State Department of Geology and Mineral Industries

1069 State Office Building
Portland 1, Oregon

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STATE DEPT. OF GEOLOGY
& MINERAL INDS.

BAY HORSE MINE (Ag)

Conner Creek District
Baker County

Location: T. 13 S.; R. 45 E.; Sec. 9.

Owner: U. S. Metals Company, Harvey F. Stone, 405 Realty Building, Spokane, Washington.

Area: One patented lode claim.

General: The Bay Horse mine is credited with a small silver production as early as 1891,[1] but its most productive period of operation occurred between 1920 and 1925.

During this period the property was operated by the U. S. Metals Company, under the management of Mr. W. B. Diehl from 1920 to late 1923, and under the management of Mr. Walter Fellows from late 1923 to 1925. Mr. Diehl was one of the original organizers of the company.

The property has been inactive since 1925, and the workings are reported by Gilluly[2] as being inaccessible in 1930. Available information concerning the underground geologic conditions is therefore limited to the reports made by D. C. Livingston, who was consultant to the original operating company from 1920 to 1923.

According to Livingston,[3] silver-bearing tennantite is the sole ore mineral, associated in only a few places with small quantities of other sulphides. The ore occurs in a fractured zone close to the contact between a Permian andesite and a rhyolite flow. It occurs both as an impregnation in the rhyolite and as a replacement in the andesite. The orebody is generally characterized by silicified masses of irregular outline containing numerous seams and veinlets of tennantite.

The general strike of the orebody is reported as N. 70 W. to roughly west, with a dip of 10 feet in a hundred "into the mountain" (south - ?). The maximum width of the orebody as mined in 1922 is reported as between 40 and 50 feet, but no length is given as the westward limit had not then been reached.

The mine was opened by two tunnels, both of which pre-dated the U. S. Metals Company operation. These are located on a very steep hillside, one 130 feet above the other. The original U. S. Metals Company operation was conducted entirely from the upper tunnel which, Livinston states, penetrated the hill a distance of some

800 feet. The latter company is understood to have driven a 1400 foot access tunnel. This was probably an extension of the lower tunnel, but the exact facts as to its location are not currently certain.

Production during the 1920 to 1923 period of operation consisted of mine-run ore which was shipped to the Bunker Hill Smelter in Kellogg, Idaho. This was sometimes sweetened by sorting and sometimes shipped in an "as mined" state. A total of 137 carload shipments were made, according to Mr. Diehl.[4] Those were valued at approximately $127,000 net, after freight and treatment charges.

Four shipments totalling 150 dry tons were also made during this period to the A. S. & R. smelter at Tacoma.

Ore shipments during the 1924 and 1925 period of operation are known to have been made to the Bunker Hill smelter, to the Tacoma smelter, and to the smelter at Sumpter, Baker County, Oregon, with which Mr. Fellows was then affiliated. The shipments on record at the Bunker Hill and Tacoma smelters for this period are listed later in this report, but no record is now available for those made to the Sumpter smelter. It is understood, however, that much of the ore produced at this time was handled at the Sumpter plant.

The available records[5] of shipments to the Bunker Hill and Tacoma smelters are listed in the following tables. These records cover both periods of operations as can be recognized by the shipment dates.

Shipment Record to Bunker Hill Company

Date Received	Lot no.	Dry Tons	Au	Ag	Cu	Pb	Zn	Fe	Insol	S
4/22	1	54.9260		29.0	0.3	0.25	1.2			1.4
5/22	2	43.6285		52.4						
5/22	3	50.4340		34.6	0.3	2.7				
5/22	4	47.4410		36.8						
6/22	5	48.0395		45.0						
6/22	6	42.3400		56.6						
6/22	7	94.9460		35.6						
6/22	8	48.0730		41.9	0.34	1.47				
6/22	9	145.1725		42.0						
6/22	10	42.5260		34.5						
7/22	11	50.3105		33.3						
7/22	12	89.3145		39.2						
7/22	13	89.9695		25.4						
7/22	14	80.6830		26.2						
7/22	15	92.7385		22.5	0.38	1.73				
7/22	16	118.2540		25.9						
7/22	17	38.0220	.010	31.3		3.3	1.8			3.3

Date Received	Lot no.	Dry Tons	Au	Ag	Cu	Pb	Zn	Fe	Insol	S
8/22	18	45.8950		27.8		3.0	1.7			1.8
8/22	19	98.7935		27.3	0.39	2.2	2.0			2.7
8/22	20	101.0740	.003	22.2		1.5	2.6			2.2
8/22	21	93.2820		25.3	0.2	1.3	2.7			3.0
8/22	22	97.6780	.003	29.4	0.55	1.4	2.2			1.8
8/22	23	148.1230		26.2		1.2	1.6			1.6
9/22	24	41.4650		54.7		4.6	0.5			1.8
9/22	25	157.3860	.006	24.5	0.47	0.7	1.0			
9/22	26	109.1985		47.2		1.4	1.4			1.6
10/22	27	142.9450	26.5	26.5		2.2	1.0			1.6
10/22	28	160.7410		27.5		1.1				
10/22	29	88.3340		33.2		2.5	2.1			1.8
10/22	30	148.1360		30.7	0.21	6.3	0.3			1.9
10/22	31	105.9415		48.9		1.3	2.0			1.6
11/22	32	105.5545		34.7	0.25	2.2				
11/22	33	112.6815		25.5		2.7	2.2			
11/22	34	143.3510		22.2		3.0				
11/22	35	114.4575		19.9		3.9	1.0			
11/22	36	105.9665		28.4		2.0	1.6			
12/22	37	213.8925		23.0		2.2	2.1			1.4
12/22	38	166.9140		23.9						
1/23	39	56.6125		19.2		3.0	3.1			
1/23	40	171.9580		15.1						
1/23	41	117.5935		20.7		1.2				
1/23	42	60.0270		14.8		1.3				
1/23	43	61.1255		10.7		1.1				
2/23	44	108.3460		12.3		1.0				
2/23	45	53.7505		17.1						
3/23	46	51.7860		17.5		1.5				
3/23	47	53.4650		18.4		2.1				
3/23	48	54.8880		15.0		1.3				
4/23	49	57.8890		22.4		1.0				
5/23	50	52.6500		22.2		0.5				
5/23	51	49.1810		24.6		1.5				
3/24	52	59.2790		23.5			1.2	4.3	82.8	1.8
1/25	53	56.4600		53.0			1.9	3.3	79.8	1.8
7/25	54	58.3060		60.5	0.45	1.6	3.2	2.9	75.0	2.3
10/25	55	54.2025		42.3			1.8	3.1	77.6	1.6

Shipment Record to Tacoma Smelter

Date Received	Dry Tons	Oz/Ton Au	Oz/Ton Ag	Cu%	Shipper
6/20	30	-	33.35	1.48	B. H. Miller
8/20	37	-	36.73	1.19	" "
12/20	30	-	36.57	0.4	" "
4/22	53	-	37.75	Tr	U. S. Metals Company
4/24	53	-	24.75	1.02	Sumpter Valley Smelter Company

Report by: N. S. Wagner, January 9, 1957.

Informants:
1. Lindgren: Gold Belt of the Blue Mts of Oregon, USGS 22nd Annual Report Vol. II, 1901.
2. Gilluly: Some Mining Districts of Eastern Oregon, USGS Bull. 846A, 1933.
3. Livingston: A Geologic Reconnaissance of the Mineral and Cuddy Mountain Mineral District, Washington and Adams Counties, Idaho, Idaho Bureau Mines, Pamphlet 13, 1925.
4. Diehl, W. B.: Personal Communication.
5. Courtesy, Bunker Hill Company and American Smelting & Refining Company.

8/50

Bay Horse Mine — NAME

OLD NAMES

Gold - Silver - Copper — PRINCIPAL ORE

MINOR MINERALS

13S T | 45E R | 9 S½ S

Baker ..... COUNTY

Connor Creek ..... AREA

about 2200 ..... ELEVATION

On Robinette road 7 miles below Huntington ..... ROAD OR HIGHWAY

On UP Branch ..... DISTANCE TO SHIPPING POINT

PRESENT LEGAL OWNER (S) ....U.S. Metals Co.....

c/o Harvey F. Stone .....

.....

.....

OPERATOR .....

Name of claims	Area	Pat.	Unpat.
1 claim		x	
3 claims			x

PUBLISHED REFERENCES

Lindgren 01:753
Gilluly Reed and Parks 33:52 (U.S.G.S. Bull 846-A)
Oregon Metal Mines Handbook 14-A page 22

MISCELLANEOUS RECORDS

Geologic Map-about 1923-Livingstone
Report " " "
Smelter receipts 1920-23 period-include 137 carlots to Bunker Hill
All of the above in possession of Mr. W.B. Diehl, Rte.3 Box 336; Tacoma, Washington

Address Portland, Oregon.....

405 Realty Bldg.; Spokane, 8, Washington.....

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Name of claims	Area	Pat.	Unpat.

EQUIPMENT ON PROPERTY

MI-21

DEPARTMENTAL RECORDS on file in	P'land	G.P.	Baker
REPORTS			
The Bay Horse Mine, Confidential report by N.S.W. 1/15/45	x	x	x
Statement regarding sampling results--John Arthur *3/10/45			x
Geology and Ore-Deposits-Bay Horse Mine-D.C. Livingstone 1/6/22	x		x
Preliminary report on Bay Horse Mine-Carl N. Anderson, M.E. 4/24/23	x		x
Informal report on Bay Horse Mine in letter written by Walter Fellows, M.E.-2/25/23 to Mr. J.P. Winter			x
"Geology of Part of the Ouse Ferry Quad" by Jason Spiller U.of O. 1958 MS.	x		
SHIPMENT AND ASSAY RECORDS			
Bunker Hill & Tacoma Smelter Shipments Records 1920-1925			x
MAPS			

THE BAY HORSE MINE

CONNOR CREEK DISTRICT:

Prescott--6/1/37--Just west of the Snake river about 7 miles below Huntington, the nearest town. It was opened up many years ago and was a regular shipper from 1920 to 1925 to smelter at Tacoma. While idle at present it is known to contain reserves of good silver and copper ore. Owner is the U. S. Metals Company, Portland, Oregon.

Land directly upon the Riblinette branch of Oregon Short Line.

Mine developed by two tunnels 130 ft apart in elevation. Most of the work was done on the upper one, and shipments made from it. The property has been idle for several years.

BAY HORSE MINE CONNOR CR. BAKER

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GEOLOGY AND ORE DEPOSITS OF THE BAY HORSE MINE

by D. C. Livingston

As the location, etc. of this mine is so well known repetition of this would be useless, and the idea of this write-up is to describe the geology, and occurrence of the ore as nearly as possible, in a non-technical manner. In order to understand the manner in which the ore occurs, a brief account of the many geological features and rocks of the district is necessary.

GENERAL GEOLOGY

The rocks of the district consists of four main types, and they will be described briefly in the order of the relative ages, the oldest being described first, and the youngest last. The oldest rock is known as an andesite breccia or tuff, - that is, it is a rock which is made up almost entirely of fragments and volcanic ash which were ejected from a volcano, a good many million years ago. This ash and fragmental material hardened into a somewhat purplish colored rock which shows the fragments, somewhat rounded in places, and also the ash which is now a hard and solidified material. The surface which was formed by the erosion of this rock was afterwards covered by an outpouring of a light colored lava, which for want of a better name has been called rhyolite. This light colored and somewhat iron-stained lava covered and filled in the irregularities of the andesite, ahd has at the present time an extremely irregular and wavy contact with the andesite below it. The openings up which this rhyolite came have not been disclosed so far as can be seen, either on the surface or in the mine. A long time after the rhyolite was poured out, the country was depressed below the level of the sea, and a series of what are known as sedimentary rocks were laid down by means of the erosive action of the weather and the sorting action of water upon the top of the rhyolite and andesite. The oldest of these rocks whihh is the one lying immediately above the andesite and rhyolite, is what is known as a schist. It is made up of fragments which were derived from these older rocks, and at one time was a gravel or conglomerate. Very deep and heavy movements of the earth's crust have altered this gravel or conglomerate to what is known as a schist. Above this schist lie beds of limestone, gypsum and slate. The contact between these rocks and the old volcanic rocks below occurs along the trail between the mine and the bunkhouse and runs diagonally across the property. The top of the hill above the mine is completely covered with these sedimentary rocks, and the old volcanics are hidden from view.

The fourth type of rock consists of a series of dikes of basalt or diabase. That is to say, fissures in the older rocks have been filled with igneous material from below and this igneous or volcanic material hardened in these fissures. These dikes extend through all the different rocks and occur in a somewhat irregular manner, both on the surface and in the mine. They are undoubtedly channels up which the great outpourings of lava came which are seen so widely displayed further down the river. At this particular place the lava has been entirely removed by erosion.

OCCURRENCE OF THE ORE

The ore bodies lie in what might be called a lode. That is, they occur

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along a zone or belt where the earth has been subjected to movement, i.e., folding and fracturing. The rocks along this zone are full of slips and fracture lines where this movement has taken place. This line of movement has been the channel up which deep seated and probably hot waters emanating from some igneous mass below, have travelled toward the surface. This lode or line of fracturing runs about East and West through the property, across the Snake River, and extends through the andesites and upinto the rhyolites. Whether it extends upwards into the overlying schists and limestone has not as yet been determined.

The ore at the Bay Horse does not occur in a simple fissure vein but is of the type known to geologists as a replacement deposit. Certain heated waters from the earth's interior in working their way upwards along very small fissures or cracks, have altered the surrounding rock by means of chemical reactions to a solidified mass of material, and have also brought in certain sulphide minerals such as galena, sphalterite, and silver-bearing tetrahedrite. In other words, the ore does not occur along a definite fissure like certain quartz veins which are well known in the mining countries, but as masses of altered country rock, the alteration being done by means of solutions, and the change which has taken place in the rock being chiefly the addition of silica or quartz and the removal of certain other material, The mode of occurrence of the ore on the surface is not in all cases clear, as there is a considerable amount of rock slide, mine dump, etc., along the direction where the mineralization would be most likely to occur.

The upward moving solutions which carried the valuable metals, following easy paths through the rocks and these paths or channels were probably fissures which were formed by movements of the rocks and are known as faults. Wherever these solutions were checked or dammed back in their course, there was a better opportunity for chemical reaction, replacement of the country rock, and deposition of the valuable sulphide minerals. The checking of these solutions was brought about in the Bay Horse mine in several different ways. One of the places where this took place was along the line of contact between the andesite and the rhyolite flows. When the solutions reached this point they reacted with the rocks along this contact replacing them and depositing the sulphide minerals. At this contact therefore ore occurs in more or less flat or irregular dipping masses which usually lie on top of a reddish clay above the andesite. Considerable movement has taken place since the ore was deposited and has resulted in faulting with duplication of the ore beds in certain places.

The main ore deposition however has taken place along one of the diabase or basaltic dikes. This body of ore is probably 40 to 50 feet wide and of undetermined length has been opened up in Junction Stope to a depth of about 30 feet below the tunnel level. The diabase dike forms the north wall of the ore body which extends roughly east and west. There is no reason why ore should not be found on the other side of the dike at this point as it does occur in such a manner near the present face of one of the tunnels further west.

The development which has been carried on by Mr. Miller since my visit to the mine last summer has cleared up a number of points which were somewhat in doubt then. My opinion of the future of the property and the down-

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ward extension of the ore is far stronger than it was at that time, and I can see no reason why ore should not be encountered in the lower tunnel if this tunnel is extended into the ore zone. The Bay Horse is a somewhat unusual type of deposit and some of the ideas outlined here may be proven wrong by more extensive development, but I believe that in general the conditions are as stated above and might be summarized as follows:

(1) There is a well defined zone of movement along which fissuring, fracturing and folding of the rocks has taken place. This runs approximately east and west through the Bay Horse property and across the river.

(2) In certain places along this zone silver bearing solutions have replaced the country rock forming workable bodies of ore.

(3) The places where the deposition has occurred are due to certain barriers like dikes, faults or contacts of two different rocks and the main concentration of the ore has been localized at places of this kind.

(signed) D. C. Livingston

January 6th, 1923