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HOUSTON INTERNATIONAL MINERALS CORPORATION
MEMORANDUM

DATE: November 12, 1981
TO: Jim Adler, Gary Foye, Preston Hafen, Nil Mukherjee, Web Stickney
FROM: Barbara Sheinberg
SUBJECT: West Min/Tournigan Mining's Big Missouri Property, British Columbia

INTRODUCTION

The Big Missouri property is located approximately 25 miles north of Stewart, British Columbia. This is immediately north of HIMCO's land position. The property consists of 85 claims optioned by West Min in 1978. From 1938-1942 Cominco owned the property and mined 850,000 tons of 0.07 oz/T gold and 0.62 oz/T silver from below the Province Zone. Currently West Min's target is one million tons of 0.1 oz/T gold equivalents. They have indications there may 3 million tons of 0.1 to 0.15 gold equivalents. This report is a composite of information from a) a field trip to Big Missouri in 1980 by Larry Freeman and the writer of this report and, b) a talk, attended by the author, at the 1981 district 6 C.I.M. conference by Shaun Dykes, project geologist. The abstract from this talk is attached (Figure 1).

STRATIGRAPHY

Big Missouri is underlain by Jurassic Hazelton volcanic and volcanoclastic rocks. Rock types, from oldest to youngest are:

- 1) Dark grey andesitic fragmentals
- 2) Black carbonaceous ash flow/tuffs with pumice fragments and glass shards
- (?) 3) Dillsworth Rhyolite
- 4) Maroon andesitic volcanoclastics
(HIMCO's "brick red unit")
- 5) Andesitic fragmentals and flows-dark green lapilli tuff with chert and rhyolite fragments, variable carbon content
 - 5a. Mineralized horizons - cherty tuff surrounded by bleached, sericitic, pyritic andesitic fragmentals
- 6) Basalt-tuffs and breccias
- 7) Black calcareous siltstone

Units 1 and 2 thin to the north. Unit 1 was broken into 2 units during the 1980 fieldtrip. These were: 1) black fine grained ash flow or siltstone, 2) black carbonaceous andesite with 2-5 mm quartz and feldspar phenocrysts (HIMCO's Slate Mt. sequence).

There is disagreement between HIMCO and Big Missouri geologists on bedding orientations and tops in the area. Big Missouri has the rocks striking N40°W, 10-30°SW and tops to the west. In 1979 the Kretschmars mapped 3 bedding orientations trending N5-15°W, 45-60°E along the Grand Duc road, in Big Missouri's #6 and 7 units (Kretschmar, 1979). On Slate Mt. tops have also to been mapped to the east. Field work in 1981 suggested there may be an anticlinal axis nearly parallel the Big Missouri road. This should be further investigated.

MINERALIZATION

There are three mineralized zones (Figure 2).

Upper - Province
Middle - Calcite Cuts, N. trending underground workings
Lower - Dago Hill (3 horizons)

Details:

I. Dago Hill -

- (1980) a) Grade: Bleached andesite with stringer zone - 0.09 oz/T Ag; Cherty tuff, over 3 meters - 0.25 oz/T Au
- b) Mineralized zone is 100 meters wide with 3 horizons of cherty tuff
- c) foot wall andesites - brecciated, flooded with grey silica, chert and quartz fragments
cherty tuff - grey to white wholly siliceous exhalite - little volcanic or chert fragments, sulfide rich, gold occurs with dark grey fine grained galena, sometimes a sintery appearance to the rock, shot through with thin black carbonaceous stringers
hanging wall andesites - sharp or brecciated contact, bleached, sericitized
- d) Quartz - carbonate stringers with abundant pyrite are associated with mineralization. Several generations of veins have redistributed the gold and silver to form lower grade envelopes, amenable to open pit mining. Envelopes are bleached, sericitic and pyritic.

II. Calcite Cuts -

- (1980) a.) Grade: over 1 meter of cherty tuff - 0.5 oz/T Au,
6 oz/T Ag
over 6-7 meters (incl'd foot & hanging wall) -
0.25 oz/T Au, 2 oz/T Ag
- b.) mineralization is similiar to Dago Hill

III. Province Zone -

- (1981) a.) Grade: over 4-5 meters (incl'd cherty tuff & bleached andesite)
0.01 - 0.15 oz/T Au,
0.02 - 0.3 oz/T Ag

STRUCTURE

General trend of the rocks is N40°W, 10-30°SW. In general there are only gentle broad folds. In the Dago Hill area there is a N60°E fold axis. Bedding orientations here are N45-60°E, dipping SE or NW on respective sides of the fold axis. At N 20°W, almost perpendicular to the fold axis, a tensional plane was created. Consequent infilling has produced quartz breccia veins at this orientation. Foliations are E-W, dipping S at Dago Hill.

There are 3(?) major fault sets.

- (1980) 1) A curving reverse fault trending down Silver Creek which curves westward south of Hog Lake - major topographic/air photo signature.
- (1980) 2) Dago Hill area: a fault set of east dipping, high angle reverse faults striking N40°W.
- (1981) 3) NE faults with vertical displacement.

GENESIS

The gold-silver-lead-zinc cherty tuff mineralization is distal from it's source (Premier?). It was formed as a submarine exhalitive event during periods of relative quiescence in andesitic volcanism. The deposition of the exhalitive horizon brecciated and altered the footwall andesites. Alteration and brecciation of hanging wall rocks was a function of time. If the overlying flow was deposited before the exhalite solidified there was a churning and brecciation in the hanging wall. If the exhalite solidified first there is a sharp contact. Mineralization occurred in reducing paleobasins. The margins of the basins are seen as oxidized (maroon) volcanoclastics. Late state quartz-carbonate veining redistributed gold and silver into low grade envelopes around the cherty tuff horizons.