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GEOLOGISTS REPORT

WESTAIRS MINES LIMITED

Revelstoke
B.C.

by

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1964

TABLE OF CONTENTS

	<u>PAGE</u>
SUMMARY	i
CONCLUSIONS and RECOMMENDATIONS	ii
INTRODUCTION	1
THE PROPERTY	1
A. Location	1
B. Accessibility	2
C. Property Title	2
D. History	2
E. Natural Resources	3
GEOLOGY	4
A. Regional Geology	4
B. Property Geology	4
MINERALIZATION	5
A. Sulphide Zones	5
B. Depositional Controls	7
C. Sampling and Tenor	7
POTENTIAL OUTLOOK OF THE ROSEBERRY MOUNTAIN DEPOSITS	9
A. The Property	9
B. Adjoining Prospects	10
PROPOSED EXPLORATION and ESTIMATED COSTS	11
ACKNOWLEDGEMENTS	13
DECLARATION	

ILLUSTRATIONS

PLATE No. 1	LOCATION PLAN
PLATE No. 2	TOPOGRAPHIC PLAN
PLATE No. 3	PROPERTY PLAN
PLATE No. 4	REGIONAL GEOLOGY
PLATE No. 5	PROPERTY GEOLOGY
PLATE No. 6	GEOLOGY OF WORKINGS - A & E GROUP
PLATE No. 7	DIAGRAMATIC SECTION ILLUSTRATING STRUCTURAL CONTROL OF MINERALIZATION
PLATE No. 8	ASSAY PLAN
PLATE No. 9	PROPOSED UNDERGROUND EXPLORATION

WESTAIRS MINES LIMITED
Revelstoke
B.C.

SUMMARY

The Property of Westairs Mines Limited is located within the Revelstoke Mining Division, British Columbia, in an area, locally known as, the Big Bend. The original group of eight unpatented claims, identified since 1900 as the A and E Group, were purchased from F. Beruschi of Revelstoke, in 1963. Subsequently, the group was enlarged to 39 claims and incorporated as Westairs Mines Limited.

The Big Bend Highway follows the Columbia River northward from Revelstoke. From Mile 21 on this Highway, a 10 mile trail follows Carnes Creek and its tributaries to the old workings on the Property. Helicopter transportation is favored today to conserve time and energy. A road following the approximate route of the trail is economically feasible.

The core of the Property lies on the north-easterly slope of Roseberry Mountain. The old workings and exposures are located in and around a glacial cirque at an average elevation of 6400 feet. Water timber, sand and gravel are abundant on or adjacent to the Property. Hydro power potential is estimated sufficient for medium size production requirements.

The Big Bend is considered, generally, as being the northerly extension and termination of the productive Slocan-Lardeau silver District. The 'Bend' was of interest, initially, for its placer gold, followed shortly by lode prospecting for gold, silver and lead. One of the better placer creeks was Carnes which cuts through the Westairs mineral belt. Roseberry Mountain, on which Westairs is located, was the most active lode 'mining' area in the Bend during the period of 1897 and 1900. It has continued to offer considerable attraction to mining companies down through the years. Work on the A and E Group was limited to several cuts and two adits excavated into its mineralization.

The regional and Property geology are similar. The Columbia River traces a regional 'U' which outlines a major, south-easterly plunging syncline. The core is limestone. The underlying flanks are interbedded limestones, schists and quartzites. The Property overlies part of this cross-section. Regional strike faults following an average azimuth of 335° and dipping north-easterly, deform the incompetent schists along their contacts with limestones. The faulting extends the length of the syncline and was active across a two mile width. The Property and Roseberry Mountain lie within this belt of activity. Massive to disseminated arsenical sulphide zones of lead and zinc are intermittently distributed along two zones of movement, and possibly a third. One of the two principal zones has been traced for 11,000 feet; the other for 1650 feet. All significant structure on the property - faulting, bedding and contacts - follow the common regional attitude of 335° azimuth and dip an average 55° NE. Two major drag folds appear to locally deform the structural trend and may have served as traps for the mineralization. Adjacent to the north boundary of the Property outcrops an intrusive of porphyritic granite which is believed to have played a ~~xxx~~ hydrothermal role during the period of mineralization

Summary con't.

Fine grained, massive mixtures of galena, sphalerite, pyrite and arseno pyrite have been observed to reach a maximum width of nine feet and are estimated to average four feet. Haloes of the same sulphides disseminate laterally to provide a maximum overallwidth of 35 feet. Sampling of the limited exposed and accessible sulphides in both zones have provided the arithmetical average: 0.18 oz Au; 6.96 oz Ag; 5.2% Pb; 10.31% Zn or a total 'in the ground' value of approximately \$ 56. The vertical interval covered by sampling was 570 feet. The silver-lead ratio is approximately 1:1. With the presence of steel galena and/or gray copper, the writer has been shown assays as high as 198 oz Ag per ton. The gold is intimately associated with the arsenopyrite. Its recovery may not be economical.

The strong structure, its tracability at higher elevations, the indicated frequency of shoots of massive sulphides, the preliminary outlook of tenor and speculative tonnage, all suggest that the property of Weststairs Mines Limited has major potential. Detrimental to the Property are the arsenical nature of the mineralization, and, the rugged terrain with its short season climate.

The topographic enviorment in relationship to the attitude of the mineralized zones is such, that, an underground exploratory entry may be executed at creek elevation, 2000 feet below the present showings. Part of the 1964 program should be directed toward establishing the existance of one or more of the zones at this low elevation. Diamond drilling at the elevation of the workings would be costly and probably yielding poor core recovery. A program of surface mapping and an underground drivage along the massive sulphides, terminated with comparatively low-costx undeground drilling will provide the information sought for longerrange planning.

CONCLUSIONS and RECOMMENDATIONS

The following conclusions and recommendations are based upon, personal examinations of the Property and surrounding country, a study of available information concerning the Big Bend Area and its mineral deposits and four years of professional mining and exploration experience in the general area.

A. Conclusions

It is concluded, now, that:

1. The Weststairs Mines Limited Property overlies a well mineralized section of a series of strike faults.
2. The Property contains two Zones of economic interest, the A and B. These are indicated to be of major dimensions, consisting, each, of a series of massive, gold-silver bearing, lead-zinc, arsenical sulphidex lenses, accompanied by haloes of disseminated mineralization.
3. The B Zone follows the faulted contact between phyllite and limestone beds for a distance of, at least, 11,000 feet, and, the

Conclusions con't

- intermittent mineralization is known to extend through a vertical interval of at least 600 feet.
4. The A Zone is a subsidiary structure of the B Zone, and, describes a cymoid-like loop into the competent hanging wall limestone. The A Zone's mineralization is distributed along a strike length of at least 1650 feet and was observed through a vertical interval of 570 feet.
 5. The two Zones have parallel attitudes, averaging 335° azimuth and dipping 55° NE, except at the locations of their convergence.
 6. The average combined metal tenor of the mineralization in the two zones is indicated to be approximately \$ 56 per ton.
 7. The sulphides will require fine grinding to liberate the mineral constituents. The tenor of the mineralized Zones should be calculated on the basis of its contained lead, zinc and silver, until it can be determined if the gold can be economically recovered from the arsenopyrite.
 8. The B Zone will contain several more lenses of massive arsenical sulphides along its 11,000 feet of strike length, particularly to the south-east.
 9. There is evidence to suspect that the B Zone will intersect Burke Creek at the desirable elevation of 4000 feet, and that disseminated to massive sulphides will be present. Such a discovery will extend the prospecting season from two months at the higher elevations to five months at the lower elevation.
 10. The rugged terrain, the short season, the extensive cover by talus and overburden and the resulting high costs of surface diamond drilling must suggest probing by underground exploratory openings as soon as the risk ratio will permit.

B. Recommendations

The report refers, frequently, to the physical and climatic barriers of the area. There can be no doubt that these drawbacks played an important role in the slow development of the Bg Bend. With the techniques and equipment available today, these problems are no longer serious, but ~~wikk~~ would become important considerations of the economics of an operation.

The known areas of exposed mineralization are at the higher elevations where overburden is light, but accessibility^{here} becomes a problem for detailed sampling and mapping. Above timberline, the assured snow free season is two months. Frost heaving and deep talus make exploration assessment by diamond drilling extremely expensive. The alternative is an underground approach.

Recommendations con't.

It is recommended that:

1. A two year evaluation program be adopted by Weststairs Mines Limited.
2. The program for 1964 be limited to the climatic prospecting season of five months and executed as follows:
 - (a) Establish a base camp at timberline near the old workings.
 - (b) Service this camp and work crews by helicopter under charter.
 - (c) Collar a 500 foot exploratory heading (5 x 6.5 ft.) in the lowest open cut on the A Zone (el. 6100'). The objectives of this slusher-mucked advance should be: (1) to determine the chemical and physical behavior of the massive sulphide shoots; (2) to determine the average tenor at this elevation; (3) to provide accessibility for underground drilling into other targets of interest; (4) to determine water and ground conditions. The heading should be completed by September 1.
 - (d) Drill 2000 feet of exploratory holes from the adit level into the B Zone as well as establish vertical continuity on the A Zone.
 - (e) Geologically map the property on the prepared topographic plans. The scale of this reconnaissance exploration is to be 1" to 400'. All known mineralized areas are to be mapped on a detail scale of 1" to 40'. Prospect along the strike of the B Zone for the purpose of locating other sulphide deposits. Make every effort to trace, by prospecting and, geophysical methods, if necessary, the down slope continuation of the B Zone to Burke Creek.
3. Funds, totalling a maximum of \$130,000 should be provided for the 1964 program.
4. The continued evaluation of the Property be accepted as requiring a one year underground exploration program, consisting of, drifting, cross-cutting, raising and diamond drilling, all, of which, is predicated upon the encouragement and precipitated risk ratio from the 1964 assessment. The entry to this work should be established as low on the slope of Roseberry mountain as possible to take advantage of accessibility, longer, favorable climatic conditions and production backs.
5. The completion of this final exploration program should then place the Property in position for decision of advancement toward a production target. The high prevailing value of silver, and, the upward price trends for both lead and zinc suggest expediency with the evaluation of the Property.

February 22, 1964

K.G. Hope
Geological Engineer

(DRAFT ONLY)

GEOLOGIST'S REPORT

WESTAIRS MINES LIMITED

Revelstoke,
B.C.

INTRODUCTION

The purpose of this report is to outline the results of certain examinations made upon this Property and to recommend work programs to further evaluate the mineral claims of Westairs Mines Limited, Revelstoke Mining Division, B.C. The examinations were made under commission from Mr. I.C. Stairs, Bathurst, N.B. prior to the incorporation of the Company.

A preliminary investigation was completed in October, 1962, by Dr. C.G. Cheriton, consulting geologist, Bathurst, N.B.. The purpose of this examination was to determine the advisability of acquiring, under option, a parcel of the present property, known then as the A and E Group. The option was recommended and the property was optioned. An assessment of the Property was undertaken during the period of August 5 to 15, 1963, by the writer, who was assisted by two prospectors, Harris Hanson, Kirland Lake, Ontario and Joseph Fieneler, Revelstoke, B.C. Subsequently, between September 14 and 17, the writer, in company with Mr. Stairs, returned to the property for the purposes of further evaluation and reconnaissance exploration of the neighboring terrain. It became the recommendation of the writer to exercise the option and the purchase was completed in December, 1963. From January 31 to February 5, 1964, the writer examined all available records of mining and prospecting activity in the area through library services in Revelstoke, Vancouver and Victoria.

The report is based, primarily, upon personal examination of the Westairs claims and adjoining property. Acknowledgement is made, here, for the liberal use of information contained in the Annual Reports of the British Columbia Department of Mines, H.C. Gunning's Summary Report for 1928 and Dr. Cheriton's report to Mr. Stairs. The optioner of the A and E Group, Mr. F. Beruschi of Revelstoke and prospector, Mr. J. Fieneler, also of Revelstoke, volunteered informative background ~~information~~ comments.

THE PROPERTY

A. Location

Twenty-two air miles almost due north of Revelstoke lies the summit of Roseberry Mountain. The discovery of high grade silver-lead-zinc sulphides was made on the north-east slope of the mountain, below the summit and this point is the core of the Westairs Property, which extends from the floor of Burke's Creek, south-easterly, over the summit and mid-way down the south-east slope of the mountain. The Property

Location con't.

lies approximately on the intersection of 51° 18' north latitude and 118° 08' west longitude. The vertical range covered by the claims is from ~~3300~~⁴⁰⁰⁰ feet to 7800 feet. PLATE No. 1 locates the Property with reference to Revelstoke.

B. Accessibility

The Big Bend Highway, a first class gravel road, follows the Columbia northward from Revelstoke. At Mile 21 on this Highway, a trail follows the north banks of Carnes Creek and its tributaries, Kelly and Burke Creeks, in that order. Eight miles of trail places one at the base of the Property on Burke Creek. Two miles of ascending switch-back trail terminate at the old A and E cabin, just inside timberline and at 5750 feet elevation. The trail is infrequently used today in favor of helicopter transportation, which shortens the travelling time from 12 hours to 30 minutes and spares exhaustion. PLATE No. 2 outlines the topography and identifies the trail.

A road, from elevation 1700 feet on the Highway, to the core of the Property, is economically feasible. Such a road would be of interest to the B.C. Forestry Service and to the Companies holding forest management licences in the area. Financial assistance for roads leading to the development of new natural resources is a policy of the present British Columbia Government.

C. Property Title

The original A and E Group of eight unpatented mining claims was purchased in December, 1963, from Mr. F. Beruschi, Revelstoke, B.C., by Mr. I.C. Stairs, Bathurst, N.B. In the months of August and September of that year, a large, adjoining block of claims were staked for Mr. Stairs. Following the completion of purchase of the A and E Group, 31 claims were added to the original eight to provide the newly incorporated Company, Weststairs Mines Limited, with 39 claims.

The original eight claims are recorded under numbers 4377 to 4382 inclusive and 3531, 3532. Assessment work is due upon these claims before August 24 for the former and July 23, 1964 for the latter. The following 31 claims are held in good standing until August 26, 1964: 4588-4593, inclusive; 4632-4636, inclusive; 4664-4671, inclusive; 4776-4783, inclusive; 4788-4791, inclusive.

D. History

At least twenty silver-lead properties in the Big Bend area were 'producers' by the 'turn of the Century' standards. The transportation of hand-cobbed ore was accomplished by 'raw-hiding' from the mine to the Columbia River, and then barged to railhead at Revelstoke for shipment to a smelter. Prior to the lode mining, well in excess of one million dollars of placer gold was won from certain creeks which cross-cut the 'Bend's' big mineralized belt. One of these streams was Carnes Creek. Interest and activity in the Big Bend area is increasing

History continued

with the current upward price trends of lead and zinc, and, the high prevailing value of silver. Most of the activity is being concentrated around the old prospects which contain gold and silver along with the base metals.

The early history of the Big Bend's active days is sketchy. Lode prospecting followed several years of successful placer operations and was first recorded in 1895. The Annual Report of the B.C. Department of Mines for 1933 provides the most comprehensive information. Much of this Report was drawn from the section "Geology and Mineral Deposits of the Big Bend Map Area" contained in H.C. Gunning's Summary Report for 1928. In summary, these reports stated that the British financed, Carnes Creek Consolidated Mining Company Limited undertook active development of the Roseberry Mountain and adjoining J and L Group deposits between the years 1897 and 1900. Gold was the principal attraction, followed by lead and silver. Zinc commanded a smelting penalty at that time. The venture died for an unstated reason.

At some later date, the A and E Group was acquired by two well known prospectors, Andrew Kitson and Edward McBain and after whom, the Group received its name. They continued to work the Property until their deaths. Their heirs released the Group to F. Beruschi of Revelstoke, for disposal. In 1962, I.C. Stairs arranged an option agreement for the purchase of the claims. The option was exercised on December 31, 1963. Thirty-one claims were added to the original group of eight. Weststairs Mines Limited will actively explore the mine-making potential of the Property during 1964 and expects to commence the program on May 15.

E. Natural Resources

Adequate stands of spruce, fir and cedar are available on the lower north-east slope of the Property, to meet the requirements of a mining operation.

Gravity fed domestic and mining water supplies are abundant on the upper slopes of the Property. Any future milling requirements would have to be drawn from lower elevations in the drainage creeks.

One tributary of Burke Creek has its origin in a glacier fed lake high up on the slope of Carnes Peak. Its volume and precipitous change in elevation, indicate that the Creek could support a 2000 hp hydro-electric plant.

Sand and gravel deposits are abundant along the valley floors of Carnes, Kelly and Burke Creeks. These deposits, incidentally, are those that were worked for gold before the turn of the Century.

Snowfall is heavy in the Big Bend area and may, as a guess, be expected to approach ten feet at the higher elevations. Avalanches are frequent during the months April and late March. The prospecting season commences in May and ends in October. During this season, the climate is typical of the B.C. Coastal area.

GEOLOGYA. Regional Geology

North of Revelstoke, the Columbia River traces out a regional 'U' shaped course, which, approximately, outlines a major south-easterly plunging syncline. The core is limestone, locally known as the Badshot Formation of Cambrian Age (?). The underlying and flanking rocks are inter-bedded progressions of limestone, phyllites, sericitic, graphitic and chloritic schists, argillites and quartzites. It is the flank of this syncline that has produced mines and prospects of gold, silver, lead and zinc for a distance of 260 miles, extending across the U.S. Border.

Intruded into the synclinal unit are the Kuskanax and Nelson granite and porphyritic derivatives. Regionally, these igneous rocks are believed, by many, to have been the hydrothermal mineralizers.

The flanks of the syncline are locally contorted and faulted. Large, south-easterly plunging drag folds are known to have exercised a physical control upon ore deposition at one property in the proximity of Weststairs. The Western flank of the syncline has a regional strike of 335° azimuth, dipping north-easterly through a wide range of angles.

The southerly extension of the syncline has contributed much toward the mineral wealth and production of the Province. The deposits in the Big Bend are, either, predominately, silver-lead-zinc complexes, with associated gold, or, copper sulphides. The greater number of discoveries have been made along a belt of interbedded sediments which have been strike faulted across a width of two miles and extending along most of the Western flank. From the air, this long, narrow target is very pronounced, through the visual aids of gossan and scarps.

Geologically, one public contribution concerning the area, has been made. In 1926 and 1927, H.C. Gunning's parties mapped the Western flank of the syncline from Revelstoke to just beyond Downie Creek, 40 miles northward. His map is partially reproduced here and appended as PLATE No. 4.

B. Property Geology

As a preliminary statement, the Property geology does not appear to be complex. Immediately beyond the eastern boundary of the claims, lies the fringe of the synclinal core of Badshot Limestone. Thick horizons of limestone, interbedded with sericite schist and phyllite progress westerly across the property. The limestone remains remarkably uniform. Bands of marble offer the only color contrast. As incompetent beds, the schists and phyllite show ample evidence of extensive punishment. Minute to coarse crenulations, drag folding, slickensides and mullion release many clues of the extensive deformation. Boudins and bulbous veins of quartz, well mineralized with pyrite and arsenopyrite are abundant and appear to follow no definite pattern through their hosts.

Structurally, the beds follow the regional strike of 335° azimuth, dipping through a range of 45 to 75 degrees and averaging 55°.

Property Geology con't.

The writer has no doubt that major strike faults followed the contacts between the limestones and schistose rocks. Helicopter reconnaissance of the area has visually limited the width of fault action to two miles. Roseberry Mountain and its deposits, the Roseberry and the A and E, are located inside this limit. Close examination of this faulting on the Property has disclosed that, not only the contacts suffered movement, but also, the adjacent limestones ^{were} penetrated by cymoid-like loops, which re-join the contacts. As a general observation, ~~both of~~ these 'breaks' contain massive arsenical lead-zinc sulphides, accompanied by haloes of the same disseminated ~~xxx~~ ^{minerals} sulphides. Several minor transverse slips occur along these horizons of movement; however, their apparent movements are negligible. The fractures are frequently occupied by quartz-carbonate bulbous injections and these are mineralized with pyrite and arsenopyrite.

Anticlinal remnants of two large drag folds were observed, both, associated physically with the bands of mineralization. The writer attaches tentative significance to their presence and locations because of the speculation of having served as structural traps for the mineralization.

Within one mile of the northerly boundary of the Property, outcrops a small porphyritic granite stock, identified on Gunning's map as belonging to the Kuskanax intrusives. It is quite probable that this stock played a hydrothermal role during the emplacement of sulphides.

The area surrounding the Property's principal showings of sulphides has been transit-stadia surveyed. The geology was mapped on this base. Large areas of talus and inaccessible ~~areas~~ ^{exposures} of interest were geologically inferred or plotted by binocular observation at close range. The talus slopes at the base of cliffs ^{were} used to determine mineral content as well as rock types. PLATE No. 5 shows the results of this work. The underground picture is contained on PLATE No. 6 and represents the detail of the ~~xxx~~ sulphide emplacements which are described in the following section.

MINERALIZATION

Of principal interest are the fine grained concentrations of galena, sphalerite, pyrite and arsenopyrite. Analyses of character specimens and samples confirm the presence of appreciable gold and silver.

Currently, and, without exception, it is inferred that the strike faults have rendered the incompetent schistose beds and the adjacent limestones permeable to sulphide and precious metal bearing solutions. Sulphide lenses of significant dimensions have been found distributed along the faulted limestone-phyllite contacts and in the looped excursions into the limestone. Somewhat higher overall grade of sulphides and continuity appear to favor the limestone host.

A. Sulphide Zones

The Property has three known zones of mineralization, all, of

Sulphide Zones con't.

which, offer definite promise of base and precious metal potential. These are described in the following paragraphs and are read stratigraphically deeper into the Property and Regional settings.

Zone A Most of the attention in the past, and, currently, has been directed along this belt of sulphides. It was examined by means of five exposures and talus float along a strike length of 1650 feet. The vertical interval covered in this strike length was 570 feet. Talus and precipitous slopes prevented more detailed examinations. The lowest exposure of base metal sulphides is in a partially caved cut into the slope. Its elevation is approximately 6100 feet. Massive arsenical lead-zinc sulphides are exposed intermittently through a vertical interval of 30 feet, with a width range of one to five feet. At an elevation of 6200 feet, an adit-drift followed the same sulphides for a distance of 62 feet, exposing a maximum width of nine feet of massive material. The face contains three feet of this mixture. A four foot band of completely oxidized sulphides follows the hanging wall of the massive sulphides. At an elevation of ~~6350 feet~~, 6500 feet, a test pit, partially caved, was located in the talus. It exposes the same characteristic sulphides, but the width could not be determined. At an elevation of 6650 feet, the steep face of a cliff exposes two parallel bands of sulphides, six feet apart. The limestone between them approaches a skarn and is well impregnated with disseminated mineralization, gradually diminishing in content beyond the two bands, but representing a width of 35 feet. Between the upper and lowest exposures, the talus contains an abundance of ~~float~~ well mineralized float. Across the cirque to the north-west, a fifth exposure was located in talus. Sufficient bedrock was exposed to conclude that these massive sulphides were part of the A. Zone. In summary, the A Zone is estimated to have a strike length of 1650 feet, massive sulphide shoots, having an average width of four feet and extending through a vertical range of 600 feet minimum. Including the disseminated halo, the zone may be expected to widen to 35 feet, and in some locations, contain ~~two parallel deposits of massive sulphides.~~

Zone B A large, lens shaped zone is exposed for approximately 800 feet on the easterly phyllitic wall of the Property's cirque. It is inaccessible, but clearly displays iron staining, gossan and great ramifications of quartz veining. By the use of binoculars and the talus at its base, the exposure is known to contain massive arsenical sulphides, believed concentrated along its contacts with the hanging wall limestone and a large limestone inclusion. Pyrite and arsenopyrite can be found disseminated through, virtually, all of the phyllitic portions of the talus. The lens is exposed for a height of 200 feet. ~~xx~~ The A Zone appears to converge with the B at this lens. To the north-west, across the talus covered floor of the cirque, a barrier cliff partially exposes the same zone. An adit-drift, advanced 131 feet along the contact between the phyllite and limestone, exposes several pods of massive lead-zinc arsenical sulphides for the first 70 feet, and, from there on, the injection is continuous to the face. Pyrite and arsenopyrite are noticeably more abundant and analyses suggest that the gold content is higher than in the A Zone. It is the writer's current opinion, that Zone B lies on the major strike fault extending through the property and that Zone A is on a subsidiary looped fissure into the Hanging wall limestone.

Sulphide Zones con't.

Zone C A north-east striking hog-back ridge skirts parallel to and inside of the Property's westerly boundary. ~~On aerial photographs and~~ On the ground, this ridge was found to contain a strong siliceous and brecciated zone in limestone. Its apparent dip and strike is conformable with the bedding and the other Zones. With reference to Zone B, it lies approximately 1000 feet stratigraphically lower and 1400 feet to the west. Ground investigations were quite limited because of climatic conditions at the time of examination. The zone is exposed for 275 feet and has an average width of 25 feet. Malachite and azurite coat sections of the exposures, which is believed to have resulted from the leaching of gray, threaded metallics (tetrahedrite?). To the north-west and down the flank of strike, an impressive deposit of travertine and limonite is being deposited beneath a major drag fold. It is noteworthy that azurite is sometimes an indicator of the presence of silver with copper, and, as such, becomes a tool of the prospector.

The three Zones are parallel and are each, apparently, conformable with the bedding contacts. The only exception to this statement will be for Zone A at the points where it commences to converge with Zone B. The average dip is 55°. The three Zones are plotted on PLATE No.5. PLATE No.6 shows the geology of the two adits.

B. Depositional Controls

Structurally, the permeability caused by the strike faulting, the limestone-schist contacts and the cymoid-like excursions into the limestone are suggestive channelways for the sulphide bearing solutions. Regionally, drag folding can be observed with some degree of frequency. To the south of the Property, the Mastodon orbodies were structurally controlled by large drags along the limestone-schist contacts. On the Property, two large drag folds have been located, one in the A and the other in the C Zone. Their influence upon the emplacement of the sulphides is unknown; however, they may be regarded suspiciously for the present.

Chemically, the limestone should serve as a good precipitant for lead and zinc from the hydrothermal solutions. Some evidence is present for the replacement of the limestone by the sulphides, particularly in the wider sections; however, most of the emplacements appear to have been fracture fillings.

C. Sampling and Tenor

Chip sampling was carried out under the supervision of the writer on all exposures. No attempt was made to establish a pattern of regularity. The initial purpose of sampling was to determine a preliminary outlook upon the potential of the Property.

Sampling and Tenor Con't

From Zone A, the sampling that was done, returned the following results:

LOCATION	DESCRIPTION	oz. Au	oz. Ag	% Pb	% Zn	% Cu
Lowest Cut	Character S. from dump	0.31	0.22	0.12	2.96	N.A.
Lowest Cut	Chip - 5 ft.	0.26	0.30	0.21	0.92	N.A.
Lowest Cut	Dump grab - Cheriton	0.32	2.48	1.99	3.34	N.A.
No.1 Adit	Chip from back - 9'	0.06	3.22	3.40	9.68	N.A.
No.1 Adit	Chip - face - 6'	0.24	1.65	1.17	0.50	N.A.
No.1 Adit	Character sample - dump	0.12	31.80	22.86	15.55	N.A.
No.1 Adit	Character do	0.12	8.75	11.80	11.46	0.16
No.1 Adit	do	0.07	8.53	12.35	21.90	0.24
No.1 Adit	do	0.13	2.20	1.84	7.54	0.08
No.1 Adit	do	0.06	36.12	7.18	2.93	0.73
Test Pit	Chip	0.02	14.89	14.28	19.51	N.A.
Test Pit	Chip	0.115	12.79	6.25	25.16	N.A.
Test Pit	Chip					
Cliff Ocp.	Chip - 1st Zone - 2'	0.01	6.87	10.04	23.00	N.A.
Cliff Ocp.	Chip - 2nd Zone - 1.8'	0.015	2.02	4.78	8.83	N.A.
Cliff Ocp.	Chip - 2nd Zone - 2.2'	0.19	7.77	6.89	23.55	N.A.
Talus	Series of grab samples	0.01	6.67	9.15	14.63	N.A.
	of massive sulphides	0.015	0.15	0.14	0.24	N.A.
	taken between No.1	0.015	5.94	12.00	18.88	N.A.
	Adit & Cliff outcrop	0.015	3.54	9.90	13.89	N.A.
		0.05	22.10	18.24	12.55	N.A.
		nil	1.53	4.21	11.64	0.24
	Arithmetic Averages	0.10	8.31	7.56	12.31	-
	Dollar Value \$	3.50	21.60 19.65		32.00	
	(Gold @ \$35)		11.63			
	GROSS VALUE IN GROUND					
	TOTAL				\$ 66.78	

From Zone B, the sampling was limited to extractions from the talus and the No.2 Adit

LOCATION	DESCRIPTION	oz. Au	oz. Ag	% Pb	% Zn	% Cu
Cirque Talus	Grab-massive & dissem	0.23	0.86	1.19	7.68	N.A.
Cirque Talus	Grab - selected spec.	0.14	28.99	11.01	7.59	0.60
No.2 Adit	Chip at face - 3'	0.51	0.95	0.63	4.03	N.A.
No.2 Adit	Chip- portal plus 115'	0.01	0.20	0.26	2.44	0.14
No.2 Adit	Chip- Portal plus 100'	0.30	8.10	7.58	13.12	0.17
No.2 Portal	Chip - Cheriton	0.11	6.56	3.51	15.05	N.A.
No.2 Adit	Chip - Cheriton	0.35	0.41	0.03	2.09	N.A.
No.2 Dump	Grab -	0.53	2.89	0.61	10.80	N.A.
No.2 Dump	Grab -	0.18	1.51	0.74	12.12	N.A.
	Arithmetic Average	0.26	5.61	2.84	8.32	-
	Dollar Value \$	9.10	7.85	7.38	21.63	
	TOTAL				\$ 45.96	

Zone C was not sampled

The sampling results provide certain information concerning the

Sampling and Tenor con't.

tenor of the metals and their behavior. With few exceptions, the silver lead ratio remains constant at 1:1. Large discrepancies are attributed to the presence of one of the gray coppers, probably fiebergite. The B Zone probably has a higher gold content because of the greater arsenical concentration. The A Zone appears to carry more silver. Copper is negligible in both Zones. Assays as high as 198.3 oz. in silver have been shown to the writer by the vendor

The sulphides in both Zones are intimately mixed and very fine grained. Steel galena was observed in several specimens. It is estimated that -200 mesh grinding would be necessary to liberate the grains. of the different ~~xxxxxx~~ metallic constituents.

POTENTIAL OUTLOOK OF THE ROSEBERRY MOUNTAIN DEPOSITSA. The Property

Ground exploration and helicopter reconnaissance have traced Zone B for approximately 11,000 feet, commencing at the south-east property boundary and extending north-westerly, parallel to the long axis of the claim group, until it disappears beneath talus and overburden on the north slope of Roseberry Mountain. Approximately, one mile beyond this point of disappearance, on strike, the first rock seen is a porphyritic granite. Ground checks of iron stained and gossaned areas were made during the reconnaissance. One such exposure was found to have been investigated by an old cross-cut, now caved. The dump material contained massive to disseminated arsenical sulphides similar to those seen in the A and B Zones around the cirque.

The writer is of the opinion that this major belt of faulting will divulge the presence of several more promising deposits such as the A and B Zones.

There can be little doubt that the gold is intimately associated with the arsenopyrite. A metallurgical problem of economical recovery arises. However, the arsenopyrite is widespread throughout the 'Bend' and for the present, it must be assumed that the placer gold in the creeks was, in part, if not entirely, derived from this source. Further, arsenopyrite appears to be widespread throughout the large phyllitic lens in the B Zone. With a metallurgical solution, the gold potential of this Zone could become very important.

For the immediate future, the Property's Zones are of ^{potential} economic interest in lead, zinc and silver. The dimensions and indicated tenor of both zones are sufficiently represented to warrant the exploration expenditures recommended in balance with the present risk ratio.

The depth, to which economic concentrations of mineralization will extend, should share the same exploration favor as determining the continuity of shoots and locating others along strike. The usual purpose of depth exploration is to raise the indicated tonnage. In an area of rugged relief, it is natural to think in terms of gravity feed to avoid difficult transportation of muck. Therefore, the lower that an underground approach can be made, the better. Under the early

Property Potential con't.

stages of probing, and if the proper topographic environment is in harmony with the strike and dip of a belt of mineralization, a very advantageous position can possibly be developed before large expenditures are made. The Weststairs' Zones and the physiographic features appear to satisfy this situation. The Zones have a projected strike which crosses Burke Creek at an elevation of approximately 3300 feet. If these Zones can be traced and located at this elevation and shown to carry ore potential, an adit can be driven along the zone which will provide the very desirable 1000 feet of backs. It would initially be advanced as an exploration drift, and later, if warranted, be converted to a main haulageway, for production purposes. Since the average dip does not diverge greatly from the slope of the Mountain on its easterly flank, it may be possible to locate and qualify the this exploration bet by vertical diamond drilling from surface.

B. Adjoining Prospects

The two mile wide belt of mineralization along the Western flank of the Big Bend Syncline has been described, already, as containing many silver-lead-zinc prospects. Roseberry Mountain, which lies within this belt, has certainly received its share of the mineralization. The A and E (Weststairs) contains three ~~xxxx~~ belts of sulphide deposition. A fourth, and apparently major zone lies to the west of Weststairs and is exposed along the western flank of Roseberry Mountain. Two 'mines', the Roseberry and the J and L (Raindor) had been very active in the past and are well regarded prospects today. Their common horizon of mineralization, parallels the Weststairs belts in both strike and dip, and will underlie them at depth. The Roseberry 'Lead' has been described by Gunning and others. A digest of these reports follows:

The Roseberry 'Mine' represents a consolidation of crown granted and unpatented claims. During the interval of 1897 to 1900, underground exploration was active on three levels along the 'break', at intervals of approximately 100 vertical feet. Reports and plans in the hands of the writer indicate that a total of 895 feet of drifting and cross-cutting as well as an unknown amount of shaft sinking was completed by 1900. One drift is described as 600 feet in length and that the advance was entirely in ore. From cross-cutting, a 50 foot wide belt of disseminated mineralization was exposed. The drifting on all levels followed a centrally located five foot core of massive arsenical sulphides of lead and zinc. Gold and silver were the attractions and it must be concluded that the values were sufficient to warrant this extensive hand-steeled development. One report continues with a statement that production was being planned. A mill site had been located on Kelly Creek, below the workings, and, ~~xxxx~~ the ore would be delivered to the mill via an aerial tramway. The vertical interval between the mine portal and mill site is approximately 900 feet.

The mineralization on the J and L Property is similar to that of the Weststairs and Roseberry with the exception of a higher arsenical content, and, consequently, better gold values. The principal development of this 'mine' followed the same years as did the Roseberry. The workings consist of a number of short levels, totaling 355 feet and two winzes which add 245 feet to the development.

Adjoining Prospects continued

The known work was concentrated between the elevations 3475 and 4075 feet. The property has been intermittently active since 1900, but it is not known how much additional work was done. The chief attraction to the property has been its gold content. The average of all assays quoted by the examiner for the B.C. Department of Mines was 0.48 oz/ton, with the highest being 1.14 and the lowest 0.24 oz/ton. A mill test was carried out in Ottawa in 1926 for the principal purpose of determining whether an economical extraction of the gold content could be realized by flotation and cyanide treatment. The results were quite unsatisfactory; however, it is to be wondered if today's technique of preliminary roasting and leaching might not brighten the outlook.

PROPOSED EXPLORATION and ESTIMATED COSTS

The exploration season is relatively short in the Big Bend area. The problem of determining the best methods for continued assessment of the Weststairs Property is controlled by two principal factors; the first being accessibility and the second is the short prospecting season. The objective of the 1964 season should be one of obtaining sufficient information to precipitate the necessary decisions to plan a future year round program. This statement, of course, dictates an underground approach, some of the reasons, for which, are set forth as follows:

- (1) The surface exploration season is limited to an assured five months at lower elevations and to two months ~~at~~ above timberline.
- (2) The rugged terrain does not support the frequent movements of trenching, drilling and short adit crews to evaluate showings.
- (3) The extensive talus slopes, the difficult terrain and the frost heaved, blocky mantle indicate that diamond drilling, from surface, would be very costly and that core recovery would be poor.
- (4) Unless trenching can be continuous, or nearly so, and this is impossible, the dimensions and frequency of potential ore shoots cannot be assured.
- (5) Underground entries, carried as small exploration headings provide permanent records of discoveries and are available for inspection by interested parties.
- (6) Carefully planned entries can be altered, under a production schedule to serve as haulage and service ways.
- (7) Diamond drilling from underground headings can be directed into parallel structures as well as quickly assess the verticality of the drifted shoots. Underground drilling is estimated to cost one-third that of surface drilling on the Weststairs Property and the anticipated recovery would be adequate for the assessment of intersections.
- (8) Advantage can be taken of the greater availability of manpower during the off-season.

Specifically, the Weststairs Property should be evaluated through a minimum two year program. The execution of surface drilling should be limited, in favor of underground coring. The two year evaluation period should be sufficient to diminish the risk ratio to a level at which production would become the target in sight.

Proposed Exploration and Estimated Costs con't.

To accomplish the 1964 assessment program, the writer recommends the establishment of a base camp at timberline near Zones A and B. From here, two, two-man parties would prospect and map the property on a scale of 1" to 400'. This reconnaissance work will serve as a base for detail on ^{interesting} ~~intersecting~~ discoveries. The mapping should commence on June 1 and carried up the slopes as the snow retreats. Simultaneously, a crew would collar an adit-drift on the massive sulphides exposed in the lowest cut on the A Zone and advance southeasterly along strike for a distance of 500 feet. Finally, diamond drill from this underground adit into the B Zone and establish verticality on the A Zone. To expedite this program, it is recommended that a helicopter be taken under charter for the season. Its principal uses ^{would be} ~~are~~ to airlift supplies, men and equipment from Mile 21 on the Big Bend Highway to and from the base camp, and, to service prospecting crews.

The time scheduling for the recommended work is as follows:

- (1) May 15-June 1 Assemble and airlift building materials, supplies and equipment from Mile 21 on the Highway to the base camp. Erect a temporary tent at the Highway depot and employ a watchman.
- (2) June 1 - 7 Construct the base camp. Commence mapping the lower slopes of the property.
- (3) June 7 - 15 Prepare the adit for drivage
- (4) June 15 -Sept.30 Drift 500 feet of the A Zone sulphides
- (5) Sept. 30-Oct.15 Underground diamond drilling.

Under a combined program of surface and underground exploration, the following are estimated costs to satisfactorily complete the ~~XXXXXX~~ the 1964 assessment:

(1) Mining equipment and supplies	\$ 20,300
(2) Camp buildings (framed tents) & equipment	6,000
(3) Engineering supplies charter	1,300
(4) Service - helicopter under split xxx	30,000
(5) Overhead - personnel only	
(a) Mining	21,800
(b) Exploration	18,200
(6) Supplies to be expended	3,200
(7) Sampling and assaying 2000	2,500
(8) Underground diamond drilling - 8000 xfeet	8,000

TOTAL ESTIMATED EXPENDITURE \$ 111,300

It is to be noted that head office and consulting fees are not included with this estimate.

ACKNOWLEDGEMENTS

The writer wishes to acknowledge and thank Messers. Harris Hanson and Joseph Fieneler for their able assistance during the examination periods.

Respectfully submitted,

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Geological Engineer

Hampton, New Brunswick
February 25, 1964



