Premier 886478 Tom Schwetz Mar. 26/87 FINAL

LADIES AND GENTLEMEN

TITLE: - PROBLEMS IN ORE CONTROLS AND ORE GENESIS IN VOLCANIC-HOSTED PRECIOUS-BASE METAL MINERALIZATION SILBAK PREMIER AND BIG MISSOURI DEPOSITS NORTHWESTERN BRITISH COLUMBIA

INTRODUCTION

My purpose today is to illustrate many of the problems confronted by the explorationist working in mineral deposits in andesitic arc environments. I wish to discuss:

1) stratigraphic setting of the ores
2) textural features of the ores and affects of deformation
3) geometry of the ore zones

My interest in massive sulphide and other volcanogenic deposits give me a particular bias. Other of the authors have speciallized in epithermal deposits and hence their bias. I will proceed from the less complex Big Missouri deposits to the more complex Silbak Premier deposit.

PRODUCTION AND RESERVES

Summ - as you can see from the production and open pit reserve information on the slide, these deposits represent attractive exploration targets, with a total of 2.5 million ounces Au and 57 million ounces Ag.

OPEN PIT RESERVES
(AS OF DECEMBER 1985)

		GRADE	
	TONNAGE	OZ/T AU	OZ/T AG
SILBAK PREMIER	6,366,400	0.060	2.52
BIG MISSOURI	3,031,000	0.075	0.95

PAST PRODUCTION

		OUNCES	
	TONNAGE	GOLD	SILVER
SILBAK PREMIER	4,722,413	1,814,723	37,963,245
BIG MISSOURI	822,011	63,295	49,320
GEOLOGICAL RESERVES	9,397,400	609,300	18,922,800
TOTAL		2,487,300	56,936,300

LOCATION AND TECTONIC SETTING

Loc'n map

The Premier and Big Missouri deposits are situated in Northwestern B.C. adjacent the Alaska Panhandle, on the western edge of the Intermontane Tectonic Belt (in green), and near the east margin of the Coast Crystalline Belt (in brown).

We'll start by discussing the

STRATIGRAPHY AT BIG MISSOURI

– locate Big Mo property + X Sec.

The Big Missouri deposits are located 6km north of Silbak Premier.

Sec | Plan Reg

1) Mineralization is hosted by andesitic volcanic rocks of the Upper Triassic-Lower Jurassic Hazelton Group which is interpreted as an island arc assemblage.
2) Mapping ~~by Westman~~ in the Big Missouri area indicates a moderately west-dipping sequence. Stratigraphic tops are interpreted by Westman to be westward.

The stratigraphy may be divided into two parts; an Upper and Lower Sequence.

UPPER SEQUENCE

Massive green andesite flows, coarse breccia and tuff

LOWER SEQUENCE

Purple — Mixed maroon and green heterolithic andesite breccia and tuff, volcanic wacke and conglomerate

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Orange — Dilworth Rhyolite unit - coarse pumiceous rhyodacite breccia to fine tuff and volcaniclastic, carbonaceous tuffs and local carbonate beds

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The lowermost unit in grey and olive — Heterolithic Andesite flows, lapilli tuff and local ash flow tuff

The Lower Sequence is interpreted as a sequence of mixed, texturally variable, andesite to rhyodacite deposited in a shallow water marine environment flanking an emergent volcanic ediface. Facies changes within the Lower Sequence are rapid, both vertically and laterally.

On the other hand, the Upper Sequence is a monotonous sequence of green andesite flows and coarse breccia (shown in green). The Upper Sequence is interpreted as having been deposited in a quieter, perhaps deeper water, marine environment. Rocks of the Upper Andesite Sequence host all the significant mineralization at Big Missouri and also at Silbak Premier.

REGIONAL GEOLOGY

~~The Big Missouri deposit located south of Silbak Premier, looking now at the Regional Scale~~ regional scale The area is cut by numerous reverse and normal faults, that together with few stratigraphic marker lithologies and numerous facies changes, makes for extreme difficulty in establishing stratigraphy. Regional mapping by ~~them~~ Aldrich and others suggests that the section at Big Missouri is overturned and that the stratigraphic sequence tops the other way. PROBLEM NO 1.

~~The Big Missouri deposits are located 8 km north of the Silbak Premier deposit~~. The general stratigraphic sequence at Big Missouri may be extrapolated southward to the Silbak Premier mine area. The favourable Upper Sequence andesites are shown in green with interbedded siltstone in brown.

The yellow and blue are Premier porphyry dykes, sills or flows related to the coeval Texas Creek granodiorite stock.

DISTRIBUTION OF PREMIER PORPHYRY AT BIG MISSOURI

At Big Missouri, A small eliptical body (2,500 feet in diameter) of Premier porphyry occurs in the immediate footwall of the Martha Ellen zone within the Upper Andesite Sequence.

The Groundhog Marker unit (shown in yellow dashed line) occurs at the base of the Upper Andesite Sequence, ~~overlying maroon andesites~~, and is thought to be an extrusive equivalent of Premier porphyry.

STRATIGRAPHY AT SILBAK PREMIER

Silbak plan

In the Glory Hole area (locate) correlation of lithologic units in drill core suggests moderate westerly dips (~~locate Glory Hole area~~). Strata in the immediate mine area consists of a thick sequence of green andesite flows, breccia and tuff (in green). In the hanging wall of the mineralized zone, is maroon and green volcaniclastics (in purple) plagioclase porphyry (in tan) and maroon Premier ~~andesite~~ porphyry (shown in blue). Maroon volcaniclastic rocks are interpreted as being transported material on a local disconformity. They overlie green andesites hosting the deposit and appear in turn to be overlain by green andesite.

The depositional environment at Silbak Premier is therefore marine with local deposition of subaerially derived maroon andesitic rocks.

COMPARISON OF STRATIGRAPHY SILBAK PREMIER - BIG MISSOURI

Schem. sec.

(is shown in the schematic section)

- The position of the mineralized zones is indicated by the red bars on the sides of the sections.

Andesites hosting mineralization at Silbak Premier and Big Missouri are similar although there appears to be a thicker sequence of green andesite at Silbak Premier. At Silbak Premier maroon rocks (in purple) appear to overlie andesites hosting mineralization whereas at Big Missouri the maroon rocks underlie mineralized andesites. At a district scale, it is suggested that andesites hosting mineralization are stratigraphically equivalent.

The maroon volcaniclastic rocks are transported units resulting from subaerial erosion and therefore may be time transgressive.

~~Regional mapping Post others~~

The next two slides from Silbak Premier indicate that the rocks have undergone considerable deformation

1) well developed cleavage due to intersection of cleavage and schist in andesite

2) shearing and flattening of clasts in maroon conglomerate

WHAT IS PREMIER PORPHYRY?

The term Premier Porphyry was a mine geology term at Silbak Premier that developed early in the mine history. It became synonomous with ore, but like many such terms, its usage became obscure with time.

Westmin restricts its usage to a medium to coarse grained porphyritic andesite with medium-grained plagioclase and hornblende phenocrysts, variable abundance of large K-feldspar megacrysts and generally with subhedral to euhedral quartz eyes. The textures are suggestive of a subvolcanic origin for Premier Porphyry.

SUMMARIZING THE FEATURES OF PREMIER PORPHYRY

1) Numerous discordant features indicate an intrusive character. The tabular bodies are irregular and may be conformable or crosscut stratigraphy.

(- here in the footwall to the mineralized zone, the Premier porphyry is discordant to andesite stratigraphy.)

2) Premier porphyry is lithologicaly similar to Texas Creek granodiorite stock, to the west of Silbak Premier, and gives isotopically similar ages (Zircon U-Pb approx. 190 $\pm$ 2 Ma).

3) Premier porphyry is moderate to strongly potassic with large K-feldspar megacrysts and 4 to 5% K_2O.

4) Fragmental and maroon Premier porphyry suggest extrusive facies similar in age to andesites, and local extrusion in shallow water or subaerial environment.

5) Possible extrusive equivalents such as the Groundhog marker are sericitized carbonate altered and pyritic with anomalous gold contents.

I wish to now review the

MINERALIZATION AND ORE CONTROLS - BIG MISSOURI

Big Mo Plan

Gold-silver sulphide ores at Big Missouri are hosted within extensive stratabound zones of cherty tuff and bleached andesite (in blue) in the Upper Andesite Sequence (~~shown in blue~~). Numerous surface zones of mineralization occur over a 4 km strike length on the property.

WHAT IS CHERTY TUFF?

Sec.

The character of these beds is best observed away from the main zones of mineralization. A stratigraphic drill hole 79-7 intersected numerous interflow cherty tuff beds (shown in blue) between two of the ore zones. These beds are pyritic and commonly contain up to 0.025 oz/T Au and 0.25 oz/T Ag.

Rx

The cherty tuff contains fragments of andesite varying from large blocks to delicate textured lithic fragments in a grey to green cherty silica (with or without carbonate) gangue. Lithic fragments may be variably altered but are generally monolithic; the gangue is a chemical sediment.

Rx

MINERALIZED ZONES - BIG MISSOURI

Mineralized cherty tuff beds are characterized by a consistent assymetry of alteration and morphology.

Rx2 — Hanging wall bleached sericitized andesite with grey mottled quartz-carbonate veins

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Rx1 — Cherty very siliceous top - commonly carbonaceous and pyritic

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Rx 11 — Cherty tuff - with andesite fragments in matrix of silica and carbonate, brecciated cherty tuff or semi-massive sulphide bands

(recrystallized red brown sphalerite does not include inclusions characteristic of earlier fine grained dark grey sphalerite)

Rx2 — Footwall Andesite breccia and stringer zone - usually chloritic and with quartz-sulphide stringers

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Recrystallization of the cherty tuff is common and together with extensive footwall veining results in a crystalline quartz-carbonate rock with numerous discordant textures, commonly referred to as silica breccia. It is important to distinguish between early silica matrix to the breccia and latter quartz-carbonate veining.

DISTRIBUTION OF MINERALIZATION AT BIG MISSOURI

FIRST

1) REGIONAL DISTRIBUTION

The various zones of mineralization are stratabound and have been grouped into three regionally extensive mineralized horizons.

- Longitudinal Section - shows the relative stratigraphic position of the various zones.

Upper A -> B
Middle C -> I
Lower J -> O

We will examine a longitudinal section through the Dago zone to look at the distribution of the Au and Ag in cherty tuff. (locate)

2) DISTRIBUTION AT THE DEPOSIT SCALE - DAGO ZONE (on Lower Horizon)

Detailed drilling and underground mapping in the Dago zone indicates three stratabound mineralized bands (D, E and F; 15 to 50 feet apart).

The planview shows the distribution of grade for the lower D zone horizon. The red areas are greater than 0.09 oz Au equivalent/ton. The yellow areas are between 0.045 and 0.090 oz/T Au.

Restoration of the fault displacements show a pronounced southwest-northeast elongate higher grade core to the zone. The mineralized zone is also thicker in the core zone reflecting numerous quartz-sulphide stringers between the cherty tuff horizons. The axis of the mineralized zone is interpreted to be controlled by seafloor topography and favourable feeder zones.

MODEL FOR FORMATION AND ORE CONTROL OF MINERALIZATION AT BIG MISSOURI

First, the

SYNGENETIC MODEL

The stratabound mineralization at Big Missouri is interpreted as having formed at essentially the same time as the host andesites were deposited. The deposition of sulphides may have occurred either directly on the seafloor or as subseafloor replacement of favourable unconsolidated volcanic breccias. In this model hydrothermal activity is syn-volcanic in the strictest sense.

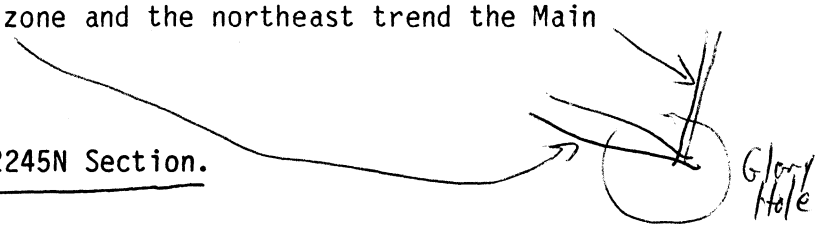
VEIN REPLACEMENT MODEL

Alternatively those ascribing to a vein-replacement model would interpret the mineralization as occurring within an epithermal system and therefore slightly to much later than volcanism. (The terms silica breccia or quartz stockwork might be used and the breccia character of the ore, numerous small scale discordant structures, gangue and sulphide banding on fragments and abundance of white vein-type quartz would be given as evidence of epithermal mineralization. The geometry of the zones ascribed to favourable structure within the fragmental andesites). This slide borrowed from Tom Schroeter and Andre Panteleyev of B.C. Geological Survey shows the development of Silbak Premier type mineralization in the deeper levels of an epithermal deposit.

MINERALIZATION AND ORE CONTROLS - SILBAK PREMIER

Silbak

Property scale geology shows the surface projection of the previously mined areas (in red). Two trends of mineralization are apparent, the northwest trend is called the West zone and the northeast trend the Main zone.



- reference Long Section and 2245N Section.

locate proposed open pit

Long.

The longitudinal section shows the relative vertical and horizontal position of the various ore lenses and a pronounced steep westerly plunge. The ore lenses have been mined over a vertical height of 1,500 feet and a horizontal length of 15,000 feet. The Northern Light zone (in orange) is interpreted to lie approximately 300 feet in the hanging wall of the Premier structure. Note the position of 2 Level in the former mine workings.

Sec

The schematic cross-section from surface to 6 Level shows the continuity of the mineralized Premier zone and the complex relationship of andesite (in green) and Premier porphyry (in yellow).

- locate the open pit area on Sec #1 + Long Sec

i) the mineralized zone has been demonstrated to be grossly conformable to andesites on 6 Level (lower part of slide) and Glory Hole area (upper part of slide). Where mineralization is conformable to the andesites, the potential for syngenetic mineralization must be considered.

TYPES OF MINERALIZATION

Mineralization at Silbak Premier has been grouped into two simple types:

LOW SULPHIDE ORE - variously refered to as stockwork mineralization or silica-breccia ore

- characterized by the Main zone, with approximately 3% sulphides Py >> sph, gn (AVG. GRADE of Main zone approximately 0.05 oz/t Au and 2.70 oz/t Ag;
  Ag:Au approximately 55:1

HIGH SULPHIDE ORE - consists of semi-massive sulphide ores averaging 15 to 25% sulphides

- characterized by the West zone (averaging 3% Zn + Pb) and Northern Light zone (averaging 8 to 10% Zn + Pb)

(WEST ZONE AVG. RESERVE GRADE approximately 0.12 oz/t Au and 1.75 oz/t Ag; Ag:Au approximately 15:1)

EXAMPLES OF LOW SULPHIDE ORES

Rx2 Stockwork veins within weakly altered Premier porphyry; cross-cutting vein relationships, symmetrical banding of veins with sulphide cores.

Rx1 Pervasive silica-K-spar altered rx cut by quartz-sulphide veinlets, in turn cut by latter barren quartz-carbonate gash-fillings (the horizontal planar features).

Rx1 Multi-stage veining in intensely altered rock characteristic of high grade low sulphide ore.

Rx1 Quartz-sulphide veinlets cutting pervasive K-spar-rich Premier porphyry.

These low sulphide zones are stockwork ~~veins~~ that are ~~in~~ grossly stratabound?

EXAMPLES OF HIGH SULPHIDE ORES

WEST ZONE - 2 LEVEL PORTAL

Grades in oz/T for Au, Ag
% for Pb, Zn, Cu

Perhaps the best example of the high sulphide ore is the West zone exposure at the two level portal where a small fault separates a thick unit of relatively unaltered Premier Porphyry (on the left) from semi-massive sulphide zone (on the right) grading 0.46 oz/t Au, 3.73 oz/t Ag, 2.4% Zn, 2.7% Pb and 0.18% Cu over 77.1 feet.

Yes!

Ag/Au ~8:1

See TGS field notes 1983? Premier

I will take you through a sequence of slides that illustrate the character of the zone; starting with the structural and apparent stratigraphic footwall of the zone. (on the far right)

Footwall stringer zone on the right - grades 0.10 oz/t Au, 0.66 oz/t Ag. Semi-massive sulphide band in the centre - grades 0.78 oz/t Au, 0.83 oz/t Ag.

- for a low Ag/Au ratio of less than 1:1 and very little base metals.

- shows irregular character of pyrite stringer zone in Footwall green andesite.

- dark green-black chloritic andesite with irregular coarse grained pyrite stringers.

Footwall semi-massive sulphide band is mainly pyrite with a more sphalerite-rich band at the upper contact with overlying siliceous green andesite breccia.

- quartz gash veins feather as they pass from siliceous andesite to the semi-massive sulphide band.
- the thin brown bands are iron-bearing carbonate and are probably related to deformation rather than primary fabric.

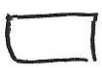
The next 3 slides are closeups of this feature.

- shows the siliceous top with coarse grained pyrite-silica band and later carbonate vein.

- shows coarse grained pyrite in siliceous matrix and relict patches of very fine-grained silica-pyrite rock; the coarse-grained pyrite is probably a recrystallization fabric.

- note the pods of coarse grained pyrite in grey fine grained silica-pyrite rock at contact with overlying green andesite band. ~~Note the~~ recrystallization of the grey silica-pyrite rock to white quartz with vuggy carbonate patches and coarse grained sphalerite patches.

Middle semi-massive sulphide lense.



The massive sulphide band is approximately 18 inches thick and contains mineralogical and textural banding.

2 m sample 3.75 oz/t Au, 7.55 oz/t Ag, 4.24% Zn, 2.39% Pb, 0.76% Cu

~~Ag~~ Ag/Au ~ 2:1

- note the laminated coarse and fine grained pyrite.
- sphalerite banding and recrystallized sphalerite patches.

- sharp Footwall contact with breccia containing green cherty fragments and andesite fragments in a sphalerite-pyrite matrix.

Overlying the massive sulphide band is coarse andesite breccia with andesite fragments in a matrix of sulphide.

- andesite fragments are rimmed by coarse grained pyrite and sphalerite.
- in areas of coarse grained pyrite, vuggy patches with quartz crystals and carbonate centers are common.

- similarly, carbonate filled vugs rimmed by quartz crystals and coarse grained pyrite.

These crystal lined vugs and symmetrical sulphide banding have been used as examples of textures indicating epithermal vein mineralization. Alternatively, these features may be the result of recrystallization during diagenesis and/or deformation.

Uppermost semi-massive sulphide band. (A 2 m sample assays: 0.078 oz/t Au, 4.52 oz/t Ag, 5.21% Zn, 9.65% Pb, 0.26% Cu). Ag/Au ~ 58:1

- the late quartz-carbonate gash veins do not cut the more sulphide rich bands.

- massive sulphide matrix is coarse grained pyrite and finer grained sphalerite and galena.
- silicified andesite fragments are broken and veined and infilled with sulphides similar to those in the matrix; later planar fractures cut earlier irregular stringers.

Summary of features in the 2 Level portal outcrop.

i) A pyrite stringer or vein zone occurs in green chloritic andesite on the footwall side of the sulphide zone. It is characterized by high gold content relative to lower Ag, Zn, Pb.

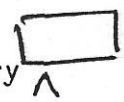
ii) There are several semi-massive to massive sulphide bands separated by veined andesite and andesite breccia with sulphide matrix. The hanging wall massive sulphide band is relatively rich in base metals and silver compared to footwall bands and a high Ag:Au ratio. Individual sulphide bands also appear ~~to~~ to show a zoning of higher base metals and Ag/Au ratio on the hangingwall side.

iii) Gangue is predominantly green with chloritic andesite fragments, green cherty silica matrix and cherty fragments, and lesser bleached sericite-silica altered fragments. Bleaching of andesite is more prominent in the upper or hanging wall part of the zone.

iv) Sulphide minerals show variable grain size from very fine grained to very coarse grained.

v) Numerous textural features and tensional vein relationships suggest that the sulphide zone has undergone considerable deformation.

vi) The relationship with Premier porphyry to the sulphide zone is unclear ~~as a result of a small fault structure~~. Andesite, on the hanging wall contact of the Premier porphyry, contains variable pervasive sericite alteration and quartz-carbonate-sulphide stringers. The Premier porphyry is relatively unaltered and cut by a few symmetrically banded quartz-sulphide veins and later quartz-carbonate veins.



~~I ask you is this a massive sulphide type~~

Interpretation of this exposure has varied from exhalative massive sulphide type mint'n to a composite multi-stage vein zone.

DISTRIBUTION OF THE MINERALIZATION AT SILBAK PREMIER

2 LEVEL PLAN - the plan shows the mineralized zone in red, stope areas in black, andesite in green and Premier porphyry in yellow and barren plagioclase porphyry in tan colour.

- note 1) locate the 2 Level portal area - mineralized zone in andesite.
  2) mineralized zone follows the contact of Premier porphyry and andesite.
  3) multiple zones in Glory Hole area.
  4) discordant body of Premier porphyry in the stratigraphic footwall.
  5) the hinge area between the Main and West zones is marked by several large faults.
  6) alteration in WEST ZONE - predominantly green alteration, silica-chlorite.
     - and in the MAIN ZONE - strong bleaching K-spar + quartz -> sericite -> carbonate alteration.
  7) the mineralized zone is grossly conformable in Main zone -
     - relationship of West zone mineralization to andesite stratigraphy is unresolved - some say the stratigraphic trend in the ~~Glory Hole~~ MAIN ZONE continues southerly; others suggest the stratigraphy is rotated along faults in the hinge area, and that West zone mineralization is also conformable to andesite stratigraphy.

could omit

We will now look through a sequence of sections in the Main zone to see the variable relationship of the mineralized zones with Premier Porphyry.

SECTION 2245N - relationship of zone over 1,500 feet vertical.
- note position of 2 Level.

SECTION 2295N - mineralization in porphyry and porphyry contact; multiple zones of porphyry and mineralization.

SECTION 2340N - mineralization in porphyry, andesite and FW ct ofporphyry.

SECTION 2395N - in andesite and on FW and HW ct of porphyry; porphyry and mineralization do not subcrop.

The relationship of the mineralized zone to andesite and porphyry is quite variable.

I'D LIKE TO BRIEFLY CONSIDER THE

METAL ZONING AT SILBAK PREMIER

Probably the most used data for evidence of an epithermal vein system has been an apparent change in Ag:Au ratio over the 1,500 foot vertical range of mining. The longitudinal section published by Grove (1971) shows Ag:Au ratios of greater than 60 to 1 in the near surface environment decreasing to 5:1 for ore on 6 Level, based on production data.

This author feels that the variation in Ag:Au ratio is more complex than this simple zoning and reflects the zoning of ore types; low sulphide ores tend to have high Ag:Au ratios compared to sulphide-rich ores with low Ag:Au ratios.

Westmin has plotted Ag:Au ratios for drill holes, (trenches) in the Glory Hole area. The values obtained do not include the earlier mined ores and as such could be misleading.

The results suggest that the full range of Ag/Au ratios can be obtained above 2 Level from <10 Ag/Au in 2 Level portal area to >180 for the north part of the Glory Hole area in low sulphide vein mineralization.

Purple	<10 Ag/Au
Blue	10-30
Green	30-90
Brown	90-180
Yellow	>180

DISCUSSION OF MINERALIZATION TYPES, ORE CONTROLS AND ORE GENESIS

DISTRICT SCALE

In summary .....

1) At a district scale the ore zones occur in green andesite at similar stratigraphic levels, although there are significant facies differences between the two properties.

AT THE PROPERTY SCALE

1) Geometry, distribution and textural features of the ores at Big Missouri suggests the ores to be stratabound and syngenetic. The ore zones occur at several stratigraphic levels with deposits at different stratigraphic levels having distinctive features. Use of a stratigraphic model has given good exploration success.

2) Discordant stockwork vein and silica-breccia mineralization at Premier occur within and adjacent Premier porphyry. The intensity of silica-sericite-K-feldspar alteration is greatest in the Glory Hole area and decreases laterally to the West zone and at depth where alteration is mainly silica-chlorite with little bleaching.

3) Within the Glory Hole the contacts of andesite and Premier porphyry are favourable for high grade ore. Elsewhere, the relationship of mineralization to Porphyry is less clear.

4) Semi-massive sulphide mineralization at Premier contains many features suggestive of exhalative deposits.

5) The zoning of Ag and Au abundance at Premier is complex. The earlier generalized model of high Ag:Au ratios at surface, decreasing to low Ag:Au ratios at depth is misleading, and is the reverse of zoning in most epithermal vein systems.

6) Ores at Premier and to a lesser degree at Big Missouri have been subjected to considerable deformation with brittle deformation in siliceous rocks resulting in numerous quartz-carbonate gash-fillings and recrystallization of earlier silica-carbonate-sulphide gangue. More sulphide-rich rocks have undergone ductile deformation resulting in recrystallization of sulphide and gangue, and locally has formed some mineralogic banding within ores.

Considering the
MODEL FOR MINERALIZATION

1) The timing of emplacement of Premier porphyry is controversial; some evidence suggests that at least part of the Premier porphyry is extrusive. Mineralization is hosted in porphyry, and Premier porphyry may intrude earlier mineralized andesite. The syn-volcanic model can accommodate these complexities.

   Alternatively, all mineralization at Silbak Premier is structurally controlled with a complex history of deposition and post deposition of the volcanic rocks.

2) Emplacement of Premier porphyry may, in either model, be the focus for hydrothermal activity.

   Ore controls for the explorationist therefore varies greatly depending on which model is subscribed to.

I wish to thank Westmin for encouraging me to give this paper; and my co-authors (who are divided on the genesis of these deposits) for their support; and I wish to acknowledge the regional mapping by Derek Brown. We have much to learn about these two deposits - I hope that we have been successful in illustrating some of the problems. Most of all however I would like to thank the prospectors who found these deposits some 70 years ago and the miners at Silbak Premier who left ~~something for us to mine~~ considerable high grade with the low grade, for us to mine.

Harlan Meade
Westmin Resources Limited
December 1, 1986