BALL CREEK MoS_2 PROSPECT

NORTHERN BRITISH COLUMBIA

104 S.E.

Vancouver Office
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G.W. MANNARD

CONTENTS

CONTENTS (Con'td.)

ILLUSTRATIONS

ADDENDA

Appended to this report is a report by W.W. Shaw on the helicopter magnetometer survey done at Ball Creek, together with susceptibility data and interpretive notes by G.W. Mannard.
(Fig. 7 - Magnetic Contours - in pocket).

SUMMARY AND CONCLUSIONS

The Ball Creek MoS_2 Prospect, in the Stikine region of Northern British Columbia, was staked during the 1963 Stikine prospecting program. The prospect lies in altered, intruded and structurally complex Early Mesozoic stratified rocks twelve miles east of the Coast Range batholith. The intrusive rocks most closely connected with the mineralized zone are an arcuate swarm of feldspar porphyry dykes, monzonite in composition. Parts of the mineralized zone are silicified and propylitized.

Molybdenite occurs intimately mixed with other very fine-grained sulphide minerals at three places within a large, weakly pyritized area. Sampling at surface and with the packsack drill indicates that the grade of the surface mineralization averages 0.01% to 0.02% MoS_2. The best chip-channel section is 30 feet of 0.04% MoS_2.

Although the 1963 sampling results are discouraging, the prospect has several features which suggest that higher grade material may exist on the claim group. A small program of detailed prospecting and surface sampling is recommended for 1964.

RECOMMENDATIONS

The following recommendations are discussed more

fully in the final section of this report. They can be carried out most efficiently by a three or four-man party, during August and September, 1964.

(1) Additional surface sampling should be done to the southwest of the Gully Showing, to the east of the South Showing and at the North Showing.

(2) The area along the nose of the ridge, roughly between the North and South Showings, should be carefully prospected, wherever the topography allows.

The cost of implementing the above program will be in the $5,000 to $10,000 range, depending upon the distance from which a helicopter must be chartered to transport the party to and from the showing.

INTRODUCTION

LOCATION AND ACCESS

The Ball Creek MoS_2 Prospect is located in the Stikine region of Northern British Columbia, 50 miles southeast of Telegraph Creek. The showing lies five miles west of the newly-completed section of the Cassiar-Stewart road, at a point 20 miles south of Kinaskan Lake (see location map).

At present, the only means of access is by helicopter, although the area could be reached by packhorse if trails were prepared. The nearest point at which fixed wing aircraft can land is Little Iskut Lake, six miles to the northwest.

HISTORY

The area which includes Ball Creek was first investigated by Southwest Potash Corporation during the Tuya Reconnaissance Program in 1962. A prominent stain zone drew attention to a ridge at the junction of Ball Creek and its northern tributary, and the area was briefly prospected. The rocks in the vicinity were found to be pyritic and silicified, and one of several soil samples taken contained 60 ppm Mo.

The area was selected for more detailed examination

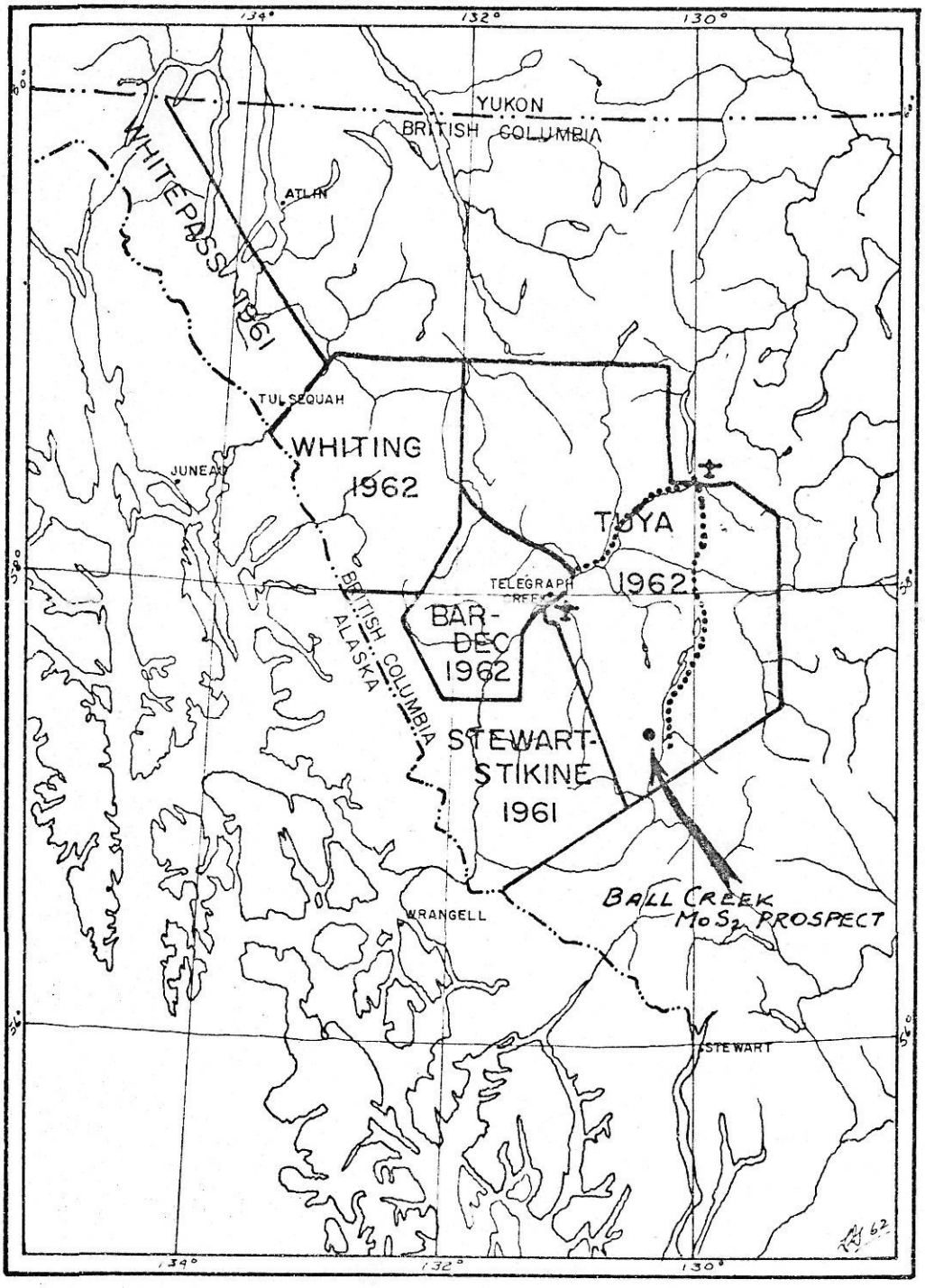
134°
132°
130°
60°
YUKON
BRITISH COLUMBIA
WHITE PASS 1961
ATLIN
TULSEQUAH
JUNEAU
WHITING
1962
TOYA
1962
TELEGRAPH
BAR-
DEC
1962
BRITISH COLUMBIA
ALASKA
STEWART-
STIKINE
1961
BALL CREEK
MoS2 PROSPECT
WRANGELL
STEWART
54°
LOCATION MAP
0
40
80
MILES
Road
Landing field

Figure 1

in 1963, and on June 13, the first occurrence of MoS_2 was found. Trenching, soil sampling, geologic mapping and pack-sack diamond drilling were done around the showing, and adjacent areas were investigated in reconnaissance fashion.

43 claims were staked on August 28 and 30, and recorded at Telegraph Creek September 1, 1963 (see map 6).

Most of the work on the showing was done by H.G. Sherwood, under the close direction of the writer. P.O. Hachey, J.A. Hansuld and R.W. Hutchinson visited the prospect at various times.

PHYSIOGRAPHY

The Ball Creek MoS_2 occurrences lie on both sides and the nose of a ridge which projects into the elbow formed by the junction of Ball Creek and its north branch. The crest of the ridge is smooth, but the steep sides are cut by deep, irregular gullies. The crest of the ridge is at 5500 feet, and its base at 2500 ft. The mineralized areas lie between 3000 and 4000 feet.

Timberline is at 3500 feet. White spruce and balsam up to 18 inches in butt diameter are plentiful on the lower slopes. Permanent water is available in large amounts in Ball Creek and the North Branch. Smaller streams in the gullies on the sides of the ridge derive their water from

melting snow near the crest, and are not reliable sources of supply after the end of July.

The gullies and streambeds in which the only fresh outcrops of mineralized rock occur are not completely free of snow before August.

REGIONAL GEOLOGIC SETTING

The prospect lies in an area of structurally disturbed Early Mesozoic sedimentary and volcanic rocks which separates the Coast Range batholithic complex (12 miles to the west) from the Late Mesozoic Bowser sedimentary basin (3 miles to the east). Several small plutons, aplite to gabbro in composition, outcrop in the vicinity. They are possibly consanguineous with the Coast Range intrusions. Hypabyssal plutons, including felsite, rhyolite and basalt dykes and explosion breccias belong to a much later intrusive episode, and may have been feeders for the Tertiary extrusive and pyroclastic rocks which cap many of the nearby mountains.

The area lies near the northern end of a copper metallogenetic province which includes the Granduc and Galore Creek deposits.

GEOLOGY OF THE CLAIM GROUP

GENERAL STATEMENT

Considerable difficulty was met in distinguishing mappable rock units due to:

(1) Scarcity of unweathered outcrops.

(2) Lack of recognizable differences between rock types.

(3) Alteration effects.

(4) Geologic complexity.

All projections of geologic contacts and structures beyond the gully areas should be regarded as tentative. The relative ages of the stratified rocks could not be determined.

STRATIFIED ROCKS

Volcanic rocks, including andesite, basalt and agglomerate, form a broad, hook-shaped band, open to the southwest. Where fresh, these rocks are dark green and aphanitic. The agglomeratic members are distinguished by light-and-dark-green mottling. Minor amounts of brown (tuffaceous?) argillite occur with the volcanic rocks.

All the volcanic rocks are highly fractured, and those near the mineralized areas have been either silicified or propylitized.

Clastic sedimentary rocks underlie the largest part of the area mapped, occurring on both sides of the volcanic rocks. Grey to black shale, sandstone and conglomerate comprise the clastic sedimentary rocks. These rocks were not as susceptible to alteration as the volcanics, and are unmineralized, except for calcite veinlets and a little pyrite.

Limy sedimentary rocks are found between the

volcanic sequence and the clastic beds. They pass gradationally into the clastic sedimentary rocks. Limestone, chert, limy shale and limy siltstone are included in this unit. Despite the intrusion and mineralization which have occurred nearby, the limy rocks are essentially unaltered. Calcite veinlets and breccia-fillings are common.

INTRUSIONS

The volcanic rocks, and parts of the sedimentary assemblage near them, contain a complex array of dykes, sills and small plugs, emplaced during at least two intrusive episodes.

Sill?

Porphyritic diorite outcrops mainly on the crest and upper slopes of the ridge. It consists of chunky phenocrysts of plagioclase, enclosed in a matrix of fine-grained saussuritized plagioclase and chloritized hornblende. Inclusions of schistose andesite agglomerate are common. Scattered large phenocrysts of pink orthoclase were seen in places.

Hornblende monzonite consists of equal parts of pink orthoclase, and grey plagioclase, with 5% to 10% of hornblende. Both medium-grained even-textured and porphyritic facies are present.

Feldspar porphyry is the most abundant intrusive

rock exposed in the claim group. Pink euhedra of orthoclase up to 4 cm. in diameter, occur in a matrix of medium to fine-grained orthoclase and plagioclase. Hornblende is rare.

The relationship between the feldspar porphyry and the other intrusive rocks is not entirely understood. It is younger than the porphyritic diorite and in places seems to have cut and altered the hornblende monzonite. It may be the acidic differentiate of a series including the diorite and monzonite, an alteration product of the monzonite, or a separate, younger intrusion.

Silicified and mineralized zones in the claim group are closely related spatially to the feldspar porphyry, and there is little doubt that they are genetically related to this rock type.

Fine-grained gabbro occurs as a swarm of dykes, many of which are sharply discordant with local structural trends. They obviously belong to a much later intrusive episode than do the previously described intrusive rocks.

STRUCTURAL GEOLOGY (See maps 2 and 3)

Folds - Outcrop pattern and the orientation of minor folds suggest that the shape of the spur on which the Ball Creek showings occur reflects the presence of a large

anticline, plunging moderately to the east or northeast. The fold predates the intrusions, and has exerted a strong control on their form and distribution.

Faults - There are two prominent sets of faults, both of which stand out clearly on the linear map (fig. 3):

(1) Radial northwest faults range in strike from WNW to NNW, and are steep-dipping breaks, expressed at surface as rusty schistose or brecciated zones. The amount and sense of the movement on these faults is not known. The radial northwest faults may be related to a major fault which seems to separate two major structural units ("A" and "B" in fig. 3).

(2) East-northeast faults are probably parallel to the axial plane of the anticlinal structure. Their surface expression is similar to that of the radial northwest faults, but they are less obvious due to their concordance with the stratified rocks.

Some of the feldspar porphyry and hornblende monzonite dykes are cut by the faults; others were intruded into shear zones. This suggests that there was recurrent movement along the faults over a long time interval.

MINERALIZATION AND SAMPLING RESULTS

GENERAL STATEMENT

Sulphide minerals, predominantly pyrite, occur

irregularly in an area two miles long by one mile wide, over a vertical range of 2000 feet. The surface expression of this broad mineralized zone is a large stained area, which curves around the nose of the anticline (see fig. 3). Within this area, molybdenite in more than trace amounts has been found at three localities.

DESCRIPTION OF SHOWINGS

Gully Showing (see fig. 4)

The Gully Showing includes the outcrops where the first MoS_2 was found, and at which detailed geologic mapping and packsack drilling were concentrated. In the bottom and sides of a large gully, fine-grained MoS_2 occurs as tiny veinlets and sooty smears, and as disseminated flakes and thin selvages in grey quartz veinlets. Abundant fine to coarse-grained pyrite, and lesser amounts of fine-grained galena, metallic-grey sphalerite and chalcopyrite are associated with the molybdenite. The host rocks are altered andesite, hornblende monzonite and feldspar porphyry. The best mineralization occurs in bleached, silicified andesite near feldspar porphyry contacts. The area known to be mineralized is 500 feet in diameter. The distribution of MoS_2 within this area is sparse and irregular.

Sample locations and assay results are given in figure 4. Grab sampling in the discovery trench gave re-

sults ranging from 0.01% to 0.16% MoS_2, but channel samples taken in the same area had MoS_2 contents consistently in the 0.01% to 0.02% range. These results were confirmed by the sampling of 199 feet of EX core from 6 short holes drilled along the gully bottom.

All of the chip-channel samples assayed contained at least four times as much copper as molybdenum. The zinc content of most samples was "trace", but zinc ranged from 0.08% to 0.23% in a few samples.

South Showing (see fig. 4)

The South Showing was found late in the field season, on a heavily stained cliff above Ball Creek. Grab sampling of talus material at the foot of the cliff gave the following results:

	% MoS_2	Cu	Pb	Zn	ozAg	Au
(1) Fine-grained grey quartz with MoS_2	0.22	ND	Tr	Tr	ND	ND
(2) Fine-grained grey quartz with MoS_2	0.61	0.14	Tr	ND	ND	0.02
(3) Calcite vein with galena and sphalerite	0.02	0.17	1.65	2.07	Tr	0.02

A 150-ft. chip sample taken along the weathered face of the cliff contained MoS_2 from 0.01 to 0.05% and Cu from 0.04 to 0.14%, as well as small quantities of Pb, Zn

and Ag.

The mineralization is in quartz and calcite veins which cut feldspar porphyry and silicified, pyritized volcanic rocks within a north-trending shear zone. The MoS_2 is concentrated in veinlets and small, highly silicified patches rather than being distributed evenly throughout the mineralized zone. There is an apparent increase in grade from west to east along the sampled face, and the easternmost 10-foot length has the highest MoS_2 content, 0.05% (see fig. 4). The extent of the mineralized zone north and south of the cliff face is not known.

North Showing

Little work was done on this showing, which consists of a few outcrops in the bed of a tributary of the North Branch. The mineralization is identical in all respects to that at the Gully Showing, and there is no reason to suspect that the grade is higher.

Quartz Stockwork Areas (See fig. 4)

During detailed mapping in the vicinity of the Gully Showing abundant barren quartz veinlets were noted at two places near the western edge of the area mapped. After mapping has been completed the melting of a large snowpatch in the gully bottom disclosed that some of the veinlets con-

tain streaks of the fine-grained grey metallic mineral assemblage which occurs at the other showings. The stockwork areas are two neighbouring lobate patches, 500 x 300 and 200 x 200 feet, in which veinlets of fine-grained grey to white quartz occur at intervals of a few inches to one foot. The predominant vein strikes are NNE and ENE. Some of the quartz veinlets cut and displace others, and all are cut by pyrite veinlets. Malachite staining is common. Between the veinlets, the rock is bleached, but not strongly silicified.

It is significant that the stockwork areas contain a large amount of introduced silica - more than could be expected to have been derived from any of the intrusive rocks now exposed in the vicinity. This, together with the fact that quartz veinlets cut all intrusions except the late gabbro, suggests that the veinlets, and the accompanying sulphide minerals, were emplaced by siliceous hydrothermal solutions from an unexposed source.

WALL ROCK ALTERATION

Two alteration-types are conspicuous in all of the mineralized areas:

1) Silicification - silicification, accompanied by bleaching, is intense in limited areas adjacent to feldspar porphyry dykes. The best MoS_2 mineralization occurs in

these silicified zones.

2) Propylitization - Volcanic rocks near the mineralized areas have been altered in part to blotchy, pale to dark green aggregates of chlorite, epidote, carbonate and pyrite. This alteration is most evident in brecciated fault zones, and near feldspar porphyry dykes, where moderately propylitized rock encloses more distinct inner silicified zones.

GEOCHEMISTRY

GEOCHEMICAL ENVIRONMENT

More than two thirds of the area is covered by one to five feet of silty to clayey glacial till. Steep slopes and frost action have prohibited the formation of a profiled soil. Outcrops are weathered and leached, except in the rapidly eroding gullies. Near the heads of some gullies, erosion has removed the glacial till and exposed immature residual soil.

The soil pH is predominantly acidic. Fifty pH determinations show a range of 7.2 to 4.0, and an average of 5.0. (Only one determination is above 7.0). Stream sediments are either alkaline (7.9-8.5) or slightly acidic (6.6-6.9). Stream waters are alkaline (7.1-7.9), except for one southern tributary of Ball Creek, where the water has a pH of 4.4.

ANOMALOUS AREAS

Map 5 shows that anomalous areas (soil) exist only in or near the heads of actively eroding gullies, where the glacial overburden has been removed, and decomposed, molybdenite-bearing rock has been exposed to erosion. The pattern of anomalous areas is thus largely topography - dependent, and does not outline the mineralized area.

The results of stream sediment sampling downslope from mineralized outcrops are inconsistent, and water sampling results are essentially negative. These results suggest that molybdenum at Ball Creek is transported mechanically rather than chemically. Further geochemical work in the Ball Creek area should be confined to soil sampling.

SURROUNDING AREAS

Areas around the Ball Creek Showing were prospected in the hope of finding similar but richer mineralized zones. No such zones were located. Molybdenum was found in soil over a narrow silicified shear zone containing some felsitic intrusive rock, on the east side of the North Branch valley. The shear zone is parallel to the northwest - trending faults in the showing area.

Geochemical prospecting showed that trace amounts of Mo occur in flat-lying Tertiary rhyolite in the nearby

Spectrum Range. This suggests that the Ball Creek intrusions and other "felsites" may be the feeders of the Tertiary volcanic outpourings.

FUTURE EXPLORATION

Molybdenite is widely distributed in an area with a complex intrusive and structural history. The surrounding rocks have been fractured and altered, but not pervasively, and a considerable amount of silica has been introduced as veins.

Following a visit late in August, R.W. Hutchinson recommended that the area be staked. At the time, the writer was fully in accord with the idea. However, the following information, which has become available since staking, is discouraging:

(1) The results of chip-channel sampling show that the grade of surface mineralization is in the range 0.01 to 0.05% MoS_2.

(2) Some of the best-looking mineralized areas, visually estimated to contain 0.10% MoS_2, contain only 0.01%, the remainder being made up of extremely fine-grained grey sphalerite, galena, pyrite and chalcopyrite, similar to the deceptive sulphide assemblage at Decker Creek.

Considering these unfavourable facts, the showing

does not merit a full-scale exploration program in 1964. However, the existence of widespread MoS_2 in a geologically favourable environment demands that all possibilities in the vicinity be investigated. This investigation can be accomplished by the following work:

(1) Further surface sampling and detailed mapping at the eastern end of the south showing, where the highest results were obtained in 1963 (chip samples of 0.04 and 0.05% and grab samples of 0.22 and 0.61% MoS_2). This area is topographically difficult, and parts of it are inaccessible.

(2) Chip sampling of the mineralized outcrops at the North Showing (not sampled in 1963). Some stripping will be necessary in this area.

(3) Prospecting wherever possible along the nose of the ridge, between the South and West Showings.

(4) Prospecting and surface sampling in the stockwork areas near the Gully Showing.

The above work can be accomplished by a four-man party in a month to six weeks, preferably in August and September. The cost will be between $5,000 and $10,000, provided that a helicopter can be chartered nearby to move the party in and out.

If the work is not completed before the anniversary of the Mary claims (Aug. 31), the following (23) claims

should be allowed to lapse (see fig. 6):

1, 2, 3, 4, 6, 7, 8, 11, 12, 13, 14, 15, 19, 20, 21, 27, 28, 29, 35, 36, 41, 42, 43. The remaining 20 should be retained either by applying assessment work, or by making cash payment.

G. W. Mannard.

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