The Mosquito Creek Gold Mining Co. Ltd.

Location

The Mosquito Creek Gold Mining Co. Ltd. is a one hundred ton per day gold mine located at Wells B.C. Wells is approximately fifty-five miles east of Quesnel. Quesnel is on Highway 97, approximately seventy-five miles south of Prince George (Figure A). The Mosquito Creek Property adjoins, on the northwest, claims held by the former producer, Cariboo Gold Quartz Mines Ltd.

History

Placer gold was first discovered in the area in the 1860's, and is still being exploited today. Prior to the opening of the Cariboo Gold Quartz Mine in 1933, at least two attempts had been made to mine lode gold. These failed due to poor recoveries. The cyanide extraction method used by the Cariboo Gold Quartz and Island Mountain Mines apparently gave a 90% recovery rate. The Island Mountain Mine, started in 1934, became known as the Aurum Mine after its purchase by the Cariboo Gold Quartz in 1954. Some of the Island Mountain workings extend into the Mosquito Creek ground, and are reported to contain 40,000 tons, at 0.7 ounces per ton. (Refer to Table 1 for a chart indicating production from both these mines.)

Regional Geology

The rocks in the mine area had been classified as sedimentary formations of the Cariboo Group dating from Early Cambrian and later age by early geological workers. They believed that the shallow-water sandstones, shales and limestones were uplifted, metamorphosed, folded and eroded during a Devonian to Mississippian Cariboo Orogeny.

However, recent work (Struik, 1981) suggests that these rocks may be Late Proterozoic to Cambrian sediments deposited on a shallow to moderately deep ocean shelf with the folding, metamorphism and faulting not occurring until the Early Jurassic to Late Cretaceous Columbian Orogeny. If this hypothesis is accepted, the ore bodies could be Tertiary, since they are controlled by the folding and by the faulting.

The Cariboo Group have been folded into northwest striking and plunging folds which have been overturned to the southwest (Figures B to D). These structures plunge at 20 to 25 degrees; and, going from
southwest to northeast, have been called the Island Mountain Anti-
cline, the Snowshoe Syncline and the Cunningham Anticline. The
ore bodies are restricted to the northeast flank of the Island
Mountain Anticline in the Rainbow and Baker Members which have
been shown (Sutherland-Brown, 1957) to be parts of the Snowshoe
Formation. The degree of schistosity and cleavage in all rocks of
the Cariboo Group is directly related to the intensity of the
folding.

Struik interprets the faulting sequence in the mine areas as being
(Figure C):-

(1) thrust faulting in the plane of the folds
(2) high angle, reverse and normal faulting in the fold
plane
(3) high angle, southeast dipping, normal faults at right
angles to the fold plane
(4) high angle, east dipping, north striking faults with
right lateral movement

Economic Geology

Gold ore in the Wells area occurs in two forms: firstly, as
auriferous pyrite in quartz veins in the Rainbow Member; and
secondly, as bedded auriferous pyrite replacement bodies in the
Baker Member.

Quartz Veins

The quartz-pyrite veins in the black argillite and argillitic
quartzite metasediments of the Rainbow have three fracture
directions: -

(1) Transverse Veins - strike N 30 - 50° E and
dip 70 - 90° SE

(2) Diagonal Veins - strike N 70 - 90° E and
dip 70 - 90° S

(3) Strike Veins - strike N 40 - 60° W and
dip steeply NE

Transverse Veins reportedly provided 60 - 75 percent of the ore
at the Cariboo Gold Quartz Mine; whereas the Diagonal Veins were
the source for most of the vein ore at the Island Mountain Mine.
The Strike Veins, although the largest, were also the fewest and
least productive.
Ore grade quartz veins would generally contain 15 to 25 percent pyrite and could assay 1 to 2 oz. Au./ton. Weaker pyritization was occasionally accompanied by cosalite (lead-bismuth sulphide), bismuthinite and free gold. The paragenesis determined by Skerl (1948) is: ankerite, quartz, pyrite, sphalerite, chalcopyrite, galena, argentite, cosalite, gold and quartz. Quartz ore was the source for most of the production from the Cariboo Gold Quartz Mine and resulted in an average grade of 0.39 oz. Au./ton.

**Replacement Ore**

The replacement pyrite ore bodies occur exclusively in the light grey-green calcareous sericitic phyllites, quartzites and limestones of the Baker Member. Generally, replacement ore is adjacent to, or in, the Baker Limestone (Figures B, D and E) which is from 5 to 50 feet thick and up to 50 stratigraphic feet from the Rainbow. This demonstrates the long recognized necessity of being in the proximity of the Rainbow-Baker Contact for success in the search for ore of both types (Figure F). The contact trends northwest and dips at 40 - 50° to the northeast.

Another recognized control for replacement ore is the noses, and occasionally the troughs, of drag folds in the Rainbow-Baker Contact (Figure E). Pencil shaped stopes occur when the replacement is restricted to the nose of the fold; but, occasionally, tabular stopes occur when the replacement follows the flattened limb of the fold.

Also, some stopes appear to have the replacement 'dammed' up against a flat fault (Figure E). The finer grained pyrite in replacement ore carries more gold. The fringes of an ore body are being reached, when increased ankerite, minor amounts of galena and sphalerite, and coarser grained pyrite appear. Trace amounts of scheelite and arsenopyrite are found in both ore types.

Silver values are approximately 10 percent of gold values, so are not as economically interesting.

**Ore Genesis**

Three theories have been advanced for the existence of the ore:-

1. remobilized from the country rock by the folding and metamorphism
2. hydrothermal fluids from a deeply buried source coming up the quartz veins
3. hydrothermal fluids from a deeply buried source rising up the north striking faults
Theory (1) is doubtful, because pyrite taken from country rock gives low gold assays; while pyrite from quartz veins and replacement ore gives high assays. Evidence exists to prove both of the remaining theories. However, Mr. Marcel Guiguet* (personal communication, 1982), A.C. Skerl, and apparently, A. Sutherland-Brown feel the fault theory is the most important ore control. Local mine history has indicated that most of the ore (both types) is found in close proximity to these faults.

*Geologist and former Manager of Cariboo Gold Quartz Mines Ltd., and currently Consultant to Mosquito Creek Gold Mining Co. Ltd.

Alteration and Trace Element Studies

Little has been done with regard to alteration and trace element studies. A remapping of the workings is in progress: preliminary observations indicate an increase in sericite near ore bodies, particularly in the footwall. Mariposite (Fuchsite) is always closely associated with replacement, usually in fractures in the ore.

Acknowledgements

The writer wishes to thank Dan Alldrick, B.C. Ministry of Mines, and, Vic Tanaka and Jim Kelly, Asamera Inc., for their helpful suggestions and discussions during their visits to the property.

Respectfully submitted,

Larry W. Carlyle,
Geologist,
The Mosquito Creek Gold Mining Co. Ltd.
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<td>Cariboo Gold Quartz Mine (1933 - 1959)</td>
<td>1,681,950</td>
<td>.3925</td>
<td>660,088</td>
<td>626,755</td>
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<td>Aurum Mine (1954 - 1967)</td>
<td>474,186</td>
<td>.5172</td>
<td>245,265</td>
<td>237,063</td>
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<td>Total Both Mines</td>
<td>2,927,245</td>
<td>.4283</td>
<td>1,253,683</td>
<td>1,196,283</td>
<td>137,750</td>
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Suggested Mid-Mesozoic Deformation

FIGURE C

a. ANTLER FORMATION THRUST

b. WESTERLY DIRECTED THRUST FAULTING

c. MAJOR FOLDING

d. FOLD RELATED THRUST FAULTING

e. HIGH ANGLE REVERSE AND NORMAL FAULTING

f. STEEP SOUTH SIDE DOWN TRANVERSE FAULTING

g. RIGHT LATERAL STRIKE SLIP FAULTING

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Struijk (1981), Page 1772
Canadian Journal of Earth Science

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FIGURE B

Fold Structure
Figure 6.—Idealized vertical cross-section, showing type of folding in Island Mountain mine and simplest interpretation of regional structure hypothetically extrapolated.
Figure 7.—Typical vertical cross-section through replacement orebodies.