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PART B - GEM PROPERTY

INTRODUCTION

The Gem geology and mineralization are described in detail in the April, 1969 report; hence the following text represents an abbreviated summary of the above. However, since the writer's last visit the No. 2 adit has been cleaned out and sampled by Mr. Bates.

Fig. 3 and Dwg. G71-1 present all of the essential details of the Gem property, geology, mineralization, and workings.

CLAIMS

Croesus No.'s 3 and 4 M.C.'s comprise 'key claims' in respect of the Gem mineralization and its foreseeable extensions; both are held in good standing by virtue of assessment credits obtained from exploratory work accomplished within more southerly claims of the general Croesus group.

LOCATION, ACCESS, & GENERAL FEATURES

The Gem adits and open cuts situate some 4000 ft. northeast of the main, or Lower Croesus trenches. They are directly accessible via a branch road leading eastward and northward from the main Zymoetz River 'north' road. Regionally, the workings lie at about 7 air-miles E.N.E. of Terrace within a moderately-sloping, well-timbered area on the south side of Kleanza Mtn.

HISTORY

The Gem vein was discovered (Hagan?) during the late 1920's or early 1930's. During the (mid?) 1930's W. Hagan and associates explored the vein via 3 or 4 short adits, of which only the upper two are now accessible. This group stoped and sacked a small amount of high-grade pyritic ore; there is no record of shipments. The property lay dormant until 1966, when these and other local prospects were acquired by Kleanza Mines Ltd. via the staking of the enclosing Croesus group. Since 1966 R. H. Bates has rehabilitated and sampled the Gem No.'s 1 and 2 adits, re-opened old trenches, carried out geochemical (heavy-metals) soil surveys and electromagnetic surveys, and surveyed and mapped all workings in the locality. During his several visits to the property between 1966-71, the writer geologically mapped and check-sampled the principal exposures.

GEOLOGY & MINERALIZATION

The Gem gold-silver mineralization occurs within a strong quartz vein traversing the regional Hazelton Group andesites. It trends at about N 20° E, and dips about 70° E. The primary quartz filling has been fractured and filled with pyrite and subordinate Pb-Zn-Cu sulphides. Exposures within 4 adits (2 lower caved) and consecutive trenches delineate a gross strike, and dip-lengths of about 1000 and 400 feet, respectively. No.'s 1 and 2 adits, respectively at 2150' and 2250' els. and each about 180' long, together open a 300-ft. strike-length. Within these, vein widths range from 10-30 inches; however stoping (Hagan) done near the inner end of No. 1 was done on 3 to 4 ft. widths.

ASSAYS & ORE ESTIMATES

Sampling carried out by Mr. Bates and the writer results in the following estimates:

		Length'	x	Width'	Au oz./ton	Ag oz./ton
General Averages, #1	Adit,	115	x	1.37	0.62	1.18
General Averages, #2	Adit,	110	x	1.20	0.93	2.38
Weighted-Average, #1 & 2	Adit,	112	x	1.30	0.76	1.73

Indicated Ore - no dil. = 4800 tons at the above weighted-average width and grade, with a net-recoverable value of approx. $25.00 per ton.

GENERAL CONCLUSIONS & RECOMMENDATIONS

The vein is free-breaking, and the contained sulphides amenable to gravity-concentration. With both faces in ore, further development should provide an increase in ore reserves and opportunities for selective mining. With the above, the writer considers the Gem deposit to be a potentially profitable mining situation - if organized and undertaken in a manner appropriate to the type, size, and net-value of the deposit.

W. M. Sharp

C E R T I F I C A T E

I, William M. Sharp, with business and residential addresses in North Vancouver, British Columbia, DO HEREBY CERTIFY THAT:

1. I am a graduate of the University of British Columbia with an M.A.Sc. (1950) degree in Geological Engineering.

2. I am a registered Professional Engineer in the Province of British Columbia, Reg. No. 2164.

3. I have practiced my profession for 20 years, including 7 years as a geological consultant.

4. I have personally examined the KDL, Gem, and Hope Silver properties - most recently during August 14-15, 1971.

5. I have examined the staking relating to the 'key' claims on the Gem and Hope Silver properties and can advise that it has been done as required by the Mineral Act.

6. I have no direct or indirect interest in the properties or securities of Kleanza Mines Ltd. (N.P.L.), nor do I expect to acquire any such interest.

W. M. Sharp
W. M. Sharp, P. Eng.

North Vancouver, B.C.
August 30, 1971.

Industrial Confidential

Mines Branch Investigation Report IR 72-20

MINERALOGICAL INVESTIGATION OF A GOLD-SILVER ORE FROM KLEANZA MOUNTAIN, TERRACE AREA, BRITISH COLUMBIA

by

A. E. Johnson*

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SUMMARY OF RESULTS

A sample of gold-silver ore from Kleanza Mines Ltd., Terrace area, northern British Columbia was investigated mineralogically. The ore consists of granular pyrite aggregates in quartz. The pyrite contains inclusions of gold-silver-lead-bismuth tellurides together with trace amounts of chalcopyrite, sphalerite, and goethite. The gold and silver values come from the tellurides which are present as several related phases within any one inclusion. No free grains of the tellurides were noted in the mill products or head samples obtained from this ore.

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INTRODUCTION

Several samples of gold-silver ore from the Terrace area of northern British Columbia were received from Mr. A. Stemerowicz of the Mineral Processing Division in March, 1972. Mr. Stemerowicz stated that 390 pounds of the ore had been submitted to the Mines Branch by Mr. R.H. Bates of Kleanza Mines Ltd., Post Office Box 580, Terrace, British Columbia, for beneficiation test. A mineralogical examination of the samples was requested. The samples received included several hand specimens, a head sample crushed to minus 10 mesh and a jig-table concentrate that was obtained during the beneficiation tests.

The mining property is located approximately 7 miles east of Terrace, British Columbia, on Kleanza Mountain, at an elevation of 2150 feet (topographic map 103 I 9/w; Lat. 54°32'; Long. 128°27').

METHOD OF INVESTIGATION

The hand specimens were sawn and a polished section was prepared from one of them. This section was studied under the reflecting microscope and several telluride minerals were found. These minerals were identified by electron microprobe analyses and two of them were examined by X-ray diffraction methods.

The head sample was screened into several size fractions between 10 and 270 mesh. These fractions were separated into float and sink sub-fractions in heavy liquids as follows:

1. 48 to 150 mesh in liquids having specific gravities of 2.96, 3.33, and 3.7;
2. 150 to 200 mesh and 200 to 270 mesh in liquids having specific gravities of 2.96 and 3.33;
3. minus 270 mesh in liquids having specific gravities of 2.96 and 4.20.

The sink and float portions were prepared as polished sections and studied by means of a reflecting microscope and by X-ray diffraction.

Three polished sections of the jig-table concentrate were studied using the reflecting microscope.

RESULTS OF INVESTIGATION

General Description of the Ore Samples

The hand specimen consists of friable pyrite aggregates in milky white quartz. Some of the aggregates are crudely banded, and the pyrite is oxidized.

Mineralogy

The ore consists of pyrite and quartz (see Figure 1) with trace amounts of chalcopyrite, sphalerite, goethite, tellurides, and native gold.

Pyrite

Massive and spongy varieties of pyrite are present in the ore. The massive pyrite occurs as dense, homogeneous material (see Figure 2) and is relatively free of inclusions.

The spongy pyrite (see Figure 2) is characterized by containing numerous rounded inclusions of quartz, chalcopyrite, sphalerite, and tellurides. Because of these inclusions, the polished surface of the pyrite is often strongly pitted.

Tellurides

Several Au-Ag-Bi-Pb tellurides were noted and identified by using the electron microprobe. These included the following:

Name	Composition (wt %)		Formula
Altaite	Pb	60.70	$Pb_{1.06}Te_{1.00}$
	Te	35.36	
Hessite	Ag	61.95	$Ag_{2.05}Te_{1.00}$
	Te	35.73	
Petzite (possibly)	Ag	40.75	$Ag_{1.43}Au_{0.33}Te_{1.00}$
	Au	17.04	
	Te	33.83	
Volynskite	Ag	15.04	$Ag_{0.42}Bi_{0.53}Te_{1.00}$
	Bi	37.00	
	Te	46.29	
Pb-Tellurbismuth	Pb	15.15	$Pb_{0.20}Bi_{0.52}Te_{1.00}$
	Bi	38.87	
	Te	45.99	

The tellurides occur as rounded inclusions in pyrite (see Figure 3) and as veinlets and/or interstitial fillings between pyrite grains (see Figure 4). Most of the inclusions are smaller than 30 microns in diameter and consist of complex intergrowths of two or more tellurides. The small grain size of the tellurides renders identification difficult, nevertheless, electron microprobe analyses were obtained for each of the 5 minerals referred to above. The Pb Tellurbismuth has, as yet, not been named, but further work will be attempted to more fully characterize its physical and chemical properties.

Native Gold

One very small grain of native gold, approximately 2 microns in diameter, was found. It occurred together with a telluride inclusion within pyrite.

Goethite

Minor amounts of goethite occur as encrustations on pyrite grains. These particular grains were noted in samples of mill products but no goethite was observed in the hand specimens examined.

CONCLUSIONS

The gold and silver in this ore are present largely as tellurides which occur as inclusions and fillings in spongy pyrite. The gold values are in petzite whereas the silver values are in hessite, petzite, and volynskite.

The telluride grains are so small that very fine grinding would be required to liberate even the coarser ones. This conclusion was reached after detailed examinations of mill products and tabled pyrite concentrates failed to locate free tellurides in the pyrite aggregate.

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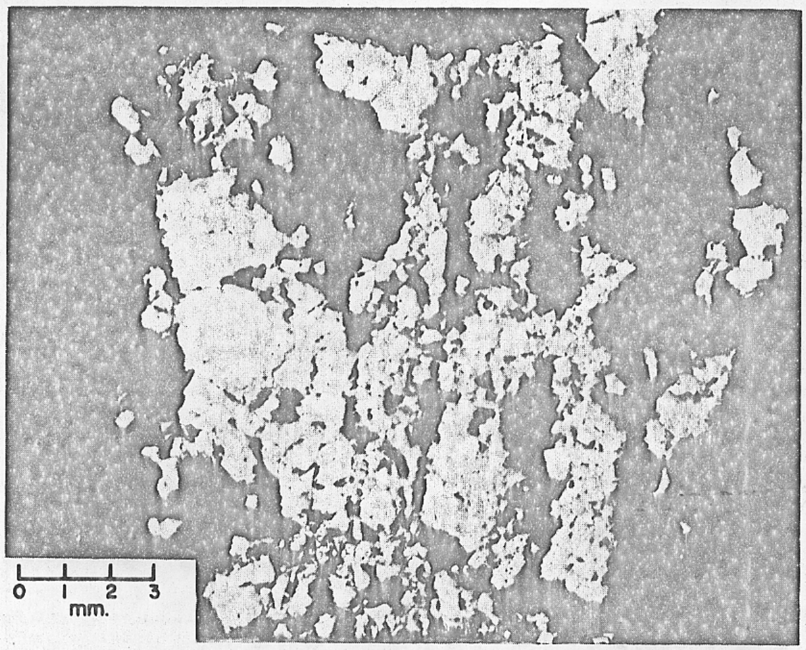

Figure 1. Pyrite aggregate in quartz.

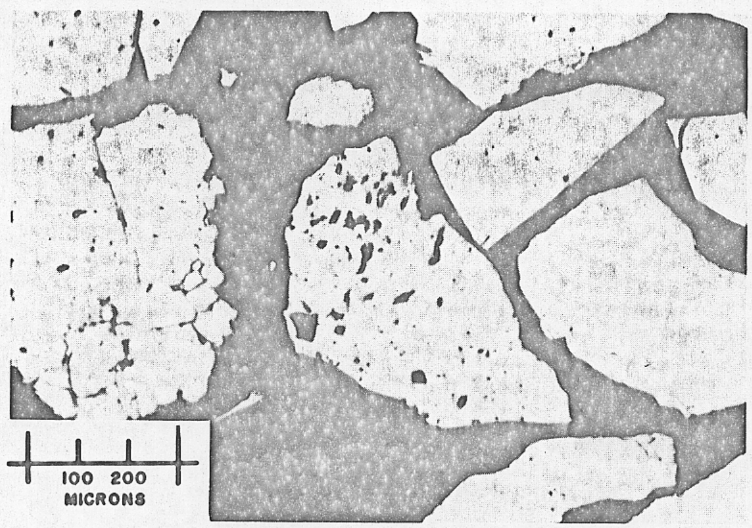

Figure 2. Photomicrograph of a sample of mill product which includes both massive pyrite and spongy pyrite.

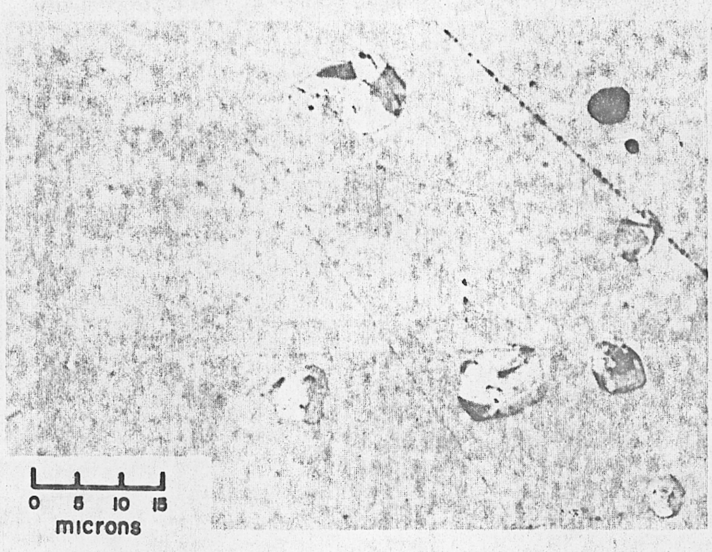

Figure 3. Rounded inclusions of multi-phase Pb-Bi-Au-Ag telluride in pyrite.

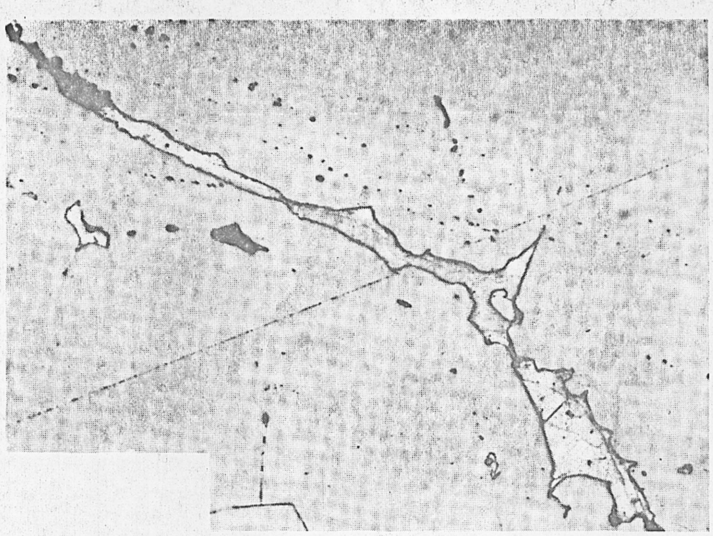

Figure 4. Interstitial multi-phase Pb-Bi-Au-Ag telluride in pyrite.