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A REPORT ON THE ERIE GOLD MINE

ERIE, B.C.

for

MR. D. W. COATES

by

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Vancouver, B.C.

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SUMMARY AND CONCLUSIONS

The Arlington-Erie Gold Mine at Erie, B.C. has a history of intermittent operation between 1900 and 1954, and reports show that approximately 24,500 tons of ore yielded 47,800 ounces of gold and 113,000 ounces of silver in addition to values in lead and zinc. Between 1958 and 1967 lessees shipped 35,957 tons of dump rock to the Trail smelter and realized payment for 4,980 ounces of gold and 19,703 ounces of silver.

Underground mining was concentrated in structurally favourable sections of the low angle quartz vein where transverse folding produced thick sulphide-rich zones containing in excess of 3 ounces of gold to the ton. Some of this material is visible in the walls and pillars of the old stopes.

It is concluded that approximately 125,000 tons of dump rock and stope clean-up material is available for shipment to the Trail smelter with an indicated grade of 0.13 - 0.16 ounces of gold per ton. The geologic potential is such that: a) high grade material remains in the walls of the old stopes, and b) there is a possibility of extensions to the transverse mineralized structures, and c) there is the possibility of a lower level repetition of the favourable quartz vein.

The recommendations include the shipment of dump rock to the smelter and a staged program of evaluation and exploration to assess the underground potential. The total expenditure to carry out the total program is estimated at $168,000.00.

INTRODUCTION

The purpose of this report is to present the results of a study of the Arlington-Erie Gold Mine at Erie, B.C. The writer visited the property in mid November 1973 in the company of Mr. Albert Shrieves of Nelson, B.C. Mr. Shrieves was the resident Manager for New Arlington Mines Limited and was able to provide first-hand information during the underground tour, in addition to supplying significant records stored from the last period of operation. These records consisted of memoranda, reports, and sketches with information pertaining to mine and mill operation. Geological information was located which suggests that there is potential worthy of evaluation.

The body of this report consists of a summary of the history and operational aspects of the property, a discussion of the geology, mining and economic potential, and recommendations for the evaluation of the indicated potential.

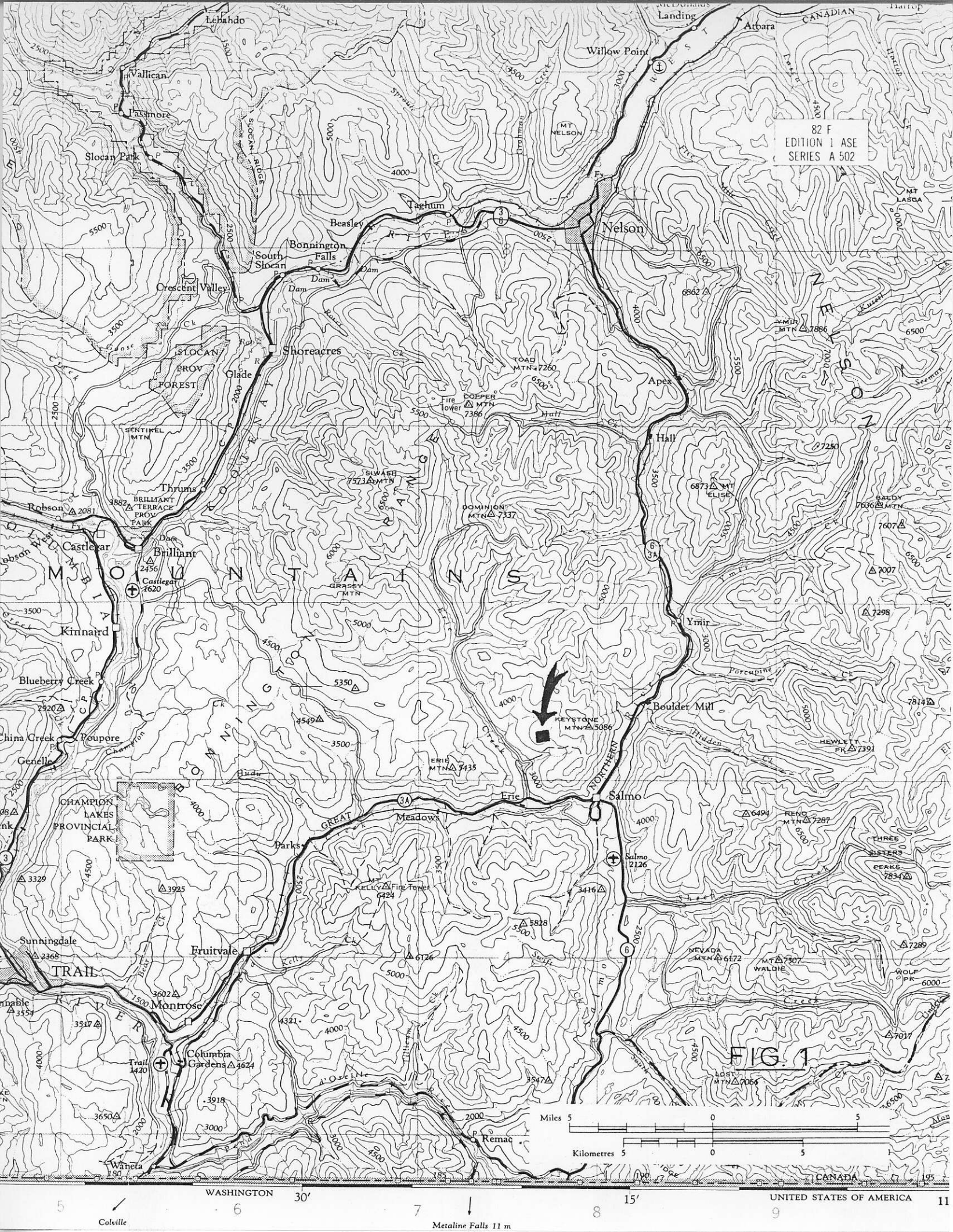
82 F
EDITION 1 ASE
SERIES A 502
Lebahdo
Vallican
Passmore
Slocan Park
Willow Point
Nelson
Taghum
Beasley
Bonnington Falls
South Slocan
Crescent Valley
Shoreacres
Glade
SLOCAN PROV FOREST
Thrums
Robson
Castlegar
Brilliant
Kinnaird
Blueberry Creek
Poupore
China Creek
Genelle
CHAMPION LAKES PROVINCIAL PARK
Sunningdale
Fruitvale
TRAIL
Montrose
Columbia Gardens
Trail
Waneta
Apex
Hall
Ymir
Boulder Mill
Salmo
Erie
Meadows
Parks
Remac
Atbara
Landing
MT NELSON
MT LASCA
YMIR MTN 7886
TOAD MTN 7260
COPPER MTN 7386
SIWASH MTN
DOMINION MTN 7337
GRASSY MTN
KEYSTONE MTN 5086
ERIE MTN 5435
MT KELLY Fire Tower 6424
RENO MTN 7287
HEWLETT PK 7391
THREE SISTERS PEAKS 7834
NEVADA MTN 6172
MT WALDIE 7307
WOLF PK 6000
LOST MTN 7056
BALDY MTN 7636
MT ELISE 6873
SENTINEL MTN
BRILLIANT TERRACE PROV PARK
COLUMBIA MOUNTAINS
SELKIRK MOUNTAINS
ROOSEVELT
DONALD
Miles 5 0 5
Kilometres 5 0 5
WASHINGTON
30′
15′
UNITED STATES OF AMERICA
CANADA
Colville
Metaline Falls 11 m

FIG. 1

FIG. 2.

Sc. 1in=1/2

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PROPERTY, LOCATION AND ACCESS

The property is located in the Nelson Mining Division at 117 18' W.L. and 49 13' N.L. on the nose of a westerly trending ridge which lies approximately 2 miles northwest of Salmo. Access is gained from the Erie Creek road which turns off paved Highway 3A at the hamlet of Erie. About 1½ miles from Erie the mine road leaves the Erie Creek road and winds its way to the property at an elevation of 3500 to 4000 feet ASL.

The mountain slopes are heavily wooded, but the topography is not extreme, and the road is navigable by car. The overburden consists of soil, and the thickness varies from 3 to 8 feet in areas visited by the writer.

The property consists of 20 Crown Granted mineral claims and 84.16 acres of adjoining fee-simple land; all are recorded in the name of Erie Mines Limited. The claims, their record numbers and size are listed below, and the property outline and location is shown in Figures 1 and 2.

Name	Lot No.	Size
MAGGIE	617	21 acres
ARLINGTON	3648	41.30
ARLINGTON FR.	3649	10.94
ARMOUR PLATE	4186	43.50
CANADIAN KING	4196	34.95
BROAD AXE	4198	35.16
GOLD STANDARD	4199	42.20
HENRY CLAY	4200	36.92
DIRECTORATE	4442	27.40

Name	Lot No.	Size
MICAWBER	4443	48.10
MICAWBER FR.	4444	2.10
LA DORA	4459	48.00
STRONTIAN	4460	48.60
LA DORA FR.	4461	17.60
M S C	4623	49.00
DIRECTORATE FR.	4882	11.00
ORIGINAL	5120	25.50
FEE DONALD	5124	50.20
ORIGINAL FR.	5125	44.50
NELLIE N	6057	31.30

HISTORY

The property has a history of intermittent operation between 1900 and 1954, and reports show that approximately 24,500 tons of ore yielded 47,800 ounces of gold and 113,000 ounces of silver in addition to values in lead and zinc. A report by Mr. W. N. Plumb, P.Eng., dated October 13, 1954, summarizes the activity during this period accordingly:

> "The Arlington Mine was brought into production in 1900 and operated until 1912. The ore was mined by hand-steel, sorted underground, and the waste used as backfill. About 17,000 feet of development work was done and approximately 12,000 tons of ore, averaging $40.00 per ton, was shipped. The mine was closed in 1912, due to labour shortage during the First World War. From 1912 to 1933, it was operated sporadically by lessees.
>
> In 1933, Premier Gold Mines Limited acquired the property and leased it to the Oscarson brothers of Spokane, Washington. From

1933 to 1941, the Oscarsons mined by hand-methods, sorted and shipped 5,360 tons of ore averaging 1.34 ounces of gold, 3 ounces of silver and 3 per cent lead per ton. Premier Mines Ltd., meanwhile, mapped the mine and thoroughly sampled the extensive mine dumps, which are reported to have assayed about 0.145 ounces of gold per ton.

Since 1943, the mine has been operated intermittently by the present owners, on a small scale. Hand methods were still used until 1947. In 1948 and 1949, Kenville Gold Mines Limited, under option, uncovered two narrow veins by surface stripping and sank a thirty-foot shaft on one of them. They also took several bulk samples of the mine backfill, which is reported to have assayed about 0.165 ounces of gold per ton. The option lapsed in 1949. In recent years a 100-ton mill was erected and operated on dump "ore", supplemented by underground ore, believed to have come from 80-Level and from the Rolick stope on 60-Level. A 360-foot cross-cut was driven on 110-Level without finding ore. 573 feet of diamond drilling was done in 1953 in a search for new ore, with negative results. Mining and milling were suspended in July 1954."

The writer has no record of activity up until 1957 when Messrs. Fox and Linn of Trail obtained an operating lease. The Minister of Mines Reports record the following shipments of dump material to the Trail smelter:

		Content		Grade			
Year	Tonnage	Gold	Silver	Gold	Silver	Lead	Zinc
1958	30 tons						
1959							
1960	52	37 oz	105 oz	0.71 oz	2.02 oz	1.70%	2.11%
1961	161	114	320	0.71	1.99	1.89	1.92
1962	277	148	262	0.53	0.94	0.97	0.92
1963	1357	348	1004	0.25	0.74		
1964	4168	548	1869	0.13	0.45		
1965	5406	767	3044	0.14	0.56		
1966	7017	1003	3573	0.14	0.51		
1967	7325	851	3241	0.12	0.44		

		Content		Grade			
Year	Tonnage	Gold	Silver	Gold	Silver	Lead	Zinc
1968	5722	681 oz	2993 oz	0.12 oz	0.52 oz		
1969	3339	398	2219	0.12	0.66	0.57%	
1970	1103	85	1073	0.07	0.97		
	35,957 Tons	4,980 oz	19,703 oz				

Minor attempts at underground work are reported, but no significant results were achieved.

The writer found the underground workings to be in good shape considering their age. Much of the timber is still firm, and the posts and caps examined show no evidence of taking pressure as a result of ground settlement. Local caving in the portal areas would require clean-up to provide easier access and better ventiliation.

GEOLOGY

REGIONAL:

The area west of the Salmo River between the town of Salmo and the hamlet of Ymir, is underlain by a belt of northerly-trending volcanic and sedimentary rocks which have been intruded by the Nelson batholith. The oldest rocks are Lower Jurassic in age and consist of andesitic and basaltic lava flows of the Rossland Formation. Flow breccias and pyroclastic material

are fairly common, and in places vesicular and amygdaloidal horizons have been noted.

The Rossland Formation has been folded into a moderately open syncline which trends northerly, and the resulting trough is occupied by sediments of the Hall Formation; middle to upper Jurassic in age. In lithology these rocks vary in composition from conglomerate through greywacke-sandstone to quartzites, siltstones and argillites. In the mine area the formation is represented by black well-indurated hornfelsic argillites. These rocks appear to reflect the syncline defined by the underlying Rossland Formation.

The Jurassic volcanic and sedimentary rocks are intruded by Nelson Plutonic Rocks probably Lower Cretaceous in age. The predominant phase is porphyritic granite, but other phases which have been identified are quartz diorite, quartz monzonite, diorite, monzonite and syenite. Within the area under consideration the predominant phase is a coarse to medium grained non-porphyritic granite which occurs in satellite stocks poking through the volcanics and sediments.

LOCAL:

The property is situated on the western slope of Keystone Mountain and the immediate mine area is underlain by argillites which vary from well-indurated hornfelsic and calcareous to soft graphitic and schistose. The latter has been intensely folded while the harder calcareous beds have resisted deformation. The result has been that significant movement developed along

the bedding planes. The zone of mineralization occupies one of these bedding faults where an aplite sill has been intruded between a thick series of calcareous argillite and an underlying horizon of schistose and graphitic material. The sill has been regarded in the past as the major ore control. Mr. A. Lakes (1952, 53, 54) recognized several horizons between the upper levels and the lower 110 drift, and his mapping shows quartzitic, carbonaceous and limy argillite cut by "igneous rocks". These varieties of argillite might be difficult to recognize until more familiarity was acquired. However, the subtle differences, together with structural features, might be significant. The "igneous rocks" which appear on Lakes' sketches are further described by Plumb 1954, as varying from aplitic to porphyritic. Apart from the previously mentioned sill, these rocks appear in dykes and sills throughout the mine.

The regional stratigraphic sequence on Keystone Mountain has a northerly trend and a gentle to moderate westerly dip. In the mine area the northerly strike is modified somewhat by a convexity to the east which defines a broad syncline plunging to the west at approximately 20°. Structural mapping underground, along with the pattern created by the drift as the producing horizon was followed, traces out this broad structure over an area approximately 1700 by 800 feet. The westerly dip is further modified by a series of gentle rolls transverse to the syncline which create flat areas, and which have an important bearing on ore localization.

Numerous faults with a northerly strike and easterly dip of 45° - 60° displace the mineralized horizon: the most significant displacement noted by

Plumb is 60 foot vertical in a dip-slip sense.

The structural picture in the mine area, although complicated, should not be regarded as complex. It is the key to ore localization, and structural analysis must be a major consideration in any future evaluation. Points of particular interest are:

1. The relative ages of the syncline and the transverse rolls.
2. The relationship between folding, faulting and mineralization with respect to age and location.
3. The relationship of the dykes and sills to folding and mineralization.

Plumb concluded that the cross-faulting played a more significant roll in ore localization than the folding by creating dilatant zones and anticlinal dragfolds on the western side of the fault. Parallel zones, or subsidiary bedding faults, were developed which allowed the emplacement of mineralization above the main flat fault. The Rolick and Little Bull Pen stopes mined such ore.

It is reasonable to question these conclusions and suggest that the cross-faulting is relatively late and has, perhaps, had no significant effect other than to complicate the picture by displacement. It is further suggested that the transverse folds are pre-ore and thus provided the most favourable sites for concentration. This type of folding could develop under the same stress pattern which would produce the bedding plane faults. The more competent argillite resisted tight folding while the soft carbonaceous horizons

yielded readily and crumpled to produce dilatant zones and bedding plane faults which would provide channels for the splite sill, or sills, and closely related quartz and mineralization. The later cross-faulting developed adjacent to the folds because of existing lines of weakness set up by the folding. If these faults were pre-ore, one would expect to find at least quartz vein material, if not sulphide mineralization: no such mention was found in the available descriptions dating back to 1932.

The axis of the transverse folds as located and plotted by Lakes (1954) on the drift plan composite drawing, reflects the open syncline and gives the impression that the syncline may be a post-ore feature.

Geological mapping by Lakes in the 110 level drift at the 4100 foot elevation shows considerably more folding than in the upper levels. There is an interesting repetition of stratigraphy, and Lakes points out that the carbonaceous horizon of economic interest should occur ahead. The face of the drift is in quartzitic argillite, such as overlies the sill and ore zone on the upper levels. Repetition is reasonable to expect, and drilling is justified to assess these possibilities. The face of the 110 cross-cut is well located and affords a first rate drill site.

MINERALIZATION:

The zone of mineralization is concisely described by Plumb:

> "The orebody consists of a network of quartz stringers permeating the highly contorted graphitic achists in a three- to six-foot band, usually below the aplite sill but sometimes above the sill and below the flat fault. Occasionally it forms a single vein from 4 inches to 4 feet thick, usually where it has intruded less graphitic material, in which case it may contain brecciated frag-

"ments of argillite. There is only the one main ore horizon throughout the mine, pinching and swelling but forming a more or less continuous sheet in a north-south direction and thinning gradually to the east and west.

"The mineralization consists of massive, fine- to coarse-grained pyrite, with occasional fine-grained galena and sphalerite. The gold and silver and contained in the sulphides and do not occur free. The fine-grained pyrite, with some galena, is reported to carry the higher gold and silver values. The silver to gold ratio is about two to one. The wall rocks, for at least 50 feet above and 100 feet below the graphitic zone, are thoroughly impregnated with fine-grained pyrite and were found to assay 0.012 ounces of gold per ton."

The writer took two character samples of vein material in the area of the Little Bull Pen stope where Mr. Shrieves pointed out sulphide mineralization in an 8 foot thick quartz vein. This material consists of medium to fine grained galena and pyrite in bands ¼" to ½" thick in white quartz. The occasional speck of malachite suggests minor copper, and past assays show the presence of appreciable zinc. On the writer's samples the following results were returned:

	Gold	Silver
Sample 3377	1.23 ounces	2.9 ounces
3378	5.71 ounces	11.0 ounces

MINING and REMAINING POTENTIAL

A total of 17,000 feet of drifting and raising has been carried out as shown in the accompanying map of composite drift plans. Except for the 60 and 110 level cross-cuts, the development drifting and raising was kept in the

vein and areas were mined which made ore. The better stopes were located where folds localized heavy sulphides, and Shrieves commented that 6 - 8 ounce gold was not uncommon in such zones. Several panels were extracted in flatter areas, but the grade was not as good. The practice during these periods of operation was to hand sort the muck underground and bring out only the better vein material. The remainder was put back in the stopes as fill. This fill material has been sampled by various investigators during the period 1950-53, and values reported in the order of 0.15 ounces of gold per ton and 1.10 ounces of silver. The dump has also been fairly extensively sampled and values in the order of 0.13 - 0.16 ounces of gold per ton have been reported. The various estimates on the tonnage of material remaining underground as fill, and on the dumps, vary between 150,000 and 170,000 tons. Approximately 36,000 tons have been shipped during the period 1958 - 1970, so the total is reduced accordingly. Of the total, it is probable that portions of the dump will have a significant gold content while other portions will be low.

In the 80 level stoping areas parallel gold-bearing veins were located in zones underlying the main zone and, although some mining was initiated, Shrieves suggested that significant amounts of material remained. Plumb examined this possibility in 1954 and reported that the structure had the potential of providing approximately 10,000 tons of mineable material. The grade to be expected was based on samples taken from the 80 level stoping area, and Plumb reports as follows:

> "Samples taken by New Arlington Mines Limited for 80 feet along strike averaged 1 ounce of gold, 6 ounces of silver, 1.4 percent lead and 2.3 percent zinc over a 3½-foot width. One character sample, taken by the author, in the same zone, averaged 0.34 ounces

of gold over a width of 81 inches, of which 9 inches was quartz, assaying 2.58 ounces, and 72 inches represented graphitic wall-rock, assaying 0.06 ounces."

The two Bull Pen stopes and the Rolick stope offer potential in clean-up, and thorough sampling of the walls combined with a structural study is fully justified.

CONCLUSIONS AND RECOMMENDATIONS

Three possibile areas of economic potential deserve consideration in view of the significant increase in the price of gold and silver since the property was operated in 1954.

1. Approximately 125,000 tons of material with an indicated grade of 0.13 - 0.16 ounces per ton of gold is available for shipment to the Trail smelter. The rock on the mine dumps can be shipped immediately, while underground clean-up and a little more effort will be required to recover the fill.

2. Clean-up and general salvage work in the old stope areas will be well rewarded, and thoughtful geological effort may well point to untested areas.

3. The possibility of lower level repetition, as suggested by Lakes, is not unreasonable and there is no geological evidence that precludes it.

With these possibilities in mind, the following course of evaluation is recommended:

1. Examine the various dump areas carefully, block out the better grade areas, and begin trucking the material to Trail. Values will be found in gold, silver, lead, zinc and quartz.

2. Carry out a comprehensive underground study which will include mapping and sampling. Begin with the stope areas to outline salvage possibilities and assess the structural signature of favourable areas.

3. Initiate diamond drilling in two phases:-

   (a) Set up an underground machine at the face on the 110 level and drill at least 4 holes to evaluate lower level potential as suggested by Lakes.

   (b) Utilize a small surface machine to test the northwestern portion of the mine area, and possibly areas of interest located by the geological work.

4. After studying the disposition of recoverable fill and salvage material, clean out the appropriate portals and drifts to gain working access.

COST ESTIMATE

1. Two trucks and a loader should be available locally and the estimated cost is itemized as follows:

(a) Allowing $1.00 per yard per hour for a 10 yard single axle truck working a 10 hour day, 22 days a month, the estimated cost would be $2,200 per month. To utilize 2 trucks:

Allow - $4,400 per month x 6 months	$ 26,400

(b) Rental on a 2½ yard rubber-tired loader:

- $3,000 per month, include fuel & maint. x 6	$ 18,000
Operator at $50 per day x 22 = $1,100 per month, plus benefits at 15%, $165	
$1,265 x 6	$ 7,590

The round trip is 52 miles of which 44 miles are paved between Erie and Trail. Two and a half hours per trip, including loading and unloading, is a reasonable allowance, and each truck should make 4 trips a day. This should move 2,000 tons to 2,400 tons per month to the smelter.

The cost estimate includes operating costs for a 6 month period to allow for the time lapse in processing at the smelter and receipt of the returns.

Haulage estimate for a 6 month period -	$ 51,990
Contingencies at 10% -	5,190
	$ 57,189

Allow $ 57,000

1. Geological Study and Sampling:

With concentrated effort, a Geologist and Assistant should map, sample and evaluate the underground excavation within a three week period.

(a)	Allow 20 days at $300	$ 6,000
(b)	Subsistence at $40 per day x 20	800
(c)	Vehicle rental and operation	400
(d)	Assay charges; estimate 200 samples at $17.00 (Au, Ag, Pb, Zn)	3,400
(e)	Evaluation and correlation of results, 5 days at $200	1,000
		$ 11,600

Estimate $ 12,000

3. Diamond Drilling:

(a)	2500 ft. of AQWL from 110 L @ $9.00	$ 22,500
(b)	2000 ft. in short holes from upper levels @ $9.00	18,000
(c)	Compressor rental & maintenance 2000 x 2 months	4,000
(d)	Logging and sampling	2,500
	- analytical	1,500
	- sample shipment	100
		$ 48,600

Estimate $ 49,000

4. It is anticipated at this time that access to the 80 level working areas might be desirable. Two men would be required to clean out the portal then 6 men could be utilized between drift rehabilitation and stope clean-up.

Labour and equipment rental & purchase	$ 50,000

Cost Summary:

1.	Haulage	$ 57,000
2.	Geological study & sampling	12,000
3.	Diamond Drilling	49,000
4.	Underground Work	50,000

Total: $ 168,000

The anticipated schedule for the above program is planned as follows:

1.	April thru November	- Haulage
2.	April	- Study and sample
3.	May - June - July	- Drilling
4.	June on -	- Underground rehabilitation and clean-up

Respectfully submitted,

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JSV:jlc