MR-194-05

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REPORT ON
THE DELTA RIVER AREA

By

Earl R. Pilgrim

1930

The Delta River Area. —

by

Earl Pilgrim 1930

The Delta River Area

It is desired in this report to describe some of the mineral resources of that area adjacent to the Delta River and its headwaters and tributaries. This area has long been accessable to prospectors and miners as the trail from Valdez to Fairbanks, the Richardson Highway, has been in use for 24 years first as a winter foot and dog trail, later becoming a wagon road, and finally an automobile highway used by residents, prospectors, and tourists. There has been considerable prospecting in this area for gold placers with a few discoveries which have yielded gold in workable quantities. The accessibility of the nearby hills has kept a few determined prospectors searching for placer gold. Little search has been made however for lodes. Gold has been known to exist in the gravels of tributaries of the Delta River for about 30 years. Placer gold has been found also in many of the streams along the north flank of the Alaska Range to the west.

Examinations by U. S. Geological Survey

In 1910, Stephen R. Capps, geologist and J. W. Bagley, topographer covered the north slope of the Alaska Range between the Nenana River and the Delta River; Bull. 501, U. S. Geol. Survey, 1912, The Bonnifield Region. In the same year a survey was made covering the south slope of the Alaska Range which included the headwaters of the Delta River; Bull. 498 U. S. Geol. Survey, Headwaters Regions of Gulkana and Susitna Rivers. Moffit, Fred, H.

Present Examinations

A trip was made by the writer over the Richardson Highway during the summer of 1930. Mineral developments along and near to the highway were visited. This report is compiled from information obtained during this trip. It is here desired to acknowledge appreciation for aid furnished the writer by various prospectors and officials of the Alaska Road Comission who kindly furnished

transportation between points where stages were not available.

Geography

Drainage

The Delta River area includes that drainage of the Delta River from its mouth on the Tanana River to the head of Phelan Creek and the vicinity of Gulkana Glacier. The Delta River, one of the larger north flowing streams of the Alaska Range, over 90 miles in length has its source beyond the south flank of the range. It flows in an almost due north direction cutting through the backbone of the range to the Tanana Valley where it joins the river of that name. It is fed by a number of glaciers among which the larger are; Castner, Canwell, the large unnamed glacier west of Black Rapids, and at times Gulkana Glacier. The latter is at times known to feed into both the Delta River and into Summit Lake which drains into Gulkana River and eventually reaches the Copper River and the Pacific Ocean.

The water supply of this drainage is mostly from melting snows and ice. The heavy flows are in late spring and summer when the warm weather works strongest on the glaciers and snow fields. In fall and winter these waters are low and clear.

The larger tributaries of Delta River are Phelan and Eureka creeks which join it within 30 miles of its head and Jarvis Creek which joins at a point 10 miles from its mouth. The river flows

The river flows through three topographical provinces. At its head in the south slope of the Alaska Range the tributaries Eureka and Phelan creeks flow in an easterly and westerly direction respectively to their junctions with the Center Fork which is a clear water stream heading in the Tangle Lakes. This south province is lower and of a more level terrain. Much of the area is flat and swampy furnishing a difficult field for the prospector. The area is dotted with lakes while much of it is covered with glacial till mantling

the rocks beneath.

The central province covers the Alaska Range for about 25 miles- an area of high rugged mountains approaching an elevation of from 7,000 to 10,000 feet with a few peaks rising to over 12,000 feet. Most of the higher valleys are occupied by glaciers. The Delta River and its tributary Phelan Creek have cut a deep valley through the range furnishing one of its lowest passes from the coast-side to the interior. This pass now used by the Richardson Highway in crossing through the range was long considered as a possible railroad passage to the interior. The highest point on the highway is 3,310 feet. The river emerges from the mountains a short distance north of the Black Rapids and continues on for 35 miles through the gravel covered lowlands of the Tanana Valley. Jarvis Creek heads on the north slope of the range and flows .. northernly roughly parallelling the Delta River for 25 miles through a typically glacial gravel filled valley, then turns to the northwest for 5 miles to its junction with Delta River.

Trails and Transportation

This area is reached over the Richardson Highway by automobile from June 1 to October 1. The high pass through the range is often closed until after June 1. In 1930 the first automobiles crossed on June 15. The main highway at either end is generally open before June 1. The Valdez section is slow to clear of snow in the spring but the Fairbanks end is often kept open for 90 miles during the whole winter.

Chitina, Valdez, and Fairbanks are the distributing points for the Richardson Highway. Chitina is located at mile 131 from Cordova on the Copper River and Northwestern Railway. Isabella Pass, the highest point on the highway is 150 miles from Chitina, 203 miles from Port Valdez, and 166 miles from Fairbanks. Valdez on Port Valdez, Prince William Sound is one of the many fine har-

bors along the Alaskan coast. Fairbanks is on the northern terminal of the Alaska Railroad at mile 467. The Richardson Highway is 371 miles in length between Valdez and Fairbanks with a branch from Chitina 39 miles to its junction with the main highway from Valdez at mile 92.4. The highway is constructed and maintained by the Alaska Road Comission under the supervision of the U. S. Army Engineer Corps.

Vegetation and Climate

The Delta River lowland is well timbered with spruce and small patches of birch and poplar. The spruce along the lower streams is suitable for saw timber. With increasing elevation to the south the timber decreases in abundance and in size until at 2,500 feet it has almost ceased. Willows are found much higher in protected passes and valleys. South of the range spruce and poplar are found. Spruce is in preponderance. Timber line is from 2,500 to 3,000 feet elevation. In many places however timber is not found at even lower elevations. The spruce is scrubby above 2,000 feet and is only useful for fuel. It grows largest along the valley floors of the larger streams, at lower elevations. Willows and some alder are found along the streams south of the range grow- often at elevations considerably above timber line. Grass suitable for forage is found along many of the smaller streams also in patches of burned over timber. Grass is often found considerably above timber line and generally can be found in and close to willow patches. Frost destroys the grass early in the fall so that it can be relied upon only during the period from June 15, to September 1. Willow leaves of certain varieties are eaten by horses at any time of the season.

Precipitation is generally light throughout this area, averaging less than 12 inches of which over one half is winter snow fall. There are many rainy days during the summer but the sum total is only a few inches. Temperatures range from 40 to 50 degrees below

zero in the winter to 80 or 90 degrees above zero in the summer. The higher areas have a less range of temperature than the lower areas. The summers are cooler and the winters are warmer. The higher more open areas have greater winds which are more difficult to combat than the lower temperatures with no winds.

Geology

The geology of this area has been covered briefly by Capps and Moffit in their surveys of 1910. Capps reached the Delta River along the north slope of the range while Moffit covered the south slope and reached across Phelan Creek and to Gulkana Glacier. The writer during his brief visit to this area gathered some slight additional information which is incorporated in this report.

Moffit shows in a geologic column of the upper Susitna- Gulkana Region the following rocks which are found in the area described in this report;

Quaternary:

Recent	Stream gravels, sands, and silts.
Pleistocene	Glacial gravels and moraine deposites.

Unconformity

Tertiary:

Upper Eocene (Kenai formation,?)	Unconsolidated sand and gravel with lignite deposites. Sandstone, shale and conglomerate with lignite coal beds.

Unconformity.

Jurassic (?) or later	Granular intrusives, diorite, quartz diorite and related forms. Shale, sandstone, slate, arkose, limestone, tuffs, and lava flows.
Carboniferous or later	Basic lava flows, tuff, and tuffaceous conglomerate.
Carboniferous	Slate, tuff, quartzite, limestone conglomerate, and granular intrusives.
Pre-Ordovician (?) (Birch Creek schist)	Highly altered sediments with igneous intrusives.

In addition we must add a formation described by Capps and assigned to upper Tertiary age and consisting of a series of loosely consolidated , elevated gravels, sands, and clays.

The oldest rock found inthis area is the Birch Creek schist. It is known in many parts of the interior of Alaska. It is composed of metamorphosed, unfossiliferous sediments consisting of micaceous, graphitic, quartzite schists, quartzites, and some limestones and locally intrusive rocks intensly folded and compressed, and containing many white glassy quartz lenses and stringers generally following the foliation of the schist. Occasional fissures are observed cutting the foliation. These contain; stibnite, pyrite, and arsenopyrite, and some free gold. These veins are found in the vicinity of intrusive granular rocks.

Moffit described a considerable area of rocks occurring east of Phelan Creek and west of Delta River northward from Eureka Creek to Canwell Glacier, where "the high mountains consist of slates, tuffaceous beds, quartzitic sediments, and local limestone beds associated with diabasic flows or intrusions and with light gray or greenish gneisses that probably represent metamorphosed diorite intrusions. These beds are much folded and in places a schistose structure has been developed. The weathered surfaces of many of them have a rusty red color that renders them particularly conspicuous and makes them recognizable at long distances." These rocks abut against the Birch Creek schist on the north by a fault contact.

West of Summit Lake and south of Eureka Creek is a belt of heavy, dark-colored, volcanic rocks consisting principally of diabase locally amygdaloidal and associated with argillites, tuffs and tuffaceous conglomerate and intruded by diabases and other less-basic porphyritic rocks. These flows have been folded and faulted considerably showing a development of schistocity in places.

These rocks are set at Carboniferous or later age.

East of the foot of Gulkana Glacier, about two miles north of Summit Lake, close to Yosts old road house on the Richardson Highway, four miles farther north on Phelan Creek and at several places north of Eureka Creek, a series of conglomerates, sandstones, shales,and clays are found which contain interbedded coal seams and beds of carbonized wood. These sedimentary beds are severely tilted. Undoubtedly much of the formation has been removed by erosion. The lignite seams in most cases appear very small averaging less that an inch in thickness. Some of the carbonaceous material shows only slight change from the origional woody structure. On Petrokov Creek near its head one saam was observed by the writer over 7 feet in thickness of fair grade lignite.

North of the Alaska Range, Tertiary beds are found outcropping which contain beds of workable lignite coal. They are found outcropping along the foothills for over 150 miles. The Healy River coal seams are in this formation. This formation is also found along the drainage of the headwaters of Jarvis Creek. It consists of a series of gravels sands, and clays interbedded with lignite. The series is conspicuous by its light color. Wherever it is found exposed to and considerable thickness coal seams are also exposed and can be recognized from a distance of several miles. The formation shows near the head of Jarvis Creek covering an area of at least 1½ miles east and west by 3 or 4 miles north and south.

A widespread series of high gravels, sands, and clays occurring along the high hills north of the range has been described by Capps, and assigned to upper Tertiary (Miocene or Pliocene). This, Nenana Gravel, is found covering many of the higher hills and ridges between the Tanana Valley and the high mountains comprising the Alaska Range. At one time undoubtedly this series covered most of that area. It still is an important feature of that locality. It consists of a series of loosely consolidated and generally

unstratified assortment of schist, quartzite, quartz, granite, and other intrusive sands and gravels all derived fron the Alaska Range. They are believed by Capps to have been deposited as a great compound alluvial fan or apron along the north front of the range. By whatever method they were laid down however they are an important formation of this region because of their relationship to at least a part of the placer gold deposits.

These gravels are found occurring along the higher hills east of the Delta River and overlying the Tertiary lignite bearing sediments.

The Quaternary deposites include all gravels, glacial till, morainal deposites, and present stream gravels. They ocupy a large portion of the surface of this area filling the stream valleys, occupying the valleys of formen glaciers, hillside slopes, and mantling the hills along glaciated areas. They are unconsolidated deposites which in most areas are being reworked and redistributed by present erosion.

These deposites occupy the valley of the Delta River and cover the hills on either side. They are closely associated with the older gravels and in some localities are difficultly distinguishable from them.

The present streams reworking and reconcentrating these quaternary gravels are developing placer deposites containing gold in appreciable amounts. The immense quantity of glacial material left along the rivers and hills undoubtedly contained considerable amounts of gold scattered throughout with little concentration. The present stream gravels are resultant of the erosion and cutting through of morainel deposites, high gravels, Tertiary lignite beds, intrusives, and older schists. Their development is controlled by factors which are not uniform to all streams of even as small an area as this. Many of the streams are fed from glaciers while others derive their waters from melting snow and rainfall. It is true

of all streams of this locality that the volume of water is extremely variable with the seasonal changes. The clear water streams have their greatest volume with the annual spring run off of melting snows. They fluctuate thereafter during the summer with rains only, and during hot dry summers diminish greatly. The glacial fed streams receive their greatest impetus during the hottest dryest summer weather.

The glacier stream gravels are formed by the moving and washing of unassorted materials furnished by the glaciers. The flood waters classify these gravels to a considerable extent carrying the finer materials farther downstream before dropping them. A great amount of grinding and scouring takes place in these heavily laden waters. The coarser and heavier particles are dropped as the stream gradient diminishes and as the channel widens.

There is a tendency of most present glacial streams due to the lessening load from the retreating glaciers, to cut new and deeper channels into the older valley floors. This results in a reworking of these gravels and a concentration of the heavier materials. Similarly but to a lesser extent the clear water streams are reworking the older till sheets and higher gravels.

Intrusive Rocks

Quartz diorites and related intrusive rocks occurring as dikes sills, and large masses of irregular form are described by Moffit as intruding the older sedimentary and igneous rocks. He describes them as- prevailingly gray in color and differing considerably in alteration. They cut the Triassic sediments but not the Tertiary deposits. They are therefore set tenatively as of late Jurassic and early Cretaceous age. These rocks are found on both sides of Gulkana Glacier, on both sides of Delta River near Millers Road House, near the head of Rainy Creek, and near the head of Eureka Creek. A dike of hornblende diorite was noted by the writer cut-

ting across Ober Creek about 2 miles from its head.

Mineral Resources

The first prospedtors on Delta River are said to have arrived in 1900 from the Chisna River. They found colors on the gravel bars along the river and fair prospects on Eureka and Rainy creeks. A considerable stampede grew out of this the following year. Although considerable gold has been found well distributed along the river and a number of its tributaries, a successful placer district has not been developed. A number of prospectors have remained in the locality and have recovered sufficient gold to encourage a continuance of search. Very little lode prospecting has been done in this locality as in most of the isolated placer localities of Alaska. A few gold bearing lodes have been found but very little work has been done to develop them. Several seams of coal are known and a few tons have been mined and used locally from at least two of them.

Ober Creek and Tributaries

Ober Creek joins Jarvis Creek from the west at a point about 17 miles from its mouth. Ober Creek heads in the hills 3½ miles east of Donnelly Station, mile 243 from Valdez, on the Richardson Highway and runs about 11 miles northward to its junction with Jarvis Creek. It is a clear water stream with flat valley and gentle gradient. The valley is about 500 feet in width at the mouth of Savage Creek its largest tributary. The valley is nearly devoid of timber towards its upper end where placer gold has been found. There are no terraces or benches showing along the valley. Birch Creek schist bedrock outcrops frequently along the sides of the valley. The hills on both sides are of gravel. The long low ridge between Ober Creek and the Delta River Valley probably is covered with morainic till. The ridge is irregular and dotted with many small lakes characteristic of morainel deposits. The hills to the east are considerably higher, and show gravel covered. This gravel

bears a strong resemblance to the higher gravels farther west described by Capps as Nenana gravel.

A number of tributaries have cut their channels through this gravel on the east and into the schist bedrock. There are no tributaries entering Ober Creek from the west except towards its lower end. Alder Creek joins Ober Creek about 7 miles above its mouth. Miller Gulch is 1½ miles south of Alder Creek. Savage Creek is ¾ mile south of Miller Gulch. Three gulches enter Savage Creek from the east Mineral, Snow and Harding gulches. Savage Creek is about 1¾ miles in length. The side gulches are all short and steep. Most prospecting has been confined to these tributaries of Savage Creek and in Savage Creek close to its mouth. A number of shafts have been sunk in Savage and several opencuts and bedrock drains put in with small automatic dams. These have all shown gold to be present. The gravels are frozen. They are composed of intrusive rocks, schists, dark slates, quartzites, and quartz pebbles, sands, and boulders. The largest boulders are found in the side gulches and in Ober Creek. The side gulches have a gravel depth of from 6 to 12 feet with very little muck. The gravels of Savage Creek are from 6 to 25 feet in depth with a few feet of muck back from the creek trough. Ober Creek Valley shows gravel from the surface down. Pans taken from the top gravels along the creek show a few fine colors of gold. No holes have been sunk to bedrock on Ober Creek. The concentrates from bedrock gravels along Savage Creek and the side gulches shows considerable magnetite and red garnet. The gold is rounded and well worn. It is not known what the fineness of this gold is but it has sold for $ 17.00 per ounce.

Big Creek 68

Frozen gravels and lack of fuel are given as reasons for not prospecting the deeper gravels of Ober Creek. On Ober Creek at the mouth of Savage Creek (Elevation 2300 feet) the gravels should not be over 40 feet in depth. The number of boulders on this creek

are not few . Some of them have a diameter of 5 feet.

On the hills above Mineral Gulch the older gravels are cut through by the streams. These gravels pan gold throughout from the surface down. Undoubtedly ~~these gravels~~ they are the chief source of the placer gold contained in the gravels of the gulches and of Savage and Ober creeks.

About ½ mile below the mouth of Savage Creek a hornblend diorite dike cuts across Ober Creek in a northeasterly direction. The dike shows intruding the schist and is unaltered except for a natural weathering of the exposed surfaces.

Casey's Cache Placer

About ½ mile below the mouth of Phelan Creek at mile 217 from Valdez, at the locality known as Casey's Cache, a small creek enters the Delta River from the east. At the mouth of this creek a placer discovery was made in 1929 by Charles Miller. The gravels were being prospected in 1930 by means of a small automatic splash dam.

This creek named Last Chance Creek, not over ½ mile in length, joins the Delta River at an elevation of 2,300 feet. The gravels are found extending back from the Delta River for probably 300 feet, where this discovery was made, although they have not been prospected for this width. They extend along the rivers edge for perhaps ½ mile upstream to where the river cuts into the bedrock bluff on its east bank. The creek extends back from the river at an acute angle. A section along the creek from the rivers edge shows a gravel depth of 5 feet with no muck overburden. At 200 feet upstream the gravel is 4 feet in depth with 2 feet of vegetable muck. The gravels are generally coarse with some boulders as large as 4 feet in diameter. There is not a large quantity of sediment in the gravels except close to bedrock. A considerable amount of blue clay is found in the lower part of the gravels which appears probably of glacial origion.

M.F. Hayes 68

The bedrock surface is dipping southwest towards the Delta River although the creek is running in a direction of N. 20° W. The ground surface is rising towards the Delta River so that there is an appreciable increase in the depth of the alluvials. On the bank of the river 200 feet south along the rivers edge from the mouth of the creek the gravels are over 20 feet high above the rivers edge. Bedrock id a blocky, decomposed, basic, porphyritic rock. The mountains to the east are formed of a dark diabase containing many quartz veinlets.

The gold is rusty, and well worn. The fineness is not known. Pans taken along the creek in a bedrock cut, showed fair prospects in the gravels close to bedrock.

Spruce timber is plentiful on both banks of the Delta River at this locality. The highway runs directly across this property within a few hundred feet of the present workings.

Mt. Hayes Sp

K+bb-33

Rainy Creek Placer

Rainy Creek enters the Delta River about 6 miles upstream from the mouth of Phelan Creek. It is reached in summer by poling boat from Casey's Cache up the Delta River. The creek is approximately 10 miles in length. Gold was discovered in 1900 on this creek and has been mined and prospected intermittently since then, producing several thousand dollars in gold. The gravels are said to average 12 feet in depth varying from over 20 feet at the lower end to only a few feet at the upper end. The gravels at the lower end of the creek are mostly fine containing a few boulders 18 inches in diameter. Upstream the boulders increase in size and quantity, some being as large as 6 feet in diameter. There is considerable clay sediment in the gravels which is said to wash easily. There is no much overburden above the gravels which are all thawed.

The gold is fine, well worn, anddistributed throughout the gravels from the surface down. It has a sale value of $ 17.00 per ounce.

The bedrock is a blocky, porphyritic, dark- colored rock. Considerable prospecting has been done along Eureka Creek and its tributaries. The placers are said to resemble those on Rainy Creek in general occurrence, and conditions.

Lode Deposits

As before stated very little prospecting has been done in this area for lodes. Conditions are perhaps better for finding valuable lode deposits than they are for finding placers. So many of the valleys have been recently scoured by glacial action that it is hardly to be expected to find valuable concentrations of gold, during the short period of erosion and concentration following the glacier's retreats, in most of the valley gravels. Transportation conditions are now such that gold or silver lodes could be mined profitably if found to contain reasonably high values.

Gulkana Glacier Copper-Gold Vein

About 2 miles from the mouth of Petrokov Creek which joins Gulkana River, a half mile below the glacier of that name, and from the east, is a vein discovered by T. Eagen Petrakov. This vein was not examined by the writer and data here given ~~were~~ furnished by Petrokov. It is said to be from 4 to Over 30 feet in width.

The vein strikes northerly and dips 65° to the east. A tunnel has been driven in for 55 feet which shows a strong fissure vein occurring in slate. The vein is mineralized with chalcopyrite, pyrrhotite, galena, pyrite and sphalerite. The pyrrhotite carries small amounts of nickel. A sample from this vein assayed;

gold 0.56 oz. silver 4.55 oz. copper 13.3 %.

Black Rapids Black Rapids Lode

A vein was described to the writer by T. Eagen Petrokov and Charles Sponberg as occurring 2 miles east of the Richardson Highway at a point about 2 miles south of Rapids Road House at mile

231 from Valdez. This is apparantly on a contact between intrusive porphyritic rocks and schist. The mineralization reaches a maximum width of over 100 feet. Surface outcrops show stibnite, pyrite, arsenopyrite, and small amounts of galena in a quartz filling. Samples taken from the surface exposures returned;

No. 1. gold 0.14 oz., silver 0.80 oz., antimony 34.45 %.

No. 2. gold 0.42 oz., silver 3.0 oz., antimony 48.00%.

A tunnel has been drivem in the mountainside for 275 feet towards this outcrop but has not reached it.

A number of small pyrite seams are outcropping on the mountain about 2 miles northeast from the Rapids Road House. They are said to carry gold in small amounts.

KRB-35 Coal

About 5 miles east of Donnelly Station on the Richardson Highway, 128 miles from Fairbanks, and 1½ miles southeast from the head of Ober Creek, a small creek running easterly has carved a gulch through the Tertiary sediments and exposed two seams of coal. This exposure is at an elevation of 2,500 feet. The beds are striking due east and dipping gently to the south. The coal is well exposed in the gulch but when visited in June snowdrifts still obscured much of the outcrops. The upper seam measures 4½ feet in thickness of clean solid coal and is separated from the lower seam by 10 feet of light-colored sandy clay. The lower seam measures 5 feet in thickness. The quality of the coal appears to be similar to that of the upper seam. A sample was taken across the outcrop of the upper seam. The coal was only slightly weathered but contained some clay and sand washed down over the outcrop. This probably increased the ash content slightly.

Sample of coal Ober Creek.

Air-dry loss 17.3

		Coal Air dried	Coal As received	Coal Moisture free	Coal Moisture and ash free
Moisture		6.9	23.0		
Volatile matter		43.0	35.6	46.2	52.0
Fixed carbon		39.8	32.9	42.7	48.0
Ash		10.3	8.5	11.1	
		100.0	100.0	100.0	100.0
		Non - coking			
Sulphur		0.3	0.3	0.4	0.4
Calorific value	Calories	5537	4579	5948	6685
	B. T. U.	9965	8240	10705	12035

Other beds are outcropping along the same gulch to the east. They probably underlie the two beds described above. They were covered by snowdrifts and not examined by the writer.

The Tertiary lignite formation extends south of this exposure for three or four miles, where the coal seams can be observed outcropping on the mountains. There are no doubt a number of coal seams containing workable coal in this locality which could easily be used along the Richardson Highway.

Gulkana Glacier Coal

Near the head of and 1½ miles from the mouth of Petrokov Creek a coal seam outcrops on the north side of the valley. This seam outcrops at an elevation of 4,190 feet The seam measures 7½ feet in thickness. It strikes N. 49° E. and dips 79° SE. A shaft has been sunk on the seam a few feet and some coal mined for local use. About 200 feet north of the outcrop and apparantly dipping under the Tertiary beds is a small mass of basic lava. The sedimentaries outcropping probably represent a small block which has been faulted into its present ill-defined position.

A sample taken across a width of 7½ feet of this seam by the writer gave the following analysis;

Sample of coal Eagen Petrokov Mine, Gulkana Glacier.

Air-dry loss 10.9

		Coal Air dried	Coal As received	Coal Moisture free	Coal Moisture and ash free
Moisture		7.3	17.4		
Volatile matter		47.0	41.9	50.7	56.4
Fixed carbon		36.4	32.4	39.2	43.6
Ash		9.3	8.3	10.1	
		100.0	100.0	100.0	100.0
			Non-coking		
Sulphur		0.1	0.1	0.1	0.1
Calorific value	Calories	5396	4808	5822	6472
	B. T. U.	9715	8655	10480	11650

This coal is 6½ miles from the Richardson Highway. An automobile can drive 5 miles of this by following along the gravel floor of the glacial stream to the mouth of Petrokov Creek.

Float lignite is found along the gravel bars of Rainy Creek which indicates an exposure of the Tertiary sediments somewhere towards the head of the creek.

Respectfully Submitted,

Nov. 25, 1930

Earl R Pilgrim

Earl, R. Pilgrim.

Alaska Agricultural College and School of Mines

In Cooperation with

U. S. Bureau of Mines, Department of Commerce

College, Alaska

July 29, 1930

REPORT OF ASSAY

On samples received from Mr. E. R. Pilgrim, Territorial Mining Engineer

Assay No.	Mark on Sample	OUNCES PER TON		Value Per Ton	PERCENTAGE OF			
		Gold	Silver		Lead	Copper		
01087	Whitham #1	10.39	12.70		1.67	0.15		
01088	" #2	49.73	73.00		6.11			
01089	" #3	0.10	1.80	.....		4.90		
01090	" #4 S	0.06	0.20					
01091	" Vein D	0.01	0.10					
01092	A. S. Johnson, Vein 6 ...	0.02	0.10					
01093	B. J. Davis, Vein F	0.01	62.40		72.95			
01094	" Bonanza	Trace	0.40					
01095	Wm. James A	Trace	Trace					
01096	" B	0.02	0.40					
01097	" C	0.06	0.20					
01098	" E	0.22	0.60					

Assayed by,

Paul Hopkins

Paul Hopkins,
Associate Anal. Chemist,
U. S. Bureau of Mines.

Total charges for above assays..... Official

Amount received from sender.....

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DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Test No. _____ G—COAL-ANALYSIS REPORT Lab. No. 4137

Sample of Coal Can No. _____

Operator _____ Mine Eagan Petracoff

State _____ County _____ Bed Gulkana Glacier

Town _____

Location in mine _____

Method of sampling _____ Gross weight, lbs. 55 Net weight, grams _____

Date of sampling _____ Date of Lab. sampling 8/29/30 Date of analysis 9/2/30

B. of M. or U. S. G. S. section Territory Collector E. N. Pilgrim - M. E.

		Air-dry Loss 10.9	Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Proximate Analysis	Moisture		7.3	17.4		
	Volatile matter		47.0	41.9	50.7	58.4
	Fixed carbon		36.4	32.4	39.2	43.6
	Ash		9.3	8.3	10.1	
			100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen					
	Carbon					
	Nitrogen			Non-coking		
	Oxygen					
	Sulphur		0.1	0.1	0.1	0.1
	Ash					
Calorific value	Calories		5396	4808	5822	6478
	British thermal units		9715	8655	10480	11650

Softening temperature of ash _____ ° C. _____ ° F.

Date September 5, 1930 (Signed) Maurice L. Sharp

Chemist.

6—6859

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DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Test No. _____ G—COAL-ANALYSIS REPORT Lab. No. 4136

Sample of Coal Can No. _____

Operator _____ Mine Ober Creek

State _____ County _____ Bed Out Crop

Town _____

Location in mine _____

Method of sampling _____ Gross weight, lbs. 92 Net weight, grams _____

Date of sampling _____ Date of Lab. sampling 8/29/30 Date of analysis 9/2/30

B. of M. or U. S. G. S. section Territory Collector E. N. Pilgrim, M.E.

Air-dry Loss 17.3		Coal (Air dried)	Coal (As received)	Coal (Moisture free)	Coal (Moisture and ash free)
Proximate Analysis	Moisture	6.9	23.0		
	Volatile matter	43.0	35.6	46.2	52.0
	Fixed carbon	39.8	32.9	42.7	48.0
	Ash	10.3	8.5	11.1	
		100.0	100.0	100.0	100.0
Ultimate Analysis	Hydrogen				
	Carbon				
	Nitrogen		Non - coking		
	Oxygen				
	Sulphur	0.3	0.3	0.4	0.4
	Ash				
Calorific value	Calories	5537	4579	5948	6685
	British thermal units	9965	8240	10705	12035

Softening temperature of ash _____ ° C. _____ ° F.

Date September 5, 1930 (Signed) Maurice L. Sharp

Chemist.

6—6099

IN ANSWERING REFER TO No.....

DEPARTMENT OF ~~THE INTERIOR~~ COMMERCE

BUREAU OF MINES

ALASKA EXPERIMENT STATION

FAIRBANKS, ALASKA

Sept. 25, 1930.

Mr. E. R. Pilgrim,
Territorial Mining Engineer,
Fairbanks, Alaska.

Dear Mr. Pilgrim:

Your samples for identification have been examined with the following results:

The sample marked "Rock, Whitham" consists mainly of feldspar and hornblende with very little quartz. It is probably an igneous rock of the diorite class.

The white sample marked "Whitham" is largely gypsum, with a small amount of calcite.

The dark sample marked "Whitham" is mainly magnetite, containing a little quartz.

The sample marked "Limestone? contains no calcite. It consists of silicates resembling andalusite or some similar mineral. The crystals are cloudy from alteration, and are difficult to identify. Possibly the rock may be classed as a schist.

The sample marked "Wm. James, Chisana" is a pebble of placer magnetite.

The sample marked "Sargents property" consists mainly of magnetite, with veinlets and masses of pyrite. No copper, lead, zinc, or nickel were found in the sample.

The sulphides in the sample from Devinney and Dolan are mainly pyrite. They give a faint test for copper. In panning the sample, a small amount of amorphous graphite was noticed. This may be the cause of the dark color of the sulphides.

Very truly yours,

Paul Hopkins

Paul Hopkins,
Assoc. Anal. Chemist.

4115-21