

INITIAL WAR MINERALS REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

W. M. R. _____

Coal

1944

SOME COAL FIELDS ALONG THE ALASKA RAILROAD
AND THE
RICHARDSON HIGHWAY, ALASKA

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SUMMARY

1/ This preliminary war minerals report has been prepared for the engineers and consultants of the Bureau of Mines for their technical review and criticism, and to keep them informed of the progress of the Bureau of Mines war minerals program. It is not to be made available to others, as the data are subject to correction and revision. The final report, when issued, will be distributed on a limited basis to officials of the Federal war agencies, the owners or operators of the properties described therein, and to certain others with specific concern in the production of minerals vital to the prosecution of the war.

INTRODUCTION

During the winter of 1942-1943, a serious coal shortage was experienced in Interior Alaska. This was due to an increased demand for coal for war activities and to operating difficulties at one of the larger Alaska coal mines.

In an effort to prevent a recurrence of this situation, the Army created a Coal Procurement Section in its Alaska Department. The Chief of this Section, Lt. Col. C. W. Jeffers, is assisted by Major Donald Sibray and Major George Chapman, Captain James Rasch, and Lt. Prichard. The objective of this organization was the investigation of the whole coal situation in the territory of Alaska and the initiation of necessary measures to insure an adequate supply of coal for Army and civilian needs during the emergency. An engineer^{1/} of the Bureau of Mines was assigned to assist the Army Coal Procurement Section in the capacity of a consulting coal mining engineer.

The Army was interested in establishing reserves of a large tonnage of good quality, easily minable coal. In the course of this program, the following deposits were examined:

Leasing Block 28

Broad Pass	Coal Prospect
Willow	Coal Prospect
Houston	Coal Prospect
Vasilla	Coal Prospect
Donnelly	Coal Prospect

These are described under separate headings in this report.

^{1/} Henning Marstrander, Mining Engineer

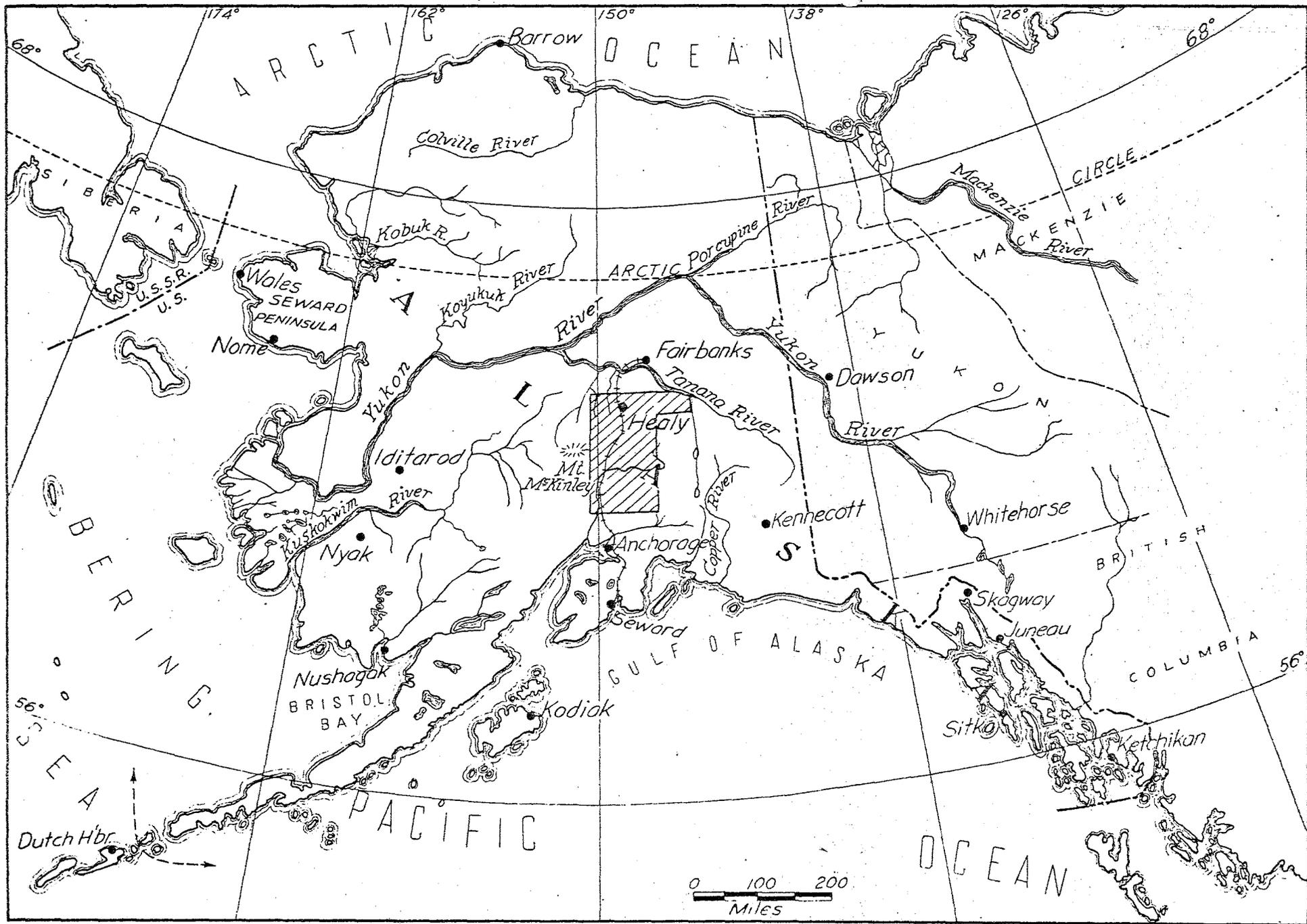
The coal deposits described are in a district extending roughly from Lat. 61° to 64° 30' N. and from Long. 145° 30' to 150° W. The most southerly deposit is approximately 50 miles northeast of Anchorage and the most northerly is approximately 65 miles south of Fairbanks. (Fig. 1.)

Climate is an important consideration in the mining of coal as well as in its consumption. In the territory under consideration in this report, there are considerable differences in climate at the several properties and points of consumption. Climate varies with the distance from the coast and with the topography. Detailed studies have been made of the climatic conditions in the coal fields investigated^{2/} and data are summarized in the discussions of the different fields.

In the preparation of this report, extensive use has been made of publications of the Bureau of Mines, the Federal Geological Survey, the Alaska Territorial Department of Mines, and the reports of the Regional Office of the Weather Bureau at Anchorage, Alaska.

Charles R. Garrett, Coal Mine Inspector of the Alaska Territorial Department of Mines, was especially helpful in offering advice and in assisting in the sampling of coal beds. Ludlow G. Anderson, Bureau of Mines Safety Engineer for Alaska, and Maurice L. Sharp, Chief Coal Analyst, Alaska Railroad, gave all possible assistance. The cooperation and assistance given by officers of the Army Coal Procurement Section, by Austin Lathrop, President of Healy River Coal Corp., and by Peder Nilsen, Mine Superintendent of the Suntrana Mines is gratefully acknowledged.

^{2/} Graphic charts of maximum, minimum, and mean temperature; rainfall, and snowfall are on file at the Bureau of Mines at Rolla, Missouri. Juneau, Alaska. The records may be examined by interested parties.



DISCRIPTION OF THE DEPOSITS

LEASING BLOCK NO. 28 (ROTH COAL PERMIT)Summary

Because the Army was concerned in determining the presence of a large tonnage of easily minable coal of the best possible quality, the bureau of mines undertook to investigate the coal deposits in Leasing Block 28 which was believed to be the most promising location. The sum of \$1500 was made available by the Army Coal Procurement Section for trenching and sampling the parts of the deposits which seemed suitable for immediate production.

The presence of 500,000 tons of subbituminous coal available for open cut mining was determined, 50 percent of which is readily available for immediate extraction.

General

Leasing Block No. 28, formerly known as the Roth Permit, lies on both sides of Healy Creek north of the Alaska Range. The location is shown on figure 2. The Block is part of the Nenana coal field located approximately at Lat. 64° N. and extending approximately from Long. 147° W. to 150° W. The field may extend eastward to the Donnelly Field near Rapids on the Richardson Highway, but this is not certain. Coal-bearing rocks have been traced northward beyond Lignite Creek (Hoseanna Creek) and westward at least 20 miles beyond Healy village. The Diamond open pit mine, approximately 4 miles west of Healy, was operated on an Army contract during the late fall of 1943.

Other coal-bearing lands occur along Healy Creek between Healy and Leasing Block 28. The Suntrana Mine of Healy River Coal Corporation is 4.4 miles by rail east of Healy.

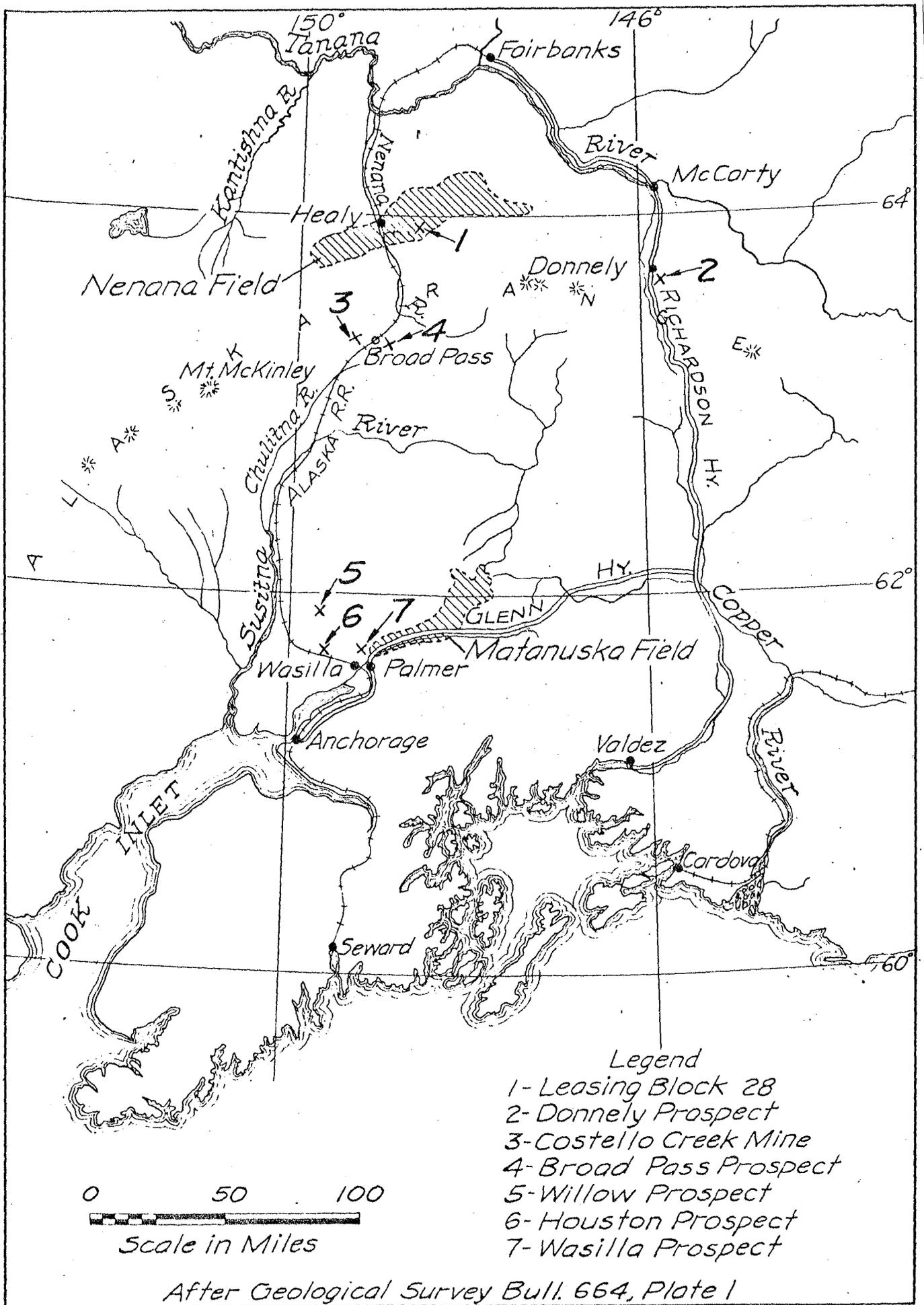
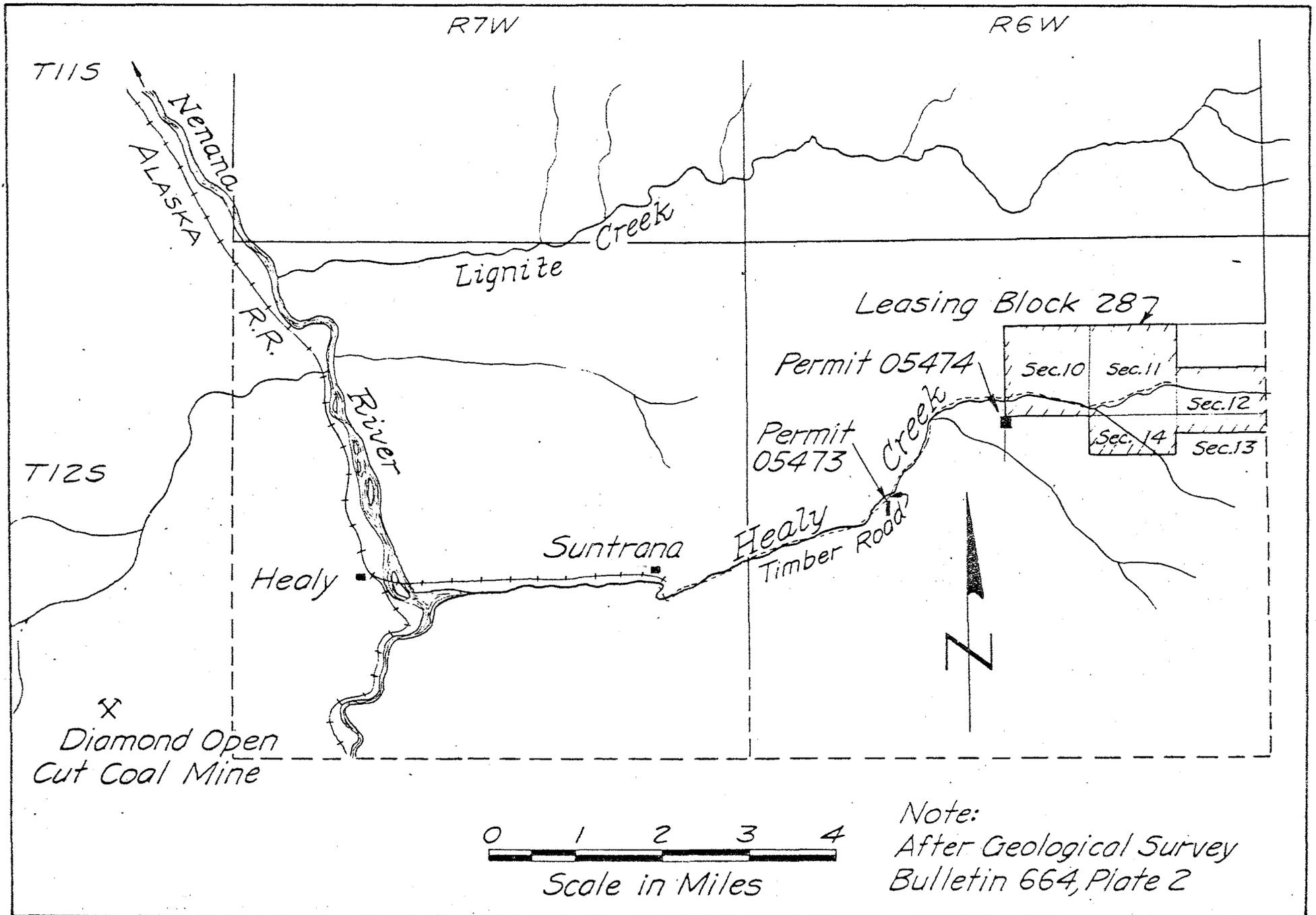


FIG. 2, PG. 5, LOCATION OF COAL PROSPECTS



Note:
 After Geological Survey
 Bulletin 664, Plate 2

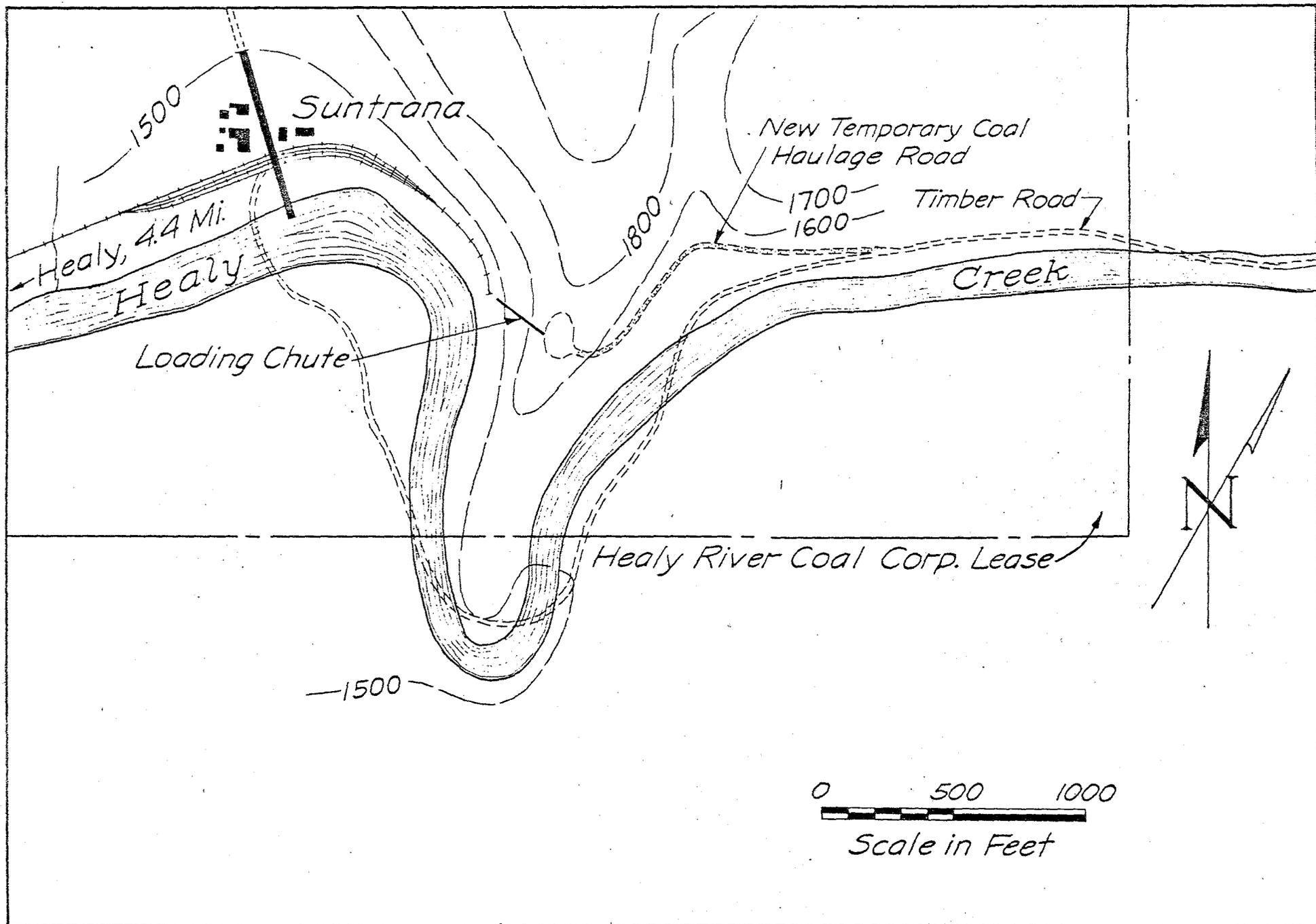


FIG. 4. PG. 5. RIDGE AT SUNTRANA WITH ROADS AND LOADING ARRANGEMENTS

The property in Leasing Block 28 consists of sec. 10 and sec. 11, the S. $\frac{1}{2}$ sec. 12, N. $\frac{1}{2}$ N. $\frac{1}{2}$ sec. 13, and N. $\frac{1}{2}$ sec. 14. T. 12 S., R. 6 W., Fairbanks meridian and is in the Nenana Precinct of the 4th Judicial Division.

Leasing Block 28 is approximately 12 miles east of Healy. Healy is a village of about 50 people.

The Alaska Railroad crosses the field. The distance from Healy to Anchorage is 244 miles, from Fairbanks to Healy is 112 miles.

Accessibility

The Coal from Leasing Block No. 28 can be transported to the railroad without great difficulty. A railroad spur extends from Healy to the Suntrana Mine. From this mine, a road has been graded along the creek as far as Leasing Block 28 for the hauling of timber for the mine. Though this road crosses Healy Creek in four places close to Suntrana. these crossings can ordinarily be made by trucks and tractors with little difficulty. Repairs to the road are necessary after heavy rains. Because of the crossings the road is not adequate for large scale operations.

In order to avoid these stream crossings, obtain better facilities for loading coal into railroad cars and avoid at present the construction of a tunnel through the ridge near the Suntrana Mines, the Bureau of Mines proposed construction of a road up the east side of the ridge and from a point at the top of the ridge dumping the coal into a bin from where it could be dropped through a chute down the steep west side of the ridge to railroad cars at the bottom. This plan was eventually adopted. A short connection between the existing old road and the top of the ridge, and a combined coal bin and chute, were constructed by the present operation, Usibelli and Sanford, for handling coal which they expected to

mine from deposits covered by Army Free Use Permits Nos. 05473 and 05474. Lumber for the bin and chute was supplied by the Army as advance payment for coal. Maximum grades of the road up the east side of the hill are 5 to 8 percent.

Present plans for the development of Leasing Block 28 provide for the construction of a permanent road to replace the timber road. This would be built on the terrace on the north side of the creek where it will be from 20 to more than 50 feet above floodwater and will be safe from damage by floods. The length of the road, east of the slope on the ridge, would be a little more than 7 miles.

As this road can not be connected with the railroad at Suntrana without great expense, it is planned that the road up the ridge be improved and the present method of handling coal through a chute be continued until this field is opened up for mining of coal on a large scale.

The Alaska Road Commission estimates the cost of a permanent road which, including the distance up the east side of the ridge, would be about 8 miles in length at \$100,000. A local construction firm estimates its cost at \$40,000.

There would be no great difficulty in extending the Suntrana railroad spur to Leasing Block 28 or constructing a truck road capable of handling a large tonnage. It is believed that as much as 66,000,000 tons of coal can be produced from this block above the level of Healy Creek.

Physical Features and Climate.

The Nenana coal field is part of a foothill belt on the north side of the Alaska Range. This range extends in a crescent shape from Lake Clarke on the west to the St. Elias Range on the east. Numerous peaks reach an altitude of more than 10,000 feet; and Mt. McKinley, the highest peak in North America, has an altitude of 20,300 feet. The coal field lies between the Alaska Range on the south and the broad flats of the Tanana Valley on the north. The topography of the district consists of more or less parallel ridges separated by lowlands which are often terraced. The streams which flow into the Tanana River from the south, such as Nenana River, originate in the glaciers of the Alaska Range at elevations of approximately 5,000 feet, though the altitude at the confluence of the Nenana and Tanana Rivers is only 350 feet. The southern half of the territory drained by the Nenana is rough and broken, while there is considerable level, gently rolling country in the northern half. Healy Creek which flows across Leasing Block 28, and Lignite Creek farther north, enter Nenana River from the east.

The coal-bearing rocks are found in broad open valleys, having an east-west trend and crossing the main streams at right angles.^{3/} The hills which border these valleys are high and rugged; and were it not for the dominance of the high Alaska Range to the south, they would be termed mountains.

^{3/} Davis, John A., Supt., Alaska Experiment Station, Bureau of Mines, Annual Report of the Mine Inspector, page 144, 1922.

Near the mouth of Healy Creek, the Nenana debouches from a steep canyon in the schist hill which form the backbone of the foothills and flows northward in a valley eroded across the coal-bearing formation. On both sides of the valley the coal-bearing rocks rise in bluffs or terraces which vary in height from 100 to 500 feet. Opposite the mouth of Healy Creek, the terrace is about 100 feet in height and from 600 to about 1,000 feet in width, the ground then rising to a second terrace. A series of terraces follow, one above the other.

Coal Leasing Block 28 and the immediately adjacent coal lands are at the east end of an elongated basin bordered on the north and south by converging steeply-dipping ridges of schist. Healy Creek flows approximately along the major axis of the basin. It is joined by small tributaries from the north and south which have cut deeply into the rims of the basin. The south side of the basin is made up largely by terraced lands which rise suddenly and steeply into the schist hills. The north side is only slightly terraced.

The climate is continental, having great extremes in temperature between summer and winter, with light to moderate rainfall and snowfall. The precipitation in this district, while light in comparison with that of the coast, is greater than that at Fairbanks. According to the Alaska Weather Bureau, the total annual precipitation in the lower Tanana and middle Yukon Valleys is about 12 inches. Practically all precipitation in December, January, and February and nearly all that in November and March is in the form of snow. Commonly, the wettest months are July and August with June and September following in order. Over half of the total annual precipitation occur in these four months. The summer rainfall consists largely of violent showers. A study of the data gathered over a period of 15 years shows that the wettest years have had more than twice the preipi-

tation of the driest years and that the difference is due largely to an excess of rain in the summer months in the wet years and a deficiency in those months in the dry years. Generally 25 percent of the precipitation occurs in the form of snow. The total snowfall is light. Most of it occurs after the early part of October, the heaviest snowfall being in December and January. Rainfall of more than one inch in 24 hours is unusual. Occasionally mild thunderstorms occur and sometimes hail, but there are few violent storms in summer.

The Nenana coal field is in nearly the warmest portion of Interior Alaska. The mean temperature for July is slightly above 60° F. Temperatures of 70° F. and more are common in June, July, and August and occur occasionally in May and September, with some warmer days. Winters are cold with temperatures of -50° F. to -60° F.

High winds are rare and seldom occur with temperatures lower than -10° F.

Climatic conditions will permit open-cut operations during 8 or 9 months of the year and underground operations throughout the year. One effect of the severe winter cold is the small flow in Healy Creek and therefore little trouble from ice. No serious trouble is expected from freezing and icing of the gravel road built on the flats of the creek. This opinion has been confirmed by persons who have lived in the valley continuously for more than 20 years.

Labor and Living Accommodations

No mine labor is available in the Healy district. Healy is only a small village and all labor at Suntrana, near Healy, is needed for the mine now being operated there. Importation of labor would be necessary for any large mining operation. In 1943, miners were brought from Pennsylvania and the West Coast. During the emergency, labor was supplied by the Alaskan Department of

the Army. At first, soldiers drew only their Army pay, but this proved to be unsatisfactory and soldiers were given furloughs in order that they might obtain the same wage paid to civilian labor.

Present wage rates as standardized for the territory of Alaska by the War Labor Board are as follows:

Air hammer operator - open cut	\$1.315 an hour
Core driller	\$1.500 " "
General labor	\$1.015 " "
Power shovel operator	\$1.700 " "
Truck driver (5 cu. yds. and under)	\$1.400 " "
Wagon drill operator	\$1.615 " "

At some mines, unskilled labor was paid from \$1.10 to \$1.25 an hour. Tractor operators have been paid from \$1.60 to \$1.75 an hour.

The only living accommodation, except at the Suntrana Mine., is one privately owned cabin and it will be necessary to construct camps for any operation whether this is exploration or mining.

History and Production.

The first mention of the mining of coal near Healy is found in the Report of the Territorial Mine Inspector for 1920.^{4/}

"In the Nenana coal field, mining was conducted by two private companies, one mine being the Peterson mine of the Healy River Coal Corporation, on the Government Railroad at the mouth of Healy Creek, and one on the left limit of Lignite Creek, 1-1/2 miles from the railroad and across the Nenana River.* From these two mines, approximately 21,000 tons of coal were mined during 1919 and 1920. A considerable amount of this coal was disposed of to private buyers at Nenana and Fairbanks, the remainder being used by the the Alaskan Engineering Commission. The coal was delivered at Fairbanks for \$9.00 per ton."

^{4/} Stewart, B.D., Territorial Mine Inspector, Annual Report, 1920, page 10.

* This operation was on the south side of Lignite Creek and on the east side of Nenana River.

Extracts from the Twelfth Annual Report of the Director of the Bureau of Mines are as follows: ^{5/}

"Attention was attracted first to the outcrops on Lignite Creek and during the period of construction of the northern division of the railroad, lignite was mined there and supplied to towns along the line, including Fairbanks. When the railroad was built through Healy, a somewhat better grade of coal was found in the river bank and underlying the right of way. This was mined and put on the market. Prospecting was extended, with the result that there was found on Healy River, about 4 miles from the main line of the railway, a large deposit of subbituminous coal so situated as to permit cheap and easy mining. The beds dip into the hills at 30° to 45°."

In the period from 1920 to 1922, the Peterson mine of the Healy River Coal Corp. produced about 12,500 tons of coal. In 1922, the same company started work on the inclined slope of a second mine, called the "New mine" about 1,000 feet from the Peterson entry. The total production from the "New mine" was only 1,500 tons. *← West bank of Peterson River*

The only other mine in the Healy district which produced coal up to the summer of 1943 was the Suntrana mine of the Healy River Coal Corp. Development of this mine was started in November 1921. In October, 1922, a railroad spur 4.4/10 miles in length was completed from the line of the Alaska Railroad to Suntrana. The Suntrana mine has been in almost continuous operation since that time and has been an important producer of coal. In later years, the production has been from 200 to 500 tons a day.

The Diamond strip mine, 4 miles west of Healy Forks, was brought into production in the late fall of 1943. This mine is operated for the Army Coal Procurement Section by the C. F. Lytle Company and the Green Construction Company. Production has been approximately 500 to 600 tons a day.

Two 10-acre tracts a short distance west of Leasing Block 28, are held by the Coal Procurement Section under Free-Use Permits. These tracts are operated by Emil Usibelli and Thadeus Sandford, both of Suntrana, and the small output which is expected has been contracted for by the Army.

Application for these two tracts was made at the U. S. District Land Office in Fairbanks on October 2, 1943, by George Chapman, Major, Q. M. C. on behalf of the Army. They are described as follows:

Serial No. 05473.

East $\frac{1}{2}$, NE $\frac{1}{4}$, NE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 16, and West $\frac{1}{2}$, NW $\frac{1}{4}$, NW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 15, both in T. 12 S., R. 6W., Fairbanks Meridian;

Serial No. 05474.

West $\frac{1}{2}$, West $\frac{1}{2}$, SE $\frac{1}{4}$, Sec. 17, T. 12 S., R. 6 W., Fairbanks Meridian.

The application stated that a production of up to 25,000 tons a year, from the two tracts was to be used for Army purposes.

The Original prospecting permit for the tract know as Coal Leasing Block 28 was issued on June 23, 1923, to R. F. Roth, of Fairbanks. This permit covered 1920 acres, was valid for 4 years, and permitted the sale of coal during propsecting. The report of the Territorial Mine Inspector for 1923^{6/} states that:

"A camp has been erected and preparations have been made to drive two prospecting tunnels on the area held by R. F. Roth, of Fairbanks, under a 4-year prospecting permit. This area lies adjacent to Healy Creek, four or five miles upstream from the Suntrana mine.

It is planned to obtain from the two proposed tunnels sufficient coal for use in making tests to determine its commercial usefulness. It will be necessary to transport the coal to the railroad by means of sleds, which can be used only during the period that Healy River is frozen."

On October 26, 1923, this permit was amended to cover 2,080 acres. The output during the winter of 1924 was 160 tons and that in 1925 was 590 Tons.

^{6/} Stewart, B.D., Territorial Mine Inspector, Annual Report, 1923.

On May 29, 1928, the Commissioner of the General Land Office recommended the segregation of this property as Coal Leasing Block No. 28. Application was made by Roth and a lease was issued to him on June 3, 1930. Soon after this, the property was assigned to the Alaska Cannel Coal Corp. and official approval was granted on September 9, 1930. Only a small production was made by this company; and on September 27, 1935, the U. S. Land Office accepted relinquishment of the lease.

On October 6, 1943, Emil Usibelli, Healy Forks, Alaska, applied for a mining lease, No. 05490, on the following property:

Sec. 11
S $\frac{1}{2}$, Sec. 12
N $\frac{1}{2}$, N $\frac{1}{2}$, Sec. 13
N $\frac{1}{2}$, Sec. 14

all in T. 12 S., R. 6 W., Fairbanks Meridian.

Usibelli's application covered Leasing Block 28, except that Sec. 10 was omitted.

Government regulations require that the lessee expend \$100 an acre for development during the 5-year period following the granting of the lease.

On the basis of the acute need for coal by both the Army and the civilian population, the District Land Office at Fairbanks recommended that the lease be granted without delay. However, a leasing block can be leased only to the highest bidder. The Alaska Road Commission has estimated that the construction of a suitable road from the railroad spur at Santrana to Leasing Block 28 will cost \$100,000. Under this condition, no bid for less than this amount can be accepted. Even if a lease can be granted, it is probable that some time will elapse and the field cannot be opened for production before it is granted unless acute need for coal should make action by the Government or Army necessary.

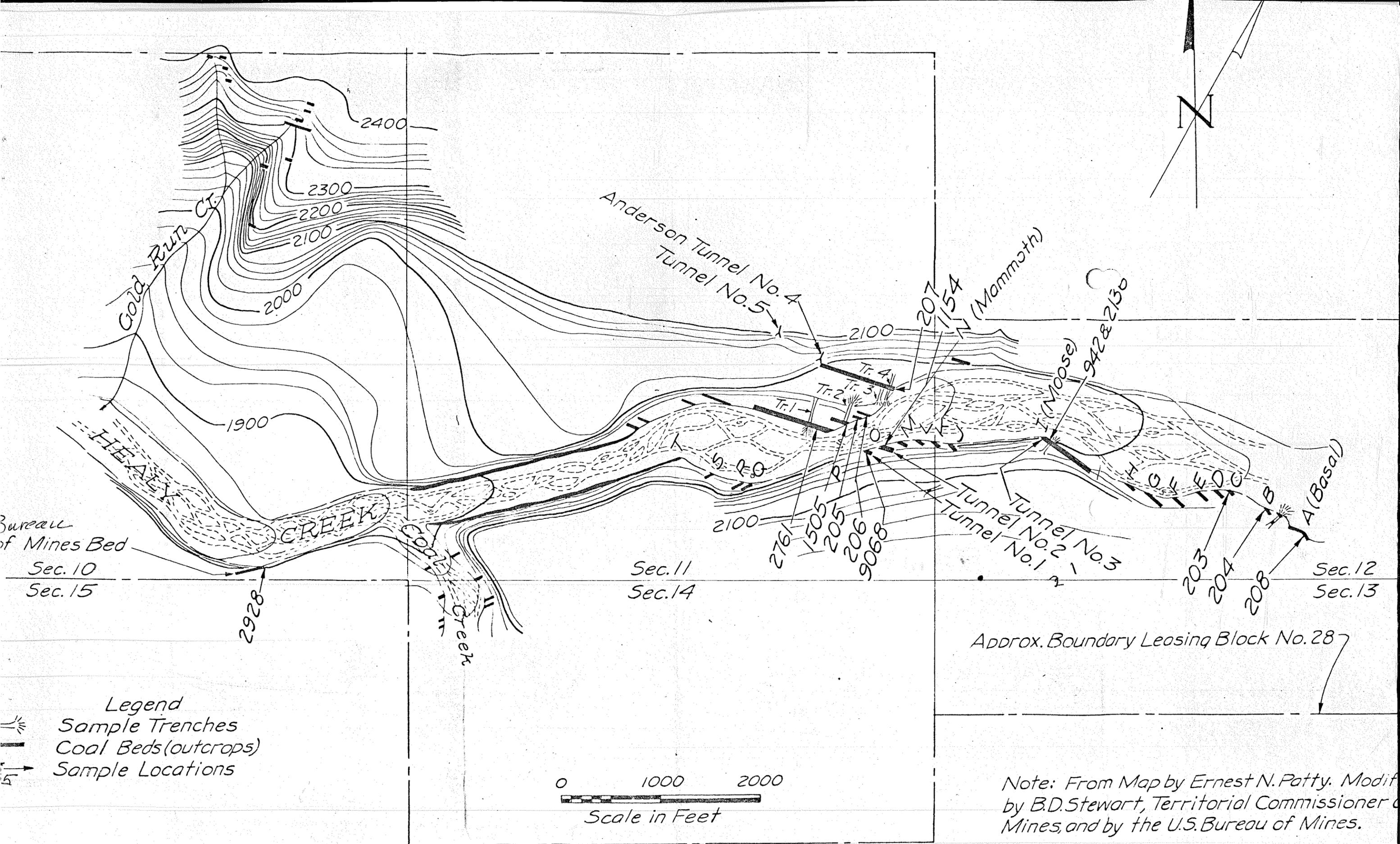


FIG. 5. PG. 13. TOPOGRAPHY AND OUTCROPS AT LEASING BLOCK 28

Deposit

The geology of the coal-bearing formation has been discussed by Capps.^{7/} This formation was deposited on an uneven erosion surface and it is improbable that the beds were ever continuous. Erosion has removed portions of the deposits and left them less extensive and less continuous than they originally were.

At the base of the formation is a thickness of several hundred feet of smoothly rounded pebbles of chert and white quartz in a matrix of white sand and clayey material, which is easily recognized. Above this are beds of shale, clay, sand, subbituminous coal or lignite, and some fine gravel. The coal beds are thickest and most numerous in the lower half of the section while in the upper half they are thinner and fine gravel is more abundant. Above the coal-bearing formation is the thick Nenana gravel.

The thickness of the formation is variable from place to place and the maximum thickness is not known. Near the Suntrana mine, in the Healy Creek district, the thickness is approximately 1,900 feet. This district contains a greater aggregate thickness of coal than any other which has been examined. The report of the Territorial Mine Inspector for 1922 quotes the measurement of one section in which the aggregate thickness of the coal beds is 292 feet. Of this, 203 feet is in beds 10 feet or more in thickness.

In the Healy Creek district the coal beds can be followed eastward practically without interruption from the Nenana River to the end of this coal basin, a distance of approximately 12 miles. The coal-bearing rocks are in the form of a syncline, the axis of which extends approximately east and west. On both flanks of the syncline, the beds dip from 30° or 35° to

^{7/} Capps, Stephen R., Geology of the Alaska Railroad Region, Dept. of the Interior, Geological Survey, Bull. 907, 1940, pp. 118-120.

90°. The dip in the present workings on the No. 4 bed in the Suntrana mine is from 26° to 39° to the north. Some folding is apparent at the east end of the basin.

At the east end of the basin, Healy Creek runs approximately along the middle of the syncline for more than 2 miles. In this distance a number of thick coal beds have been exposed on both sides of the creek. The thinner beds range in thickness from 3 to 6 feet and the thicker ones up to 40 to 55 feet. The combined thickness of coal is 350 feet or more.

Of the beds exposed, the most prominent are the Mammoth and the Moose. Where these are exposed on the north side of the creek the thickness of the Mammoth bed is at least 36 feet and that of the Moose bed 19.5 feet. On the south side of the creek, the thickness of the latter bed is from 40 to 55 feet. The thickness of the Mammoth bed has been given by Ernest N. Patty as 54 feet on the south side of the creek. This apparent increase in thickness toward the point of sharpest folding in the syncline.

Large quantities of coal can be produced from these exposures by open cut mining.

Trenching and Sampling by the Bureau of Mines

Exploratory work consisted of surface trenching to remove overburden, and sampling and measurement of the beds in place. The trenching was done on contract for \$6.50 an hour for actual trenching work. The owner of the equipment furnished supplies, repairs, and living accommodations for his crew. The total length of trenches was approximately 1550 feet. The cost of this trenching work was paid from Army funds.

8/ Ernest N. Patty, Professor of Mining, University of Alaska.

Trenching work required about 2 weeks. This included some lost time because of difficulty in moving the equipment. On the north side of the creek there was no difficulty from frozen ground, but on the south side it was necessary to remove thawed overburden from one trench and then move to another trench, thus leaving the surface in the first trench exposed for further thawing. In this way, work was in progress in 3 trenches at a time.

At the beginning of the work, the Army Coal Procurement Section was principally interested in exploration of the Mammoth bed where this is exposed on the north bank of the creek and in parallel beds lying to the north of the Mammoth. The exposure of the Mammoth bed at this point extends for a length of 900 feet. This outcrop occurs on a terrace which is only 20 to 30 feet above the sand and gravel flats of Healy Creek and one edge of the bed is covered by sand and gravel.

At least five large beds outcrop on this terrace, all with parallel strike of approximately N. 70° to 80° W. The dip is approximately vertical.

The first trench was dug across the strike of the Mammoth bed. From 3 to 6 feet of material was removed. The thickness of the bed at this point is more than 36 feet. The coal bed forms the bank of the creek and the exact thickness could not be determined.

A second bed was uncovered 105 feet north of the Mammoth. The thickness of this bed is 22 feet, all of which is clean coal.

At the north end of this trench, which was approximately 200 feet in length, a third bed was found. In order to obtain better measurement of this bed, a second trench was excavated about 300 feet east of the first trench.

A third trench was excavated across the Moose bed. Two beds of coal were found in this trench.

The log of a cross-section of the Moose bed where it crops out on the south bank of the creek is as follows:

	Feet	Inches
Coal27	-
Parting		1
Coal	1	4
Parting		1
Coal	1	3
Parting		1
Coal	1	9
Parting		1
Coal	1	-
Parting		1
Coal	6	2
Dirty Coal		7
Parting		4
Dirty Coal	1	2
Coal	2	7
Parting		1
Coal	2	3
Parting		4
Coal	4	1
Parting		1
Coal	1	6
Bone		2
Coal	3	0

Carbonaceous Shale, Footwall

Thickness of bed	55 + feet
Thickness of sample	28 Ft. 1 In.

The map prepared in 1926 by Ernest N. Patty shows a barn directly above the Moose bed. To determine whether coal actually existed in this point, a trench was dug beside the barn but no coal was found.

Three trenches were excavated on the south side of the creek. At the point where the Moose bed crops out, the bank rises abruptly to a height of 80 to 100 feet above the creek level and considerable difficulty was experienced by the owner of the bulldozer in building a road to the site. The beds on this side of the creek are lettered for identification, from east to west. Only two are known continuations of beds exposed on the north side of the creek, these are "I" which is a continuation of the Moose bed and bed "N" which is a continuation of the Mammoth. Undoubtedly other beds are continuous across the creek, but they have not been correlated. The first trench was on the Moose bed. This bed rises abruptly from the creek to a

height of from 80 to 100 feet. The thickness ranges from 40 to 55 feet as measured by Garrett^{9/} and Marstrander^{10/}, the greater thickness than on the north bank probably being accounted for by local folding. The length of exposure at this point is approximately 1,000 feet. With an average height of 80 feet and an average width of 40 feet, the amount of coal available for open pit mining is 128,000 tons.

The trench at the east end of the syncline exposed the bottom coal bed with a thickness of 29 feet.

Some evidence of early working, apparently done from 15 to 20 years ago, was found on the Moose bed on the north side of the creek. The old Anderson Tunnel No. 4 and Tunnel No. 5 were entries which have collapsed. Abandoned and collapsed workings were found on the south side of the creek in beds "O", "N", and "I". These were known, respectively, as Tunnels 1, 2, and 3. It is reported that 700 tons of good coal was mined from Tunnel No. 3.

There are many reports of the mining of cannel coal from this deposit in past years, but the engineers of the Territorial Department of Mines and the Bureau of Mines were unable to find any traces of cannel coal. However, the district could not be thoroughly explored because of the lack of time.

Coal beds are exposed east of the outcrop of the Moose bed on the south side of the creek and at the east end of the syncline. Samples 203, 204, and 208 were taken from 3 of these beds. At this point, the creek bank is only 30 to 40 feet in height. The strikes of the beds are approximately N. 50° W. to N. 65° W. and the dip is 60° to 75° to the SW.

^{9/} Garrett, Charles R., Mine Inspector, Territorial Department of Mines.
^{10/} Marstrander, Henning, Mining Engineer, U. S. Bureau of Mines.

The thicknesses of the beds on the south side of the creek are as follows:

<u>Beds</u>	<u>Thickness, feet</u>	
A	21	40
B	21	28
C	20	20
D	18	
E	12	
F	15	
<i>Below</i> G	11	
H	8	
I - <i>Moose</i>	40-55	40
J	10	
K	6	
<i>above</i> L - 1	20	
M - 2	12	
N - 3	36+	
O	15	12
P	12	
Q	20	
R	12	
S	18	
T	15	
Bureau of Mines	<u>12</u>	
Total	369	Plus

One new fair size outcrop was found during the first trip to the deposits by the Engineer of the Bureau of Mines and the Territorial Mines Inspector. This outcrop occurs on the south side of the creek. It may be a continuation of bed "T" or of the bed which outcrops on the north side of the creek just above the mouth of Coal Creek. The strike is S. 80° W., the dip 35° N., and the thickness 12 feet. The conditions are favorable for mining. Until this bed is correlated, it is referred to herein as "Bureau of Mines bed". Sample No. 2928 was taken from this bed.

Several outcrops in the mountains near the head of Gold Run Creek and near the mouth of Coal Creek are known. Also large outcrops on Cripple Creek are reported. These beds were not of immediate interest to the Procurement Section and no time was available for examining them.

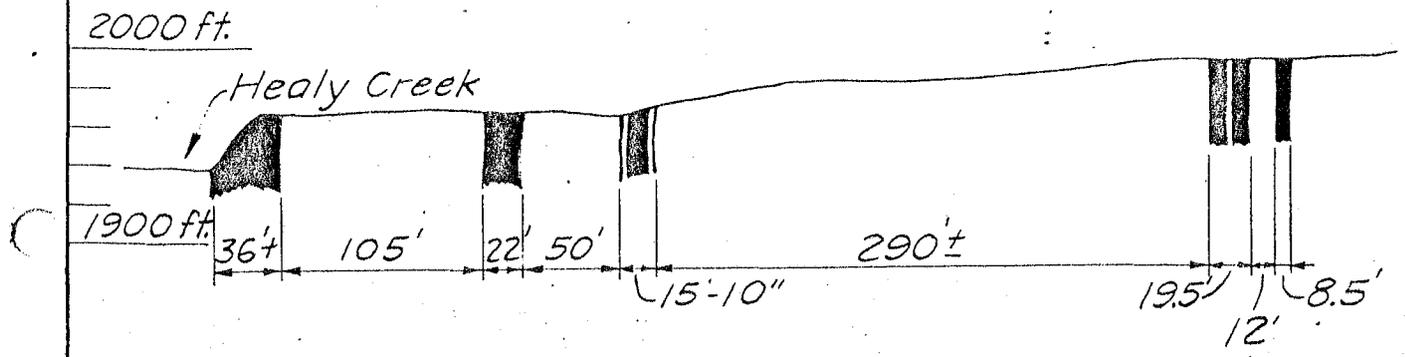


FIG. 6. PG. 15. PROFILES OF TRENCHES NO. 1, 2, 3 AND 4

Reserves

Available data are not sufficient to justify a close estimation of reserves.

11/
Capps estimated an average aggregate thickness of approximately 172 feet and that an area of 20 square miles was underlain by coal. His estimated tonnage was more than 3,890,000,000 tons.

The Bureau of Mines estimates that the aggregate thickness of the beds exposed in Leasing Block 28 is 369 ^{feet} tons.

Taking into account the known dip and strike of the beds it is calculated that the amount of coal present in Leasing Block 28 amounts to approximately 660,000,000 tons. This is to be considered only as an indication of the order of magnitude of the deposit. Approximately 10 percent of this coal or 66,000,000 tons is above the gravel flats of Healy Creek and at least 500,000 tons is available for open-cut mining.

The amount available above creek level in the Moose bed on the south side of the creek is approximately 128,000 tons.

Table 1 gives an approximation of the amount of coal on both sides of the creek available for immediate exploitation.

Analyses of the samples taken during the investigation are given in Table 2. The analyses were made by Maurice Sharp, Chief Coal Analyst and Coal Sampler, Alaska Railroad, in the railroad laboratories at Anchorage.

The analyses show that the coal is a high volatile subbituminous coal with high moisture content. Both ash and sulfur are low.

The Moose bed on the south side of the creek, represented by samplers 2136 and 942, was not completely sampled as the upper 27 feet could not be reached.

TABLE 1

Tonnage Above Creek Level In Leasing Block 28

Name of bed	Sample No.	Estimated Length available for stripping, feet	Width of bed, feet	Height of bed, feet	Estimated tonnage of available coal
North bank of creek	1) Mammoth bed	2761	900 700	30	22,000 16,400
	1) No. 1 north of Mammoth	1505	850	22	15,000
	1) No. 2 " "	205	850	13.5	11,000
	1) No. 3 " "	206	875	19.5	17,000
	1) No. 4 " "	207	850	8.5	7,000
South bank of creek	10 B. O. M. bed	2928	180	12	9,000
	11 Bed T		2500	6	9,000
	11 Bed O	9068	300	15	11,000
	11 Bed N (Mammoth)	1154	300	36	26,000
	12 Bed I (Moose)	942 2136	1000	40	128,000
	12 Bed A-B	204 208	400	25	20,000
Total Tonnage					275,000

3

TABLE 2

Samples From Leasing Block 28 *

South Side of Healy Creek from West to East

Sample Can No.	Air Drying Loss	Form of Analysis	**		Vol. Matter	Fixed Carbon	Analysis, Percent		Heat Value B.F. U.	Sample length normal to coal bed
			Moist.				Ash	Sulphur		
2928	16.5	A	8.7		47.3	37.5	6.5	0.2	10070	12 feet
		B	23.8		39.5	31.3	5.4	0.2	8410	
		C	-		51.1	41.1	7.1	0.3	11035	
		D	-		55.8	44.2	-	0.3	11875	
9068 9068	16.5	A	9.2		45.4	40.0	5.4	0.2	10045	12 feet
		B	24.2		37.9	33.4	4.5	0.2	8385	
		C	-		50.0	44.1	5.9	0.3	11060	
		D	-		53.1	46.9	-	0.3	11765	
1154	15.0	A	7.8		46.8	37.1	8.3	0.2	10430	Middle 18 feet
		B	21.6		39.8	31.5	7.1	0.2	8865	
		C	-		50.8	40.2	9.0	0.3	11310	
		D	-		55.8	44.2	-	0.3	12435	
2136 ***	13.0	A	6.9		48.7	40.6	3.8	0.2	11795	40 feet
		B	19.0		42.4	35.3	3.3	0.2	10260	
		C	-		52.3	43.6	4.1	0.2	12670	
		D	-		54.6	45.4	-	0.3	13205	
942 ***	13.5	A	7.3		48.6	39.9	4.2	0.2	11520	40 feet
		B	19.8		42.1	34.5	3.6	0.2	9965	
		C	-		52.5	43.0	4.5	0.2	12425	
		D	-		55.0	45.0	-	0.3	13005	
204	9.6	A	5.9		42.3	40.2	11.6	0.3	10790	28 feet
		B	14.9		38.3	36.3	10.5	0.3	9755	
		C	-		45.0	42.7	12.3	0.4	11460	
		D	-		51.4	48.6	-	0.4	13070	
203	8.2	A	5.7		41.5	39.8	13.0	0.3	10640	20 feet
		B	13.4		39.2	36.5	11.9	0.3	9770	
		C	-		45.3	41.0	13.7	0.3	11285	
		D	-		51.1	48.9	-	0.4	13080	
208	7.3	A	4.7		45.1	39.5	10.7	0.3	11205	40 feet
		B	11.7		41.8	36.6	9.9	0.3	10385	
		C	-		47.3	41.5	11.2	0.3	11765	
		D	-		53.3	46.7	-	0.4	13246	

(TABLE 2 CONTINUED)

North Side of Healy Creek from West to East.

Sample Can No.	Air Drying Loss	Form of Analysis	Moist.	Vol. Matter	Fixed Carbon	Analysis, Percent		Heat Value B.T.U.	Sample length normal to coal bed
2761 ✓	15.0	A	8.2	46.7	34.1	11.0	0.2	10195	16 feet taken at an angle of 45°
		B	22.0	39.6	29.0	9.4	0.2	8665	
		C	-	50.7	37.2	12.1	0.3	11110	
		D	-	57.7	42.3	-	0.3	12635	
1505 ✓	16.0	A	9.9	45.8	39.5	4.8	0.2	10410	10 feet
		B	24.3	38.5	33.2	4.0	0.2	8745	
		C	-	50.8	43.9	5.3	0.3	11550	
		D	-	53.7	46.3	-	0.3	12200	
205 ✓	13.0	A	9.7	42.5	40.9	6.9	0.3	9905	15 feet
		B	21.4	37.0	35.6	6.0	0.3	8615	
		C	-	47.1	45.3	7.6	0.4	10960	
		D	-	51.0	49.0	-	0.4	11860	
206 ✓	10.4	A	8.0	45.4	40.1	6.5	0.2	11015	19 feet
		B	17.6	40.7	35.9	5.8	0.2	9870	
		C	-	49.4	43.6	7.0	0.2	11980	
		D	-	53.1	45.9	-	0.3	12880	
207 ✓	14.0	A	9.0	43.5	34.6	12.9	0.3	9640	8 feet
		B	21.7	37.4	29.8	11.1	0.3	8290	
		C	-	47.8	38.0	14.2	0.4	10585	
		D	-	55.7	44.3	-	0.4	12335	

* Analysis by Meunice Sharp, Coal Analyst, Alaska Railroad

* *
 A air-dried
 B as received
 C moisture free
 D moisture and ash free

* * * Upper 27 feet of bed inaccessible

The occurrence of numerous other coal outcrops in this field, which were not examined, but which extend from 3 to 4 miles down the creek and south of it, indicates the presence of 250,000 tons of coal which can be easily mined by stripping. Many beds having thicknesses of from 10 to 15 feet were not investigated.

Proposal For Future Exploration

The Bureau of Mines proposes to explore and develop Leasing Block 28 so that it can be brought into prompt production to meet any possible coal shortage. As the peace time requirements can be met with production from existing mines, this is a war emergency measure requiring Federal financing at least in part. The proposed program is as follows:

1. Construct a gravelled truck road from the end of the railroad spur at Suntrana to Leasing Block 28. Construction should start as soon as climatic conditions permit efficient work to be done, using Access Road Funds or a special appropriation.

In advance of a road location survey, the problem was discussed with Ike Taylor, Chief Engineer of the Alaska Road Commission. It is estimated by Taylor that the first mile of road over the ridge east of Suntrana will cost \$25,000 and the remaining distance \$12,500 a mile or a total of approximately \$100,000.

2. Map the area in detail and complete the trenching and sampling of the more important coal beds.

3. Remove the overburden from 75,000 tons of coal and complete the preparations for strip-mining.

This should however be done now only if the coal is going to be mined and shipped immediately after the overburden has thus been removed. The coal must not be uncovered by stripping the overburden, and thereafter be left in place for mining and extraction at a later date or season.

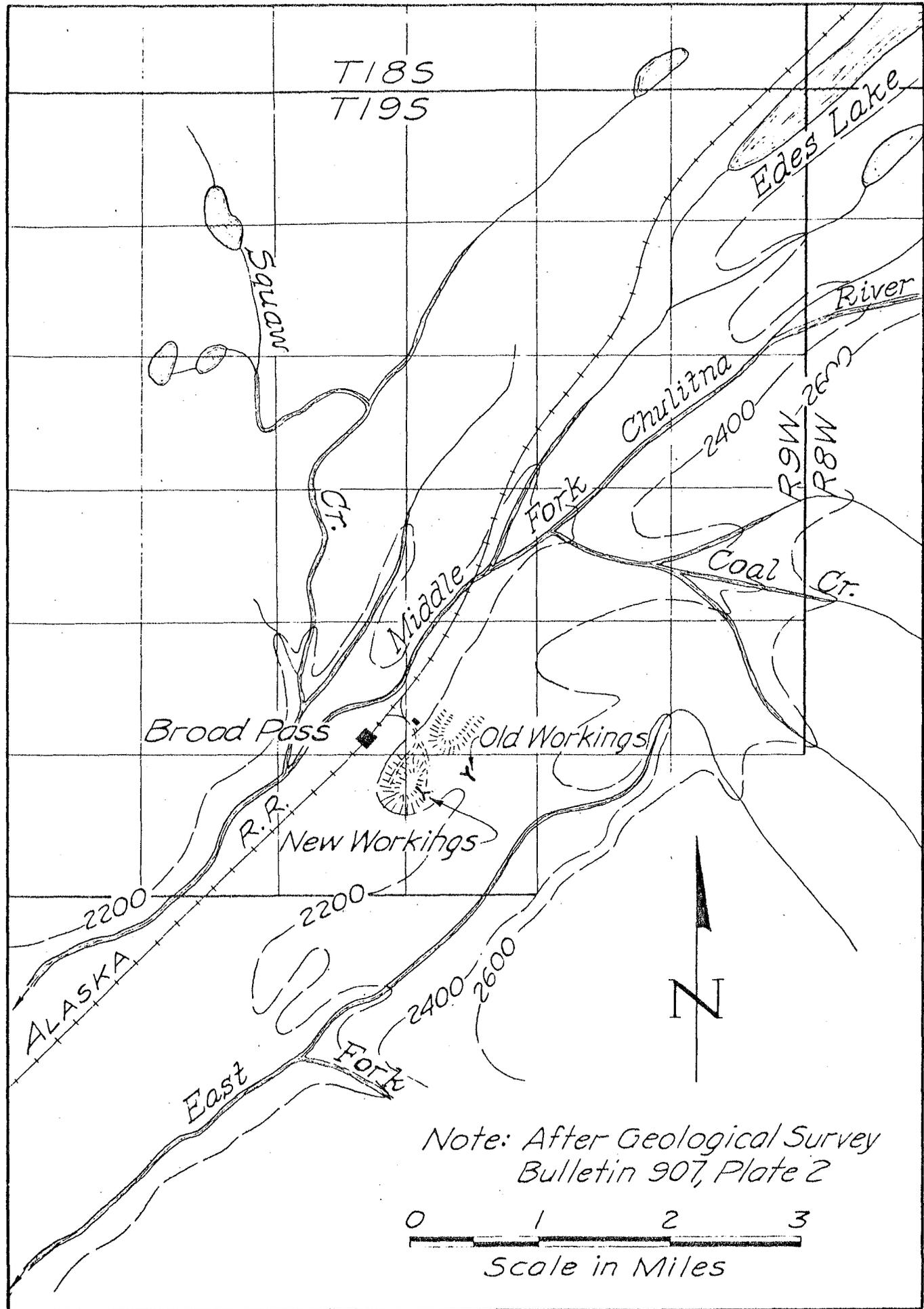


FIG. 7, PG. 25, LOCATION OF WORKINGS AT BROAD PASS COAL PROSPECT

If a lease is approved it is suggested that the royalty payments be increased to at least 15 cents a ton to partially compensate the Government for the cost of the road and exploration.

The cost of the exploration and access road for this project is estimated to be as follows:

Engineer, 4 months	\$ 1,600
Labor...2 laborers, 4 months.....	\$ 2,400
2 samplers, 3.5 months.....	\$ 2,240
1 bulldozeroperator, 1 month.....	\$ 500
1 cook, 4 months.....	\$ 1,500.....
	\$ 6,540
Travel.....	\$ 700
Tools, rent of bulldozer, miscellaneous supplies.....	\$ 2,500
Loss on boarding house.....	\$ 760.....
	\$ 3,260
Total.....	\$ 12,200

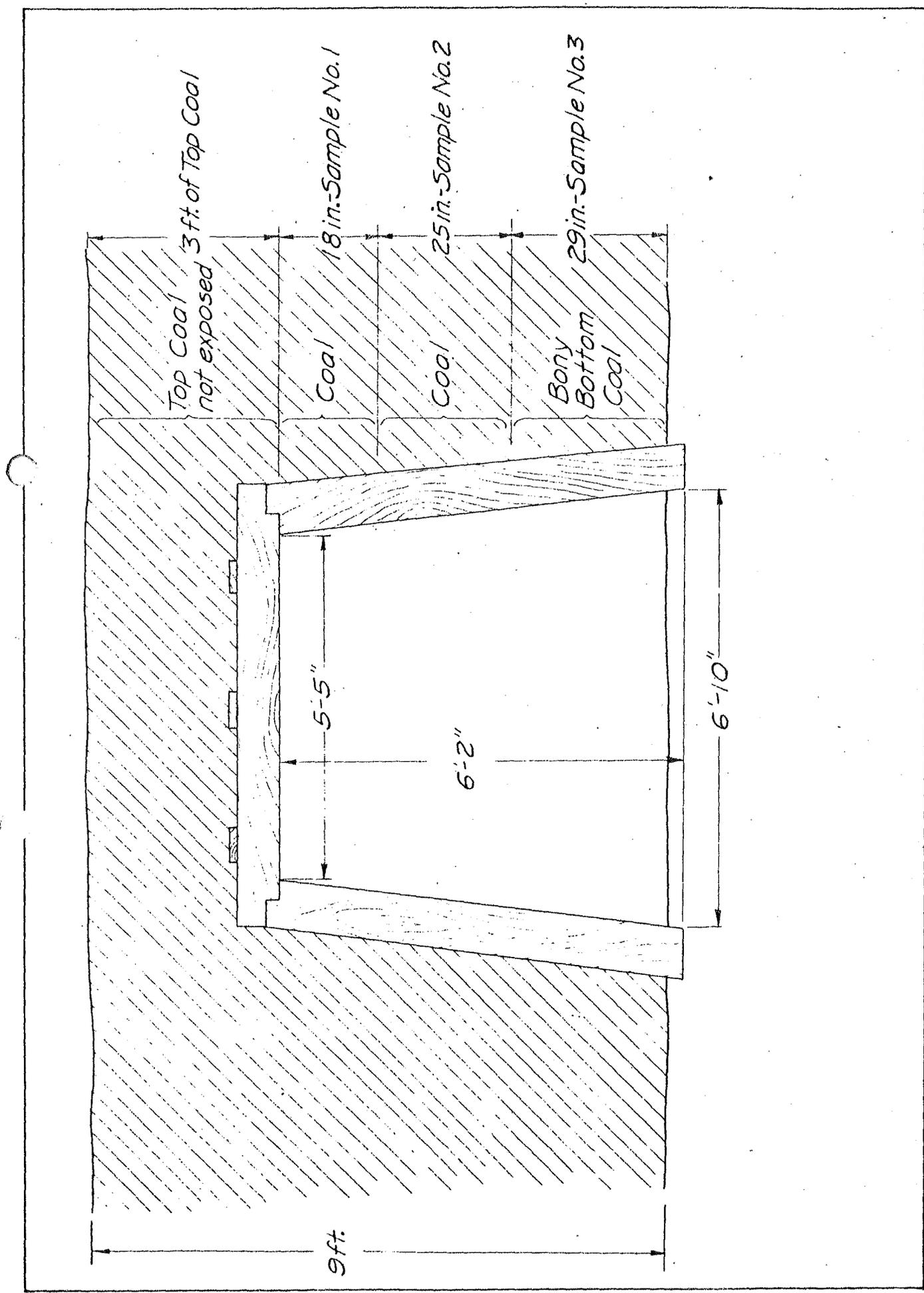
Removal of 12,500 cu.yds of overburden from 75,000 tons of stripping coal in Moose bed, left limit of Healy Creek.....	\$ 6,800
Cost To The Bureau of Mines, Total.....	\$ 19,000
From Access Road Funds.....	\$100,000

It is possible that by the summer of 1944, the coal situation in Alaska may indicate the desirability of the extraction of a portion of the reserves below strip-mining levels. In this event it would be desirable for the Bureau of Mines to core drill a part of this Leasing Block, so that mining operations and surface installations could be planned to greatest advantage.

BROAD PASS COAL PROSPECT

General

This prospect was examined early in November, 1943, at the request of the Army Coal Procurement Section which has encouraged the opening of a mine on this prospect for the development of a reserve which could be mined in case of emergency. If production is interrupted at some other mine, it is



Top Coal
not exposed
3 ft. of Top Coal

Coal
18 in. - Sample No. 1

Coal
25 in. - Sample No. 2

Bony
Bottom
Coal
29 in. - Sample No. 3

5'-5"

6'-2"

6'-10"

9 ft.

REPRODUCED FROM THE ORIGINAL DRAWING BY THE U.S. GEOLOGICAL SURVEY

planned that the equipment shall be brought to this operation which supposedly will be in condition for production.

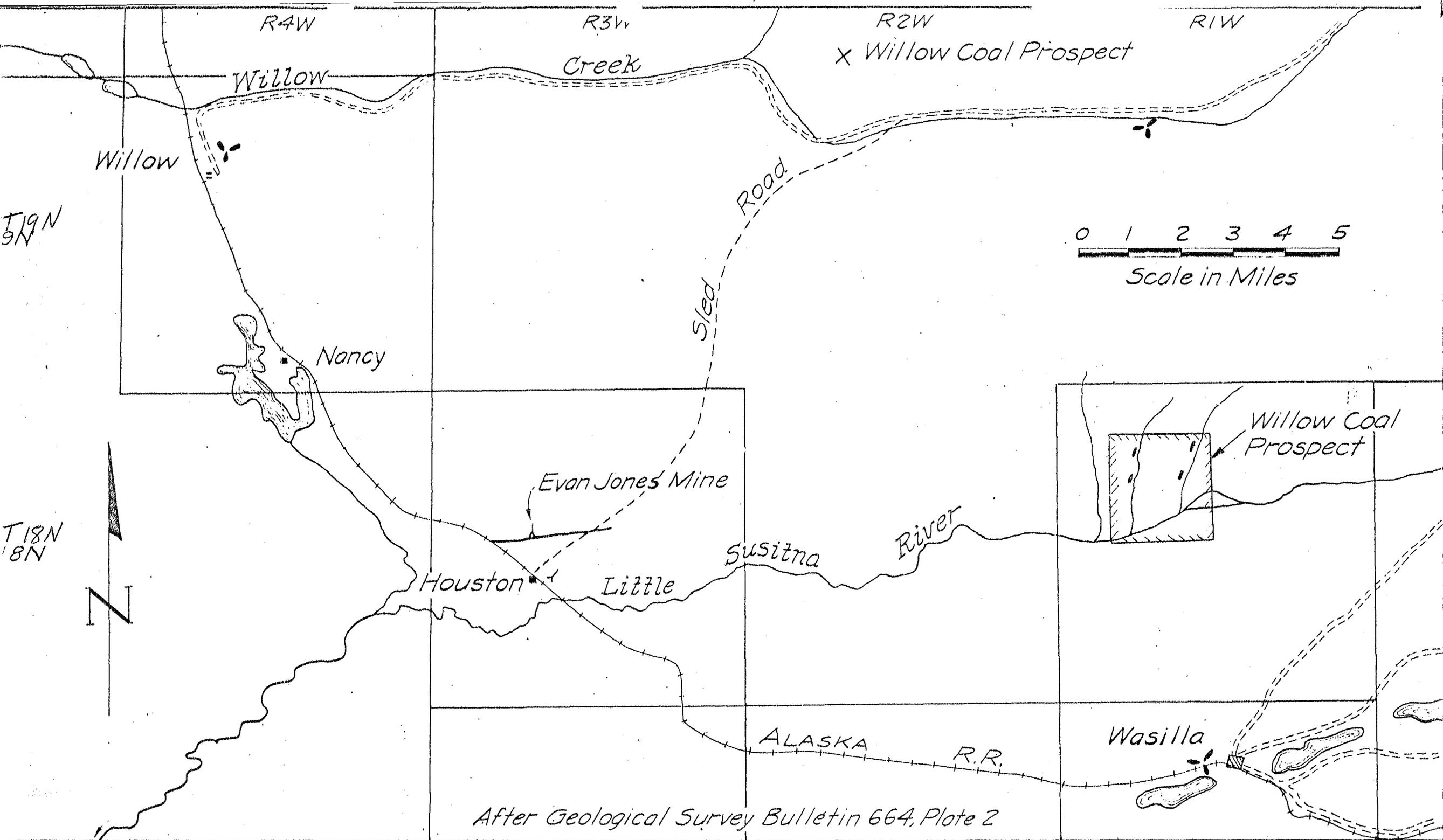
The coal outcrops on the hillside approximately 1 mile north-east of the present operation. Abandoned workings show that some coal has been produced from this point. The coal field is known to extend for at least 4 miles parallel to the railroad and on the east side of it and to be from 2 to 2.5 miles inwidth. It is probable that the whole valley is underlain with coal-bearing formations, and that Broad Pass is only one of many points where these formations are not covered by quaternary gravel. It is to be expected that coal can be found all along the valley by trenching or drilling. The name "Coal Creek" given to some streams indicates that the existence of coal beds in this area has been known for many years.

The present development consists of an entry 34 feet in length driven northwest into the east side of a small hill. The driving and timbering of this entry occupied two men and a timberman for approximately one month. Two other men were occupied in cutting timber for the construction of a combined stable and tool house and for mine support.

A road has been constructed in a general southerly direction from a Y at the station to the mine opening. A branch of the road extends to the west side of the hill. A track bed has been completed from the mine opening around the edge of the hill to the west side and it is planned that coal shall be trammed over this track and dumped into a loading chute from where it can be discharged into trucks.

The coal was sampled at the face of the entry. Results of analyses are given in table 3, which also includes analyses of other samples of the same bed taken at other places by G. O. Gates ^{11/} and Evan Jones.

11/ Gates, G. O., Associate Engineer, Federal Geol. Survey.



After Geological Survey Bulletin 664, Plate 2

FIG. 9, PG. 27, LOCATION OF COAL PROSPECTS AT WILLOW, HOUSTON AND WASILLA

Apparently, the coal which outcrops to the east of the present working is of better grade than that which is now being developed and it is believed that the conditions in the vicinity of the old working are more favorable for the development of a considerable production than those at the present workings.

Proposed Exploration By The Bureau of Mines

The Bureau of Mines proposes to explore this deposit by trenching, sampling and topographic mapping.

The cost of this proposed project is estimated to be as follows:

Personnel services, when actually employed:

1 engineer, 1 month.....	\$ 400	
2 samplers, 1 month.....	\$ 640	
2 laborers, 1 month.....	\$ 600	
1 bulldozer operator, 1 month.....	\$ 420	\$2060

Travel expenses.....		700
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Supplies:

Rent of bulldozer, 1 month.....	\$ 500	
Tools and miscellaneous supplies.....	1000	
Boarding house equipment.....	500	2000

Incidentals.....		240
------------------	--	-----

Total.....	\$5000	
------------	--------	--

WILLOW COAL PROSPECT

Summary And Conclusion

Coal was discovered in the summer of 1943 in the foothills of the Talkeetna Mountains, approximately 14 miles east of Willow Station which at mile 185.7 on the Alaska Railroad. The discoveries were made by Buck Sparling of Anchorage in the course of prospecting for gold.

A good graveled road extending east from Willow crosses Willow Creek about 16 miles east of Willow. Sparling occupies a cabin 2 miles northeast of the bridge across Willow Creek and the coal beds are approximately 2 miles from the cabin. Several thin beds have been uncovered in

TABLE 3

BROAD PASS FIELD *

Samples by Bureau of Mines at
face of 34-foot entry

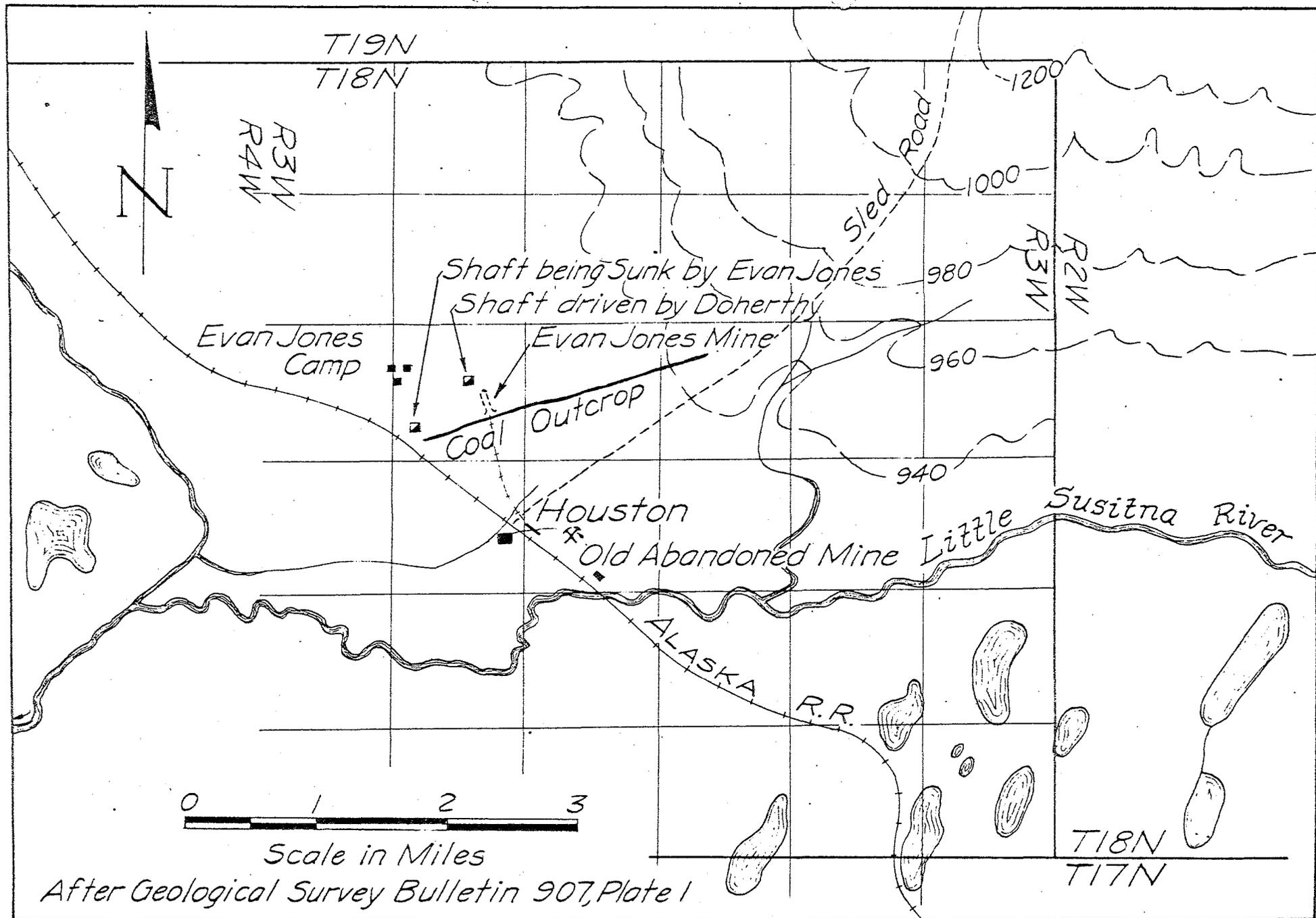
Sample No.	Air dry Loss	Form of ** Analysis	Moisture	Vol. Matter	Fixed Carbon	Analysis, Percent		Discription
						Ash	B.T.U.	
1	7.2	B	8.2	44.04	22.9	27.5		Bureau of Mines, At Face, 18" from cap piece and down.
2	7.3	B	8.6	42.6	28.3	20.5		Bureau of Mines, at Face, 25" middle of face;
3	8.3	B	6.6	33.0	26.0	34.4		Bureau of Mines, At face, 29" bottom coal.

Samples at outcrops of
Broad Pass Coal Bed.

	27.0	A	10.1	45.4	33.9	10.6	9370	G.O. Gates, Federal Geol. Survey, in vicinity of Coal Creek 2 miles east of Broad Pass Station
		B	34.4	33.1	24.8	7.7		
		C	-	50.4	37.8	11.8		
		D	-	57.2	42.8			
1	18.0	A	15.8	46.3	25.7	12.2	8575	Evan Jones, outcrop, 2 miles northeast of Broad Pass Station
		B	31.0	38.0	21.0	10.0	7070	
		C	-	55.1	30.4	14.5	10185	
		D	-	64.4	35.6		11915	
2	19.2	A	16.0	46.8	26.7	10.5	8655	Evan Jones, outcrop, 0.5 mile east of Broad Pass Station
		B	32.1	37.8	21.6	8.5	6995	
		C	-	55.7	31.8	12.5	10705	
		D	-	63.6	36.4	-	11780	

* Analyses made at Alaska Railroad Coal Laboratory at Anchorage, Alaska
by Maurice L. Sharp, Chief Coal Sampler and Analyst

** A Air dried
B As received
C Moisture free
D Moisture and Ash free



a distance of about 200 feet along a draw. The beds are much disturbed and folded. A log of the best outcrop shows the following:

12 inches	hard coal
23 inches	sandstone
24 inches	shale
36 inches	clean, hard, shiny, blocky coal
18 inches	loose sandstone, gray to brownish
36 inches	clean, hard, shiny, blocky coal
24 inches	soft clay
12 inches	hard coal
7 inches	sandstone
12 inches	coal

The beds strike northeast to southwest and dip 30° to the northwest. Samples were taken, but no results of analysis have been received. The thickness of overburden is approximately 30 feet. The prospect is in rough country and there is no trail or means of access from the main road.

Because of the folded nature of the beds and the disturbed geology, the Bureau of Mines does not propose further investigation. Willow, and the gold mines in the district, can be supplied from existing mines in the Matanuska Valley and from the Wasilla deposit if coal is produced there. It is possible that Sparling may find other outcrops in the vicinity.

HOUSTON COAL PROSPECT

General

On August 28, 1943, the Army Coal Procurement Section discontinued the investigation of Leasing Block 28 and asked the Bureau of Mines to examine a coal deposit at Houston Station on the Alaska Railroad with the object of determining the adaptability of this deposit to immediate production by stripping. Because of the favorable location of this deposit, it was believed that it could be more advantageously worked than Leasing Block 28. This opinion was based largely on the belief of Army officials that it would be impossible to provide for movement of coal from the latter deposit to the

railroad in time to prepare for shipment during the fall and winter of 1943. It is the opinion of the Bureau of Mines that the difficulties of transportation were overestimated.

The Houston coal deposit is near Houston Station at mile 174.9 on the Alaska Railroad. The distances from Houston to towns along the railroad are as follows:

Anchorage	60.6 miles
Matanuska	24.2 miles
Wasilla	15.1 miles
Willow	10.8 miles
Palmer	30.7 miles
Curry	73.6 miles

Houston is not accessible from other neighboring places. A poor sled road runs northeast from Houston and joins the road which extends east from Willow Station at a point 15 miles east of Willow. This road is in poor condition and is not serviceable for a mining operation.

The coal permit is in Sections 16, 17, 20, and 21, T. 18 N., R. 3 W., Seward Meridian. The property is being operated by Evan Jones and a partner, Tucker, of Jonesville, Alaska. Jones accompanied the engineer of the Bureau of Mines on the examination.

The coal deposit is in the lowlands of the Susitna River basin near the point where the railroad crosses the Little Susitna River. The country is wet and swampy with many streams, lakes, and ponds.

At Houston Station the direction of the railroad is from southeast to northwest and evidences of old and new mining operations can be seen close to the railroad on the northeast. An abandoned mine near the station was operated many years ago. There is a loading platform at the station.

More recent operations were conducted about 1,500 feet north of the station. A tipple which was built directly under the outcrop of the coal bed is still standing. The outcrop extends in a straight line on both sides of the tipple and intersects the railroad about $3/4$ mile northwest of the station.

The outcrop can be followed for $2\frac{1}{2}$ miles eastward from its intersection with the railroad. The strike is approximately N. 60° E. and the dip from 4° to 7° to the northwest.

Evan Jones has a camp consisting of small houses near the point at which the railroad crosses the outcrop of the coal bed, and he also has a house a few hundred yards southeast of the station near the oldest of the abandoned workings. Living accommodations are adequate for 12 men. There is some equipment for underground mining. Adequate water for drilling is available.

Description of the Deposit

It is believed that the upper 14 inches of the top bench cannot be saved because it is frozen, badly broken, and contains 3 thin clay seams. It should be possible to mine the lower 23 inches of this coal.

The bottom bench has approximately 40 inches of good coal. The total minable thickness is estimated at approximately 63 inches. No information is available concerning the quality of coal in the 2 lower beds.

Table 4 shows the results of analyses of samples taken by the Bureau of Mines and by Evan Jones.

The overburden is not thick but it is wet and the surface is swampy.

Development

Jones has driven a slope into the seam for 520 feet, from where approximately 1500 tons of coal has been produced. There is a small tippie which was formerly connected with the railroad by a track, but the rails have been removed because they were needed elsewhere by the Alaska Railroad. Arrangements have been made to have a spur track laid along the outcrop of the coal bed to the tippie and part of the material is on the ground.

At the time of the examination, the slope was full of water and inspection was impossible.

TABLE 4

Analyses of Coal Samples taken by U. S. Bureau of Mines
by Evan Jones

Houston Coal Deposits

Sample No.	Air dry Loss	Form of Analysis	Moisture	Vol. Matter	Analysis, Percent			B. T. U.	
					Fixed Carbon	Ash			
3	14.0	A	9.5	36.6	39.8	14.1	9575	Bureau of Mines, Upper half of top bench, Outcrop near and west of tipple.	
		B	22.2	31.5	34.2	12.1	8235		
		C	-	40.6	43.9	15.5	10580		
		D	-	47.9	52.1	-	12535		
2	13.0	A	11.7	39.6	36.6	12.1	8520	Bureau of Mines, Lower half of top bench, Outcrop near and west of tipple.	
		B	23.2	34.5	31.8	10.5	7410		
		C	-	44.9	41.4	13.7	9650		
		D	-	52.0	48.0	-	11175		
1	9.4	A	9.7	32.9	28.1	29.3	8440	Bureau of Mines, Lower Bench of Upperseam, Outcrop near and west of tipple.	
		B	18.2	29.8	25.4	26.6	7645		
		C	-	36.4	31.1	32.5	9340		
		D	-	54.0	46.0	-	-		
4	8.3	A	6.5	42.0	33.8	17.7	9480	Bureau of Mines, Outcrop face of exposed coal bed, half a mile east of Tipple.	
		B	14.3	38.5	31.0	16.2	8695		
		C	-	44.9	36.2	18.9	10145		
		D	-	55.4	44.6	-	12510		
1	12.0	A	8.7	42.1	38.7	10.5	9190	Evan Jones, Top bench open cut.	
		B	19.7	37.0	34.1	9.2	8085		
		C	-	46.1	42.4	11.5	10065		
		D	-	52.0	48.0	-	11370		
2	8.5	A	6.3	40.7	40.6	12.4	9860	Evan Jones, Bottom bench near mine portal.	
		B	14.3	37.2	37.1	11.4	9020		
				43.4	43.3	13.3	10525		
				50.1	49.9	-	-		

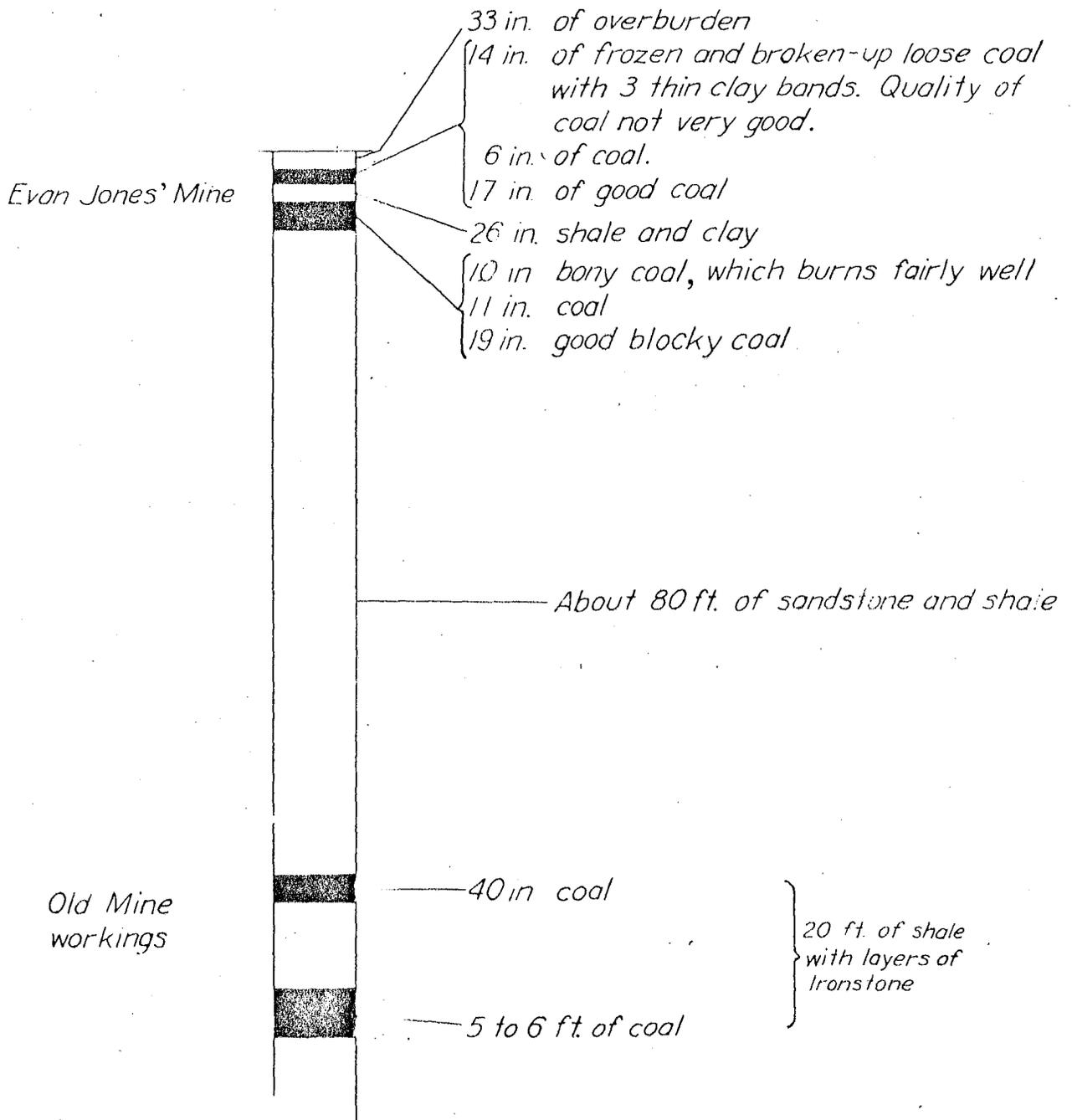


FIG. 11. COLUMN OF BEDS EVANS JONES MINE

A timbered shaft about 18 feet in depth has been sunk by Doherty, which is said to have exposed the seam being worked by Jones. Both top and bottom beds are said to be approximately 3 feet in thickness. The shaft was half full of water and could not be inspected.

Jones has also dug several trenches along the outcrop and is engaged in sinking a small shaft for exploration purposes.

It is reported that 30,000 tons of coal has been produced from a mine, on the two lower beds shown in the column.

Because of the swampy nature of the ground and the thinness of the coal, it is considered improbable that a stripping operation can be conducted on this deposit which can produce coal in competition with that from other mines along the Alaska Railroad. It is possible that coal can be produced satisfactorily by underground mining if the lower beds prove to contain coal of minable thickness. This can be determined by drilling. The Bureau of Mines believes that such drilling should be undertaken but does not propose it for the immediate future because it is believed that other more favorable deposits can be utilized.

It was suggested that the Army undertake strip mining on a small scale which could be increased if it proved successful.

WASILLA COAL PROSPECT

General

The Wasilla coal prospect is approximately 7 miles north of Wasilla in the foothills south of Bald Mountain Ridge of the Talkeetna Mountains.

Wasilla Station is at mile 159.8 on the Alaska Railroad and approximately 9 miles west of Matanuska. Wasilla has good road connections with Palmer, Matanuska, and Anchorage and is connected with Willow at mile 185.7 by a good road over the Talkeetna Mountains. There are several gold mines on this road.

Description of the Deposit

The coal in this district is considered part of the Matanuska coal fields, the geography and geology of which have been described by Capps.^{12/} Coal Creek empties from the north into Little Susitna River. Outcrops of coal were discovered in two places $\frac{3}{4}$ mile apart in the bottom of Coal Creek by Albert G. Dodson and Howard J. Brown, gold miners, after coal float had been found in the creek. No float was found above the upper outcrop. The beds had been partly uncovered at the time of the examination and samples were taken by Sibray,^{13/} Chapman,^{14/} and Marstrander.^{15/} Results partial analyses are as follows:

Sample No.	<u>Analysis Percent</u>					<u>Remarks</u>
	<u>Air Dry Loss</u>	<u>Moisture</u>	<u>Volatile Matter</u>	<u>Fixed Carbon</u>	<u>Ash</u>	
1	4.8	10.3	34.0	46.9	8.8	Thickness 10 to 12 feet. Total thickness not determined.
2	1.6	7.9	35.9	43.6	12.6	$\frac{3}{4}$ mile above Sample No. 1. Thickness not determined.

The coal is of subbituminous grade. The strike of the bed is approximately N. 55° W. and the dip from 10° to 15° to the northeast. The bottom of the bed is quite rolling and in places the dip is as much as 25°.

The coal has not been exposed in its full thickness. The thickness of the first bed was 10 feet or more but the bottom is under the creek bed and is not exposed.

The second bed is at least 4 feet in thickness but the bottom of this bed is also under the creek.

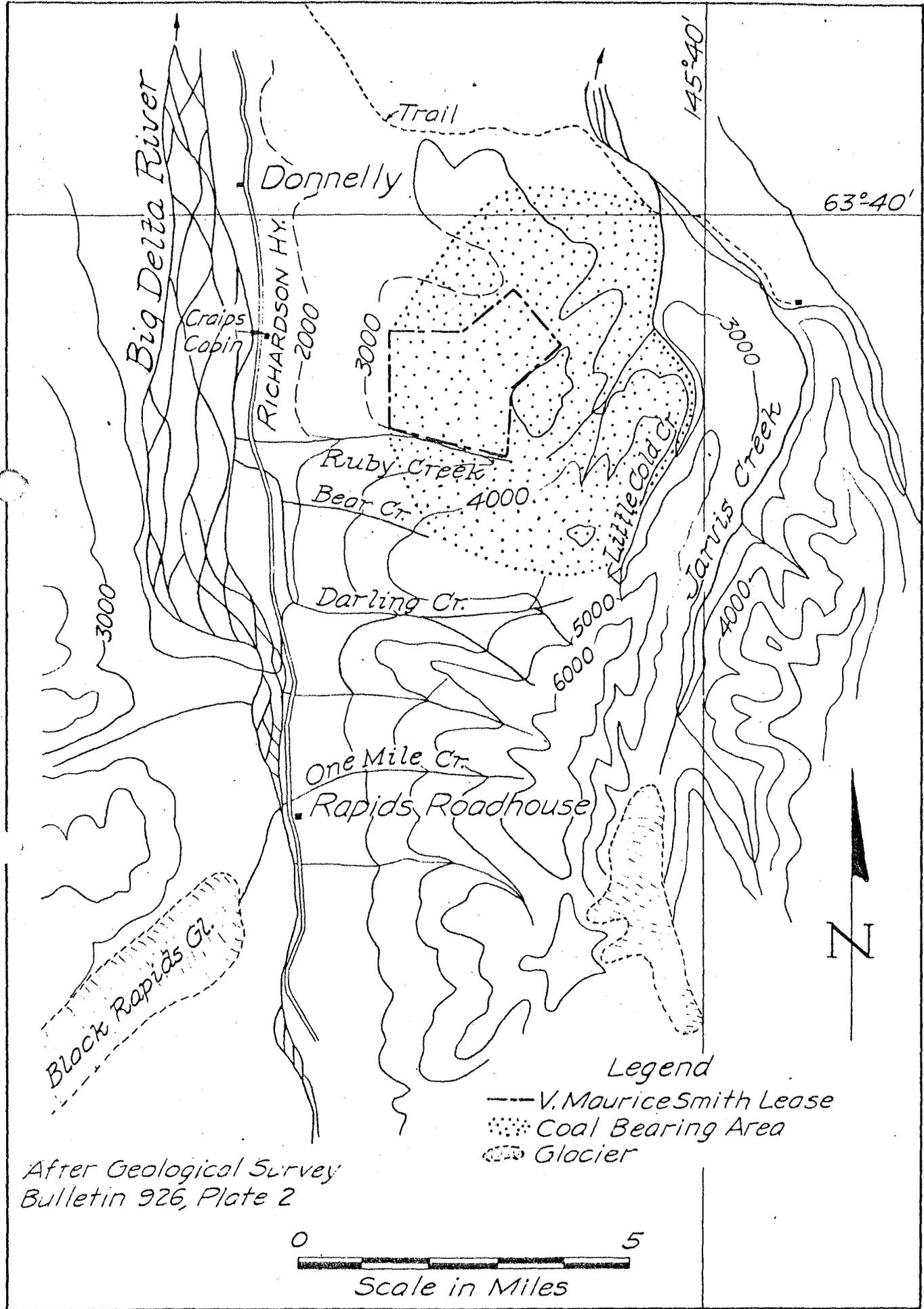
There is one cabin near the Little Susitna River which could be repaired to accommodate a small prospecting party. There are no other houses

^{12/} Capps, Stephen R., Dept. of the Interior, Geological Survey, Bull 907

^{13/} Sibray, Donald, Major, G.M.C.

^{14/} Chapman, George, Major, Q. M. C.

^{15/} Marstrander, Henning, Mining Engineer, Bureau of Mines.



After Geological Survey
Bulletin 926, Plate 2

0 5
Scale in Miles

FIG. 12, PG. 34, DONNELLY COAL FIELD

or cabins within about 5 miles of the outcrop. There is no road connection and if mining work is undertaken, it will be necessary to build a tractor road 4 or 5 miles long.

Proposed Work

The Bureau of Mines recommended work to be undertaken the winter of 1943-1944. This will consist of uncovering the full thickness of the two seams and the driving of an entry from 50 to 75 feet along the strike in preparation for sampling in the spring of 1944 and for continuance of development of the mine. This work is to be financed by Walter Grohnert, of Anchorage.

This prospect is considered promising and the Bureau of Mines proposes to prospect these beds by mapping, trenching, and sampling during the summer of 1944 and, if results are favorable, to continue the exploration by core drilling.

DONNELLY COAL PROSPECT

General

In November 1943, the Bureau of Mines was requested to examine and sample a specific-coal bed near Donnelly which was supposed to be 30 feet in thickness.

Under peace time conditions, there was no need for production of coal in this area, but war activities, including the construction of camps and the air fields at Big Delta, Tanacross, Northway, and Dry Creek have led to the consumption of unusual amounts of fuel. At the present time fuel oil is used and Army officials are inclined to favor the continuance of this practice but were interested in the possible development of coal in a district from which the various camps could be supplied by comparatively short hauls.

At the present time, coal is brought to Fairbanks by rail from Healy or Colorado Station, distances respectively of 112 and 166 miles. The coal is then trucked to points of consumption. Distances from the Donnelly coal field to Fairbanks and the air fields are as follows:

Fairbanks	135 miles
Big Delta Air Field	35 miles
Northway	200 miles
Tanacross Air Field	130 miles
Dry Creek Air Field	135 miles
Valdez Air Field	245 miles

Coal could be hauled to Tanacross and Northway in trucks returning from Fairbanks to White Horse, and to Dry Creek, Valdez, and intermediate points in trucks returning from Fairbanks to Valdez.

At the present time, oil is distributed by truck after being brought into the district by rail and truck.

It is believed that coal could be produced at the mine for \$4.00 a ton or less and that the use of coal at the various Army establishments would be considerably less expensive than the use of oil.

The Donnelly coal prospect was examined during the time from November 11 to November 15, 1943, by an engineer of the Bureau of Mines accompanied by Joe Ferrin, a former coal mine foreman, and V. Maurice Smith who has applied for a permit on this prospect.

The coal field is east of the Richardson Highway and on a ridge between Big Delta River and Jarvis Creek. This coal field is described by ^{16/}Moffitt. The center of the field is approximately 3 miles southeast of Donnelly which is an abandoned camp of the Alaska Road Commission.

The coal beds are easily accessible from the valley of Jarvis Creek, but from a place on the Richardson Highway approximately 7 miles north of

^{16/} Moffitt, Fred H., "Geology of the Gerstle River District, Alaska", Dept. of the Interior, Geological Survey, Bull. 926-B, 1942.

Rapids Roadhouse a climb of approximately 1500 feet in a distance of 4 miles is necessary. The altitude of the ridge is from 4000 to 5000 feet and that of the coal permit is from 3000 to 4000 feet.

A good starting point for a trip to the coal field is a small cabin belonging to Dr. Craip, a few hundred feet east of the road. In good weather the trip can be made in about 4 hours, but twice that time was required at the time of the examination. This cabin is the only place in the immediate vicinity in which one can stay over night and from which the trip can be made in a day. It may be possible to obtain accommodations at Rapids Roadhouse or at the Army camp at Big Delta.

Moffit's map shows a trail across the mountain from slightly north of Donnelly to Jarvis Creek and it was stated that under ordinary circumstances, a small truck could follow this trail to the top of the ridge and then follow the ridge to the coal deposit. However, this was found to be impossible in winter.

Physical Features and Climate.

The valley of the Delta River is one of the principal passes through the Alaska Range, connecting the Copper and Susitna Valleys to the south with the valley of the Tanana River to the north. In the vicinity of the coal deposit Delta River and Jarvis Creek flow from south to north through deep glaciated valleys which widen out to broad open lowlands north of Donnelly. Delta River is the route of the Richardson Highway.

The warmest months are from June to August when the temperature may rise to 80° F. the coldest month are January and February with temperatures falling to approximately -40° F. The mean average temperature is approximately 30° F.

Rainfall is moderate but unmelted snow sometimes amounts to nearly 100 inches. The greatest precipitation is from June to October; and during the period from 1936 to 1943, available figures showed a monthly precipitation ranging from 2.76 to 4.38 inches. The least precipitation is from December to March.

Snowfall will present an obstacle to outdoor operations in the cold months. The high winds which sometimes occur will prevent the accumulation of snow on the barren summit of the ridge, but there will be deep accumulation in ravines and in the river and creek bottoms. The location of an entry and of surface equipment should be studied in order to avoid trouble from snow as far as possible.

Since the elevation of the coal beds above the stream levels is considerable, it is believed that mining operations will not be hampered by large amounts of mine water.

The vegetation of the district has been discussed by ^{17/}Moffitt. He says that the best spruce trees commonly grow on the well drained terraces of the valleys and the lower hill slopes. Nearly everywhere within the limits of favorable altitude trees suitable for house logs and for the usual requirements of prospecting work are to be found. Mine timber can be cut from forests along the Richardson Highway.

Labor and Living Conditions

No labor is available locally and labor for prospecting and mining will have to be obtained from Fairbanks, Valdez, Anchorage, or other distant points. In case of prospecting work, the prospecting party will need to live in tents, build a camp, or obtain accommodations in the Alaska Road Commission Camp at Donnelly.

^{17/} Moffitt, Fred H., Previous citation.

The Deposit

The only published description of the coal bed in this deposit has been given by Moffitt.^{18/} This description gives a section across the coal-bearing beds and states that not fewer than 30 beds of coal, ranging from a few inches to 8 feet in thickness are exposed in the west wall of the basin at the head of the short creek west of Little Gold Creek. The examination by the engineer of the Bureau of Mines was so restricted in time that there was no opportunity for the study of this section. It was found, however, that it did not include the specific bed which the Bureau of Mines had been asked to examine.

This bed outcrops on the steep north bank of Ruby Creek at an altitude of approximately 3000 feet. The outcrop can be followed for a considerable distance along the side of the mountain ridge. The thickness of this bed is approximately 30 feet, the lower 6 feet of which are bony coal, thinly laminated and hard. The strike is N. 65° E. and the dip 30° to 35° N. 25° W.

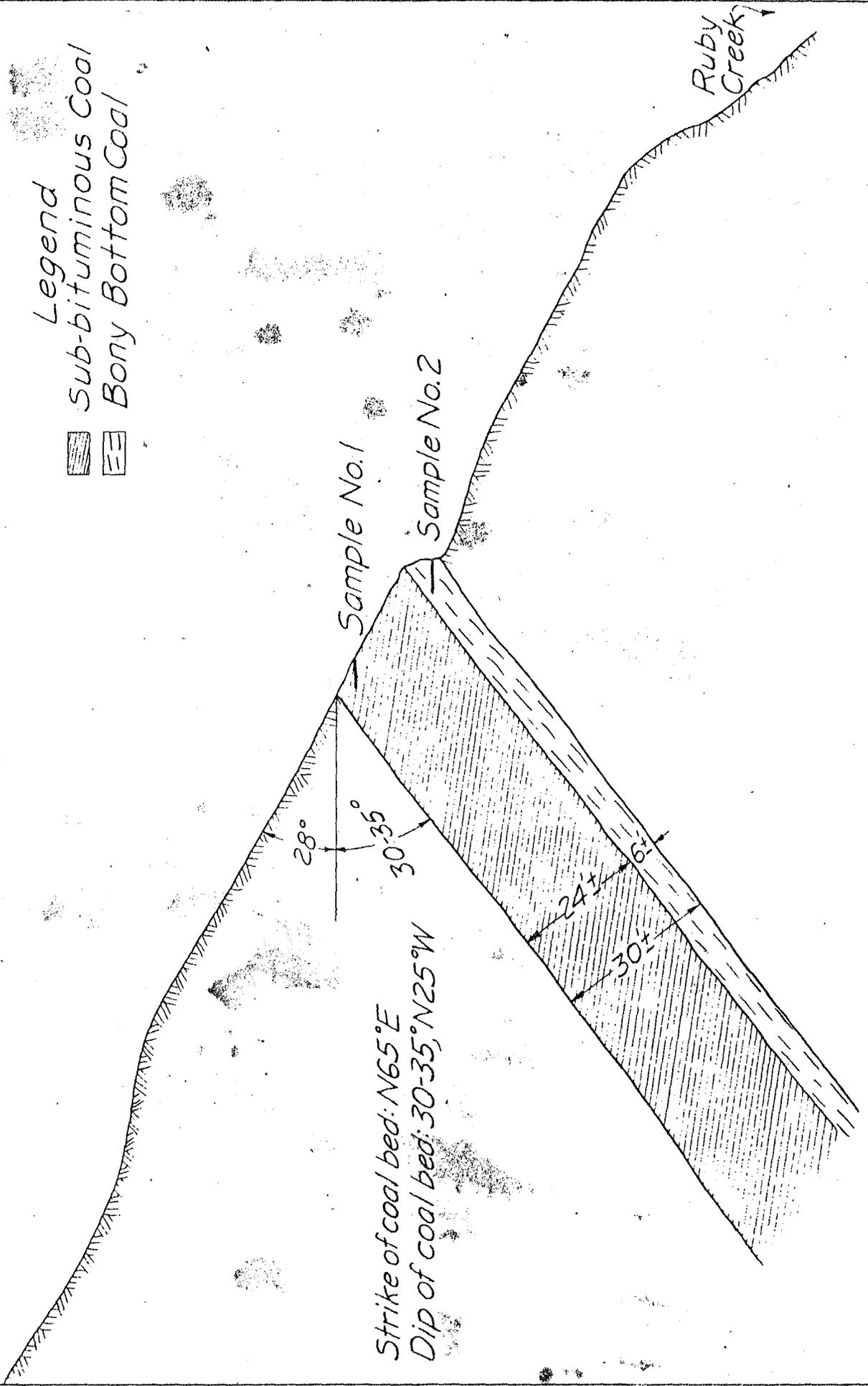
Two samples were taken in the course of the examination, one near the top of the bed and one in the bony coal at the bottom.

Three holes, each 6 feet in length, were drilled horizontally into the coal, one in the bony coal and two in the good coal. The holes were blasted and one of the latter failed to break and gave no sample. A large sample of this top coal would have been desirable but it could not be obtained under the circumstances.

Partial results of the analyses of these samples are as follows:

^{18/} Moffitt, Fred H., Previous Citation.

- Legend
-  Sub-bituminous Coal
 -  Bony Bottom Coal



Strike of coal bed: N65°E
 Dip of coal bed: 30-35° N25°W

Sample No.	Top Bench	Analysis, Percent		Volatile Matter	Fixed Carbon	Ash
		Air Dry Loss	Moisture			
1		6.5	7.2	44.9	38.8	9.1
2	Bottom Coal	9.5	3.6	36.3	26.6	33.5

Because of the high ash content of the bony coal, it is not considered minable, but will make a good mine float, *float*

No estimate of reserves is possible without further investigation.

Other beds which are probably minable are known to be present in this field. One bed which has not been investigated is reported to have a thickness of 12 feet and a number of beds ranging in thickness from a few inches to 8 feet and possibly more are present higher up on the cliff. The bed sampled is the lowest bed known in the field.

Development

No work has been done in preparation for development. The holders of the lease believe that their most profitable operation will be a stripping mine. The Bureau of Mines believes that an underground operation will be more satisfactory. The holders of the lease do not have the necessary capital for any extensive underground development but can probably finance a small operation. Only a small capital outlay will be required for the opening of a mine on a small scale.

If coal from this deposit should be used at the air fields in this part of Alaska, it is estimated that the following tonnages might be required:

Big Delta and neighborhood	15,000 tons
Northway	5,000 tons
Gulkana	5,000 tons
Tanacross	5,000 tons

In addition to this, coal may be shipped to Fairbanks and Valdez. It is considered improbable that this coal will be used in Army air fields and, therefore, improbable that any immediate development will be made.

Proposed Exploration by the Bureau of Mines

The Bureau of Mines proposes to investigate the coal deposits in this area by mapping, trenching and sampling. The cost of this project is estimated as follows:

Personal Services when actually employed:

1 engineer for 1-1/2 months	\$ 600
2 laborers for 1-1/2 months	900
1 sampler for 1-1/2 months	480
1 cook for 1-1/2 months	<u>525</u>\$ 2505
Travel	500
Tools, supplies and temporary camp	<u>950</u>
Total	\$ 3955

The results obtained during the above program may indicate the advisability of establishing reserves by means of core drilling. This work could be undertaken during the late summer and fall, and would require the allocation of additional funds.

CONCLUSIONS