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KAMLOOPS GOLD PROGRAM

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OCTOBER 1975.

CONTENTS

(a) INTRODUCTION

The dramatic increase in the price of gold has stimulated the exploration for gold deposits. The development of new techniques of treating low grade gold ores has made it possible to develop gold deposits that would not have been economical using the conventional cyanidation process.

The development of the Carlin and Cortez deposits in north-central Nevada utilizes the concept of large tonnage and low grade mining, of gold ores. These deposits are economically attractive because of the low capital investment required to put them into production and because of their lucrative returns.

Exploration for a large tonnage,low grade gold deposit is proposed for a 90 sq. mile area north and southeast of Kamloops, B.C. The regional exploration program would involve the examination of known gold occurrences as well as locating and sampling areas that appear most favourable for introduced metals (fracture fillings,intensely altered rocks). The samples would be analysed for their gold,silver and arsenic content.

(b) TYPES OF LARGE TONNAGE, LOW-GRADE GOLD DEPOSITS

The Carlin and Cortez gold deposits of north-central Nevada are perhaps the most widely recognized large tonnage, low-grade gold deposits in North America. These deposits are essentially relatively large replacement bodies with an epithermal mineral assemblage.

Calcareous siltstone beds have been replaced by quartz and chalcedony, and areas of silicified siltstones contain most of the gold. The mineral assemblage is native gold, native arsenic, stibnite, realgar and cinnabar.

The Carlin mine began production in 1965 with ore reserves of 11 x 10^6 tons averaging .32 oz/ton gold. The Cortez mine began production in 1969 with ore reserves of 3.4 x 10^6 tons averaging .29 oz/ton gold.

The Lawyers group, held by Kennco Explorations (Western) Limited, is located twenty miles northeast of Thutade Lake, B.C. This deposit consists of quartz stockworks and quartz-filled breccia zones in fractured and brecciated dacite porphyries and pyroclastic rocks. The mineral assemblage is pyrite, chalcopyrite, argentite and electrum with associated amethystine quartz.

The Lawyers deposit is reported th have 40 x 10^6 tons

averaging .3 oz/ton gold.

The Carolin Mines deposit is approximately twelve miles northeast of Hope,B.C. The deposit consists of a replacement of a greywacke-slate sequence by albite,pyrrhotite,arsenopyrite and gold with associated areas of quartz veining.

The Carolin Mines deposit is reported to have in excess of 1.5×10^6 tons averaging .08 to .1 oz/ton gold.

All of the deposits discussed above have the bulk of their gold in submicroscopic particles in or adjacent to zones of silicification. The mineral assemblages of these deposits strongly contrast with each other. The reason for such a contrast is the differences in the physio-chemical environments in which the minerals were deposited and the diverse environments in which gold can be deposited.

(c) TREATMENT OF GOLD ORES AND RELATIVE COSTS

(1) CONVENTIONAL

A conventional cyanidation plant used in processing gold ores usually includes crushing, fine grinding and agitation leaching in cyanide solution, countercurrent decantation by vacuuming and precipitation of the gold by zinc powder.

This method of treatment is costly from the viewpoint of capital investment and of operating cost. Such a process is economical for ores grading .1 oz/ton or better.

The Carlin Mine uses a conventional cyanidation plant. The following is a summary of costs incurred in the mining, milling and treating gold ores in a 2000 tpd plant.

Initial Capital Costs.

Mill and Plant Facilities		14×10^6
Operating Costs		
Cost per Ton		
(a) Mining	.50	
(b) Milling	1.00	
(c) Treatment	2.50	
(d) Overhead @ 10%	.40	
Total Cost per Ton		$ 4.40

(2) HEAP LEACHING

In the heap leaching-carbon adsorption electro-winning process, the mined ore, with or without crushing, is piled into heaps on an impervious base. The dilute cyanide-lime solution is then distributed over the surface of the heap, collected, treated in activated carbon columns and recycled after adjusting the concentration of cyanide and lime.

This process is being used successfully at the Cortez and Carlin Mines in Nevada and at the Canorex Development property in New Mexico.. This method is used on ores that grade .02 to .2 oz/ton gold. Capital investment and operating costs are low in comparison to the conventional process..

(3) VAT LEACHING

In vat leaching,. finely crushed or deslimed ore is carefully bedded in vats. The cyanide solution is applied to the vats, by upward or downward percolation and flooding to dissolve the precious metals. The cyanide solutions are treated continuously with activated carbon to recover the precious metals..

This process incurrs higher capital and operating costs than heap leaching but has advantages of higher overall recovery in a comparatively shorter period of time.

In the final analysis, the method used for a given gold ore would depend on the tonnage and grade of the deposit at the prevailing price of gold.

COST FACTOR (2000 tpd operation)

PROCESS	CAPITAL	OPERATING
(1) Conventional	1.00	1.00
(2) Heap Leach	.03-.25	.44
(3) Vat Leach	.66	.77

Taking the Carlin Mine costs as an example, the following illustrates the costs of the different processes..

COSTS (2000 tpd operation)

PROCESS	CAPITAL	OPERATING
(1) Conventional	14×10^6	4.40
(2) Heap Leach	42×10^4 to 3.5×10^6	1.94
(3) Vat Leach	9.24×10^6	3.39

(d) GEOLOGY OF THE PROPOSAL AREA

The proposal area is situated in a mixed terrane which includes Paleozoic Cache Creek Group chert,limestone and argillite,Cretaceous (?) plutonic rocks and volcanic flows of Tertiary Kamloops group.

LITHOLOGIES

(1) CACHE CREEK GROUP (PERMIAN)

The principal rock type of the Cache Creek Group is a grey to black,thin to medium bedded argillite which in places contains horizons of chert. Medium-grained greywacke interbedded with the argillite and rare sequences of dense mafic volcanics are subordinate to the argillite and cherts. An almost black limestone interbedded with the argillite is widely distributed in the area. Where close to an intrusive contact, the limestone may become bleached, pyritized and silicated.

(2) INTRUSIVE ROCKS

Within the proposal area there are a number of igneous intrusions. All are of probable medium conposition and undersaturated with respect to silica.

(a) Jurassic and (?) Later Coast Intrusions

A large body of granodioritic rock designated by Cockfield (1948) as being part of his Wild Horse Mountain batholith lies immediately south of the proposal area. The rock is light colored,medium-grained,and contains quartz and some orthoclase, though the predominate feldspar is plagioclase. This

rock has associated aplite dikes. The granodioritic lacks any sign such as alteration or pyritization that might link it with mineralization.

(b) Cretaceous and/or Early Teriary Intrusions

Small outcrops of a greenish-grey,fine to medium grained,biotite diorite intrusive is found in the vicinity of Barnhartvale. The biotite is weathering limonite and chlorite.

A biotite feldspar porphyry is widespread within the area of Barnhartvale. This rock is chloritized and has bleached,silicified and pyritized the argillites in the vicinity. Kaolinized feldspar porphyries are observed in the vicinity of the biotite feldspar porphyry. These rocks are strongly fractured and quartz fills the fractures. The quartz veins and veinlets are gold bearing and are most likely genetically related to the feldspar porphyries.

(3) KAMLOOPS GROUP (Miocene or Earlier)

This group of rocks consists of flows and interbedded agglomerates of andesitic to basaltic composition.

STRUCTURE

Within the proposal area the Cache Creek rocks have been highly folded and in places contorted. In the vicinity of the intrusive porphyries there is some brecciation.

In the vicinity of Barnhartvale, both to the north and south, the area has a northeast striking structural grain. This structural grain is indicated by the trends of the larger feldspar porphyry intrusives and the trends of observed fault systems.

(F) GOLD PROSPECTS WITHIN THE PROPOSAL AREA

Within the proposal area there is a group of mineral deposits that have been formed in Paleozoic sedimentary rocks. They are quartz veins and mineralized shear zones carrying pyrite, chalcopyrite, tetrahedrite and in places, galena. The beds in which they occur are faulted and there is evidence of post-mineral movement. Gold values are reported up to 2.1oz/ton. A small production has been made from a few of the deposits.

(1) MOT CLAIM GROUP

Work carried out by Copper Range Exploration Company, Inc. has outlined two zones containing anomalous values in gold and arsenic. The first zone measures approximately 1000 feet by 2000 feet and the second zone measures approximately 700 feet by 2000 feet. Values in the second zone range from .007 oz/ton to .594 oz/ton A cyanide leach on seven samples taken from this zone gave a better than 90% recovery of gold. This indicates that the gold is not locked in fine grained deposits of other minerals.

The mineralized zone is confined to an area of strong fracturing, silicification and quartz veining. The mineral assemblage is pyrite, chalcopyrite and in places galena.

(2) HARP CLAIMS

The Harp Claims were originally held by the Clairdon Mining Co.

The showing consist of Quartz veins and stringers in shear zones in Paleozoic sedimentary rocks near the contact with granitic intrusions. Gold values are reported as occurring up to 1.4 oz/ton. The mineral assemblage noted is pyrite and chalcopyrite.

(3) CONSTANT GROUP

The Constant Group covered a shear zone with accompanying quartz veining. Gold values have been reported to range up to 2.1 oz/ton.

The mineral assemblage noted is pyrite and minor chalcopyrite.

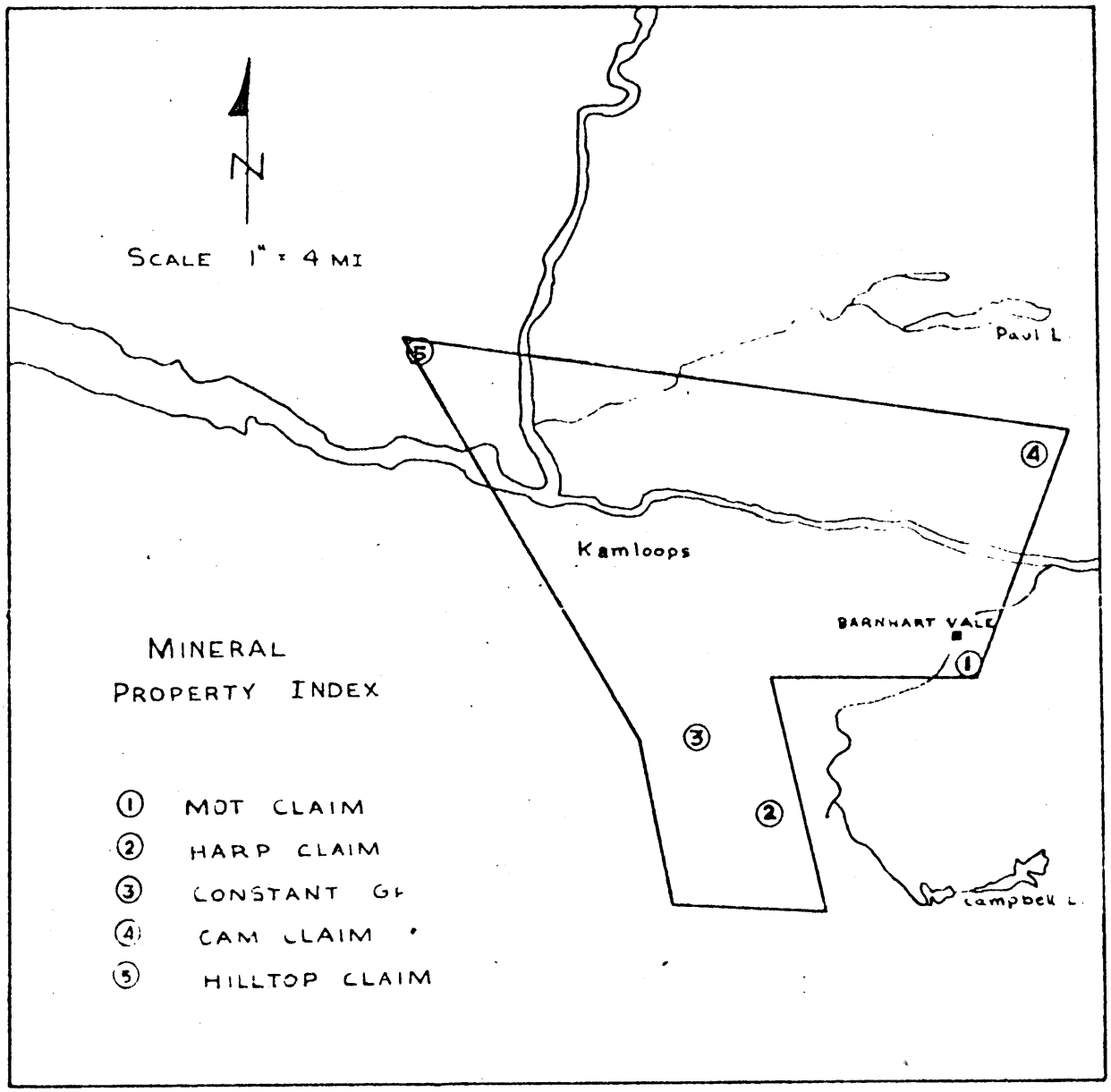
(4) CAM CLAIMS

The rocks in the area of the Cam Claims are argillites, quartzites, breccia and limestone of the Cache Creek group. The showing consist of veins and stringers of quartz that follow one or more shears. Quartz veins within the zones are discontinuous and there are numerous stringers of quartz together with much silicification of the wall rock. Gold values range up to .5 oz/ton and there is recorded minor production.

The mineral assemblage noted is pyrite, chalcopyrite and in places, tetrahedrite..

(5) HILLTOP CLAIM

The mineral showing consist of quartz veins following a shear zone in Paleozoic sedimentary rocks. Gold values are reported to range to .38 oz/ton.



(f) METHOD OF EXPLORATION

The method of exploration for disseminated gold deposits in the proposal area would involve several stages.

(1) Examination of areas of known mineralization, noting the features associated with these areas.

(2) Isolating areas within the proposal area that have features similar to the known gold bearing deposits. Areas with the following characteristics will be searched for:

(a) Copper geochemical anomalies

(b) Strong structural features

(c) Areas of silicification

(3) Sample those areas that look favourable for introduced metals.

(a) Run samples for gold, silver and arsenic content.

(4) Evaluate results.

(G) PROGRAM COSTS

This program would be carried out over a period of 30 days by a two man crew. The crew would be based out of a motel and would use a four wheel drive vehicle. The principle variable expense would be commercial assaying.

(1) Food and Lodging	$ 1320
(2) Gas and Truck Rental	$ 450
(3) Staking Fees	$ 500
(4) Assaying @ 6.75/sample (500 samples)	$ 3375 ±
(5) Miscellaneous (Maps, Assesment Reports etc.)	$ 150
Estimated Costs	$ 5795 ±

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