

Excerpt from report GOLD LODES OF THE NENANA DISTRICT by
Earl R. Pilgrim, Associate Mining Engineer for Territorial Department
of Mines - March 10, 1931

Eva Creek

In July 1915 Peter Swanson and John Montan discovered a body of mineralized schist outcropping on Eva Creek tributary of Elsie Creek and California Creek. The property was optioned to a Spokane group and considerable work was done on it in 1924 and 1925. A 12 mile automobile road was constructed by the Territory, to the property in 1925, but through disagreement over terms, work was stopped on the property and it remained idle until in 1930 when a lease was taken by Algot Norbert, Oscar F. Erickson, Justice Johnson and Bror Johnson. The property known as the Liberty Bell Mine consists of the following claims:

Liberty Bell	Bear Paw
Liberty Bell Fraction	Rose
Liberty Bell No. 3	Irene Fraction
Liberty Bell No. 4	Irene No. 2
Wild Goose	Four above Placer Claim

The camp, located on the Liberty Bell No. 4 claim is at an elevation of 2,545 feet. The claims lie across the valley of Eva Creek and extend onto the hillside south of the creek.

The underground workings consist of a vertical shaft sunk from a point close to the south edge of the creek, for a distance of about 70 feet. The shaft encounters the mineralization at a depth of about 20 feet. A tunnel is driven from the edge of the creek for a distance of about 550 feet with 3 cross drifts to the south, 170 feet, 130 feet, and 20 feet in length. From the latter which starts from a point 100 feet in, a winze has been sunk 30 feet and a drift from the bottom driven to the south for a distance of 140 feet following the mineralization. Most of these workings have caved and are at present inaccessible. A new tunnel has been driven from a point 50 feet north-east of the original tunnel, at an elevation of 2,492 feet in a direction of S. $5\frac{1}{2}^{\circ}$ W. for a distance of 260 feet. A cross-drift is turned off to the northwest from a point 70 feet in, for a distance of 175 feet. At a point 60 feet farther in the tunnel, a cross-drift is driven to the south-east for 135 feet where a fault is encountered which drops the formation to the east for over 30 feet vertically. The mineralization occurs in a black slate lying from horizontal to 30° W and extends downward from a hard rather impervious bed of quartzite overlying the slate. Most of the prospecting has been done by driving the tunnels with cross-drifts extended off to either side. It was found impossible to keep the mineralized zone next to the roof in the tunnels and cross-drifts for considerable distances due to the upward or downward slope of the beds. Raises were driven at intervals to cross the ore zone and also winzes were sunk occasionally when the slate dipped below the drifts. About 400 feet east of the new tunnel and downstream, a tunnel is driven in a southerly direction for 50 feet. A winze is sunk from there to a depth of 10 feet and a drift driven 22 feet to where it encountered a fault. 200 feet

southeast of this tunnel is a short tunnel at an elevation of 2,504 feet, 55 feet in length, driven in a southwesterly direction. A winze is sunk from the face, the depth of which is not known. About 1, 250 feet east of the new tunnel, on the south side of the creek, at an elevation of 2,450 feet, on the Irene claim, a tunnel has been driven S. 24° W. for 25 feet. This tunnel is said to show some values. A drill hole sunk from just below the portal of the tunnel to a depth of 17 feet is said to show an average of \$4.80 in gold and silver.

The mineralization consists of quartz, arsenopyrite, bismuthinite, pyrite, gold and silver. Some native bismuth has been noted but was not observed by the writer. The mineralization extends from the quartzite roof downward with the best values in gold and silver apparently close to the roof. The arsenopyrite and bismuthinite although associated with the gold generally, do not always accompany the best gold values. One sample taken by the writer assayed: gold 4.02 oz., silver 0.20 oz., arsenic 0.85%, bismuth 0.32%. Another sample returned: gold 26.80 oz., silver 1 oz., arsenic 21.25%, bismuth 5.52%; while a third sample showed: gold 0.56 oz., silver 0.10 oz., arsenic 19.75%, and bismuth 3.37%. These indicate little close relationship between the gold, arsenopyrite, and bismuthinite and a probability that careful metallurgy will be able to separate the gold from the sulphides without cyanidation, or having to ship a concentrate. The property is in a very accessible location for operating. Excellent timber is available about 6 miles distant on California Creek. A number of coal seams are located on California and Bonanza Creeks. One seam outcropping in a side gulch on the east side of California Creek, has been opened up by the lessees of the Liberty Bell property. This seam showing 17 feet in thickness, is described by Martin: "Exposure No. 30. In the same gulch at an altitude of 1,985 feet is a coal bed 17 feet thick, which strikes N. 60° E. and dips 15° S." Above this seam are two other seams described by Martin: "Exposure No. 28. In a gulch in the NE $\frac{1}{4}$ sec 27, at an altitude of 2,045 feet, is a coal bed 6 feet thick, with a variable clay stringer. This bed strikes N. 65° E. and dips 45° S." "Exposure No. 29. In the same gulch at an altitude of 2,020 feet a coal bed 8 feet thick strikes N. 85° W. and dips 40° S. (?)"

Above copy made in the Territorial Department of Mines Juneau Office on October 3, 1957

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Gold Lodes Of The Nenana District.

Introduction.

The purpose of this report is to describe the occurrence of lode gold in that section north of the Alaska Range, which has been previously described as the western part of the Bonnifield Region^a and as a part of the Nenana Coal Field^b. Neither of these publications cover the gold lode deposits described in this report. Data for this report were obtained during a number of visits to the region in 1924, 1925, 1926, 1927, and in February 1931.

Geography.

The Nenana district covers the area in the northern foothills of the Alaska Range, between the range and the Tanana Valley and extending both east and west of the Nenana River. It is a region of moderate relief, ranging in elevation from 1,000 feet to over 4,000 feet in elevation. The hills generally trend in an east-west direction with long smooth rounded crests. The drainage is north to the Tanana Valley and east and west to the Nenana River. The principal north flowing streams, named from west to east, are the Nenana River, Totatlanika, Tatlanika, and Gold King creeks and Wood River. The west flowing streams are Lignite, Healy, and Moody creeks. The Nenana River the largest stream of the region, heads on the south side of the Alaska Range, cutting a broad pass through the range and foothills to the Tanana Valley. It heads in glaciers, as do a number of its tributaries, cutting a deep narrow canyon through the range followed by a characteristic glacial gravel filled flat valley floor on its course through the region here described. The low pass formed by this river is utilized by the Alaska Railroad in crossing the Alaska Range.

Wood River is the only other stream in this region, which is fed from glaciers. The other streams are clear water confined to narrow

a. The Bonnifield Region, Stephen R. Capps, U. S. G. S. No. 501, 1912.

b. The Nenana Coal Field, G. C. Martin, U. S. G. S. No. 664, 1919

channels except where the streams have cut canyons through the east-west ridges leaving wide basins between.

Climate.

The climate of the Nenana district is continental, characterized by great extremes in temperature of the seasons and by a light precipitation. Records have not been kept in the immediate vicinity but the temperatures are known to be decidedly higher in winter than at a few miles farther north at lower elevations, in the Tanana Valley. Also the annual snowfall is much less than in the lower Interior points. Much of the region is nearly bare of snow most winters, with an accumulation of a foot or more in the valleys. The summer seasons are characterized by many clear days with moderate temperatures.

Timber.

Spruce timber is found along most of the wider valleys to altitudes of slightly over 2,000 feet, with the best timber considerably lower. Trees up to 24 inches in diameter at the base suitable for saw logs, are found in the basins of Rex, Bonanza, Tatlanika, Totatlanika, Gold King, Bonnielfield creeks and on Nenana and Wood rivers. A large portion of the timber along the east side of Nenana Valley has been burned off. There would not be over a few miles of haul to secure mining timbers for any section of the region.

Game.

The region is one fairly plentiful in game for the prospector. Mountain Sheep are found in the higher mountains a few miles to the south. Caribou often are found in the higher valleys in summer and along the barer ridges in winter. Moose are found in the lower valleys in winter and summer. Black bear are found in the region while the glacier variety of the grizzly is found farther south in the higher mountains. Greyling and trout are abundant in the clear streams.

Transportation.

The Alaska railroad serves the district. Ferry Station at mile 371, from Seward, connects with a 12 mile Territorial highway extend-

ing eastwardly up Walker Creek to the heads of Little Moose and Elsie creeks and down into Lva Creek. Lignite at mile 363 is located at the mouth of Lignite Creek. Healy at mile 358 is at the junction of the 4.4 mile spur across Nenana River and up Healy Fork to the Healy River coal mines at Suntrana.

Geology.

The general geology of the district has been described clearly by Capps. The oldest rocks are a series of metamorphosed sediments known as the Birch Creek schist and correlated with the great series of schists of the same name underlying large areas of the Interior. These quartz and mica schists, quartzites, and phyllites greatly altered, folded, and intruded have been assigned provisionally as pre-Ordovician. They are probably underlying the whole district except where intruded by large igneous masses, and are outcropping in the higher areas. They form the high north slope of the Alaska Range.

Overlying these older schists and forming most of the foothills north of the range is a series of quartz-feldspar rocks considerably metamorphosed, known as the Totatlanika schist. These rocks grade from gravel and shale sediments near the base to extrusive volcanics near the top with the two very much intermixed in between. The series is greatly altered and bears considerable resemblance to the older schists except for the predominance of the volcanics, principally rhyolites. These rocks have been assigned by Capps provisionally as Silurian or Devonian age.

The next younger rocks lying unconformably on the Totatlanika schist and in localities directly upon the Birch Creek schist are a series of sandstones, shales, and conglomerates with lignite coal beds. A full description of these lignite coal beds has been given by Martin.

A widespread series of high gravels, sands, and clays is found occupying many of the higher ridges and hills of this region. These sediments at one time undoubtedly covered most of the area but erosion has cut down through, rewashing them until they are completely

removed from a large portion of the district. This unstratified assortment of schist, quartzite, quartz and igneous sands, gravels, and clays are believed to be the source of a considerable portion of the placer gold of the district. They are assigned to upper Tertiary (Miocene or Pliocene).

The Quaternary deposits occupying the stream valleys are till, and present stream sediments. These deposits are unconsolidated and in many places are being reworked as evidenced by the terraces shown along the gravel walls of most of the valleys.

Intruding the Birch Creek schist and in a few localities the Totatlanika schist are granodiorites, diorites, and andesites with smaller dikes of diabase.

Mineral Resources.

Gold Placers.

Placer gold has been found in nearly all of the stream gravels of the region. Many of them have been worked in a small way and the Bonfield region records a production of over 300,000 dollars. Most of these placers have been previously described and will not be covered in this report.

Gold Lodes.

Gold lodes have been described by Capps on Chute Creek a tributary of Wood River from the east and on Kansas Creek tributary of Wood River. The Chute Creek lode is described as " an altered rhyolite porphyry which weathers to conspicuous red and yellow colors and is filled with extremely small cubes of finely disseminated pyrite..... The mineralization was observed to occur in a zone which has a width of over 100 feet, striking nearly north and south, and which has a high dip, so that a large body of pyritic rock is exposed. It is reported that the average values recovered were equal to \$ 5 in free gold to the ton of rock milled, and that assays of the tailings yielded about \$ 4 more."

Daniels Creek. ⁵⁰⁻¹⁻⁸⁹

A sample furnished the writer by Otto Lindfelder, of a vein uncovered on Daniels Creek tributary of Totatlanika Creek, about 6

miles above the mouth of Rex Creek, assayed;

Gold ----- 0.32 oz. per ton.

Silver ----- 0.20 oz. per ton.

This sample was taken from a quartz vein several inches thick showing in the bed of an open cut placer.

Moose Creek. 458-17

Mr. Charles Zilkie on upper Moose Creek has done a small amount of work on a quartz vein outcropping on the south side of the creek. It is said to contain some values in gold and silver.

On Moose Creek about 3 miles above its mouth, a dike of weathered rhyolite cutting the Totatlanika schist was examined by the writer in 1925. This dike showed considerable pyrite mineralization and a sample taken for assay showed;

Gold----- 0.16 oz. per ton.

Silver ----- 0.40 oz. per ton.

The mineralization appears to extend across a width of only a few feet.

About 2 miles upstream from this point and at the lower end of a placer cut, a rib of quartzite schist striking east and dipping to the north, outcrops showing a considerable arsenopyrite mineralization. A sample taken from this outcrop assayed;

Gold -----0.02 oz per ton.

Silver -----0.10 oz. per ton.

Occasional placer silver nuggets have been found in the gravels of Moose Creek.

Eva Creek. 458-53

In July 1915 Peter Swanson and John Montan discovered a body of mineralized schist outcropping on Eva Creek tributary of Elsie Creek and California Creek. The property was optioned to a Spokane group and considerable work was done on it in 1924 and 1925. A 12 mile automobile road was constructed by the Territory, to the property in 1925, but through disagreement over terms, work was stopped on the and it property, remained idle until in 1930 when a lease was taken by Algot

Norberg, Oscar F. Erickson, Justice Johnson and Eror Johnson. The property known as the Liberty Bell Mine consists of the following claims;

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Little Moose Creek. 58-171

At the head of Little Moose Creek near the divide between Little Moose and Walker creeks, Ronald Campbell has 4 claims covering a gold silver mineralization in schist. A number of pits have been dug on several outcrops and one short tunnel 18 feet in length at an elevation of 2,444 feet driven in a direction of N. 70° E. on the east side of the north fork of Little Moose Creek. This tunnel is in a light colored clayey schist (probably an altered rhyolite) dipping 24° SE. and striking N. 25° E. The schist is said to carry fair values in free gold.

Respectfully Submitted,

Earl R. Pilgrim
Earl R. Pilgrim.

March, 10, 1931.

NOTED
MAR 17 1931
J. D. STEWART

Alaska Agricultural College and School of Mines

In Cooperation with
U. S. Bureau of Mines, Department of Commerce

College, Alaska

Feb. 13, 1931.

REPORT OF ASSAY

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

Assay No.	Mark on Sample	OUNCES PER TON		Value Per Ton	PERCENTAGE OF			
		Gold	Silver		Arsenic	Bismuth	Acidity (lbs. CaO per ton)	Iron
01166	No. 1	4.02	0.20	0.65	0.32			
01167	" 2	0.47	0.20					
01168	" 3	1.15	0.20					
01169	" 4	0.30	0.10 <i>soft pyrite.</i>					
01170	" 5 A	26.80	1.00	21.25	5.52	<i>high grade streak.</i>		
01171	" 5 B	0.56	0.10	19.75	3.37	<i>Arsenopyrite picked</i>		
01172	" 7	1.88	0.20					
01173	" 8	1.76	0.20	0.15				
01174	" 9	0.28	0.10					
01175	" 10	0.44	0.20	1.77	0.05	4.4	11.05	
01176	" 11	0.12	1.00 <i>Outcrop on creek bank above cabin.</i>					

Sample #4 was received in the form of coarse sand consisting of about one third pyrite, the balance being mainly quartz. No arsenic or bismuth minerals were found.

Sample #5 consists of about one half arsenopyrite, with considerable bismuth in the form of bismuthinite, the sulphide. The gangue appears to be quartz and schist.

Sample #5 B is similar to #5 A except that the gangue is mainly quartz and the crystals of bismuthinite appear to be larger.

No copper, lead or zinc was found in any of these samples. Native bismuth and native arsenic have been found in similar ores from the same property, but neither were found in these samples.

Acidity as high as 28 lbs. CaO per ton has been found on ore from this property but this was found in an ore containing much more sulphides than sample #10.
4279-81

Assayed by.

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

Total charges for above assays..... Official.

Amount received from sender.....

NOTED

FEB 17 1931

D. STEWART

100-58-53

*To accompany report
on 11th Dec
done*