009 U-0.007
134'6-3/4"
Coal, sparsely thin-banded; 1/16" pyritic lenticle at bottom.
TE 14 PMG-2.4 eU-0.006 U-0.005
135'1"
Coal, sparsely thin- and medium-banded with pyritic facings; 1/2" vitrain band at 135'5".
TE 15 PMG-3.9 eU-0.009 U-0.008
135'6"
Coal, moderately thin-banded with 1-1/2" of vitrain in three thick bands.
TE16 PMG-1.6 eU-0.008 U-0.008
135'11-3/4"
Coal, dominantly thin- to medium-banded; 1/2" vitrain band at 136'4-1/2".
TE 17 PMG-1.4 eU-0.003 U-0.003
136'6"
Coal, abundantly thin- and medium-banded.
TE 18 PMG-2.7 eU-0.004 U-0.005

) Bureau of Mines Sample 570-3-3 Analyses requested: Sp. Gr. Prox. Ult. Btu Forms of S Ash fusion

(Cont. on next page)

136'10-1/2") Bureau of
Coal, dominantly bright; three 1/4" bands; lower 1") Mines
attrital.) Sample
TE 19 PMG-5.2 eU-0.007 U-0.007) 570-3-3
137'3-1/4") (Cont.)
Coal, moderately thin- and medium-banded.)
TE 20 PMG-2.4 eU-0.004 U-0.004)
137'7"
Shale, black, occasional coaly streaks.
CGL (and TE) 33 PMG-0.9 eU-0.003 U-0.002
138'1"
Shale, gray with lighter streaks.
CGL 34 PMG-0.5
138'8"
Shale, as above, becoming darker merging with sample below.
CGL 35 PMG-0.4
139'9"
Shale, carbonaceous, dark gray; with 1" pyritic nodule at 139'10-1/2".
CGL 36 PMG-0.5
140'10"
Pyritic zone, solid but granular.
CGL 37 PMG-0.9
140'10-3/4"
Sandstone, fine- to medium-grained, crumbly, loosely cemented, with a few 1/4" pyritic nodules.
CGL 38 PMG-0.7
142' (Bottom of Box 5 and Bottom of core submitted to Columbus Laboratory)

NOTES

Core in general was received in good condition at Columbus, slightly moist in clayey sections as unpacked, but with little excess of moisture from drilling. Depth markings were provided for "pull" levels within the core shipped, and at top and bottom of each core box.

Twelve small specimens taken from the core reserve have been stored under water for preparation of thin sections of attrital coal.

Hole 4 (upper part)

DATES: Coal cored - 9/27/52
Shipment received at Columbus - 10/3/52
Described and sampled at Coal Geology Laboratory - 10/14/52

LOCATION: SENW sec. 28-24N-95W SURFACE ELEVATION: 6610'

42'6" (Top of Box 1 and Top of Core Sent to Columbus Laboratory)
Shale, medium gray, carbonaceous
TE 1 PMG-1.5 eU-0.006 U-0.004
43'
Shale, as above.
TE 2 PMG-1.9 eU-0.006 U-0.003
43'6-1/2"
Shale, dark gray at top, becoming progessively darker and coaly toward the bottom.
TE 3 PMG-5.0 eU-0.010 U-0.006
43'10-1/2"
Coal, moderately thin- and medium-banded; core split into thin laminae.
TE 4 PMG-2.4 eU-0.003 U-0.003
44'1-3/4"
Coal, abundantly thin- and medium-banded; core mostly in chips.
TE 5 PMG-0.9 eU-0.002 U-0.001
44'6-1/2"
Coal, sparsely thin-banded; core badly broken in upper half; 1/4" parting, carbonaceous shale, below 44'11-1/2", excluded from Bureau of Mines sample; impure coal below parting.
TE 6 PMG-3.4 eU-0.005 U-0.003
45'1/4"
3-3/4" shale, black with small gray clayey blebs; excluded from Bureau of Mines sample.
TE 7 PMG-5.1 eU-0.008 U-0.006
45'4"
4" shale, coaly; excluded from Bureau of Mines sample.
TE 8 PMG-2.7 eU-0.005 U-0.003
45'8"
Coal, sparsely thin-banded and attrital.
TE 9 PMG-4.5 eU-0.007 U-0.006

) Bureau of Mines Sample 570-4-1 Analyses requested: Prox. Sp. Gr. Ult. Btu Forms of S

) (Revised Sample 570-4-S4 to S15

) (Cont. on next page)

46'3/4") (Excl. S7,
Coal, sparsely thin-banded to dominantly attrital; core) S8 and
split and broken.) 1/4"
TE 10 PMG-3.9 eU-0.008 U-0.006) shale
46'7") parting in
Coal, impure; core broken.) S6))
TE 11 PMG-4.5 eU-0.006 U-0.005)
47'1/2")
Coal, sparsely thin-banded; core in part badly broken)
with some displacement.)
TE 12 PMG-2.0 eU-0.003 U-0.002)
47'6-1/2")
Coal, moderately thin-banded.)
TE 13 PMG-3.3 eU-0.005 U-0.004)
48')
Coal, sparsely thin-banded, with occasional medium)
bands; core broken and displaced in upper portion.)
TE 14 PMG-2.0 eU-0.004 U-0.003)
48'6")
Coal; core ground to <1/4" fragments.)
TE 15 PMG-1.4 eU-0.002 U-0.002)
48'8")
Shale, carbonaceous, dark gray; core nearly pulverized.
TE 16 PMG-1.0 eU-0.004 U-0.002
49'
Shale, buff to medium gray, carbonaceous.
TE 17 PMG-0.7 eU-0.002 U-0.001
49'8"
Shale, silty, dark, buff to gray, carbonaceous.
TE 18 PMG-0.6 eU-0.002 U-0.001
50'4"
1-1/2" loss in coring accumulated below 42'6".
50'5-1/2" (Bottom of Box 1 and of Core Received at Columbus Laboratory)

NOTES

The core was slightly moist when unpacked in the laboratory. Although in part the coal was badly broken, no evident displacement in shipment was noted. Depth markings were given for top and bottom of the core shipment.

Twenty small specimens of coal and high PMG shale from the reserve portions have been appropriately stored for later preparation of thin sections.

Hole 4 continued (lower part)

DATES: Coal cored - 10/14-17/52
Shipment received at Columbus - Boxes 2 and 3, 10/20/52
Boxes 4, 5 and 6, 10/23/52
Described and sampled at Coal Geology Laboratory - 10/20-27/52

480'4-3/4" (Top of Box 2)
Shale, carbonaceous.
S19-Lab PMG-0.6
481'1/2"
Shale, carbonaceous.
S20-Lab PMG-0.5
481'5"
Coal, sparsely thin-banded.
S21-TE PMG-0.7 eU-0.001 U-0.002
481'11"
Coal, dominantly attrital.
S22-TE PMG-0.4 eU-0.001 U-0.001
482'4"
Coal, dominantly attrital; core broken below 482'8".
S23-TE PMG-0.6 eU-0.001 U-0.001
482'9-1/2"
Coal, sparsely thin-banded; core badly broken.
S24-TE PMG-0.7 eU-0.002 U-0.001
483'1"
Coal, moderately thin-banded.
S25-TE PMG-0.5 eU-a U-0.001
483'6-1/4"
Coal, sparsely thin-banded.
S26-TE PMG-0.7 eU-a U-0.001
484' (Pull at this depth and bottom of Box 2 and top of Box 3)
1-1/4" shale parting, medium gray below 484', excluded from Bureau of Mines sample; 4" of coal, sparsely thin-banded below 484'1-1/4".
S27-TE PMG-0.1 eU-0.001 U-0.001
484'5-1/4"
Coal, dominantly attrital.
S28-TE PMG-0.3 eU-a U-a
484'10"
Coal, dominantly attrital.
S29-TE PMG-0.4 eU-0.001 U-0.001

) Bureau of Mines Sample 570-4-S21 to S42 (Excl. 1-1/4" shale parting in S27)
) Analyses requested:
) Sp. Gr.
) Prox.
) Ult.
) Btu
) Forms of S
) Ash fusion
) (Cont. on next page)

485'4")
Coal, dominantly attrital.)
S30-TE PMG-1.0 eU-0.002 U-0.001)
485'9-1/2")
Coal, moderately thin-banded.)
S31-TE PMG-0.4 eU-0.001 U-0.002) Bureau of
486'3") Mines
Coal, moderately thin- and medium-banded.) Sample
S32-TE PMG-0.7 eU-0.001 U-0.001) 570-4-S21
486'7-3/4") to 42
Coal, moderately thin-banded.) (Cont.)
S33-TE PMG-0.6 eU-a U-0.001)
487'1")
Coal, moderately thin- and medium-banded.)
S34-TE PMG-1.3 eU-0.002 U-0.002)
487'6-1/2")
Coal, abundantly medium- and thin-banded.)
S35-TE PMG-1.5 eU-0.002 U-0.002)
488')
Coal, moderately thin- and medium-banded.)
S36-TE PMG-0.8 eU-0.002 U-0.001)
488'5-1/2")
Coal, abundantly thin-banded except for one 1-3/4")
vitrain band below 488'6-3/4".)
S37-TE PMG-0.3 eU-a U-0.001)
488'9")
Coal, sparsely thin-banded.)
S38-TE PMG-0.5 eU-a U-0.001)
489'2")
Coal, dominantly medium- and thin-banded.)
S39-TE PMG-0.6 eU-0.002 U-0.002)
489'6-1/2")
Coal, sparsely thin-banded; upper 3" broken in coring.)
S40-TE PMG-3.1 eU-0.006 U-0.005)
489'11-3/4")
Coal, sparsely thin- and medium-banded.)
S41-TE PMG-3.2 eU-0.006 U-0.005)
490'5-1/2")
Coal, sparsely thin- and medium-banded.)
S42-TE PMG-1.1 eU-0.001 U-0.001)
490'8-3/4"
Sandstone, fine-grained, light gray with occasional thin coaly streaks; grades to siltstone, light gray below 491'1/2".
S42-Lab. PMG-0.4

491'4-1/2"
Siltstone, light gray with occasional coaly streaks; 1/2" sandstone, fine-grained, very light gray, below 491'10-1/2".
S44-Lab. PMG-0.2

491'11"
3-1/2" loss in coring accumulated below 484'.

492'2-1/2" (Bottom of Box 3)
34'9-1/2" core not sent to Columbus Laboratory.

527'(Top of Box 4)
Shale, light gray with occasional dark gray streaks.
S45-Lab. PMG-0.6

527'10-1/2"
Shale, light gray.
S46-Lab PMG-0.7

528'5-1/2"
3" coaly shale below 528'5-1/2"; 3-1/4" coal, impure partially thin-banded below 528'8-1/2"; 1/4" shale, light gray with small coal fragments below 528'11-3/4".

529'
Shale, medium-gray, slightly carbonaceous.
S48-TE PMG-1.2 eU-0.003 U-0.003

529'9"
Shale, highly carbonaceous, black.
S49-TE PMG-2.3 eU-0.004 U-0.003

529'10"
Coal, sparsely medium- and thin-banded.
S50-TE PMG-0.5 eU-0.002 U-a

530'3-1/2"
Coal, sparsely medium- and thin-banded.
S51-TE PMG-1.1 eU-0.002 U-0.002

530'9-1/4"
Coal, moderately medium- and thin-banded.
S52-TE PMG-0.7 eU-0.001 U-0.001

531'2-3/4"
Coal, sparsely medium- and thin-banded.
S53-TE PMG-1.4 eU-0.003 U-0.003

531'8"
Coal, moderately medium- and thin-banded.
S54-TE PMG-0.9 eU-0.002 U-0.002

532'2"
Coal, sparsely thin-banded; core broken.
S55-TE PMG-1.1 eU-0.002 U-0.002

532'7"
Coal, sparsely thin-banded.
S56-TE PMG-0.3 eU-0.001 U-0.001

) Bureau of Mines Sample 570-4-S50 to S63 (Excl. S61) Analyses requested: Sp. Gr. Prox. Ult. Btu Forms of S Ash fusion

(Cont. on next page)

533'3/4")
Coal, sparsely thin-banded; core badly broken.) Bureau of
S57-TE PMG-1.2 eU-0.003 U-0.002) Mines
533'5-1/2") Sample
Coal, abundantly thin- and medium-banded.) 570-4-S50
S58-TE PMG-1.7 eU-0.003 U-0.003) to S63
533'10-1/2") (Cont.)
Coal, abundantly medium- and thick-banded; core)
broken.)
S59-TE PMG-1.3 eU-0.004 U-0.004)
534'4")
Coal, moderately thin- and medium-banded; core)
broken.)
S60-TE PMG-2.3 eU-0.004 U-0.003)
543'10")
2" loss in coring accumulated below 529'10")
535' (Bottom of Box 4 and Top of Box 5))
Shale, coaly, medium gray, broken with coal fragments)
(possibly from layer below); excluded from Bureau of)
Mines sample.))
All core material included in S61-TE)
PMG-1.4 eU-0.002 U-0.001)
535'1-1/2")
Coal, abundantly medium- and thin-banded; upper 1-1/2")
broken in coring.)
S62-TE PMG-1.0 eU-0.002 U-0.002)
535'6")
Coal, sparsely thin-banded; core broken.)
S63-TE PMG-0.7 eU-0.001 U-0.001)
535'9-3/4"
Shale, silty, light gray and slightly carbonaceous.
S64-TE PMG-0.8 eU-0.002 U-0.001
536'3-3/4"
Shale, silty, light gray with occasional coal fragments.
S65-TE PMG-0.7 eU-0.003 U-0.001
537' (Bottom of Box 5)
47'9" core not sent to Columbus Laboratory.
584'9" (Top of Box 6)
Shale, silty, light gray; lower 1/4" slightly carbonaceous.
S66-Lab. PMG-0.6

585'1-1/2"
Coal, moderately thin-banded.
S67-Lab. PMG-0.1
585'7-1/2"
Coal, abundantly thin- and medium-banded.
S68-Lab. PMG-0.3
586'1-1/2"
Coal, moderately medium- and thin-banded.
S69-TE PMG-1.4 eU-0.003 U-0.004
586'6-1/4"
Shale, medium gray and slightly coaly.
S70-TE PMG-0.8 eU-0.003 U-0.001
587'2" (Bottom of Box 6 and Bottom of Core Sent to Columbus Laboratory)

NOTES

The lower coals from this hole are described in this report separately from the upper coal, previously described in Coal Geology Laboratory Report No. 57, because of the lapse of time between receipt of the upper and lower core sections from this drill hole. Core in box 2 was visibly dry; that in boxes 3, 4, 5 and 6 was damp or moist, as received. Depths were clearly marked at "pull" levels and at top and bottom of each core box.

Hole 5

DATES: Coal cored - 9/28/52
Shipment received at Columbus - 10/3/52
Described and sampled at Coal Geology Laboratory - 10/13/52

LOCATION: SENW 15-24N--95W SURFACE ELEVATION: 6580'

99'3-1/3" (Top of Box 1 and Top of Core sent to Columbus Laboratory)
Coal, shaley.
TE 1 PMG-3.5 eU-0.007 U-0.006
99'6"
Shale, clayey, slightly carbonaceous and coaly.
TE 2 PMG-2.4 eU-0.006 U-0.005
99'9"
Shale, black, coaly.
TE 3 PMG-4.0 eU-0.009 U-0.007

99'11-1/2"
Coal, sparsely thin- and medium-banded, with 1/2" vitrain band below 100'3"; pull depth recorded at 100'.
TE 4 PMG-2.2 eU-0.006 U-0.005

100'5-1/2"
Shale, black, coaly; becomes coal, shaley from 100'9" to 100'10".
TE 5 PMG-3.9 eU-0.011 U-0.008

100'10"
Shale, medium gray, slightly carbonaceous.
CGL (and TE) 1 PMG-2.7 eU-0.008 U-0.005

101'1-1/2"
Shale, black, with coaly streaks, more coaly toward bottom.
TE 6 PMG-3.9 eU-0.008 U-0.006

101'8"
Coal, abundantly thin-banded.
TE 7 PMG-4.2 eU-0.011 U-0.008

102'
Coal, moderately thin- and medium-banded, with attrital zone from 102'1-1/2" to 102'2-1/2".
TE 8 PMG-3.8 eU-0.014 U-0.014

102'5"
Coal, mostly sparsely thin-banded.
TE 9 PMG-5.7 eU-0.011 U-0.008

102'11"
Coal, sparsely to moderately thin-banded, with 1/2" vitrain band below 103'3".
TE 10 PMG-6.9 eU-0.015 U-0.012

103'5"
Coal, moderately thin- and medium-banded, 1/4" vitrain below 103'8-3/4".
TE 11 PMG-3.1 eU-0.006 U-0.006

103'10"
Coal, attrital or sparsely thin-banded.
TE 12 PMG-3.0 eU-0.006 U-0.006

Bureau of Mines Sample 570-5-1 Analyses requested: Sp. Gr. Prox. Ult. Btu Forms of S

104'2-3/4"
Clay, soft carbonaceous; gradational to shale, dark gray, carbonaceous, below 104'5"; some disturbance of top clay during drilling.
TE 13 PMG-3.7 eU-0.015 U-0.013

104'8"
Shale, clayey, dark gray, carbonaceous.
TE 14 PMG-3.2 eU-0.012 U-0.009

105'2"
Shale, dark gray, carbonaceous.
TE 15 PMG-2.5 eU-0.010 U-0.008

105'7-1/2"
Sandstone, poorly sorted, greenish.
CGL 2 PMG-0.6
106'4"
3/4" loss in coring accumulated below 99'3-1/2".
106'4-3/4" (Bottom of Box 1 and Bottom of Core received from Hole 5 at the Columbus Laboratory)

NOTES

Core was received in good condition with but little excess of moisture from drilling. Depths were marked for "pull" level and at top and bottom of the core box. The under-clay from 104'2-3/4" to 104'5" was apparently softened during drilling and the 3/4" loss accumulated at 106'4" probably was in that clay zone.

Five small coal specimens taken from the core reserve have been stored under water for later preparation of thin sections.

Hole 6

DATES: Coal cored - 10/6/52
Shipment received at Columbus - 10/13/52
Described and sampled at Coal Geology Laboratory - 10/15/52

LOCATION: SWNE 10-24N-95W SURFACE ELEVATION: 6605'

194'10-3/4" (Top of Box 1 and Top of Core sent to Columbus Laboratory)
Shale, black carbonaceous; 3/8" vitrain lense below 195'1-1/2".
TE 1 PMG-2.9 eU-0.008 U-0.006
195'2"
Coal, moderately thin-banded, shaley.
TE 2 PMG-2.5 eU-0.003 U-0.003
195'7-1/2"
Coal, sparsely thin-banded and shaley.
TE 3 PMG-3.8 eU-0.008 U-0.006
196'1-1/2"
Shale, black clayey and coaly.
TE 4 PMG-3.1 eU-0.006 U-0.006
196'7-3/4"
Coal, sparsely thin- and medium-banded.
TE 5 PMG-8.5 eU-0.009 U-0.011

) Bureau of Mines Sample 570-6-1 Analyses requested:
) (Cont. on next page)

196'10-1/2")
Coal, shaley, breaks into thin laminae.) Sp. Gr.
TE 6 PMG-5.8 eU-0.008 U-0.009) Prox.
197'2-3/4") Ult.
Coal, dominantly attrital, impure, with 1/4" layer of) Btu.
interbedded fusain and vitrain below 197' 6-1/2".) Forms of
TE 7 PMG-4.9 eU-0.009 U-0.008) S
197'9") Ash fusion
Shale, black, coaly.)
TE 8 PMG-4.1 eU-0.009 U-0.006)
198'1/2")
Shale, black, coaly.)
TE 9 PMG-4.4 eU-0.009 U-0.007)
198'5")
19" loss in coring accumulated below 194'10-3/4".)
200' (Pull at this depth))
Shale, black, coaly.)
TE 10 PMG-12.1 eU-0.016 U-0.016)
200'3")
Coal, shaley.)
TE 11 PMG-10.2 eU-0.012 U-0.015)
200'6")
Coal, shaley, broken and possibly mixed with shale)
from below.)
TE 12 PMG-6.3 eU-0.009 U-0.008)
200'9-1/2"
Shale, black, carbonaceous.
TE 13 PMG-2.5 eU-0.007 U-0.004
201'1-1/2"
Clay, greenish gray.
TE 14 PMG-5.2 eU-0.010 U-0.008
201'5"
4-1/2" loss in coring accumulated below 200'.
201'9-1/2" (Bottom of Box 1 and Bottom of Core received from Hole 6 at the Columbus Laboratory)

NOTES

Core was in good condition and moist when received. Depths were marked for "pull" level and at top and bottom of the core box.

Coal and shale material taken from the core reserve have been preserved in wax and under water for possible later preparation of thin sections.

It will be noted that the Bureau of Mines sample 570-6-1 contains both impure coal and coaly shale, without rejection. Consideration of the thicknesses involved, and the PMG values, suggested that the combustion characteristics of the interval as a whole would beof greatest interest.

Hole 7

DATES: Coal cored - 10/8/52
Shipment received at Columbus - 10/15/52
Described and sampled at Coal Geology Laboratory - 10/17/52

LOCATION: NWSW 20-24N-95W SURFACE ELEVATION: 6560'

37'1/2" (Top of Box 1 and top of core sent to Columbus Laboratory)
Shale, dark gray, carbonaceous, 1/2" black and coaly below 37'6-1/2".
S1-TE PMG-1.7 eU-0.005 U-0.003

37'7"
Coal, dominantly attrital.
S2-TE PMG-2.7 eU-0.003 U-0.003

37'10-1/2"
Coal, sparsely thin-banded.
S3-TE PMG-2.0 eU-0.002 U-0.002

38'2-1/2"
Shale, black, coaly top 1/4" pyritic; excluded from Bureau of Mines sample.
S4-TE PMG-2.4 eU-0.007 U-0.004

38'6"
Coal, sparsely thin-banded, 1/2" vitrain band below 38'8-1/4"; core broken in 1/2" layers, disarranged.
S5-TE PMG-1.3 eU-0.002 U-0.002

39'
Coal, sparsely thin-banded.
S6-TE PMG-3.8 eU-0.004 U-0.003

39'2"
Shale, carbonaceous, dark gray; excluded from Bureau of Mines sample.
S7-TE PMG-2.8 eU-0.007 U-0.004

39'4"
Coal, dominantly attrital.
S8-TE PMG-2.5 eU-0.004 U-0.003

39'8"
Coal, dominantly attrital.
S9-TE PMG-3.9 eU-0.002 U-0.003

Bureau of Mines Sample 570-7-S2 to 15 (Excl. S4 and S7) Analyses requested:
Sp. Gr.
Prox.
Ult.
Btu
Forms of S
Ash fusion

(Cont. on next page)

39'8"				)
Coal, dominantly attrital.				) Bureau of
S9-TE	PMG-1.4	eU-0.002	U-0.003	) Mines
40' (Pull at this depth)				) Sample
Coal, upper 2-1/2" abundantly thin- and medium-banded;				) 570-7-S2
lower 3-1/2" dominantly attrital.				) to 15
S10-TE	PMG-2.6	eU-0.004	U-0.004	) (Cont.)
40'6"				)
Coal, dominantly attrital.				)
S11-TE	PMG-2.0	eU-0.005	U-0.005	)
41'1/2"				)
Coal, sparsely thin-banded.				)
S12-TE	PMG-4.2	eU-0.008	U-0.008	)
41'6-1/2"				)
Coal, dominantly attrital.				)
S13-TE	PMG-1.6	eU-0.003	U-0.002	)
42'1/2"				)
Coal, dominantly attrital; 1/2" clayey shale parting				)
below 42'4-1/4" excluded from Bureau of Mines sample.				)
S14-TE	PMG-1.0	eU-0.002	U-0.002	)
42'8"				)
Coal, dominantly attrital.				)
S15-TE	PMG-1.7	eU-0.002	U-0.002	)
42'11"				
Shale, dark buff; upper 1" carbonaceous.				
S16-Lab.	PMG-0.7			
43'5"				
Shale, clayey, light and medium gray.				
S17-Lab.	PMG-0.9			
43'9"				
Shale, dark to medium buff.				
S18-Lab.	PMG-0.7			
44'5"				
Shale, dark buff.				
S19-Lab.	PMG-0.7			
44'7-1/2"				
4-1/2" loss in coring accumulated below 40'.				
45' (Pull at this depth)				
S20-Lab.	PMG-0.8			
45'5-1/2"				
Shale, buff.				
S21-Lab.	PMG-0.6			
45'11" (Bottom of core submitted to Columbus Laboratory)				

Hole 8

DATES: Coal cored - 10/11/52
Shipment received at Columbus - 10/20/52
Described and sampled at Coal Geology Laboratory - 10/31/52

LOCATION: NESW sec. 22-24N-96W SURFACE ELEVATION: 6715'

90'4-3/4" (Top of Box 1 and Top of core sent to Columbus Laboratory)
Coal, moderately thin-banded; 1/2" pyritic lens below 90'8-1/4".

S1-TE	PMG-0.4	eU-a	U-a	

90'11"
Coal, dominantly attrital.

S2-TE	PMG-0.3	eU-0.001	U-0.001	

91'4-1/2"
Coal, dominantly attrital.

S3-TE	PMG-0.6	eU-a	U-0.001	

91'9-1/2"
Coal, moderately thin-banded, slightly pyritic throughout; 1/2" zone of small pyritic lenticles below 91'10-1/4".

S4-TE	PMG-0.8	eU-0.002	U-0.001	

92'3"
Coal, sparsely thin-banded, slightly pyritic; 1" shale parting, black and highly carbonaceous below 92'50-3/4"; parting excluded from Bureau of Mines sample (included with S5).

S5-TE	PMG-0.4	eU-0.001	U-0.001	

92'9"
Shale, black and highly carbonaceous; 1/4" shale, light gray, below 92'10-1/4"; layer excluded from Bureau of Mines sample.

S6-Lab.	PMG-0.7			

92'10-1/2"
12-1/2" loss in coring accumulated below 90'4-3/4".
94'0" (Pull at this depth)
Shale, light gray and clayey; 1" carbonaceous below 94'1-3/4" and also below 94'5-3/4"; layer excluded from Bureau of Mines sample.

S7-Lab.	PMG-0.6			

94'6-3/4"
Coal, sparsely thin-banded; core broken into biscuits and slightly displaced.

S8-TE	PMG-0.6	eU-0.001	U-0.001	

Bureau of Mines Sample No. 570-8-S1 thru 5 and 8 thru 11 (Excl. 1" shale parting below 92' 5-3/4")
Analyses requested:
Sp. Gr.
Prox.
Btu
S

(Cont. on next page)

95'1") Bureau of
Coal, pulverized in drilling.) Mines
S9-TE PMG-0.4 eU-a U-0.001) Sample No.
95'6") 570-8-S1
Coal, pyritic, pulverized in drilling.) thru 5 and
S10-TE PMG-0.7 eU-0.001 U-0.001) 8 thru 11
95'11") (Cont.)
Coal, pyritic, pulverized in drilling.)
S11-TE PMG-0.8 eU-0.002 U-0.002)
96'4"
Coal and carbonaceous shale, pulverized and mixed in coring.
S12-TE PMG-0.5 eU-0.001 U-0.001
96'10"
2" loss in coring (?) accumulated below 94'0".
97'0" (Bottom of Box 1 and Bottom of core submitted to Columbus Laboratory)

NOTES

Core was moist as received but was pulverized below 95'1". 19.6% of the cored interval as submitted apparently was lost in coring, and the depths above and below the "pull" at 94' must be regarded as only approximate.

Hole 9

DATES: Coal cored - 10/17/52
Shipment received at Columbus - 10/23/52
Described and sampled at Coal Geology Laboratory - 11/3/52

LOCATION: NESW sec. 2-24N-95W SURFACE ELEVATION: 6620'

190'3-1/2" (Top of Box 1 and Top of core sent to Columbus Laboratory)
Shale, medium gray, slightly carbonaceous.
S1-TE PMG-4.8 eU-0.016 U-0.013
190'8-1/4"
Shale, black, highly carbonaceous.
S2-TE PMG-5.9 eU-0.014 U-0.013
190'11-1/4"
Shale, coaly; core broken below 191'3-1/2".
S3-TE PMG-4.7 eU-0.008 U-0.010

191'5"
Shale, black, carbonaceous.
S4-TE PMG-4.2 eU-0.008 U-0.008
191'7-1/2"
Shale, medium gray, slightly carbonaceous; 1/2" black shale band below 192'1/2".
S5-TE PMG-2.7 eU-0.007 U-0.006
192'1"
Shale, coaly and coal impure.
S6-TE PMG-5.8 eU-0.010 U-0.009
192'3-1/4"
Shale, black.
S7-TE PMG-4.1 eU-0.010 U-0.009
192'5-1/2"
Shale, medium gray.
S8-TE PMG-2.7 eU-0.009 U-0.008
192'9"
Shale, black, clayey below 193'.
S9-TE PMG-3.0 eU-0.009 U-0.007
193'3-1/2"
Shale, black;.
S10-TE PMG-3.5 eU-0.011 U-0.009
193'9-1/2"
Coal, shaley; 3/4" coaly shale below 193'9-1/2".
S11-TE PMG-4.0 eU-0.009 U-0.009
194'3/4"
Coal, abundantly thin- and medium-banded.
S12-TE PMG-3.5 eU-0.005 U-0.006
194'5-3/4"
Coal, principally thick woody band with uniformly finely dispersed pyrites; 1/2" black shale below 194'5-3/4".
S13-TE PMG-2.8 eU-0.003 U-0.005
194'8"
Coal and black shale; core pulverized and mixed.
S14-TE PMG-4.7 eU-0.005 U-0.009
194'11"
13" loss in coring accumulated below 190'3-1/2".
196'0" (Pull at this depth)
Shale, black.
S15-TE PMG-7.6 eU-0.018 U-0.018
196'3-1/2" (Bottom of Box 1 and Bottom of core submitted to Columbus Laboratory)

) Bureau of Mines Sample No. 570-9-S11 thru 14 Analyses requested: Prox. Btu S

NOTES

Core was slightly moist as received and was broken into biscuits less than 2" thick throughout; the pulverized zone of sample No. S14 appears to be largely responsible for the 18% loss in coring.

Seventeen small coal and carbonaceous shale specimens have been stored under water and in wax for later preparation of thin sections.

Hole 10

DATES: Coal cored - 10/18 and 20/52
Shipment received at Columbus - 10/23 and 28/52
Described and sampled at Coal Geology Laboratory - 11/5 and 6/52

LOCATION: NESW sec. 17-23N-94W SURFACE ELEVATION: 6510'

0'0"
54'7-1/4" core not sent to Columbus Laboratory.
54'7-1/4" (Top of Box 1 and Top of core sent to Columbus Laboratory)
Shale, black.

S1-TE	PMG-0.7	eU-0.002	U-0.001	

55'1"
Coal, dominantly thick-banded; core broken.

S2-TE	PMG-0.4	eU-0.002	U-0.001	) Bureau of Mines Sample No. 570-10-S2 thru S20 (Excl. 1" shale parting of S14, and all of S17 and S18.)

55'6"
Coal, sparsely thin-banded.

S3-TE	PMG-1.4	eU-0.002	U-0.001	

55'11-1/2"
Coal, moderately thin- and thick-banded.

S4-TE	PMG-1.1	eU-0.003	U-0.002	

56'2-1/2"
Coal, moderately thin-banded; 1-1/4" vitrain band below 56'3-1/4"; core broken.

S5-TE	PMG-1.8	eU-0.002	U-0.007	

56'7-1/2"
Coal, moderately thin- to thick-banded.

S6-TE	PMG-2.1	eU-0.004	U-0.002	

57'2"
Coal, dominantly thick-banded.

S7-TE	PMG-0.4	eU-a	U-0.001	

(Cont. on next page)

57'6-1/2"
Coal, sparsely thin- and medium-banded.
S8-TE PMG-1.0 eU-0.001 U-0.001
58'0"
Coal, moderately thin-banded.
S9-TE PMG-0.3 eU-0.001 U-0.001
58'4-1/4"
Coal, moderately medium-banded.
S10-TE PMG-0.5 eU-0.001 U-0.001
58'8-1/2"
Coal, sparsely thin-banded.
S11-TE PMG-1.1 eU-0.003 U-0.001
59'1-1/2"
Coal, sparsely thin-banded; 3/4" vitrain band below 59'2-3/4".
59'7"
Coal, abundantly medium- and thick-banded.
S13-TE PMG-0.7 eU-0.002 U-a
59'11-1/2"
1/2" loss in coring accumulated below 54'7-1/4".
60'0" (Pull at this depth)
Coal, sparsely thin-banded; 1" shale, black, below 60'0"; parting excluded from Bureau of Mines sample.
S14-TE PMG-2.0 eU-0.004 U-0.004
60'6"
Coal, sparsely thin-banded.
S15-TE PMG-1.8 eU-0.002 U-0.002
60'11"
Coal, moderately thin- and medium-banded.
S16-TE PMG-2.1 eU-0.004 U-0.003
61'2"
Shale, black, coaly and coal sparsely medium- and thin-banded; layer excluded from Bureau of Mines sample.
S17-TE PMG-1.9 eU-0.005 U-0.003
61'8-1/2"
Shale, black, coaly; layer excluded from Bureau of Mines sample.
S18-TE PMG-1.7 eU-0.004 U-0.004
62'3"
Coal, moderately thin- and medium-banded; 2" vitrain band below 62'5-1/4".
S19-TE PMG-2.4 eU-0.005 U-0.005
62'8"
Coal, moderately medium- and thin-banded; 1/8" fusain parting below 62'9-3/8"; 3/4" vitrain band below 62'11-1/4".
S20-TE PMG-1.6 eU-0.005 U-0.008

Analyses requested:
Sp. Gr.
Prox.
Btu
S

63'1"
Shale, black, slightly coaly.
S21-TE PMG-2.1 eU-0.005 U-0.003
63'7"
Shale, black, coaly.
S22-TE PMG-1.5 eU-0.005 U-0.003
63'11-1/2"
Shale, black and coal; core broken and mixed.
S23-TE PMG-2.6 eU-0.006 U-0.004
64'3"
1/2" loss in coring accumulated below 60'0".
64'3-1/2" (Bottom of Box 1 and Top of Box 2)
Shale, black, coaly.
S24-TE PMG-2.2 eU-0.006 U-0.004
64'10"
Coal, sparsely thin-banded; 1-1/2" vitrain band below 64'3/4".
S25-TE PMG-2.0 eU-0.003 U-0.003
65'2-1/2"
Coal, sparsely thin-banded; 1/2" vitrain bands below 65'8-1/2" and 66'.
S26-TE PMG-2.1 eU-0.003 U-0.002
65'8-1/2"
Coal, sparsely thin-banded; 1/2" vitrain bands below 65'8-1/2" and 66'.
S27-TE PMG-0.6 eU-0.001 U-0.001
66'2"
Coal, sparsely thin-banded; 1" vitrain band below 66'6-1/4".
S28-TE PMG-0.9 eU-0.002 U-0.002
66'8"
Shale, dark gray, carbonaceous; core broken; layer excluded from Bureau of Mines sample.
S29-TE PMG-3.3 eU-0.008 U-0.005
67'
Coal, abundantly thick- and thin-banded; 1/2" shale, black, below 67'5-1/2"; parting excluded from Bureau of Mines sample.
S30-TE PMG-4.0 eU-0.008 U-0.006
67'6" (Pull at this depth)
Coal, moderately thin-banded.
S31-TE PMG-7.7 eU-0.011 U-0.009
67'8-1/4"
Shale, black with gray streaks, carbonaceous.
S32-TE PMG-2.[illegible] U-0.004 U-0.003

) Bureau of Mines) Sample No.) 570-10-S25) thru S31) (Excl. S29) and 1/2") shale) parting in) S30)) Analyses) requested:) Sp. Gr.) Prox.) Ult.) Btu) Forms of S

68'3"

Shale, black, coaly and shaley coal.

S33-TE PMG-2.9 eU-0.004 U-0.004

68'8-1/2"

Coal, moderately thin-banded, and shale (possibly displaced from above); core broken and mixed.

S34-TE PMG-2.4 eU-0.004 U-0.003

69'1/2"

Coal, abundantly thin- and medium-banded; 1/2" coaly shale below 69'2-3/4"; parting excluded from Bureau of Mines sample.

S35-TE PMG-1.5 eU-0.003 U-0.002

69'6-1/2"

Coal, abundantly thin- and medium-banded.

S36-TE PMG-3.1 eU-0.005 U-0.003

69'11-1/4"

Coal, sparsely thin-banded; 3/8" vitrain band below 70'3-1/8".

S37-TE PMG-1.5 eU-0.003 U-0.002

70'3-1/2"

Coal, moderately thin-banded.

S38-TE PMG-1.6 eU-0.003 U-0.002

70'8"

Coal, sparsely thin-banded.

S39-TE PMG-0.9 eU-0.002 U-0.001

71'1-1/2"

Coal, sparsely thin-banded; 2-3/4" black coaly shale, below 71'2-1/4"; parting excluded from Bureau of Mines sample.

S40-TE PMG-2.6 eU-0.006 U-0.003

71'6"

Coal, sparsely thin- and medium-banded; 1/4" fusain parting below 71'9-1/4".

S41-TE PMG-1.9 eU-0.005 U-0.003

) Bureau of Mines Sample No. 570-10-S35 thru S41 (Excl. 1/2" shale of S35 and 2-3/4" shale of S40) Analyses requested: Sp. Gr. Prox. Btu S

71'11"

Shale, black, coaly with thick vitrain bands.

S42-TE PMG-1.4 eU-0.005 U-0.005

72'4"

Coal, sparsely thin-banded; 1/2" vitrain band below 72'5-1/2".

S43-TE PMG-3.0 eU-0.006 U-0.004

72'6-3/4"

Coal, shaley; 1-1/4" carbonaceous black shale below 72'6-3/4".

S44-TE PMG-1.7 eU-0.004 U-0.003

72'11-3/4"

5" loss in coring accumulated below 67'6".

73'4-3/4" (Bottom of Box 2 and Top of Box 3)
Coal, abundantly thin- and medium-banded.
S45-TE PMG-1.4 eU-0.003 U-0.001
73'9-1/2"
Coal, dominantly medium-banded.
S46-TE PMG-1.0 eU-0.003 U-0.002
74'3-1/2"
Coal, dominantly medium-banded; 1/4" fusain parting below 74'3-1/2"; 2" vitrain band below 74'3-3/4"; 1" carbonaceous black shale below 74'6-1/2"; shale parting excluded from Bureau of Mines sample.
S47-TE PMG-1.5 eU-0.005 U-0.003
74'7-1/2"
Coal, abundantly medium- and thick-banded; 3/8" fusain parting below 74'11-5/8".
S48-TE PMG-1.4 eU-0.002 U-0.002
75'1-1/4"
Coal, moderately thin- and thick-banded.
S49-TE PMG-1.3 eU-0.002 U-0.001
75'5-3/4"
Coal, dominantly attrital; 1/2" vitrain band below 75'8-1/4".
S50-TE PMG-2.7 eU-0.004 U-0.003
75'9-3/4"
Coal, abundantly medium-banded.
S51-TE PMG-1.0 eU-0.002 U-0.002
76'3"
Clay, medium gray, carbonaceous.
S52-TE PMG-0.8 eU-0.002 U-0.001
76'6" (Pull marked at this depth)
Clay, shaley, medium gray, with coaly streaks.
S54-TE PMG-0.6 eU-0.003 U-0.001
77'2"
Clay, dark gray, carbonaceous.
S54-TE PMG-1.0 eU-0.003 U-0.002
77'4-1/2"
Clay, shaley, medium gray.
S55-TE PMG-0.8 eU-0.003 U-0.001
78'
Clay, shaley, medium gray.
S56-TE PMG-0.9 eU-0.002 U-a
78'6"
1-1/4" loss in coring accumulated below 76'6".

) Bureau of Mines Sample No. 570-10-S45 thru S51 (Excl. 1" shale of S47) Analyses requested: Sp. Gr. Prox. Btu S

78'7-1/4" (Bottom of Box 3)
62'10-3/4" core not sent to Columbus Laboratory.
141'6" (Top of Box 4)
Shale, light gray, slightly carbonaceous.
S57-TE PMG-0.8 eU-0.002 U-a
141'11-1/2"
Shale, as above.
S58-TE PMG-0.8 eU-0.002 U-a
142'5"
Shale, light gray, slightly carbonaceous.
S59-TE PMG-0.7 eU-0.002 U-a
142'10-1/2"
1-1/2" loss in coring accumulated below 141'6".
143' (Pull marked at this depth)
Shale, clayey, dark gray, carbonaceous; 1/4" coaly black shale below 143'7-3/4".
S60-TE PMG-0.7 eU-0.002 U-a
143'8"
Coal, sparsely thin-banded; 1-1/4" vitrain band below 143'9-7/8" and 3/4" vitrain band below 144'3/8".) Bureau of Mines Sample No. 570-10-S61 thru S66 (Excl. 1-1/4" shale of S65) Analyses requested: Sp. Gr., Prox., Btu, S
144'1-1/2"
Coal, sparsely thin-banded.
S62-TE PMG-0.8 eU-a U-0.001
144'6-1/2"
Coal, moderately thin- and medium-banded.
S63-TE PMG-0.6 eU-0.001 U-0.001
144'11-1/2"
Coal, moderately thin- and medium-banded.
S64-TE PMG-1.0 eU-0.001 U-0.001
145'4-1/2"
Coal, sparsely thin- and medium-banded; 1-1/4" coaly black shale below 145'4-1/2"; parting excluded from Bureau of Mines sample.
145'9-1/2"
Coal, moderately thin- and medium-banded; 1/2" vitrain band below 145'11-1/2".
S66-TE PMG-1.5 eU-0.004 U-0.003
146'2"
Shale, black, carbonaceous.
S67-TE PMG-2.7 eU-0.005 U-0.004
146'5"
Coal, shaley.
S68-TE PMG-1.1 eU-0.004 U-0.002

146'7-1/2"
Coal, moderately thin- and medium-banded.
S69-TE PMG-2.4 eU-0.005 U-0.003
147'1"
Coal, shaley, and shale, coaly.
S70-TE PMG-3.3 eU-0.008 U-0.006
147'7-1/2"
Coal, moderately thin-banded; 1/2" vitrain band below 147'7-3/4".
S71-TE PMG-2.4 eU-0.005 U-0.004
148'1"
Coal, abundantly thin- to thick-banded.
S72-TE PMG-0.5 eU-a U-0.001
148'6"
Coal, moderately thin- and medium-banded.
S73-TE PMG-1.5 eU-0.003 U-0.002
149'
Coal, sparsely thin-banded.
S74-TE PMG-0.7 eU-a U-0.001
149'5-1/2"
Coal, dominantly thin-banded; 1-1/4" vitrain band below 149'9-1/4".
S75-TE PMG-0.7 eU-0.002 U-0.001
149'10-1/2"
Coal, dominantly thin-banded; 1/2" vitrain band below 150'1/2".
S76-TE PMG-0.8 eU-0.001 U-0.001
150'1-1/2"
Coal, dominantly thin- and thick-banded.
S77-TE PMG-3.0 eU-0.007 U-0.008
150'6"
Coal, dominantly thin-banded.
S78-TE PMG-3.5 eU-0.007 U-0.007
150'10-1/2"
2-3/4" loss in coring accumulated below 143'.
151'1-1/4" (Bottom of Box 4 and Top of Box 5)
Coal, sparsely thin-banded; 1-1/4" vitrain below 151'5-1/4".
S79-TE PMG-0.5 eU-0.001 U-0.001
151'5-1/2"
Coal, sparsely thin-banded.
S80-TE PMG-1.7 eU-0.002 U-0.003
151'11-1/2"
Coal, sparsely thin-banded.
S81-TE PMG-2.5 eU-0.007 U-0.005

) Bureau of Mines Sample No. 570-10-S71 thru S82. Analyses requested: Sp. Gr. Prox. Ult. Btu Forms of S

(Cont. on next page)

152'5-1/2") Bureau of
Coal, dominantly attrital.) Mines
S82-TE PMG-4.9 eU-0.007 U-0.007) Sample No.
152'9-3/4") 570-10-S71
2-1/4" loss in coring accumulated below 151'1-1/4".) thru S82
153' (Pull marked at this depth) (Cont.)
Shale, and clay, black, carbonaceous.
S83-TE PMG-3.8 eU-0.011 U-0.008
153'5-1/2"
Shale, dark gray, carbonaceous.
S84-TE PMG-1.7 eU-0.006 U-0.004
154'1/2"
Shale, medium gray, carbonaceous.
S85-TE PMG-1.4 eU-0.006 U-0.003
154'8" (Bottom of Box 5 and Bottom of Core submitted to Columbus Laboratory)

NOTES

Core appeared dry when unpacked and was somewhat mixed in Boxes 1 and 2. For the most part a reasonable reconstruction of core relationships was probably achieved, but a sampling error must exist in excess of that indicated by depths and descriptions given in the record above, down to a depth of 73'4-3/4".

Forty-one small specimens of coal, principally attrital, have been stored under water for later preparation of thin sections.

Hole 11

DATES: Coal cored - 10/19 to 21/52
Shipment received at Columbus - 10/23 and 28/52
Described and sampled at Coal Geology Laboratory -11/6 thru 8/52

LOCATION: NWNW sec. 27-23N-94W SURFACE ELEVATION: 6660'

0'0"
30'3-1/2" core not sent to Columbus Laboratory
30'3-1/2" (Top of Box 1 and Top of Core sent to Columbus Laboratory)
Siltstone, very fine-grained, tan, unconsolidated.
S1-TE PMG-0.8 eU-0.002 U-0.001

31'3-3/4"
Siltstone, light gray.
S2-TE PMG-0.8 eU-0.004 U-0.002
31'4-1/2"
Shale, black, carbonaceous; core broken and mixed with coal fragments, possibly from sample below.
S3-TE PMG-1.1 eU-0.002 U-0.002
31'7"
Shale, black and coal, gypsiferous; badly broken and mixed.
S4-TE PMG-1.1 eU-0.002 U-0.003
32'
Coal, core badly broken.
S5-TE PMG-1.1 eU-0.002 U-0.002
32'5"
Coal, core badly broken; one thick band of vitrain noted in fragments.
S6-TE PMG-1.2 eU-0.003 U-0.003
32'11"
Coal, sparsely thin-banded; core badly broken.
S7-TE PMG-1.6 eU-0.004 U-0.004
33'5"
Coal, sparsely thin-banded; 1/2" shale, black below 33'7-1/2"; shale parting excluded from Bureau of Mines sample.
S8-TE PMG-2.3 eU-0.004 U-0.004
33'10-1/4"
Coal, moderately thin- to thick-banded; 1" shale, black, coaly below 34'1"; shale parting excluded from Bureau of Mines sample.
S9-TE PMG-3.7 eU-0.008 U-0.009
34'2"
Coal and shale, coaly, broken and mixed; layer excluded from Bureau of Mines sample.
S10-TE PMG-2.8 eU-0.008 U-0.010
34'7"
Coal, moderately thin- and thick-banded.
S11-TE PMG-1.7 eU-0.003 U-0.003
34'9-3/4"
14-1/4" loss in coring accumulated below 30'3-1/2".
36' (Pull marked at this depth)
Coal, abundantly thin- and medium-banded.
S12-TE PMG-0.4 eU-0.002 U-0.002

) Bureau of Mines Sample No. 570-11-S5 thru S14 (Excl. 1/2" shale of S8, 1" shale of S9, and all of S10) Analyses requested: Sp. Gr. Prox. Btu S

(Cont. on next page)

36'4-1/2") Bureau of
Coal, sparsely thin-banded.) Mines
S13-TE PMG-1.3 eU-0.003 U-0.003) Sample No.
36'9-1/2") 570-11-S5
Coal, sparsely thin-banded; core badly broken and includes) thru S14
a few 1/4" tan silty nodules.) (Cont.)
S14-TE PMG-1.7 eU-0.005 U-0.006)
37'2"
Clay, shaley, black, carbonaceous.
S15-TE PMG-2.7 eU-0.009 U-0.006
37'8-1/2"
Sandstone, gray, poorly sorted.
S16-TE PMG-1.4 eU-0.005 U-0.003
38'3-1/2"
Sandstone, light gray, pyritic, poorly sorted.
S17-TE PMG-1.0 eU-0.004 U-0.002
38'8-1/2" (Bottom of Box 1)
62'9-1/2" core not sent to Columbus Laboratory.
101'6" (Top of Box 2)
Shale, medium and dark gray, carbonaceous.
S18-TE PMG-1.7 eU-0.005 U-0.004
101'8"
Shale, light gray.
S19-TE PMG-1.3 eU-0.004 U-0.003
102'4"
Coal, shaley; 1" coal abundantly medium-banded below 102'4" and
1-1/4" of shale, clayey, carbonaceous below 102'5".
S20-TE PMG-2.0 eU-0.006 U-0.005
102'9"
Shale, black and coaly.
S21-TE PMG-1.6 eU-0.005 U-0.004
103'5-1/4"
Coal, moderately thin-banded; 2" coal dominantly) Bureau of
attrital and shale, black, below 103'5-1/4", 1/2" shale) Mines
excl. from Bureau of Mines sample.) Sample No.
S22-TE PMG-0.8 eU-0.002 U-0.001) 570-11-S22
103'10-1/4") thru S30
Coal, dominantly thick- and thin-banded.)
S23-TE PMG-1.7 eU-0.004 U-0.003) (Cont. on
104'1-1/4") next page)
Shale, dark gray, carbonaceous; clayey below 104'6-1/2";)
layer excluded from Bureau of Mines sample.)
S24-TE PMG-2.8 eU-0.006 U-0.003)

104'7")
Shale, black and coaly; core broken; layer excluded from) (Excl. S24,
Bureau of Mines sample.) S25 and S26,
S25-TE PMG-2.0 eU-0.006 U-0.003) 1/2" shale
105') of S22)
Coal, shaley; layer excluded from Bureau of Mines) Analyses
Sample.) requested:
S26-TE PMG-2.1 eU-0.006 U-0.003) Sp. Gr.
105'5-1/2") Prox.
Coal, dominantly thin- and medium-banded.) Btu
S27-TE PMG-1.1 eU-0.002 U-0.002) S
105'9")
Coal, moderately medium-banded.)
S28-TE PMG-2.2 eU-a U-a)
106' (Pull marked at this depth))
Coal, sparsely thin-banded; 1" vitrain band below)
106'1-1/4".)
S29-TE PMG-2.1 eU-0.003 U-0.002)
106'6")
Coal, sparsely thin-banded.)
S30-TE PMG-2.0 eU-0.005 U-0.004)
106'11-1/2"
Shale, black, clayey, gray mottled.
S31-TE PMG-2.9 eU-0.008 U-0.006
107'3-3/4"
Shale, medium gray, carbonaceous.
S32-TE PMG-1.5 eU-0.006 U-0.003
107'9"
Shale, as above.
S33-TE PMG-1.9 eU-0.003 U-0.003
108'2-1/2"
Shale, black, carbonaceous.
S34-TE PMG-2.3 eU-0.008 U-0.005
108'6-1/2"
Coal, shaley and black shale.
S35-TE PMG-2.3 eU-0.008 U-0.007
109' 2-1/2"
3-1/2" loss in coring accumulated below 106'.
109'7" (Bottom of Box 2 and Top of Box 3)
Shale, dark gray, carbonaceous.
S36-TE PMG-3.2 eU-0.012 U-0.007
110'1"
Shale, black and carbonaceous.
S37-TE PMG-2.6 eU-0.009 U-0.006

110'5"
Shale, black and slightly coaly.
S38-TE PMG-2.9 eU-0.009 U-0.006

110'8-1/2"
Coal, shaley.
S39-TE PMG-3.5 eU-0.010 U-0.009

111'1-1/2"
Shale, black and dark gray, coaly.
S40-TE PMG-1.8 eU-0.006 U-0.004

111'7-1/4"
Shale, medium gray, carbonaceous, slightly coaly.
S41-TE PMG-1.7 eU-0.006 U-0.003

111'11-1/2"
Shale, light gray with finely dispersed pyrites.
S42-TE PMG-0.9 eU-0.004 U-0.002

112'7-1/4"
2-1/4" loss in coring accumulated below 109'6".

112'9-1/2" (Bottom of Box 3)
9'6" core not sent to Columbus Laboratory.

122'3-1/2" (Top of Box 4)
Shale, light gray, slightly coaly.
S43-TE PMG-1.1 eU-0.004 U-0.002

122'9-1/4"
Shale, black, carbonaceous; core broken below 122'11".
S44-TE PMG-1.5 eU-0.005 U-0.002

123'1"
Shale, black, carbonaceous; 2-1/4" shale, coaly, below 123'1".
S45-TE PMG-1.7 eU-0.006 U-0.004

123'7"
Shale, coaly and shaley coal.
S46-TE PMG-2.0 eU-0.007 U-0.006

123'11-1/2"
Coal, shaley.
S47-TE PMG-2.0 eU-0.005 U-0.004

124'3-1/2"
Coal, impure; 1" coal shaley below 124'8-1/2".
S48-TE PMG-1.4 eU-0.004 U-0.003

124'9"
Coal, dominantly thin- and medium-banded.
S49-TE PMG-1.5 eU-0.004 U-0.003

125'1-1/2"
Coal, shaley and coal impure.
S50-TE PMG-1.7 eU-0.007 U-0.004

125'6-1/2"
Coal, shaley and impure.
S51-TE PMG-1.5 eU-0.004 U-0.003
126' (Pull marked at this depth)
Coal, impure and shaley, dominantly thin-banded.
S52-TE PMG-1.9 eU-0.005 U-0.005
126'6"
Shale, black, carbonaceous; 1/4" coaly band below 126'6".
S53-TE PMG-2.1 eU-0.007 U-0.004
126'11"
Shale, light gray; 1/2" shale, coaly, below 127'8".
S54-TE PMG-1.4 eU-0.006 U-0.003
127'8-1/2"
Coal, impure and shaley.
S55-TE PMG-2.2 eU-0.005 U-0.004
128'1"
Coal, moderately thin- and medium-banded.
S56-TE PMG-1.3 eU-0.004 U-0.003
128'5-1/2"
Coal, shaley.
S57-TE PMG-3.4 eU-0.008 U-0.008
128'9-1/4"
Shale, black, carbonaceous.
S58-TE PMG-2.7 eU-0.008 U-0.005
129'2"
Coal, shaley; 1/2" vitrain band below 129'6".
S59-TE PMG-3.3 eU-0.008 U-0.006
129'8"
Coal, and coal, shaley; 1-1/4" vitrain band below 129'10-1/4".
S60-TE PMG-0.4 eU-0.003 U-0.002
130'3"
Shale, coaly.
S61-TE PMG-1.9 eU-0.005 U-0.002
130'6-1/2"
Coal, shaley.
S62-TE PMG-2.1 eU-0.006 U-0.004
131'
2-1/2" loss in coring accumulated below 162'.
131'2-1/2" (Bottom of Box 4 and Top of Box 5)
Coal, sparsely thin-banded; 2" coal, impure, below 131'2-1/2".
S63-TE PMG-1.5 eU-0.004 U-0.002

) Bureau of Mines Sample No. 570-11-S56 thru S70 (Incl. coal, impure coal and shale partings). Analyses requested: Sp. Gr. Prox. Btu Forms of S

(Cont. on next page)

131'8-1/2"				)
Coal, impure; core broken.				) Bureau of
S64-TE	PMG-2.3	eU-0.006	U-0.004	) Mines
131'11-1/2"				) Sample No.
Coal, impure; 1/4" pyrite lens below 132'2-5/8".				) 570-11-S56
S65-TE	PMG-0.9	eU-0.003	U-0.002	) thru S70
132'4"				) (Cont.)
Coal and coal, impure; 1/2" vitrain band below 132'6-1/8".				)
S66-TE	PMG-0.5	eU-0.001	U-0.001	)
132'8-1/2"				)
Coal, sparsely thin-banded.				)
S67-TE	PMG-1.3	eU-0.004	U-0.003	)
133'1/4"				)
Shale, coaly.				)
S68-TE	PMG-6.2	eU-0.016	U-0.018	)
133'3-1/2"				)
Coal, shaley.				)
S69-TE	PMG-4.4	eU-0.010	U-0.009	)
133'7-1/2"				)
Coal, shaley.				)
S70-TE	PMG-1.0	eU-0.002	U-0.002	)
133'10-1/2"				
Shale, black, carbonaceous.				
S71-TE	PMG-0.7	eU-0.002	U-a	
134'4-1/2"				
1-1/2" loss in coring accumulated below 131'2-1/2".				
134'6" (Bottom of Box 5)				
45'4-3/4" core not sent to Columbus Laboratory.				
179'10-3/4" (Top of Box 6)				
Clay, medium and dark gray, carbonaceous; 1" shale, coaly, below 180'3"; core broken.				
S72-TE	PMG-0.9	eU-0.003	U-0.001	
180'4"				
Coal, sparsely thin-banded.				) Bureau of
S73-TE	PMG-0.3	eU-0.001	U-0.001	) Mines
180'7-1/2"				) Sample No.
Coal, sparsely thin-banded.				) 570-11-S73
S74-TE	PMG-0.8	eU-0.002	U-0.002	) thru S77
180'11-1/2"				) (Cont. on
Coal, sparsely thin- and medium-banded.				) next page)
S75-TE	PMG-0.5	eU-0.002	U-0.002	)

181'4-1/2") Analyses
Coal, moderately thin- to thick-banded; 1/4" fusain band) requested:
below 181'5-5/8" and 3/4" vitrain band below 181'5-7/8".) Sp. Gr.
S76-TE PMG-0.6 eU-0.001 U-0.001) Prox.
181'9") Btu
Coal, sparsely thin-banded.) S
S77-TE PMG-0.7 eU-0.002 U-0.002)
182'2"
Shale, carbonaceous, black, 3/8" shale, coaly below 182'2".
S78-TE PMG-2.1 eU-0.009 U-0.003
182'10"
Coal, shaley.
S79-TE PMG-2.1 eU-0.007 U-0.005
183'2-1/2"
Coal, shaley.
S80-TE PMG-1.9 eU-0.005 U-0.003
183'5-1/4"
Coal, dominantly attrital; somewhat impure; 1/2" vitrain band
below 183'11-1/8".
S81-TE PMG-2.0 eU-0.006 U-0.005
183'11-3/4"
Shale, black, slightly coaly.
S82-TE PMG-2.5 eU-0.009 U-0.004
184'4"
Shale, black, and coaly.
S83-TE PMG-2.5 eU-0.006 U-0.004
184'7-1/2"
Coal, impure.
S84-TE PMG-1.4 eU-0.004 U-0.002
184'11"
Coal, impure and black shale.
S85-TE PMG-3.7 eU-0.008 U-0.005
185'1-3/4"
10-1/4" loss in coring accumulated below 179'10-3/4".
186' (Pull marked at this depth)
Shale, black and gray mottled.
S86-TE PMG-2.6 eU-0.008 U-0.006
186'7-1/2"
Shale, coaly.
Top of Sample No. S87 (For PMG see below - Bottom of S87)

186'9"
Coal, shaley and sparsely thin-banded; 1/2" vitrain band below 196'11-1/8".
Bottom of Sample No. S87-TE PMG-3.2 eU-0.006 U-0.006

187'1/2"
Coal, dominantly attrital; 1/2" vitrain band below 187'1-3/4".
S88-TE PMG-0.5 eU-0.002 U-0.002

187'4"
Coal, dominantly attrital; 1" vitrain band below 187' 5-1/2".
S89-TE PMG-0.5 eU-0.001 U-0.001

187'8-1/2"
Coal, impure, dominantly attrital; 1/2" vitrain bands below 187'9-1/4" and 187'11-3/4".
S90-TE PMG-3.0 eU-0.006 U-0.005

188'3/4"
Coal, abundantly thin- to thick-banded.
S91-TE PMG-0.5 eU-0.002 U-0.001

188'6-1/2"
Coal, core broken to minus 1/2" fragments.
S92-TE PMG-0.5 eU-0.002 U-0.002

188'11-3/4"
Coal, dominantly attrital.
S93-TE PMG-1.0 eU-0.002 U-0.002

189'4"
Coal, dominantly attrital.
S94-TE PMG-1.6 eU-0.003 U-0.003

189'7-3/4"
3/4" loss in coring accumulated below 186'.

189'8-1/2" (Bottom of Box 6 and Top of Box 7)
Shale, black and gray mottled, coaly; excluded from Bureau of Mines sample.
S95-TE PMG-4.1 eU-0.012 U-0.008

190'2"
Coal, moderately thin- and medium-banded.
S96-TE PMG-0.6 eU-0.004 U-0.003

190'6"
Coal, dominantly attrital.
S97-TE PMG-1.7 eU-0.004 U-0.002

190'9
Coal, dominantly attrital.
S98-TE PMG-2.3 eU-0.002 U-0.002

) Bureau of Mines Sample No. 570-11-S87 (Bottom part) thru S101 (Excl. S95 and S100) Analyses requested: Sp. Gr. Prox. Ult. Btu Forms of S

) (Cont. on next page)

191'1/4"				) Bureau of
Coal, impure.				) Mines
S99-TE	PMG-4.5	eU-0.010	U-0.007	) Sample No.
191'5-3/4"				) 570-11-S87
Shale, black, coaly; layer excluded from Bureau of				) (Bottom
Mines sample.				) part) thru
S100-TE	PMG-5.1	eU-0.012	U-0.010	) S101
191'8-1/4"				) (Cont.)
Coal, sparsely thin-banded.				)
S101-TE	PMG-6.7	eU-0.010	U-0.012	)
191'11-3/4"				
Shale, black, gray mottled, coaly.				
S102-TE	PMG-4.7	eU-0.016	U-0.011	
192'4-1/2"				
Shale, black, carbonaceous.				
S103-TE	PMG-4.4	eU-0.014	U-0.009	
192'9-1/2"				
Shale, clayey, black.				
S104-TE	PMG-3.1	eU-0.011	U-0.009	
193'1-1/4"				
Sandstone, tan, poorly sorted.				
S105-TE	PMG-0.9	eU-0.003	U-0.001	
193'6"				

2'-1/2" loss in coring accumulated below 189'8-1/2".

193'8-1/2" (Bottom of Box 7 and Bottom of Core submitted to Columbus Laboratory)

NOTES

Core was slightly moist when received, except for that in Box 6 (179-10-3/4" to 189'8-1/2") which appeared dry.

Bureau of Mines sample 570-11-S56 thru S70 was not immediately placed in an air tight container. For this reason "as received" values may be low in moisture.

Twenty-seven small specimens of coal, principally attrital, have been stored under water for later preparation of thin sections. Sixteen additional specimens have been cut from the impure coal in Boxes 4 and 5 to be infiltrated with wax for section preparation.

APPENDIX C

LIST OF MAP LOCALITIES, FIELD AND LABORATORY NUMBERS OF SAMPLES ANALYZED FOR URANIUM FROM THE NORTHERN PART OF THE RED DESERT AREA, SWEETWATER COUNTY, WYOMING.

Map Locality	Field Number	Laboratory Number	Map Locality	Field Number	Laboratory Number
1	RW 532	72853-54	37	RW 513	56804,
2	526	72831-32			85601-19,
	527	72833			90064
3	P 161	Not sampled	38	569	85655-78,
4	RW 525	72830			90066-67,
5	P 160	Not sampled			95605
6	RW 723	Analyses not	39	592	91957-8
		rec'd.	40	570	85664-8
7	727	"	60	179	68031-2
8	724	"	61	180	68033
9	725	"	62	AH 29	Not sampled
10	726	"	63	RW 178	68027-30
11	579B	"	64	126	63938-41
12	579A	90090-100	65	125	63936-7
13	709	99746-48	66	728	Analyses not
14	520	72826			rec'd.
15	519	728822-25	67	183	72837-8
16	518	72820-21	68	589	91952
17	517	56807-11		590	91953, 4
18	580	90101-3,	69	713	101335-9
		95547-53,	70	588	91951
		99750-51	71	710	101324-30
19	707	99741	72	153	66627-8
20	722	Analyses not	73	153	Not sampled
		rec'd.	74	184	72839
21	708	99742-45	75	160	66377-78
22	705	99733-35	76	152	Not sampled
23	706	99736-40	77	182	72834-6
24	581	95554-7, 99749	78	161	66379
25	591	91955-6	79	P 1	Not sampled
26	522	56812	80	RW 100	63244-6
	523	72828-9	81	102	63251-3
27	586	91948	82	162	66824-7,
28	587	91949-50			66383
29	577	90080-84	83	163	66386-92
30	515	85638-42	84	597	91971-8
31	578	90085-89	85	103	63254-5
32	576	90074-79	86	58	Not sampled
33	575	90068-73	87	1006	"
34	571	85669-76	88	1005	"
35	565	85630-7	89	1004	95573-83
36	514	85620-2	90	1008	95589-93

Map Locality	Field Number	Laboratory Number	Map Locality	Field Number	Laboratory Number
91	RW 5	63188-90	102	RW 55	63812-15
92	18	63206-08	103	6	63191
93	83	65000, 01	104	329	67360-64
94	57	Not sampled	105	628	72857
95	56	65049	106	1183	Analyses not rec'd.
96	19	63209-11			
97	54, 3	63176-79	107	1093	"
		63806-11	108	15	63201, 02
98	1181	Analyses not rec'd.	109	16	63203
			110	1185	Not sampled
99	1113	Not sampled	111	1184	Analyses not rec'd.
100	1108	101397			
101	59	65050-57			