Coal Resources of the Cape Lisburne–Colville River Region, Alaska

By FARRELL F. BARNES

CONTRIBUTIONS TO ECONOMIC GEOLOGY

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An evaluation based on data obtained during investigations of petroleum possibilities of Naval Petroleum Reserve No. 4 and adjoining areas in 1923–26 and 1944–53

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By FARRELL F. BARNES

ABSTRACT

Coal is widespread in northern Alaska in rocks of Cretaceous age that have been moderately folded and faulted in the foothills belt near the mountains but are flat or gently folded under the coastal plain to the north.

Estimated coal resources total 120,197 million tons, of which 19,292 million tons is bituminous in rank and 100,905 million tons is subbituminous. The bituminous coal occurs in rocks of mid-Cretaceous age in the foothills belt, and the subbituminous coal occurs in rocks of the same age under the coastal plain and in rocks of Late Cretaceous age in the eastern part of the report area.

INTRODUCTION

PURPOSE AND SCOPE OF REPORT

This report was prepared as part of a program of the U.S. Geological Survey to appraise the coal resources of the nation, determine their geologic features, and assist in the classification of public lands. The present report differs from others in the program by being based entirely on the results of field investigations that were made primarily to assess the oil and gas potential of northwestern Alaska; no fieldwork oriented specifically to evaluation of the coal resources has been done. Because of the widespread occurrence of coal-bearing rocks in the region and the recognition by field personnel of their potential economic importance, however, a large amount of information on the character and distribution of coal deposits, including measured sections and samples for analysis, was obtained during the course of the petroleum investigations.

Because of remoteness from present markets and the difficult access and consequent high cost of fieldwork in this region, it is unlikely that detailed coal investigations could be justified in the foreseeable future. It was therefore decided to base an appraisal of the coal resources of northern Alaska on currently available data,

with full realization that the results would be of a lower order of accuracy than would be provided by more detailed and coal-oriented investigations; the results are nevertheless much more reliable than previous estimates based only on the earliest reconnaissance investigations.

LOCATION AND EXTENT OF AREA

The part of Alaska covered by this report extends from the north front of the Brooks Range northward to the Arctic coast, and from Cape Lisburne eastward to the Itkillik and lower Colville Rivers (pl. 1). It has an area of about 58,000 square miles, of which 37,000 square miles is included in Naval Petroleum Reserve No. 4 (Reed, 1958, p. 5).

SOURCES OF INFORMATION

Most of the information in this report was obtained during two periods of petroleum investigations. The first was the 4-year period 1923–26, during which exploratory geologic and topographic expoditions of the Geological Survey established the broad outlines of the general geology and topography of the newly established Naval Petroleum Reserve No. 4. The results of these expeditions were published by Smith and Mertie (1930), who also summarized the results of earlier investigations in northwestern Alaska. This work provided the geologic base for the more recent investigations during the 10-year period 1944–53, when the Department of the Navy conducted a program of geologic exploration and test-well drilling in the reserve. As part of this program the Geological Survey mapped geologically large parts of the reserve and adjoining areas for the primary purpose of assessing the petroleum possibilities of the region and guiding the location of test wells. The results of these surface and subsurface investigations have been incorporated in Geological Survey Professional Papers 303 and 305, which have been published as separate chapters for each region or group of wells.

The information in the present report was taken in large part from the above published reports, but free use was also made of original field notes and other data to obtain information on coal occurrences that were not described in the published reports or that were in areas on which no reports have been published.

GEOGRAPHY

The geographic features of northern Alaska have been described in detail in earlier reports (Smith and Mertie, 1930, p. 27–112; Reed, 1958, p. 4–17; Chapman and Sable, 1960, p. 52–68; Detterman and

others, 1963, p. 226–229; Chapman and others, 1964, p. 328–334) and so will be summarized only briefly here, with emphasis on areas of coal-bearing rocks.

In describing the coal fields of Alaska, the general practice has been to divide each field or region into districts and, where further subdivision was necessary, to divide the districts into areas. The divisions are based primarily on the distribution of the principal coal deposits and are named for the main streams or other geographic features in the vicinity. Accordingly, northern Alaska west of the 150th meridian, as one of several major coal-bearing divisions of the State, is considered to be a region, and the several parts containing the principal coal deposits have been designated districts. This usage differs from the nomenclature used in the several published geologic reports on parts of northern Alaska, in which the area covered by each report is called a region, which in general corresponds to district as used in this and other coal reports.

TOPOGRAPHY AND DRAINAGE

Northern Alaska comprises two major physiographic divisions: the Rocky Mountain System, which includes the Brooks Range and the Arctic Foothills, and the Interior Plains, which are represented by the Arctic Coastal Plain. The rugged Brooks Range, consisting of older, non-coal-bearing rocks, lies outside the area of interest of this report. The Arctic Foothills make up a belt of treeless rolling hills of moderate relief 60–80 miles wide. Local relief in this province ranges from less than 200 feet along its northern boundary to 1,000 feet or more near the mountains to the south. The topography is characterized by long parallel ridges and valleys trending generally eastward parallel to the mountain front. The coastal plain is characterized by low relief, many lakes and marshes, poorly defined meandering streams, and few bedrock outcrops confined to cutbanks of the major streams.

The major drainage system of northern Alaska is the Colville River and its many large tributaries, including the Etivluk, Killik, Chandler, Anaktuvuk, and Itkillik Rivers, all of which head in the Brooks Range. North of the upper Colville River three major streams, the Ketik, Meade, and Ikpikpuk Rivers, all head in the northern part of the Arctic Foothills province and flow northward to the coast. Farther west, the Utukok, Kokolik, and Kukpowruk Rivers head on the northern flanks of the DeLong Mountains (pl. 1) and flow northward across the foothills belt and the coastal plain to the Arctic Ocean.

CLIMATE AND VEGETATION

The climate of the Cape Lisburne–Colville River region, Alaska, is cold and, in terms of precipitation, arid. Temperatures in general range from about 65°F in summer to −65°F in winter, and freezing temperatures may occur even during the summer months. The mean annual precipitation at Barrow for the 42-year period ending in 1962 as recorded by the Weather Bureau was 4.26 inches. Much of the precipitation falls as snow. In summer most of the precipitation falls as rain, although snow may come at any time. The entire region is within the zone of continuous permafrost, and permafrost is locally as much as 1,300 feet thick.

Trees are virtually absent north of the Brooks Range and are represented only by occasional stands of stunted alder and cottonwood along valleys in the Arctic Foothills province. Willows grow abundantly along the river flats, especially in the mountain and foothill provinces. Elsewhere the surface is covered by typical tundra vegetation consisting of grasses, sedges, flowering plants, mosses, lichens, and prostrate bushes.

SETTLEMENT AND ACCESSIBILITY

The only permanent settlements in northern Alaska are a few coastal villages with native populations ranging from less than 100 at Point Lay and Wainwright to more than 1,000 at Barrow. A few white people live more or less permanently at these villages. They include teachers, nurses, employees of the Alaska Communications System and the Federal Aviation Agency, and a few others. In addition, the oil companies engaged in exploration and test drilling maintain temporary camps at several points in the region, where varying numbers of employees are stationed. The largest such camp is at Umiat, on the Colville River, which is used as a logistics center by both military and civilian government agencies and by oil companies and civilian airlines.

The region contains no established roads, railroads, or trails; travel is principally by air. Airstrips at Barrow, at Umiat, and east of Cape Lisburne can accommodate large planes. Smaller planes can land in most parts of the region on skis in winter and on pontoons or wheels in summer. During the Navy exploration program, heavy equipment and supplies were moved to Barrow in late summer by ship and from there to inland points during the winter by tractor train.

STRATIGRAPHY AND STRUCTURE

Most of northern Alaska is underlain by sedimentary rocks of Cretaceous age. Rocks of Paleozoic and Mesozoic age crop out in the Brooks Range and the southern part of the Arctic Foothills province. Igneous rocks are present only as scattered mafic sills and dikes in the pre-Cretaceous rocks along the southern margin of the region. Sedimentary rocks of Tertiary age that contain a few scattered coal beds are present in a few areas east of the Itkillik River. As this coal appears to consist mostly of thin beds of lignite, it probably is of little economic importance and was not included in this report.

The Cretaceous rocks include sandstone, conglomerate, siltstone, shale, and coal; bentonite and tuff are particularly abundant in rocks of Late Cretaceous age and are commonly associated with coal. Subordinate constituents include limestone, claystone, and ironstone. Although these rocks are mostly of marine origin, nonmarine coal-bearing rocks predominate in some areas and intertongue with marine rocks in others.

The known or probable stratigraphic relations of the Cretaceous rock units in northern Alaska are shown in figure 1. The rocks mapped as Prince Creek Formation in the Utukok–Corwin district were correlated with rocks in the type area on the Colville River mainly on the basis of lithologic similarity. Although fossil evidence of the age of these rocks in the Utukok–Corwin district is inconclusive (Chapman and Sable, 1960, p. 127), their stratigraphic relations are compatible with this correlation.

The exact age relations of the Corwin Formation, the principal coal-bearing unit in the Utukok–Corwin district, to the similar Chandler Formation of the Colville River district is not known (Chapman and Sable, 1960, p. 125), but the two formations are probably at least in part correlative (Sable, 1956, p. 2642).

The structure of the bedded rocks of the Cape Lisburne–Colville River region is characterized by folding and faulting along eastward-trending axes generally parallel to the northern front of the Brooks Range. The intensity of the deformation decreases northward, from tight asymmetric folds with many faults in the southern part of the foothills belt to broad open folds with few faults under the coastal plain.

For detailed discussions of the stratigraphy and structure of the various parts of this region the reader is referred to the several chapters of Geological Survey Professional Paper 303 listed at the end of this report.

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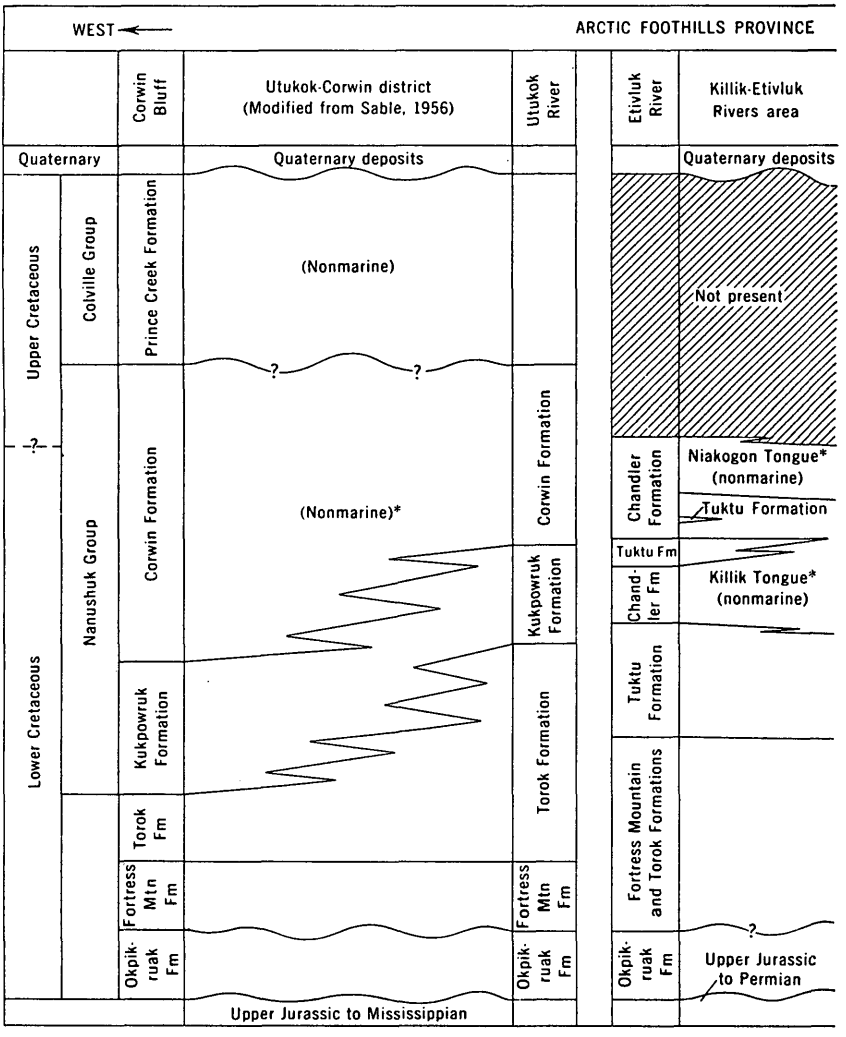
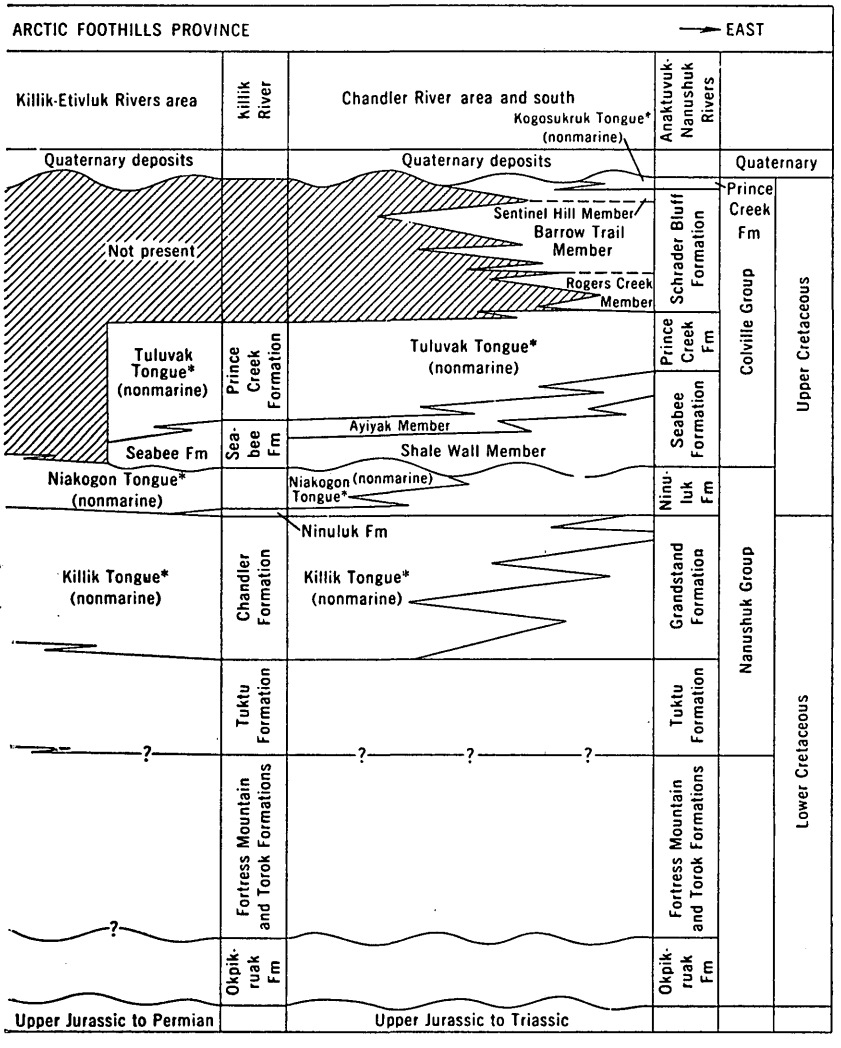


FIGURE 1.—Stratigraphic relations of coal-bearing units and associated rocks. Principal

COAL

GEOGRAPHIC DISTRIBUTION

Coal-bearing rocks are known or inferred to underlie most of the part of Alaska extending northward from the northern foothills of the Brooks Range to the Arctic coast, and eastward from Cape Lisburne at least as far as the Itkillik and lower Colville Rivers (pl. 1). The area of known and potential coal land is about 58,000 square miles. This includes several areas where because of scarcity of information, it was necessary to map the bedrock as undifferen-



coal-bearing units are indicated by asterisk. Modified after Chapman and others, 1964, fig. 62.

tiated Nanushuk and Colville Groups in which coal-bearing units may or may not be present. Also included are extensive areas in which surface and (or) subsurface data indicate that coal-bearing units are present at moderate to shallow depth beneath non-coal-bearing units. (See pl. 1.)

The coal-bearing units and associated rocks are widely exposed along the southern margin of the report area and are in a belt roughly 50 miles wide in the northern part of the foothills belt. North of

this belt, bedrock is largely covered by a mantle of unconsolidated material consisting of Recent fluviatile deposits and marine silt and clay of Pleistocene age that ranges in thickness from less than 25 feet to more than 100 feet. The nature of the bedrock in this area is revealed by scattered exposures along the principal streams and by the records of several test wells. Evidence from such sources indicates that most of the coastal plain, except for the extreme northern edge between the mouth of the Colville River and Peard Bay, probably is underlain by coal-bearing rocks (pl. 1).

Coal beds are exposed in greatest number and aggregate thickness in the sea cliffs near Corwin Bluff, about 25 miles east of Cape Lisburne (pl. 1, locs. 1–5), where they dip moderately to steeply southwest. The next greatest concentration of coal exposures is along the lower 25 miles of the Kukpowruk River, where the coal-bearing rocks have been moderately folded and faulted. On the Kokolik and Utukok Rivers, several moderately dipping coal beds are exposed near the northern edge of the foothills. Farther north on the coastal plain nearly horizontal coal beds are exposed at wide intervals along the major streams, including the Utukok, Kuk, Kugrua, Meade, and Ikpikpuk Rivers, and were also found in several test wells.

In the Colville River district, coal exposures are particularly abundant along the main stream between the Etivluk and Killik Rivers, but coal is also exposed at several points farther downstream on the Colville River and on the lower 20 miles of several of its southern tributaries. The dip of the beds in this region is generally between 10° and 30°, but locally it is as much as 45°. Farther north on the lower Colville, dips are gentle to horizontal.

STRATIGRAPHIC POSITION

Between the Utukok River and Corwin Bluff, minable coal beds are confined almost entirely to the Corwin Formation of Cretaceous age (fig. 1). Although beds of bituminous coal and coaly shale are present throughout the formation, the coal beds are thickest and most abundant in the upper part in inland areas and in the upper middle part in the type section at Corwin Bluff (Chapman and Sable, 1960, p. 104). A few thin beds of coal, bone, and coaly shale occur in the upper part of the underlying Kukpowruk Formation, and some coal and coaly shale beds are present in overlying rocks that have been correlated with the Prince Creek Formation of the Colville River district (Chapman and Sable, 1960, p. 126, 155).

In most of the Colville River district, including the Colville River basin and adjoining areas, coal beds are widespread in the nonmarine Tuluvak and Kogosukruk Tongues of the Prince Creek Formation of Late Cretaceous age and in the nonmarine Killik and Niakogon

Tongues of the Chandler Formation of late Early Cretaceous and early Late Cretaceous age (fig. 1). In the Killik–Etivluk Rivers area, coal beds are thickest and most abundant in the lower part of the Killik Tongue (Chapman and others, 1964, p. 399–400). Records of test wells indicate that a few coal beds are locally present in the lower part of the Ninuluk Formation in the northern part of the foothills belt and in the upper part of the Grandstand Formation under the northern part of the coastal plain. Test wells also revealed thick coal sections in the Chandler(?) Formation under the coastal plain. The stratigraphic position of coal beds exposed along the Kuk and Kugrua Rivers, near the Arctic coast, has not been definitely established, but this coal is believed to be in rocks correlative with the Chandler Formation.

East of the Itkillik and lower Colville Rivers, a few thin coal beds have been noted in the lower part of the Ignek Formation, of Cretaceous age, and in the Sagavanirktok Formation, of Tertiary age (Keller and others, 1961, p. 204, 207). West of the Utukok–Corwin district along the coast south of Cape Lisburne, bituminous coal is exposed at several places in strongly folded and faulted rocks of Mississippian age (Collier, 1906, p. 43–50; Tailleur, 1965). In the absence of information on the nature and extent of the coal deposits in these two areas, no attempt was made to describe them or to estimate coal resources.

CHARACTER AND THICKNESS OF COAL BEDS

SURFACE EXPOSURES

Little is known about the lateral extent and variations in character and thickness of individual coal beds in northern Alaska, mainly because most beds are known only from single outcrops. In the Utukok–Corwin district, many sandstone and siltstone beds in the Corwin Formation are highly lenticular, pinching out or grading into shale within short distances (Chapman and Sable, 1960, p. 104). Although such lenticularity was not reported in coal beds, its presence in clastic beds indicates irregularity of deposition, which may also have affected the associated coal beds. Evidence bearing on the lateral extent of coal beds was noted at Killik Bend, on the Colville River, where the same series of coal beds was recognized at two points in the river bluffs 1½ miles apart (Chapman and others, 1964, p. 400).

Coal beds are generally interbedded with shale, although locally they are associated with sandstone and siltstone. Bentonite and tuff are also commonly associated with the coal, particularly in the Prince Creek Formation and in the Niakogon Tongue of the Chandler Formation.

Burning of coal beds appears to have been a rare occurrence in northern Alaska. One of the few known occurrences was noted along the Colville and Killik Rivers for a few miles above their junction, where red baked shale and clinker marked the position of former coal beds. Other burned coals have been reported on the Kukpowruk River near locality 18 and on the Kuk River at locality 48.

The thickness of northern Alaska coals ranges from a few inches to 14½ feet in measured outcrops, but several beds more than 20 feet thick were recorded in test wells. In the Corwin Bluff–Cape Beaufort area, at least 60 bituminous coal beds ranging from 14 inches to 9 feet in thickness are exposed along the coast at localities 1–8 (pl. 1). Of these beds, 42 are less than 28 inches thick, 9 are 28–42 inches, and 9 are more than 42 inches. On the Kukpowruk River, 40 bituminous coal beds ranging from 1½ to 13 feet in thickness were measured at localities 9–21. Of these beds, 11 are less than 28 inches thick, 12 are 28–42 inches, and 17 are more than 42 inches. On the Kokolik River, exposures at localities 22–31 include 17 bituminous coal beds ranging from 2 to 6 feet in thickness, of which 4 are less than 28 inches, 3 are 28–42 inches, and 10 are more than 42 inches. On the Utukok River, the subbituminous coal at localities 32–35 occurs in 4 beds ranging from 4 to nearly 12 feet in thickness, and the bituminous coal at localities 36–45 includes 13 beds ranging from 14 inches to 6 feet in thickness, of which 4 are less than 28 inches thick, 2 are 28–42 inches, and 7 are more than 42 inches.

On the Kuk River, south of Wainwright, five beds of subbituminous coal were measured at localities 46–49; two of these beds are less than 5 feet thick, two are 5–10 feet, and one is more than 10 feet. On the Kugrua River, south of Peard Bay, two beds containing about 5 feet of subbituminous coal are exposed at locality 50, and single 5-foot beds are exposed at localities 51 and 52. On the Meade River, seven beds of subbituminous coal, mostly less than 5 feet thick, are exposed at localities 53–58. At locality 54, a 6-foot bed has been mined in recent years to supply fuel for the village of Barrow.

Near the headwaters of the Meade River, 10 beds of bituminous coal 2–6 feet thick are exposed at localities 59–61. Seven of these beds are more than 42 inches thick. On the Kigalik River, three subbituminous coal beds 2½–5 feet thick are exposed at localities 62–64, and a poorly exposed bed that may contain as much as 20 feet of coal was noted at locality 65 (Smith and Mertie, 1930, p. 311).

Farther east near the southern edge of the coastal plain, beds of subbituminous coal ranging from 2½–10 feet in thickness are exposed at many points along the Kogosukruk River and its tributaries and near the mouth of the Kikiakrorak River, at localities 66–74. Although these beds lie nearly flat and are discontinuously exposed and

so could not be reliably correlated between outcrops, they are believed to include at least eight beds less than 5 feet thick and seven beds 5–10 feet thick.

Along the main Colville River, outcrops at localities 76–78 include six beds of subbituminous coal ranging from 4 to 10 feet in thickness. Farther upstream, exposures of bituminous coal at localities 79–94, 99, and 100 include 7 beds less than 28 inches thick, 10 beds 28–42 inches thick, and 8 beds 3½–8 feet thick, Along the Awuna River and its tributaries, five beds of bituminous coal 2–5 feet thick are exposed at localities 95–98.

South of the Colville River, bituminous coal in beds ranging from 2 to 4½ feet in thickness crop out along several of the north-flowing tributaries. On the Kurupa River, nine beds, all less than 3 feet thick except for one 4½-foot bed, are exposed at localities 101–105. Single beds 2–3 feet thick were measured at locality 106 on the Oolamnagavik River, locality 107 on the Killik, localities 111 and 112 on the Chandler, and localities 114 and 115 on the Anaktuvuk River. In addition, seven beds of subbituminous coal 2½–5 feet thick crop out at localities 109 and 110 on the Chandler River, and two 3-foot beds of subbituminous coal are exposed at locality 113 on the Anaktuvuk River.

TEST WELLS

The information gained from surface exposures on the distribution and thickness of coal beds in northern Alaska was greatly augmented by the records of test wells drilled during petroleum investigations by the Navy. These wells are described in the several chapters of Geological Survey Professional Paper 305 listed at the end of this report; their locations are shown on plate 1. The greatest known concentration of coal beds in the area was revealed by Kaolak test well 1, about 20 miles northeast of locality 35 on the Utukok River (Collins, 1958c, p. 353–371, pl. 22). A sequence of rock 4,600 feet thick in the upper part of this well contains 60 coal beds with an aggregate thickness of nearly 350 feet. Two 10-foot beds and 2 thinner ones are within 1,000 feet of the surface, and 32 beds ranging from 4 to 26 feet in thickness were reached between depths of 1,000 and 3,000 feet. The rocks containing these coal beds were tentatively correlated with the Corwin Formation by Chapman and Sable (1960, p. 160) and with the Chandler Formation by Collins (1958c, p. 354–355).

Meade test well 1, 6 miles southwest of locality 56 on the Meade River, revealed a thick coal-bearing section in the Chandler Formation and the upper part of the Grandstand Formation (Collins, 1958c, p. 342–353, pl. 21). The section includes 21 coal beds 4–30 feet thick, having an aggregate thickness of 260 feet, within 2,000 feet of the

surface. More than half of these beds, including five beds more than 20 feet thick, were reached within 1,000 feet of the surface. Two other test wells on the coastal plain passed through potentially valuable coal beds. Topagoruk test well 1 (Collins, 1958b, p. 267–273, pl. 17), about 20 miles east of locality 53, cut eight beds 3–4 feet thick in the Grandstand Formation at depths between 350 and 1,000 feet; and Fish Creek test well 1 (Robinson and Collins, 1959, p. 501–506, pl. 32), about 20 miles west of the Colville River delta, cut two thin beds of coal below 1,000 feet in the Prince Creek Formation.

Several wells in the northern part of the foothills belt passed through coal-bearing rocks, some of which contained beds of minable thickness. Titaluk test well 1 (Robinson, 1959, p. 381–386, pl. 25), just east of the upper Ikpikpuk River, cut six beds 2–4½ feet thick within 1,500 feet of the surface. Three of these beds are in the Chandler Formation, but the others are in the overlying Ninuluk Formation. Wolf Creek test wells 1 and 2 (Collins, 1959, p. 448–456, pl. 30) both cut several thin coal beds in the Ninuluk and Chandler Formations at depths of less than 2,000 feet, and Knifeblade test well 1 (Robinson, 1959, p. 399–403, pl. 26) revealed six thin beds in the Chandler and Grandstand Formations at less than 1,000 feet. Knifeblade test well 2A cut two thin beds in the Chandler Formation within 100 feet of the surface (Robinson, 1959, p. 407, pl. 26). Umiat test well 11 (Collins, 1958a, p. 179–182, pl. 12) reached three beds about 3 feet thick in the upper 500 feet, and Gubik test well 1 (Robinson, 1958, p. 212–218, pl. 15) cut an 8-foot bed at 1,060 feet and a 15-foot bed at 1,560 feet, all in the Prince Creek Formation.

PHYSICAL AND CHEMICAL PROPERTIES

Most of the coal in the Cape Lisburne–Colville River region has been described as black and shiny and as having a blocky fracture. Some beds, particularly those in the Prince Creek Formation in the eastern part of the report area, and beds in the Chandler(?) Formation near the Arctic coast, have been described as dull black, with a shaly fracture. A few analyses support the physical descriptions—the bright blocky coal is predominantly bituminous in rank, and the dull shaly coal is subbituminous. Some outcrops were described in the field as lignite, but since no detailed descriptions were given and since none of the analyses indicate coal of this rank, such beds are here considered to be weathered subbituminous coal. Representative analyses of outcrop samples from several parts of northern Alaska are given in table 1. Many of the coal samples submitted for analysis were not tested for heating value; so, their rank could not be determined according to the standards of the American Society

TABLE 1.—*Analyses of coal*

[Analyses by U.S. Bur. Mines. Only samples indicated by asterisk (*) are known to have been collected in sealed containers]

Locality (See pl. 1.)	Source of sample	Formation	U.S. Bureau Mines laboratory No.	Moisture	Volatile matter	Fixed carbon	Ash	Sulfur	Heating value (Btu)	Rank
3	Near Corwin mine	Corwin	E-70927	3.0	37.6	47.8	11.6			Bituminous(?).
4	East of Corwin mine	do	E-70929	5.9	28.8	58.0	7.3			Do.
6	West of Pitmegea River	do	E-70930	3.3	40.1	52.5	4.1			Do.
10	Kukpowruk River	do	*96820	9.9	31.5	56.1	2.5	0.4	11,910	Bituminous C or subbituminous A.
14	do	do	D-34619	3.3	34.8	52.6	9.3	.3	12,170	Bituminous.
18	do	do	*C-61131	4.6	35.6	54.0	5.8	.2	12,820	Do.
21	do	do	D-34615	.8	31.4	52.8	15.0	.3	12,820	Bituminous.
24	Kokolik River	do	D-34626	2.8	36.1	50.3	10.8	.2	12,400	Do.
30	do	do	D-34614	2.8	36.5	57.6	3.1	.2	13,640	Do.
31	do	do	D-34612	1.7	34.1	46.8	17.4	.3	11,630	Do.
35	Utukok River	do	C-87715	4.6	36.2	51.6	7.6	.2	11,850	Bituminous or subbituminous.
39	do	do	C-87711	3.0	37.4	57.3	2.3	.6	13,460	Bituminous.
41	Elusive Creek	do	D-60565	5.8	33.1	57.9	3.2	.3	11,710	Bituminous.
42	Utukok River	do	C-87708	6.2	37.1	53.7	3.0	.2	11,640	Bituminous or subbituminous.
43	Ketik River	do	D-60564	5.5	33.4	57.9	3.2	.3	12,040	Do.
47	Kuk River	Chandler(?)	*C-61134	24.3	30.8	42.5	2.4	.2	9,510	Subbituminous B.
48	do	do	*C-61135	26.7	29.1	41.9	2.3	.2	9,230	Subbituminous C.
50	Kugrua River	do	*C-27946	17.8	31.9	40.5	9.8	.3	8,780	Do.
54	Meade River	Chandler	*C-27944	14.4	33.5	47.3	4.8	.6	10,330	Do.
59	do	do	C-69400	3.4	36.5	46.8	13.3	.7	11,660	Bituminous.
62	Kigalik River	do	C-87703	9.9	32.4	37.7	20.0	.3	7,700	Subbituminous.
64	do	do	C-87706	8.4	35.5	46.7	9.4	.2	9,920	Subbituminous.
75	Ikpikpuk River	do	E-78339	8.3	35.4	49.9	6.4	.8	10,720	Bituminous or subbituminous.
79	Fossil Creek	do	E-73999	2.6	40.9	53.6	2.9			Bituminous(?).
81	Colville River	do	E-73998	4.4	30.1	44.8	20.7			Do.
83	do	do	E-73994	5.3	31.1	39.3	24.3			Do.
87	do	do	C-69404	2.3	35.4	51.9	10.4	.5	12,600	Bituminous.
91	do	do	C-69403	2.7	33.1	46.3	17.9	.4	11,060	Do.
92	do	do	C-69402	3.3	31.2	45.9	19.6	.3	10,430	Do.
104	Kurupa River	do	C-69398	6.6	34.8	54.3	4.3	.4	11,410	Bituminous or subbituminous.
105	do	do	C-69397	4.3	33.0	45.7	17.0	.5	10,580	Bituminous.
106	Oolamnagavik River	do	C-69396	2.3	43.7	40.2	13.8	.4	11,400	Do.
108	Killik River	do	*A-6848	16.4	29.9	41.9	11.8	.3	8,450	Subbituminous.
110	Chandler River	Prince Creek	E-74003	7.1	31.6	49.2	12.1			Subbituminous(?).
111	do	Chandler	E-74002	6.0	32.8	47.1	14.1			Bituminous(?).
112	do	do	C-54646	3.9	37.2	56.3	2.6	.3	13,450	Bituminous.
113	Anaktuvuk River	Prince Creek	C-54647	5.2	28.3	43.1	23.4	.7	9,390	Bituminous or subbituminous.
115	Kanayut River	Chandler	E-73995	2.5	31.4	62.8	3.3			Bituminous(?).

for Testing and Materials (1965). Also, samples collected during the 1944–53 period of investigation were stored before analysis for long periods in cloth bags instead of airtight containers. Consequently, the results were less reliable.

In the absence of more and better samples, which would be needed for accurate classification of all northern Alaska coal into the proper rank categories, an approximate separation into the bituminous and subbituminous rank categories has been made for use in this report by using existing analyses and descriptions where they were available; where this information is not available, or for unsampled deposits, the rank is assigned by considering factors, such as age and degree of deformation, believed to be chiefly responsible for the rank.

First, the few available analyses of coal from the Prince Creek Formation indicate that it is mainly of subbituminous rank. Second, because the Prince Creek Formation is of Late Cretaceous age (Detterman and others, 1963, p. 284), it is presumably younger than the more severe of two periods of deformation that affected the Cretaceous rocks at the end of Cenomanian time (Chapman and others, 1964, p. 394) and consequently is less deformed than rocks of the Nanushuk Group. Accordingly, it was assumed that all coal in the Prince Creek Formation, the youngest Cretaceous coal-bearing unit, is subbituminous, on the premise that age, as well as degree of deformation, was a major factor in determining rank. It was further noted that most analyses and descriptions of coal in the Nanushuk Group, including the Chandler and Corwin Formations, indicate a bituminous rank in the folded rocks of the foothills belt and a subbituminous rank in the relatively undisturbed rocks on the lower Meade River and near the Arctic coast. Therefore, it was assumed that coal in the Nanushuk Group is bituminous at all localities in the foothills belt and subbituminous at all localities on the coastal plain, because of the difference in degree of deformation. This relation was noted as early as 1923 by Paige (Paige and others, 1925, p. 30–31), who wrote:

> The coal of the Kukpowruk-Utukok district, a district of folded rocks, is of bituminous rank; that in the Wainwright district, farther from the mountains and less folded, is of subbituminous rank, as is probably the coal of the Meade River region. There is no doubt a progressive change in rank from the mountains northward, due to differences in regional metamorphism.

An exception to this rule is indicated by a single sample of coal collected in 1924 from the Niakogon Tongue of the Chandler Formation at locality 108 on the Killik River. The analysis and heating

value of this coal (table 1) show it to be of subbituminous rank, although the locality is well within the folded foothills belt, which suggests the possibility that coal in the upper part of the Chandler Formation, as well as coal in the Prince Creek Formation, may be of subbituminous rank.

On the basis of the above assumptions, the southern margin of the coastal plain was used as a reference line for classifying coal in the Nanushuk Group for which no direct evidence of rank is available—that to the south being considered bituminous and that to the north, subbituminous. Thus, the many coal beds found in test wells on the coastal plain, particularly the Kaolak and Meade wells, were classified as subbituminous. It should be noted, however, that most of if not all the areas mapped as the Colville Group (pl. 1) are also underlain by rocks of the Nanushuk Group; hence, such areas that are within the foothills belt may be underlain both by subbituminous coal in the Prince Creek Formation of the Colville Group and by bituminous coal in the Chandler Formation of the Nanushuk Group.

According to Chapman and Sable (1960, p. 156), the coal of the Utukok-Corwin district ranges in rank from subbituminous to medium-volatile bituminous, with a general increase in heating value westward from the Utukok River. The same authors (p. 159) refer to the coal at localities 24 and 31 on the Kokolik River as subbituminous, but the calculated moist mineral-free heating values based on the analyses indicate a bituminous rank, according to the standards of the American Society for Testing and Materials. On the other hand, the coals at localities 35 and 43, on the Utukok and Ketik Rivers, were determined in the same way to be on the borderline between subbituminous and bituminous rank, which suggests that coals farther north on the coastal plain, including those at localities 32–34, probably are subbituminous.

Although no heating values were determined for samples of coal from the Corwin Bluff–Cape Beaufort area (locs. 1–8), comparison of proximate analyses with those of known bituminous coals indicates that these coals are bituminous also (Collier, 1906, p. 46–48).

The wide range in ash content shown by the analyses in table 1 probably is not representative of the coals of northern Alaska. Most of the analyses showing high ash content are of samples from isolated thin beds that were taken in the absence of anything better, and many of those showing very low ash content are of grab samples that probably represent the best coal rather than the bed as a whole.

METHOD OF ESTIMATING RESOURCES

In estimating coal resources in the Cape Lisburne–Colville River region, the relative scarcity of detailed information on the character and extent of the coal beds made necessary the use of broader assumptions than are ordinarily used in detailed coal-resource investigations. First, because of the lack of reliable analyses and heating values of coal in large parts of the report area, it was necessary to infer the probable rank of the coal at many localities, as described in the preceding section. A second major assumption made in computing resources was that the known great areal extent of the several coal-bearing units, plus the almost universal presence of potentially valuable coal beds in such units, justified the use of broader limits in determining the extent of individual coal beds than are used where the coal-bearing units are of relatively small extent or the individual coal beds are known to be either exceptionally lenticular or characterized by abrupt lateral gradation into shale or other rock.

On the basis of the above assumptions, the area underlain by a flat or gently dipping coal bed was determined by assuming that an outcrop or drill hole establishes continuity in all directions within 1 mile for indicated coal and within 6 miles for inferred coal, except where the bed is known to be terminated at a shorter distance by thinning, faulting, or erosion. In the few places, where the same bed was known or inferred to crop out at more than one locality, the limiting boundary was determined by drawing a line at the appropriate distance around all the outcrops. The extent of more steeply dipping beds was assumed to be limited by a line beyond which they are under more than 1,000 feet of overburden for indicated coal, and under more than 3,000 feet for inferred coal. The thickness of coal in single outcrops was assumed to be representative of the full extent of the bed; where the same bed was exposed at more than one outcrop a weighted average thickness was used. In computing tonnages each square mile-foot was assumed to contain 1.15 million tons of bituminous coal, or 1.13 million tons of subbituminous coal, corresponding approximately to 1,800 and 1,770 tons per acre-foot.

In tables 2 and 3, tonnages of bituminous and subbituminous coal are given by localities as shown on plate 1, and are classified into several categories based on bed thickness and depth of overburden. The inferred resources shown for each locality are based in general on the same information as the indicated resources, extended to the broader limits. The tonnages estimated for beds in the test wells are

of a lower order of accuracy than those for exposed beds, because the thicknesses used are mostly approximations based on rotary drill logs. No attempt was made to separate resources of beds in test wells into overburden categories, because of lack of information on the position of the beds away from the wells.

ESTIMATES OF COAL RESOURCES

Estimated coal resources in the region, as shown in tables 2 and 3, total 120,197 million tons in beds under less than 3,000 feet of overburden. The total resources include 19,292 million tons of bituminous coal in beds more than 14 inches thick and 100,905 million tons of subbituminous coal in beds more than 2½ feet thick. The bituminous coal includes 838 million tons classified as indicated resources and 18,454 million tons classified as inferred resources; the subbituminous coal includes 1,609 million tons of indicated and 99,296 million tons of inferred resources.

TABLE 2.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (inches)			Total indicated
		14–28	28–42	>42	
					Corwin Bluff-
1 (3 beds)	0–1,000	1.9			1.9
	1,000–2,000				
	2,000–3,000				
2 (10 beds)	0–1,000	4.3	2.3	1.5	8.1
	1,000–2,000				
	2,000–3,000				
3 (20 beds)	0–1,000	10.0	3.4	8.2	21.6
	1,000–2,000				
	2,000–3,000				
4 (21 beds)	0–1,000	7.2	2.2	1.2	10.6
	1,000–2,000				
	2,000–3,000				
5 (3 beds)	0–1,000		1.1	3.7	4.8
	1,000–2,000				
	2,000–3,000				
6	0–1,000	1.7			1.7
	1,000–2,000				
7	0–1,000			3.4	3.4
8	0–1,000			3.9	3.9
	1,000–2,000				
	2,000–3,000				
Total	0–1,000	25.1	9.0	21.9	56.0
	1,000–2,000				
	2,000–3,000				
District total		25.1	9.0	21.9	56.0

bituminous coal, in millions of short tons

Inferred resources				Total resources			
Bed thickness (inches)			Total inferred	Bed thickness (inches)			Total all categories
14–28	28–42	>42		14–28	28–42	>42	
Cape Beaufort district							
17. 4	---	---	17. 4	19. 3	---	---	19. 3
21. 2	---	---	21. 2	21. 2	---	---	21. 2
25. 1	---	---	25. 1	25. 1	---	---	25. 1
25. 9	13. 9	9. 3	49. 1	30. 2	16. 2	10. 8	57. 2
33. 2	17. 8	11. 9	62. 9	33. 2	17. 8	11. 9	62. 9
39. 6	21. 0	14. 1	74. 7	39. 6	21. 0	14. 1	74. 7
59. 8	20. 6	48. 3	128. 7	69. 8	24. 0	56. 5	150. 3
76. 8	26. 3	62. 1	165. 2	76. 8	26. 3	62. 1	165. 2
90. 8	31. 1	73. 3	195. 2	90. 8	31. 1	73. 3	195. 2
14. 0	4. 4	2. 2	20. 6	21. 2	6. 6	3. 4	31. 2
23. 3	7. 2	3. 7	34. 2	23. 3	7. 2	3. 7	34. 2
27. 5	8. 4	4. 3	40. 2	27. 5	8. 4	4. 3	40. 2
---	---	---	---	---	1. 1	3. 7	4. 8
---	1. 2	4. 0	5. 2	---	1. 2	4. 0	5. 2
---	1. 4	4. 8	6. 2	---	1. 4	4. 8	6. 2
2. 5	---	---	2. 5	4. 2	---	---	4. 2
3. 9	---	---	3. 9	3. 9	---	---	3. 9
---	---	---	---	---	---	3. 4	3. 4
---	---	19. 0	19. 0	---	---	22. 9	22. 9
---	---	25. 2	25. 2	---	---	25. 2	25. 2
---	---	29. 8	29. 8	---	---	29. 8	29. 8
119. 6	38. 9	78. 8	237. 3	144. 7	47. 9	100. 7	293. 3
158. 4	52. 5	106. 9	317. 8	158. 4	52. 5	106. 9	317. 8
183. 0	61. 9	126. 3	371. 2	183. 0	61. 9	126. 3	371. 2
461. 0	153. 3	312. 0	926. 3	486. 1	162. 3	333. 9	982. 3

TABLE 2.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (inches)			Total indicated
		14–28	28–42	>42	
					Kukpowruk River
9	0–1, 000	------	1. 0	------	1. 0
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
10 (8 beds)	0–1, 000	------	23. 5	39. 3	62. 8
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
11 (2 beds)	0–1, 000	7. 4	------	------	7. 4
12 (7 beds)	0–1, 000	2. 7	------	20. 7	23. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
13 (2 beds)	0–1, 000	5. 8	------	------	5. 8
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
14 (4 beds)	0–1, 000	------	12. 3	25. 3	37. 6
15	0–1, 000	------	------	12. 9	12. 9
16 (2 beds)	0–1, 000	------	10. 9	------	10. 9
17 (6 beds)	0–1, 000	10. 9	16. 6	------	27. 5
18 (3 beds)	0–1, 000	------	------	42. 4	42. 4
	1, 000–2, 000	------	------	------	--------
19	0–1, 000	1. 8	------	------	1. 8
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
20	0–1, 000	2. 6	------	------	2. 6
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
21 (2 beds)	0–1, 000	------	11. 4	------	11. 4
Total	0–1, 000	31. 2	75. 7	140. 6	247. 5
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
District total	----------	31. 2	75. 7	140. 6	247. 5

bituminous coal, in millions of short tons—Continued

Inferred resources				Total resources			
Bed thickness (inches)			Total inferred	Bed thickness (inches)			Total all categories
14-28	28-42	>42		14-28	28-42	>42	
district							
---	1. 0	---	1. 0	---	2. 0	---	2. 0
---	2. 2	---	2. 2	---	2. 2	---	2. 2
---	2. 6	---	2. 6	---	2. 6	---	2. 6
---	82. 0	137. 3	219. 3	---	105. 5	176. 6	282. 1
---	116. 0	194. 3	310. 3	---	116. 0	194. 3	310. 3
---	137. 0	229. 7	366. 7	---	137. 0	229. 7	366. 7
214. 1	---	---	214. 1	221. 5	---	---	221. 5
13. 7	---	103. 8	117. 5	16. 4	---	124. 5	140. 9
19. 4	---	146. 3	165. 7	19. 4	---	146. 3	165. 7
29. 0	---	219. 0	248. 0	29. 0	---	219. 0	248. 0
29. 0	---	---	29. 0	34. 8	---	---	34. 8
51. 6	---	---	51. 6	51. 6	---	---	51. 6
62. 0	---	---	62. 0	62. 0	---	---	62. 0
---	77. 2	157. 0	234. 2	---	89. 5	182. 3	271. 8
---	---	83. 8	83. 8	---	---	96. 7	96. 7
---	---	---	---	---	10. 9	---	10. 9
72. 0	107. 8	---	179. 8	82. 9	124. 4	---	207. 3
---	---	338. 6	338. 6	---	---	381. 0	381. 0
---	---	95. 2	95. 2	---	---	95. 2	95. 2
10. 2	---	---	10. 2	12. 0	---	---	12. 0
13. 2	---	---	13. 2	13. 2	---	---	13. 2
15. 4	---	---	15. 4	15. 4	---	---	15. 4
12. 6	---	---	12. 6	15. 2	---	---	15. 2
16. 7	---	---	16. 7	16. 7	---	---	16. 7
19. 7	---	---	19. 7	19. 7	---	---	19. 7
---	8. 4	---	8. 4	---	19. 8	---	19. 8
351. 6	276. 4	820. 5	1, 448. 5	382. 8	352. 1	961. 1	1, 696. 0
100. 9	118. 2	435. 8	654. 9	100. 9	118. 2	435. 8	654. 9
126. 1	139. 6	448. 7	714. 4	126. 1	139. 6	448. 7	714. 4
578. 6	534. 2	1, 705. 0	2, 817. 8	609. 8	609. 9	1, 845. 6	3, 065. 3

TABLE 2.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (inches)			Total indicated
		14–28	28–42	>42	
Kokolik River					
22 (2 beds)	0–1, 000	2. 5	------	3. 1	5. 6
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
23	0–1, 000	------	------	9. 2	9. 2
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
24	0–1, 000	------	------	10. 9	10. 9
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
25	0–1, 000	------	10. 8	------	10. 8
26	0–1, 000	------	------	7. 4	7. 4
27 (2 beds)	0–1, 000	4. 2	------	9. 7	13. 9
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
28	0–1, 000	3. 7	------	------	3. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
29	0–1, 000	------	------	7. 4	7. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
30 (5 beds)	0–1, 000	------	------	20. 8	20. 8
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
31	0–1, 000	------	------	9. 2	9. 2
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
Total	0–1, 000	10. 4	10. 8	77. 7	98. 9
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
District total	----------	10. 4	10. 8	77. 7	98. 9

bituminous coal, in millions of short tons—Continued

Inferred resources				Total resources			
Bed thickness (inches)			Total inferred	Bed thickness (inches)			Total all categories
14–28	28–42	>42		14–28	28–42	>42	
district							
11. 8	--------	15. 7	27. 5	14. 3	--------	18. 8	33. 1
15. 7	--------	20. 7	36. 4	15. 7	--------	20. 7	36. 4
18. 5	--------	24. 5	43. 0	18. 5	--------	24. 5	43. 0
--------	--------	74. 3	74. 3	--------	--------	83. 5	83. 5
--------	--------	91. 8	91. 8	--------	--------	91. 8	91. 8
--------	--------	108. 4	108. 4	--------	--------	108. 4	108. 4
--------	--------	53. 6	53. 6	--------	--------	64. 5	64. 5
--------	--------	70. 9	70. 9	--------	--------	70. 9	70. 9
--------	--------	83. 7	83. 7	--------	--------	83. 7	83. 7
--------	184. 2	--------	184. 2	--------	195. 0	--------	195. 0
--------	--------	252. 6	252. 6	--------	--------	260. 0	260. 0
20. 9	--------	48. 6	69. 5	25. 1	--------	58. 3	83. 4
27. 6	--------	64. 1	91. 7	27. 6	--------	64. 1	91. 7
32. 6	--------	75. 7	108. 3	32. 6	--------	75. 7	108. 3
39. 2	--------	--------	39. 2	42. 9	--------	--------	42. 9
47. 2	--------	--------	47. 2	47. 2	--------	--------	47. 2
55. 8	--------	--------	55. 8	55. 8	--------	--------	55. 8
--------	--------	112. 6	112. 6	--------	--------	120. 0	120. 0
--------	--------	132. 0	132. 0	--------	--------	132. 0	132. 0
--------	--------	156. 0	156. 0	--------	--------	156. 0	156. 0
--------	--------	39. 9	39. 9	--------	--------	60. 7	60. 7
--------	--------	51. 4	51. 4	--------	--------	51. 4	51. 4
--------	--------	60. 8	60. 8	--------	--------	60. 8	60. 8
--------	--------	66. 0	66. 0	--------	--------	75. 2	75. 2
--------	--------	82. 7	82. 7	--------	--------	82. 7	82. 7
--------	--------	97. 7	97. 7	--------	--------	97. 7	97. 7
71. 9	184. 2	663. 3	919. 4	82. 3	195. 0	741. 0	1, 018. 3
90. 5	--------	513. 6	604. 1	90. 5	--------	513. 6	604. 1
106. 9	--------	606. 8	713. 7	106. 9	--------	606. 8	713. 7
269. 3	184. 2	1, 783. 7	2, 237. 2	279. 7	195. 0	1, 861. 4	2, 336. 1

TABLE 2.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (inches)			Total indicated
		14–28	28–42	>42	
Utukok River					
36	0–1, 000	------	5. 5	------	5. 5
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
37	0–1, 000	------	------	11. 0	11. 0
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
38	0–1, 000	------	------	7. 4	7. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
39	0–1, 000	------	------	7. 4	7. 4
40	0–1, 000	3. 4	------	------	3. 4
41	0–1, 000	------	------	18. 5	18. 5
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
42 (4 beds)	0–1, 000	5. 3	3. 0	4. 0	12. 3
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
43	0–1, 000	------	------	13. 8	13. 8
44	0–1, 000	------	------	7. 4	7. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
45	0–1, 000	4. 1	------	------	4. 1
Total	0–1, 000	12. 8	8. 5	69. 5	90. 8
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
District total	----------	12. 8	8. 5	69. 5	90. 8
Meade River					
59 (2 beds)	0–1, 000	------	12. 1	19. 0	31. 1
60 (4 beds)	0–1, 000	3. 3	------	34. 1	37. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
61 (4 beds)	0–1, 000	2. 8	------	31. 3	34. 1
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
Total	0–1, 000	6. 1	12. 1	84. 4	102. 6
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
District total	----------	6. 1	12. 1	84. 4	102. 6

bituminous coal, in millions of short tons—Continued

Inferred resources				Total resources			
Bed thickness (inches)			Total inferred	Bed thickness (inches)			Total all categories
14–28	28–42	>42		14–28	28–42	>42	
district							
---	39. 6	---	39. 6	---	45. 1	---	45. 1
---	49. 6	---	49. 6	---	49. 6	---	49. 6
---	58. 6	---	58. 6	---	58. 6	---	58. 6
---	---	79. 0	79. 0	---	---	90. 0	90. 0
---	---	99. 0	99. 0	---	---	99. 0	99. 0
---	---	117. 0	117. 0	---	---	117. 0	117. 0
---	---	112. 3	112. 3	---	---	119. 7	119. 7
---	---	96. 0	96. 0	---	---	96. 0	96. 0
---	---	119. 7	119. 7	---	---	119. 7	119. 7
---	---	452. 6	452. 6	---	---	460. 0	460. 0
235. 5	---	---	235. 5	238. 9	---	---	238. 9
---	---	92. 5	92. 5	---	---	111. 0	111. 0
---	---	122. 1	122. 1	---	---	122. 1	122. 1
---	---	144. 3	144. 3	---	---	144. 3	144. 3
26. 4	15. 4	19. 8	61. 5	31. 7	18. 3	23. 8	73. 8
34. 8	20. 1	26. 2	81. 1	34. 8	20. 1	26. 2	81. 1
41. 2	23. 7	31. 0	95. 9	41. 2	23. 7	31. 0	95. 9
---	---	246. 2	246. 2	---	---	260. 0	260. 0
---	---	52. 6	52. 6	---	---	60. 0	60. 0
---	---	66. 0	66. 0	---	---	66. 0	66. 0
---	---	78. 0	78. 0	---	---	78. 0	78. 0
148. 0	---	---	148. 0	152. 1	---	---	152. 1
409. 9	54. 9	1, 055. 0	1, 519. 8	422. 7	63. 4	1, 124. 5	1, 610. 6
34. 8	69. 7	409. 3	513. 8	34. 8	69. 7	409. 3	513. 8
41. 2	82. 3	490. 0	613. 5	41. 2	82. 3	490. 0	613. 5
485. 9	206. 9	1, 954. 3	2, 647. 1	498. 7	215. 4	2, 023. 8	2, 737. 9
district							
---	---	539. 0	539. 0	---	12. 1	558. 0	570. 1
46. 7	---	407. 0	453. 7	50. 0	---	441. 1	491. 1
55. 0	---	448. 0	503. 0	55. 0	---	448. 0	503. 0
65. 0	---	530. 0	595. 0	65. 0	---	530. 0	595. 0
16. 0	---	182. 0	198. 0	18. 8	---	213. 3	232. 1
20. 7	---	234. 6	255. 3	20. 7	---	234. 6	255. 3
24. 5	---	277. 2	301. 7	24. 5	---	277. 2	301. 7
62. 7	---	1, 128. 0	1, 190. 7	68. 8	12. 1	1, 212. 4	1, 293. 3
75. 7	---	682. 6	758. 3	75. 7	---	682. 6	758. 3
89. 5	---	807. 2	896. 7	89. 5	---	807. 2	896. 7
227. 9	---	2, 617. 8	2, 845. 7	234. 0	12. 1	2, 702. 2	2, 948. 3

Table 2.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (inches)			Total indicated
		14–28	28–42	>42	
					Colville River
79	0–1, 000	------	------	8. 6	8. 6
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
80	0–1, 000	0. 7	------	------	0. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
81 (4 beds)	0–1, 000	0. 6	1. 9	1. 2	3. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
82	0–1, 000	1. 2	------	------	1. 2
83	0–1, 000	------	3. 4	------	3. 4
84	0–1, 000	------	0. 9	------	0. 9
85 (2 beds)	0–1, 000	0. 6	------	1. 9	2. 5
86 (2 beds)	0–1, 000	0. 7	------	1. 2	1. 9
87 (2 beds)	0–1, 000	------	------	5. 8	5. 8
88	0–1, 000	------	7. 3	------	7. 3
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
89	0–1, 000	3. 7	------	------	3. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
90	0–1, 000	------	5. 5	------	5. 5
91	0–1, 000	------	4. 6	------	4. 6
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
Knifeblade test well 1 (6 beds)	0–1, 000	28. 8	21. 6	------	50. 4
2A (2 beds)	0–1, 000	7. 2	10. 8	------	18. 0
92	0–1, 000	3. 7	------	------	3. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
93	0–1, 000	------	5. 5	------	5. 5
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
94	0–1, 000	------	------	4. 6	4. 6
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
95 (2 beds)	0–1, 000	------	5. 5	6. 8	12. 3
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
96	0–1, 000	------	6. 4	------	6. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
97	0–1, 000	------	------	9. 2	9. 2
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
98	0–1, 000	3. 7	------	------	3. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
99 (2 beds)	0–1, 000	------	11. 1	------	11. 1
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------

bituminous coal, in millions of short tons—Continued

Inferred resources				Total resources			
Bed thickness (inches)			Total inferred	Bed thickness (inches)			Total all categories
14-28	28-42	>42		14-28	28-42	>42	
district							
		85. 4	85. 4			94. 0	94. 0
		113. 4	113. 4			113. 4	113. 4
		132. 2	132. 2			132. 2	132. 2
2. 2			2. 2	2. 9			2. 9
3. 3			3. 3	3. 3			3. 3
3. 9			3. 9	3. 9			3. 9
3. 3	9. 1	5. 6	18. 0	3. 9	11. 0	6. 8	21. 7
4. 3	12. 1	7. 5	23. 9	4. 3	12. 1	7. 5	23. 9
5. 1	14. 3	8. 9	28. 3	5. 1	14. 3	8. 9	28. 3
				1. 2			1. 2
					3. 4		3. 4
					0. 9		0. 9
				0. 6		1. 9	2. 5
				0. 7		1. 2	1. 9
						5. 8	5. 8
	7. 3		7. 3		14. 6		14. 6
	16. 1		16. 1		16. 1		16. 1
	19. 1		19. 1		19. 1		19. 1
21. 2			21. 2	24. 9			24. 9
27. 4			27. 4	27. 4			27. 4
32. 4			32. 4	32. 4			32. 4
					5. 5		5. 5
	19. 7		19. 7		24. 3		24. 3
	26. 7		26. 7		26. 7		26. 7
	31. 5		31. 5		31. 5		31. 5
1, 011. 0	758. 0		1, 769. 0	1, 039. 8	779. 6		1, 819. 4
253. 0	379. 0		632. 0	260. 2	389. 8		650. 0
39. 3			39. 3	43. 0			43. 0
47. 3			47. 3	47. 3			47. 3
55. 9			55. 9	55. 9			55. 9
	35. 7		35. 7		41. 2		41. 2
	45. 3		45. 3		45. 3		45. 3
	53. 5		53. 5		53. 5		53. 5
		41. 1	41. 1			45. 7	45. 7
		55. 3	55. 3			55. 3	55. 3
		65. 3	65. 3			65. 3	65. 3
	80. 6	104. 3	184. 9		86. 1	111. 1	197. 2
	86. 1	111. 1	197. 2		86. 1	111. 1	197. 2
	86. 4	82. 0	168. 4		86. 4	82. 0	168. 4
	98. 6		98. 6		105. 0		105. 0
	105. 0		105. 0		105. 0		105. 0
	77. 2		77. 2		77. 2		77. 2
		140. 8	140. 8			150. 0	150. 0
		150. 0	150. 0			150. 0	150. 0
		110. 0	110. 0			110. 0	110. 0
46. 3			46. 3	50. 0			50. 0
55. 0			55. 0	55. 0			55. 0
65. 0			65. 0	65. 0			65. 0
	101. 0		101. 0		112. 1		112. 1
	123. 2		123. 2		123. 2		123. 2
	145. 6		145. 6		145. 6		145. 6

Table 2.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (inches)			Total indicated
		14-28	28-42	>42	
					Colville River
100	0–1, 000	------	------	4. 3	4. 3
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
101 (4 beds)	0–1, 000	7. 4	11. 0	------	18. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
102 (2 beds)	0–1, 000	------	3. 9	5. 8	9. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
103	0–1, 000	------	5. 5	------	5. 5
104	0–1, 000	3. 7	------	------	3. 7
105	0–1, 000	------	5. 0	------	5. 0
106	0–1, 000	2. 1	------	------	2. 1
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
107	0–1, 000	3. 7	------	------	3. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
111	0–1, 000	------	5. 0	------	5. 0
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
112	0–1, 000	3. 4	------	------	3. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
114	0–1, 000	------	4. 6	------	4. 6
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
115	0–1, 000	------	2. 1	------	2. 1
	1, 000–2, 000	------	------	------	--------
Total	0–1, 000	71. 2	121. 6	49. 4	242. 2
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
District total	----------	71. 2	121. 6	49. 4	242. 2
Total all districts	0–1, 000	156. 8	237. 7	443. 5	838. 0
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
Total bituminous coal	----------	156. 8	237. 7	443. 5	838. 0

bituminous coal, in millions of short tons—Continued

Inferred resources				Total resources			
Bed thickness (inches)			Total inferred	Bed thickness (inches)			Total all categories
14–28	28–42	>42		14–28	28–42	>42	
district—Continued							
		21. 4	21. 4			25. 7	25. 7
		28. 3	28. 3			28. 3	28. 3
		33. 5	33. 5			33. 5	33. 5
78. 3	117. 0		195. 3	85. 7	128. 0		213. 7
94. 3	140. 8		235. 1	94. 3	140. 8		235. 1
111. 5	166. 2		277. 7	111. 5	166. 2		277. 7
	19. 0	28. 5	47. 5		22. 9	34. 3	57. 2
	25. 2	37. 7	62. 9		25. 2	37. 7	62. 9
	29. 8	42. 5	72. 3		29. 8	42. 5	72. 3
	53. 0		53. 0		58. 5		58. 5
23. 9			23. 9	27. 6			27. 6
	54. 0		54. 0		59. 0		59. 0
10. 2			10. 2	12. 3			12. 3
13. 5			13. 5	13. 5			13. 5
15. 9			15. 9	15. 9			15. 9
56. 3			56. 3	60. 0			60. 0
60. 3			60. 3	60. 3			60. 3
45. 8			45. 8	45. 8			45. 8
	25. 3		25. 3		30. 3		30. 3
	33. 3		33. 3		33. 3		33. 3
	39. 3		39. 3		39. 3		39. 3
16. 8			16. 8	20. 2			20. 2
22. 2			22. 2	22. 2			22. 2
26. 2			26. 2	26. 2			26. 2
	32. 9		32. 9		37. 5		37. 5
	41. 2		41. 2		41. 2		41. 2
	48. 6		48. 6		48. 6		48. 6
	39. 3		39. 3		41. 4		41. 4
	128. 2		128. 2		128. 2		128. 2
1, 561. 8	1, 829. 5	427. 1	3, 818. 4	1, 633. 0	1, 951. 1	476. 5	4, 060. 6
327. 6	783. 2	503. 3	1, 614. 1	327. 6	783. 2	503. 3	1, 614. 1
361. 7	711. 5	474. 4	1, 547. 6	361. 7	711. 5	474. 4	1, 547. 6
2, 251. 1	3, 324. 2	1, 404. 8	6, 980. 1	2, 322. 3	3, 445. 8	1, 454. 2	7, 222. 3
2, 577. 5	2, 383. 9	4, 172. 7	9, 134. 1	2, 734. 3	2, 621. 6	4, 616. 2	9, 972. 1
787. 9	1, 023. 6	2, 651. 5	4, 463. 0	787. 9	1, 023. 6	2, 651. 5	4, 463. 0
908. 4	995. 3	2, 953. 4	4, 857. 1	908. 4	995. 3	2, 953. 4	4, 857. 1
4, 273. 8	4, 402. 8	9, 777. 6	18, 454. 2	4, 430. 6	4, 640. 5	10, 221. 1	19, 292. 2

TABLE 3.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (feet)			Total indicated
		2½–5	5–10	>10	
Utukok River					
32	0–1, 000	8. 2	------	------	8. 2
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
33	0–1, 000	------	9. 0	------	9. 0
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
34	0–1, 000	------	------	21. 2	21. 2
35	0–1, 000	------	31. 6	------	31. 6
Kaolak test well 1 (36 beds)	0–3, 000	29. 8	------	71. 0	100. 8
Total	0–1, 000	8. 2	40. 6	21. 2	70. 0
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
	0–3, 000	29. 8	------	71. 0	100. 8
District total	----------	38. 0	40. 6	92. 2	170. 8
Kuk River					
46	0–1, 000	5. 4	------	------	5. 4
47 (2 beds)	0–1, 000	------	20. 8	------	20. 8
48	0–1, 000	------	------	26. 2	26. 2
49	0–1, 000	10. 2	------	------	10. 2
District total	0–1, 000	15. 6	20. 8	26. 2	62. 6
Kugrua River					
50 (2 beds)	0–1, 000	------	18. 1	------	18. 1
51	0–1, 000	------	9. 1	------	9. 1
52	0–1, 000	------	17. 0	------	17. 0
District total	0–1, 000	------	44. 2	------	44. 2

subbituminous coal, in millions of short tons

Inferred resources				Total resources			
Bed thickness (feet)			Total inferred	Bed thickness (feet)			Total all categories
2½–5	5–10	>10		2½–5	5–10	>10	
district							
41. 2	----------	----------	41. 2	49. 4	----------	----------	49. 4
54. 3	----------	----------	54. 3	54. 3	----------	----------	54. 3
64. 1	----------	----------	64. 1	64. 1	----------	----------	64. 1
----------	65. 3	----------	65. 3	----------	74. 3	----------	74. 3
----------	81. 7	----------	81. 7	----------	81. 7	----------	81. 7
----------	96. 5	----------	96. 5	----------	96. 5	----------	96. 5
----------	----------	725. 8	725. 8	----------	----------	747. 0	747. 0
----------	158. 4	----------	158. 4	----------	190. 0	----------	190. 0
2, 400. 0	14,980.0	25, 900. 0	43, 280. 0	2, 429. 8	14,980.0	25, 971. 0	43, 380. 8
41. 2	223. 7	725. 8	990. 7	49. 4	264. 3	747. 0	1, 060. 7
54. 3	81. 7	----------	136. 0	54. 3	81. 7	----------	136. 0
64. 1	96. 5	----------	160. 6	64. 1	96. 5	----------	190. 6
2, 400. 0	14,980.0	25, 900. 0	43, 280. 0	2, 429. 8	14,980.0	25, 971. 0	43, 380. 8
2, 559. 6	15,381.9	26, 625. 8	44, 567. 3	2, 597. 6	15,422.5	26, 718. 0	44, 738. 1
(Wainwright) district							
167. 1	----------	----------	167. 1	172. 5	----------	----------	172. 5
----------	----------	----------	----------	----------	20. 8	----------	20. 8
----------	----------	899. 0	899. 0	----------	----------	925. 2	925. 2
329. 0	----------	----------	329. 0	339. 2	----------	----------	339. 2
496. 1	----------	899. 0	1, 395. 1	511. 7	20. 8	925. 2	1, 457. 7
(Peard Bay) district							
} ----------	796. 0	----------	796. 0	----------	840. 2	----------	840. 2
----------	796. 0	----------	796. 0	----------	840. 2	----------	840. 2

TABLE 3.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (feet)			Total indicated
		2½–5	5–10	>10	
Meade River					
53	0–1, 000	4. 5	------	------	4. 5
54	0–1, 000	------	10. 8	------	10. 8
55	0–1, 000	11. 9	------	------	11. 9
56	0–1, 000	------	23. 7	------	23. 7
57 (2 beds)	0–1, 000	30. 4	------	------	30. 4
58	0–1, 000	10. 2	------	------	10. 2
Meade test well 1 (21 beds)	0–3, 000	14. 2	120. 8	462. 0	597. 0
Topagoruk test well 1 (8 beds)	0–1, 000	103. 0	------	------	103. 0
Total	0–1, 000	160. 0	34. 5	------	194. 5
	0–3, 000	14. 2	120. 8	462. 0	597. 0
District total	----------	174. 2	155. 3	462. 0	791. 5
Ikpikpuk River					
Titaluk test well 1 (2 beds)	0–3, 000	17. 0	------	------	17. 0
62	0–1, 000	------	14. 7	------	14. 7
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
63	0–1, 000	4. 8	------	------	4. 8
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
64	0–1, 000	9. 7	------	------	9. 7
	1, 000–2, 000	------	------	------	--------
65	0–1, 000	------	------	36. 8	36. 8
Wolf Creek test well 1	0–1, 000	14. 4	------	------	14. 4
Total	0–1, 000	28. 9	14. 7	36. 8	80. 4
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
	0–3, 000	17. 0	------	------	17. 0
District total	----------	45. 9	14. 7	36. 8	97. 4

subbituminous coal, in millions of short tons—Continued

Inferred resources				Total resources			
Bed thickness (feet)			Total inferred	Bed thickness (feet)			Total all categories
2½–5	5–10	>10		2½–5	5–10	>10	
district							
266. 5	---	---	266. 5	271. 0	---	---	271. 0
---	329. 0	---	329. 0	---	339. 8	---	339. 8
424. 0	---	---	424. 0	435. 9	---	---	435. 9
---	769. 0	---	769. 0	---	792. 7	---	792. 7
586. 0	---	---	586. 0	616. 4	---	---	616. 4
180. 3	---	---	180. 3	190. 5	---	---	190. 5
1, 010. 0	8, 319. 0	23, 474. 0	32, 803. 0	1, 024. 2	8, 439. 8	23, 936. 0	33, 400. 0
3, 607. 0	---	---	3, 607. 0	3, 710. 0	---	---	3, 710. 0
5, 063. 8	1, 098. 0	---	6, 161. 8	5, 223. 8	1, 132. 5	---	6, 356. 3
1, 010. 0	8, 319. 0	23, 474. 0	32, 803. 0	1, 024. 2	8, 439. 8	23, 936. 0	33, 400. 0
6, 073. 8	9, 417. 0	23, 474. 0	38, 964. 8	6, 248. 0	9, 572. 3	23, 936. 0	39, 756. 3
district							
947. 0	---	---	947. 0	964. 0	---	---	964. 0
---	138. 0	---	138. 0	---	152. 7	---	152. 7
---	153. 0	---	153. 0	---	153. 0	---	153. 0
---	117. 0	---	117. 0	---	117. 0	---	117. 0
55. 0	---	---	55. 0	59. 8	---	---	59. 8
78. 0	---	---	78. 0	78. 0	---	---	78. 0
59. 5	---	---	59. 5	59. 5	---	---	59. 5
190. 0	---	---	190. 0	199. 7	---	---	199. 7
283. 0	---	---	283. 0	283. 0	---	---	283. 0
---	---	---	---	---	---	36. 8	36. 8
506. 0	---	---	506. 0	520. 4	---	---	520. 4
751. 0	138. 0	---	889. 0	779. 9	152. 7	36. 8	969. 4
361. 0	153. 0	---	514. 0	361. 0	153. 0	---	514. 0
59. 5	117. 0	---	176. 5	59. 5	117. 0	---	176. 5
947. 0	---	---	947. 0	964. 0	---	---	964. 0
2, 118. 5	408. 0	---	2, 526. 5	2, 164. 4	422. 7	36. 8	2, 623. 9

TABLE 3.—*Estimated resources of*

Coal locality (see pl. 1)	Overburden (feet)	Indicated resources			
		Bed thickness (feet)			Total indicated
		2½–5	5–10	>10	
					Colville River
Fish Creek test well 1 (2 beds)	1, 000–2, 000	------	------	------	--------
66 (2 beds)	0–1, 000	5. 5	9. 0	------	14. 5
67	0–1, 000	10. 2	------	------	10. 2
68	0–1, 000	------	17. 0	------	17. 0
69 (3 beds)	0–1, 000	28. 3	------	------	28. 3
70 (2 beds)	0–1, 000	5. 6	42. 4	------	48. 0
71	0–1, 000	------	20. 4	------	20. 4
72	0–1, 000	------	36. 7	------	36. 7
73	0–1, 000	29. 6	74. 5	------	104. 1
74	0–1, 000	10. 2	------	------	10. 2
75	0–1, 000	6. 8	------	------	6. 8
76 (3 beds)	0–1, 000	7. 2	21. 7	------	28. 9
77 (2 beds)	0–1, 000	------	16. 3	------	16. 3
78	0–1, 000	------	18. 1	------	18. 1
Umiat test well 11 (3 beds)	0–3, 000	11. 4	------	------	11. 4
Gubik test well 1 (2 beds)	1, 000–2, 000	------	------	------	--------
108	0–1, 000	5. 8	------	------	5. 8
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
109 (6 beds)	0–1, 000	47. 9	9. 2	------	57. 1
110	0–1, 000	6. 0	------	------	6. 0
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
113 (2 beds)	0–1, 000	3. 1	------	------	3. 1
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
Total	0–1, 000	166. 2	265. 3	------	431. 5
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
	0–3, 000	11. 4	------	------	11. 4
District total	----------	177. 6	265. 3	------	442. 9
Total all districts	0–1, 000	378. 9	420. 1	84. 2	883. 2
	1, 000–2, 000	------	------	------	--------
	2, 000–3, 000	------	------	------	--------
	0–3, 000	72. 4	120. 8	533. 0	726. 2
Total subbituminous coal.	----------	451. 3	540. 9	617. 2	1, 609. 4

subbituminous coal, in millions of short tons—Continued

Inferred resources				Total resources			
Bed thickness (feet)			Total inferred	Bed thickness (feet)			Total all categories
2½–5	5–10	>10		2½–5	5–10	>10	
district							
704. 0	----------	----------	704. 0	704. 0	----------	----------	704. 0
240. 0	----------	----------	240. 0	245. 5	9. 0	----------	254. 5
1,206. 0	3, 192. 4	----------	4, 398. 4	1, 289. 9	3, 383. 4	----------	4, 673. 3
333. 0	----------	----------	333. 0	339. 8	----------	----------	339. 8
526. 0	313. 0	----------	839. 0	533. 2	351. 0	----------	884. 2
----------	650. 0	----------	650. 0	----------	668. 1	----------	668. 1
191. 1	----------	----------	191. 1	202. 5	----------	----------	202. 5
----------	1, 024. 0	1, 920. 0	2, 944. 0	----------	1, 024. 0	1, 920. 0	2, 944. 0
29. 2	----------	----------	29. 2	35. 0	----------	----------	35. 0
38. 5	----------	----------	38. 5	38. 5	----------	----------	38. 5
45. 5	----------	----------	45. 5	45. 5	----------	----------	45. 5
352. 1	129. 8	----------	481. 9	400. 0	139. 0	----------	539. 0
22. 5	----------	----------	22. 5	28. 5	----------	----------	28. 5
31. 3	----------	----------	31. 3	31. 3	----------	----------	31. 3
36. 9	----------	----------	36. 9	36. 9	----------	----------	36. 9
15. 7	----------	----------	15. 7	18. 8	----------	----------	18. 8
20. 7	----------	----------	20. 7	20. 7	----------	----------	20. 7
24. 5	----------	----------	24. 5	24. 5	----------	----------	24. 5
2,724. 5	4, 285. 2	----------	7, 009. 7	2, 890. 7	4, 550. 5	----------	7, 441. 2
794. 5	1, 024. 0	1, 920. 0	3, 738. 5	794. 5	1, 024. 0	1, 920. 0	3, 738. 5
106. 9	----------	----------	106. 9	106. 9	----------	----------	106. 9
191. 1	----------	----------	191. 1	202. 5	----------	----------	202. 5
3,817. 0	5, 309. 2	1, 920. 0	11, 046. 2	3, 994. 6	5, 574. 5	1, 920. 0	11, 489. 1
9,076. 6	6, 540. 9	1, 624. 8	17, 242. 3	9, 455. 5	6, 961. 0	1, 709. 0	18, 125. 5
1,209. 8	1, 258. 7	1, 920. 0	4, 388. 5	1, 209. 8	1, 258. 7	1, 920. 0	4, 388. 5
230. 5	213. 5	----------	444. 0	230. 5	213. 5	----------	444. 0
4,548. 1	23,299.0	49, 374. 0	77, 221. 1	4, 620. 5	23,419.0	49, 907. 0	77, 947. 3
15,065.0	31,312.1	52, 918. 8	99, 295. 9	15,516.3	31,853.0	53, 536. 0	100,905.3

Of the total estimated resources of subbituminous coal, about 77,000 million tons, or 78 percent, is in beds found in test wells Kaolak 1 and Meade 1, which are about 65 miles apart in the southern part of the coastal plain. Nothing is known of the extent of the beds in these wells, but in view of the great thickness of the coal-rich sections—1,700 feet in the Meade well and 4,600 feet in the Kaolak well—it seems highly probable that they extend far beyond the 6-mile limit used in computing resources. Obviously much more information, particularly subsurface data, is needed before an accurate appraisal of the total coal resources of the Cape Lisburne–Colville River region can be made. Available information suggests that such an appraisal would greatly exceed the estimates given in the accompanying tables.

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