895034

Dr. E. A. Goranson,
Chief Geologist, Ottawa.

Vancouver, B.C.
February 23, 1970.

- STORIE Mo PROPERTY - 1969 REPORT -

The enclosed report by J. Ariz was prepared as a result of one week of field work on the Storie property during July, 1969, followed by several weeks of office study and re-compilation of earlier records, maps and sections. Part of that office study related to detailed air photo geological interpretation of the Storie and adjoining Rex group areas, the results of which will be submitted as a separate report. The latter study reinforced the thesis that numerous fault are present and have a considerable bearing on the degree of molybdenite mineralization.

The concept of north-northwesterly-dipping "ore Bands" with barren or waste rock between or bordering them has again been retained. Yet another concept has been added and/or enlarged upon in this 1969 report, viz. that the moderately-dipping contact area between rock units designated "2" & "3" is an important locus of mineralization particularly when cut by the more steeply dipping ENE-trending fault and fracture zones. Additional drill core assaying was done which filled certain gaps and helped to substantiate that concept. Somewhat modified outlines

have thus been designated for the ore zones.

As a result of this re-study and additional assays, new tonnage and grade calculations are presented. The drill-indicated reserves available to open-pit mining have been increased to 27 million tons of 0.115% MoS_2, with a waste to ore ratio of 0.88. Total potential inferred reserves are suggested as 93 million tons of the same grade. The gross value of this deposit is significant, and justifies a further stage of drilling and/or bulk sampling on surface or underground. That work will be required before a dependable feasibility study can be made.

R. C. Macdonald

RCM/vs

cc: W.H. Callahan

TABLE OF CONTENTS

APPENDIX

MAPS

SECTIONS

STORIE Mo PROPERTY - 1969 REPORT

By J. F. Arlz

INTRODUCTION

One week was spent on the Storie Mo property by the writer and an assistant in mid-July 1969 immediately after surveying the Rex claims. A review was made of drill cores mostly from 1964, '65, and '66 drilling, with emphasis on lithology and mineralization. Eighty-three full core samples were taken from 8 holes mostly in the Center Ore Zone to fill-in gaps or increase the width and/or grade of the ore bands previously reported.

Additional field traverses were made for correlation of core information with surface geology and also to correlate between Storie and Rex general geology.

This Year's report partly revises the lithology and structure as previously viewed, and includes new calculations of drill-indicated ore reserves based on the same concept of "ore bands" used in the 1968 report. In addition, rough estimates of total inferred ore potential are made, firstly, based on the ore band idea of mineral deposits, and secondly, on combined ore bands and contact related blanket type Mo deposits.

Again considerable effort has been exerted to gain further insight on the subject of localization of mineralization in the property.

A brief study of past drill core recovery in mineralized rock was done.

LITHOLOGY & STRUCTURE

Review of drill cores and logs this year provides additional information to further define the three classes of intrusive rocks in the property previously reported. Emphasis was given to determine the rock contacts in the drill holes and their surface correlations, and also other broader features and relationships that help to distinguish the rocks types better. (Refer to Map 30-8A and N-S Vertical Sections 18E to 26E.)

Unit 1. - This quartz monzonite is dominantly light greenish grey, with a moderately porphyritic texture (i.e. relatively small orthoclase and plagioclase phenocrysts in a medium-to fine-grained matrix). It is found in the northwest side of the property, and its main contact with underlying Unit 2 trends NE/40-45°NW. Locally it exhibits equi-granular texture and may be confused with Unit 2 west of the property. Its slight greenish color may be due to fine-grained hornblende in the matrix.

Unit 2. - This quartz monzonite has a relatively high ferromagnesian (mostly biotite) content, is normally very course-grained, and light pinkish grey, but grades into porphyritic texture not far from the contacts. The porphyritic phase has phenocryrts of orthoclase and fewer plagioclase and biotite plates, in a medium-grained matrix that retains the light pinkish-grey color of this rock. Flow banding texture was noted in two localities near the main contact where the rock changes from equi-granular to porphyritic.

Unit 2 is an 800 ft. wide band oriented NE-SW crossing the center of the property, and in cross section is wedge-shaped, the thickness gradually increasing to the west.

Unit 3. - This Unit has a deeper pink color, and is a porphyry consisting essentially of quartz and K-and Na-feldspar phenocrysts in a fine-grained matrix of the same composition, which was earlier appropriately called "Quartz-Feldspar-Porphyry". Along the trenches and in the drillholes, it is observed that farther away from the contact the matrix of the rock gradually increases in grain size to between fine-and medium-grain nearly approaching the size of the phenocrysts, and the deep pink color gradually becomes lighter. This rock is exposed on surface by the trenches on the 40N-and 42N-grid lines and by the access road down to DH-6 and -7 sites along the steep south slope facing Lang Creek. Except for the main contact between Unit 1 and 2, no further work was deemed necessary to check the occurrences of either rocks as smaller bands or interfingers in each other.

The contact between Units 1 and 2 is exposed on surface in four places:

a) 2100' N of the camp, at the W bank of the N flowing dry creek to Granite Creek.

b) 500' N of DH-18, on a shallow waterpass.

c) On the ridge S of DH-25, co-ordinates 50N, 18E. Here the contact is cut by a large E-W trending fault in the center fault zone. It is apparent that the south wall moved down relative to the north wall by some undetermined short distance.

d) 230' S of DH-44, along the steep cliff facing Lang Creek.

In these outcrops Unit 2 grades from its normal very coarse-grained texture into porphyritic texture not far from the contact, and also exhibits in two places the flow banding mentioned above.

In the drill holes the same characteristics of the contact is indicated although in some holes the gradational porphyritic border of Unit 2 is practically absent. However, the flow banding texture is present.

The main contact of Unit 2 with Unit 3 on the surface shown in 1968 Map 30-8 is now slightly revised as indicated in 1969 Maps 30-8A and 30-11. Previously, this contact showed Unit 2 in contact with lesser bands of Unit 1, but this year's review indicates that what had been shown as Unit 1 is actually a slightly coarser grained variety of Unit 3. There are two locations where this contact may be observed indirectly on the surface:

1) At 18E, 36N, 400 feet NW of DH-6, El. 4750'. The contact is talus-covered but Unit 3 outcrops about 80' below along the waterpass, and Unit 2 has outcrops about 50' above this point on the same waterpass. See Maps 30-2 (1964) & 30-8A.

2) At the trench/access road between DH-2 and DH-14. The trench was not deep enough to expose the talus-covered contact about 100' W of DH-2, but talus of Unit 3 are found only up to the approximate location of the contact. This position of the contact has been determined also by using drill interceptions in DH-14, -15, and -4.

The rocks exposed along the access road to DH-6 and -7 about 800 feet away from the contact are Unit 3 with fine to medium grained matrix and may be considered to represent

the normal texture of this rock unit. The deeper pink color of this rock nearer the contact may be related to K-feldspar alteration.

Prominent small knobs of Unit 2 outcropping on the steep slope SE of the trenches at the E side of the S flowing small creek along the 42E line, combined with observations along the Coast Silver Mines access road east of the camp, and results from drill holes 45 and 46, suggest that the area east of the 42E grid line is all Unit 2. It is inferred that the contact coincides with a strong lineament A-A at the lowest section of this small valley or saddle. (See Map 30-8A.)

Drill holes locations of the upper & lower contacts of the central Unit 2 are summarized in Appendix 1 and plotted in the NS vertical sections 22E to 38E. Because of apparent structural significance of the contact between Units 2 and 3 in the mineralized zones, a structural contour Map 30-11, was made to show this contact in plan at 100 foot intervals. The contours indicate that the contact is a northerly to northwesterly gradually plunging arch or roll. The trace of the crest of the contact arch (from S to N) passes thru DH-1, -2, -15, and -27, then turns slightly NW from DH-27 towards DH-32, passing between DH-23 and -28. The crest has a plunge of approximately -30° from the surface at El. 5150', to DH-27, at 4800' contour, then flattens gradually at -10° until reaching the 4700' contour

and resumes its -30° or 25° drop farther northwest. At the east side of the crest, the slope becomes steep in the vicinity of DH-9. To the west, the surface seems to slope around -30° in a WNW direction at the west side of the 20E grid line, although information is rather insufficient to assume that the contact extends farther WNW with the same slope.

MINERALIZATION

Eighty-three full core samples were taken from 8 drill holes to fill-in gaps or increase the size of the ore bands. The new assay results including check assays and averages are shown in Appendix 2.

With these new figures and again using a cut-off grade of 0.07% MoS_2, the averages for each ore band were computed. The results are shown in Appendix 3 which include those of 1968 for comparison. The overall net result is an increase in size of the ore bands, slight decrease of grade in a few smaller bands, but appreciable increase in grade in some larger bands. The most significant single change is in ore band C-3 in DH-27, in which width was increased by 8. ft. to 404 ft. and the average grade greatly increased from 0.097 to 0.178% MoS_2.

The center ore zone is slightly wider this year. The main footwall and hangingwall of the zone are marked "fw" and "hw" in Map 30-10a and also the vertical sections.

The footwall of ore band C-1 in DH-4 coincides with that in DH-15 at the next section west, in the plane of projection along the major direction N10E/60N (N80°E). This is taken as the footwall of the zone. This footwall has been projected further west to the two succeeding sections (N-S Vertical Sections 26E & 22E), and is found to pass beneath DH-20, and at 200 feet depth in DH-22. Since good ore extends to the bottom of DH-20 it is possible that ore extends deeper down to this projected footwall boundary. In DH-22, the first 200 feet of core shows poor mineralization but rather moderate rock alteration. Molybdenite in quartz veinlets and in hairline fractures is found on the surface below and above the drill site. However rock alteration and mineralization seem to become weaker 200 feet farther west from the drill site where only a few widely spaced quartz veinlets are found with some specks of molybdenite in relatively fresher rock.

The hangingwall of the center zone is taken at the highest limit of the ore band in DH-27 and DH-21. Similarly a plane through these points parallel to the footwall was projected to the next two sections to the west (N-S Vertical Sections 22E & 18E). In these sections DH-24 is seen to have reached this hangingwall while DH-25 has not reached it.

Judging from these observations a hypothetical size of the center ore zone can be made. The maximum thickness may then be taken as 420 feet from Vertical Sections 30E &

34E, while the maximum horizontal E-W length is about 2000 ft. between grid lines 36E & 16E, and the dip length is approximately 700 ft. Our past drilling work may be considered to have roughly explored this zone from the 36E to the 26E line or a length of 1000 ft., which is 50% of the total inferred length.

The hangingwall and footwall of the larger ore band in DH-26 and -33 are also shown in the vertical sections and Map 30-10a. Projections of these walls to the next vertical section east (N-S Vertical Section 26E) shows the footwall passing through at 100 ft. depth in DH-23, and the hangingwall at 400 ft. depth in DH-32. The first 100 ft. in DH-23 may be affected by surface weathering which is a common observation in drill cores from the center ore zone. This may then mask the possibility of occurrence of ore above this projected footwall. DH-32 shows some good ore near the bottom of the hole. This may be used as basis to suggest that the hangingwall of the ore zone passes through this section. Hence, ore may be present deeper below the bottom of this hole. An ideal drill site to check this ore zone would then be at co-ordinates 26E, 56N between DH-23 and DH-32. Further extension of this ore band to the next east vertical section seems unlikely because DH-29 does not indicate this possibility.

Projections to the next section west from DH-26 may indicate a possibility that the ore band has a steep plunge

to the west if the better mineralization near the bottoms of DH-37 and DH-34 are considered to be the upper part of the extension of this ore band. An alternative possibility is that the ore may terminate before the 18E line.

Based on the above interpretations the north ore band may then be inferred to have the following maximum dimensions: thickness, 200 ft., width along dip, 700 ft., and E-W horizontal length, 1200 ft.

Study regarding the occurrences of ore in the drill holes within the ore zones suggest that good ore occurs in the contact zone of rock units 2 and 3. In Unit 2, molybdenite occurs as fillings in quartz veinlets, small masses and disseminates associated with quartz veinlets or partially silicified veinlet walls, and also as thin fillings or films in hairline fractures. This mode of mineralization is also found in Unit 3 below the contact but, in addition, disseminated molybdenite occurs deeper in relatively fresher rock away from fractures or quartz veinlets. This was observed in most of the drill cores from the center ore zone, and on the surface, in the trench along the 40N grid line. The best drill hole example is DH-27 where the contact passes through the mid-section of 404 ft. wide of 0.178% MoS_2 ore - the best drilling results so far obtained.

The above observations suggest the possibility of "blanket type" molybdenum mineralization <u>along the contact</u> where smaller fractures related to distension are more likely

to be found. The "ore bands" concept previously suggested may be applicable only in rocks further above the contact where the dominant structural control of mineralization is apparently fault zones.

With regards to depth extensions of mineralization, DH-27 may be used to indicate the maximum apparent thickness of porphyry type mineralization. This hole shows a 404 ft. section of ore at 0.178% MoS_2 with the contact of Units 2 & 3 passing through the middle. It may then be thought that the maximum limits of porphyry mineralization is 200 ft. above and below the contact. For purposes of rough estimations of ore potential 1/2 of the maximum apparent thickness, or 200 feet will be used as an average thickness dimension.

The perpendicular distance from the contact between Units 2 & 3 to the structurally deepest known ore may be indirectly determined from DH-1 (assuming that no faulting occurred) by measuring from the 0.13% ore near 100 ft. to the contact surface above DH-1 as projected from DH-15. (See N-S Section 30E). This measures about 500 feet. The uppermost occurrence of ore in "ore bands" may be at the hangingwall side of band N-4 in DH-26 (See N-S Section 22E). This is around 600 ft. above the contact at elevation 5240 ft.

There seems to be a relationship between slope of the contact and mineralization. Map 30-11 shows that the best and widest ore drilled is in the crestal zone of the arched contact where the slope is rather gradual. The eastern

limit of mineralization coincides roughly in places where the slope of the contact steepens (-45°) as in the vicinity of DH-9, DH-16, and DH-29. The eastern limit of the porphyry or blanket ore zone then may be outlined by drawing a line connecting points: 40N,32E, 50N,38E, and 64N,30E.

Due to insufficient drilling information at depth this Unit 2-3 contact slope relation is not applied to roughly outline the western limit of blanket ore zone as done on the east side. The slope is moderate here (-30°). However, trench 40N shows mineralization to extend to about 300 ft. west of DH-1, and outcrops tend to indicate mineralization extending at least 200 feet W of DH-22. The approximate western limit of blanket mineralization may then be outlined by connecting these two points and extending the line further NW.

The overall picture of the ore zone is then a blanket mass 200 ft. average thickness along the contact zone, about 1600 ft. wide and 2000 ft. long, although further extension to the northwest appears to be a good possibility. With respect to the contact surface, the blanket ore zone would then seem to occur along the flatish section of the crestal arch mostly along the west side of the crest, generally trending NW or following the crestal trend.

DRILL CORE RECOVERY

A study of drill core recovery was made to compare previous drilling methods used. BX standard method was used for DH-1 to 18 and BQ wirline for DH-18-A to 48. The study was confined to ore bands where the rock is highly altered and brecciated and core recovery is most important. Information was obtained from the graphic logs of the 1964 & 1965 reports, and the descriptive logs of the 1966 & 1968 reports. The results are tabulated in Appendix 4 in ascending order of percent core recovery from the lowest to the highest. The core recoveries shown are weighted averages for each ore band in the corresponding drill hole.

BX core recovery is disappointingly low. The first 8 items in the list are all from BX drilling and averaged 33% for 869 feet. The lowest recovery is 27% for 132 feet of ore band while the highest in this group is 63% for 40 feet of ore band.

BQ core recovery for the next group of 13 ore bands in the list has an overall weighted average of 85%. This is fairly good for BQ wireline drilling. The lowest in this group is 68% for 172 feet of ore band in DH-28, while the highest is 99% for 80 feet of ore band in DH-22. The widest ore band is in DH-21 and averaged 86% core recovery for a width of 412 feet and the second widest ore band of 404 feet averaged 81% recovery.

The BX assay values are therefore questionable and are not truly representative of the sampled sections. On the

other hand, BQ core recovery is fair and could be taken with some confidence although recovery in the neighborhood of 90% is desirable in this type of ore sampled.

The BX holes were drilled along or near the footwall side of the Center Ore Zone. Ore grade figures used in the tonnage calculations for the footwall holes are therefore questionable. Nevertheless these figures are used in the calculations for comparison with those of last year's ore potential. It is however suggested that check drilling for grade be done in the BX-drilled area, this time using NQ wireline method. It should be anticipated that with due care in drilling, core recovery will be significantly increased.

TONNAGE & GRADE ESTIMATES

The same procedure used in the 1968 Report to estimate drill indicated ore potential is applied in this report. The two open pits with walls at -55° define the ore reserves and are shown in the N-S vertical sections and Map 30-10A. No estimates are made on the South Ore Zone because the "ore bands" are narrow and waste-to-ore ratio is apparently high. The calculations are shown in tabulated form on the following page, using a "density factor" of 12 cu. ft. per ton.

Compared to last year's calculations the most important changes are in Ore Blocks II & III of the Main Pit, and some ore bands in No. 2 Pit. The biggest change is in Ore Band C-3, Block II, where the average grade was increased to 0.178 and the tonnage more than doubled.

The total drill-indicated ore portential of the two pits combined is 27 million tons with an average grade of 0.115% Mo S_2 and a waste-to-ore ratio of 0.68. These represent an increase of 5.3 million tons and improvement in average grade by 0.006% MoS_2 over last year's figures.

TONNAGE & GRADE ESTIMATES, 1969

MAIN PIT - CENTRE (C) ZONE & (N) NORTH ZONE

BLOCK I

Ore Band	End Area-sq.ft. East	End Area-sq.ft. West	Avg. Area	Avg. Length	cu.ft. Volume	Tons	Est. % MoS_2	1000 Tons x % MoS_2
C-1	111,180	122,080	116,630	330	38,487,900	3,207,000	.131	420.117
C-2	5,026	5,606	5,316	345	1,834,250	153,000	.100	15.300
C-3	64,770	73,660	69,215	345	23,879,175	1,990,000	.098	195.020
C-4	3,600	4,300	3,950	340	1,343,000	112,000	.077	8.624
C-5	2,720	3,200	2,960	340	1,006,400	84,000	.090	7.560
C-6	3,100	3,800	3,450	345	1,190,250	99,000	.072	7.128
C-7	1,000	1,250	1,125	355	399,375	33,000	.170	5.610
					BLOCK TOTALS	5,678,000	.116	659.359

BLOCK II

C-1	62,700	82,500	72,600	355	25,773,000	2,308,000	.091	210.028
C-3	118,250	149,820	134,035	365	48,910,000	4,075,000	.178	725.350
N-10 & 11	12,600	41,400	27,000	400	10,800,000	900,000	.076	68.400
					BLOCK TOTALS	7,283,000	.137	1,003,778

BLOCK III

C-1	37,500	41,400	39,500	400	15,800,000	1,317,000	.111	146.187
C-2	7,200	8,200	7,700	440	3,388,000	282,000	.083	23.406
C-3	158,400	211,200	184,800	530	97,944,000	8,165,000	.092	751.180
N-10	7,380	9,540	8,460	540	4,568,400	381,000	.094	35.814
N-11	12,960	17,280	15,120	535	8,089,200	674,000	.154	103.796
					BLOCK TOTALS	10,819,000	.098	1,060.383

No. 2 PIT, NORTH ZONE

N-14 2	8,700	13,500	11,100	480	5,328,000	444,000	.089	39.516
N-3	8,120	12,600	10,360	520	5,387,200	448,000	.093	41.664
N-4	27,040	41,600	34,320	540	18,532,800	1,634,000	.134	225.656
N-5	1,200	1,500	1,300	565	762,750	63,000	.08	5.040
N-6	1,300	2,800	2,050	560	1,480,000	96,000	.11	10.560
N-7	800	1,400	1,100	555	610,500	509,000	.11	55.990
N-8	500	1,000	750	535	401,250	33,000	.10	3.300
					BLOCK TOTALS	3,277,000	.116	381.726

GRAND TOTALS ---------- 27,057,000 .115 3,105.246

Total tons in Pits (from 1968 Report) - 50,961,000
Waste-to-ore ratio = $\frac{23,904,000}{27,057,000}$ or 0.88

Based on the ore band concept, but disregarding open pit layout the following are rough estimates of total inferred ore potential which include drill-indicated ore.

ORE ZONE	Avg Thickness Ft	Avg Width Ft	Avg Length Ft	Million Tons
Center	420	700	2000	42
North	200	600	1200	12
Others	(Smaller ore bands adjacent to main or bands)			2
			TOTAL	63 M

Hence, the total inferred ore potential is 63 million tons. It is assumed that the average grade of this ore is 0.115% MoS_2 which is the average grade of drill-indicated ore.

If the orebody is thought of as a combination of the "ore bands" and "blanket type" deposits, the total inferred ore potential (also including drill-indicated ore) is estimated as follows:

TYPE OF DEPOSIT	Avg Thickness Ft	Avg Width Ft	Avg Length Ft	Million Tons
Blanket Type	200	1500	2000	50
North Ore Zone Bands	200	400	1200	8
Center Ore Zone Bands	420	500	2000	35
			TOTAL	93 M

The total inferred ore potential would then be 93 million tons. Again, it is assumed that this has an average grade of 0.115% MoS_2.