

## MOUNT FREE GOLD CAMP (Target #'s 2, 3 and 4)

As in the case of the Mt Nansen camp our length of visit could not do justice to the available geology, and much of the following account is necessarily heived.

ROUGH DRAFT  
V6 REPORT

### Geology

004690  
pink  
Approximately 20 mineral occurrences are largely confined to a NW trending belt 4 km wide and 15 km long. District scale mapping by Johnson (1936) shows this belt to be underlain by a similarly trending granodiorite to granite stock, intrusive, he believed, into a batholith comprising <sup>coarsely</sup> porphyritic pink syenite, porphyritic granite, and quartz monzonite.

The age relationships of these intrusives requires some updating. Our other work in the Dawson Range suggests that the granodiorites are normally older than the porphyritic granites. One answer to this question of relative age is provided by Carne (1981) who indicates that there are two distinct granodiorites at Freegold - one younger and one older than the syenite complex. He may well be right. Godwin recorded no less than 8 phases of granodiorite at Casino, a location that has some sub-volcanic similarities to Mt. Freegold.

Irrespective of the relative ages of the major intrusives they are all cut by swarms of andesite porphyry and felsic porphyry dykes. Some of the latter show flow textures and appear to be of shallow emplacement. The nearest bona fide extrusives however are several km E. of the TINTA vein and, strangely, in the bottom of Seymour Creek immediately S. of the mineralized Freegold belt. This second fact brings us to the interesting question of regional structure in this district.

A little N. of the belt is the Stoddart Creek lineament ( $140^\circ$ ), while on the S. side are the Pal Fault ( $141^\circ$ ) and the Camp Fault ( $127^\circ$ ). The Pal fault is reported to have a probable right lateral movement of some 500m, based on the presence of a vein S. of it that somewhat resembles the Laforma. But this is not true,

or, more correctly only part of the truth. The aforementioned Mt. Nansen volcanics outcropping in Seymour Creek were at time of extrusion almost certainly level with or above the sub-volcanic activity on Mt. Freegold ridge. They are now 600 m below this level and 400 m below other volcanics outcropping further south. Thus Seymour Creek represents a graben whose northerly limit must be either the Pal or the Camp Fault. The relatively low elevation of the <sup>"barely unrooted"</sup> STODDART and <sup>"high level"</sup> REVENUE breccia zones which both seem to lie between these faults implies that the major dip movement occurred on the Pal Fault.

Two other aspects of the structure are worth noting. One is that the Freegold belt <sup>as a whole</sup> is colinear with the Big Creek lineament, itself being a graben (or half graben) extending to least 25 km to the NW. The other is that we have good evidence that volcanism at Prospector Mountain and at Mt. Cockfield is contemporaneous with major faulting of the same orientation and mode.

### Mineralization

Mineral occurrences on Freegold Mountain can be viewed as falling into three categories,

1. Au bearing quartz veins and fissure fillings such as the LAFORMA, the RAMBLER VEIN, the EMMON, and the MARGARETE.

2. Low grade highly altered Cu-Au bearing breccia systems associated with high-level sub-volcanic rhyolites. Examples are the RAMBLER HILL, the STODDART, the BORDER, the CASTLE, and possibly the REVENUE zones.

3. Precious metal bearing magnetite skarns.

The quartz veins have two main subgroups. The first is a set of approximately 10 NE trending veins in the LAFORMA - RAMBLER vicinity characterized by continuity of structure and relatively high precious metal values. The second is an easterly trending set of veins and shears <sup>closely associated with similarly trending porphyry dykes and</sup> grouped near the skarn bodies. These <sup>veins</sup> are characterized by less continuity and generally lower precious metal values.

A district scale zoning is also evident (See Table 4). The most westerly veins of both subtypes up to and including the LAFORMA exhibit low ratios of Ag to Au, Ag to Pb and Sb to Bi, all indicating a fairly high temperature of emplacement. Most of the hot-spots implied by the highly altered breccia systems are also at this end of the belt.

By contrast the RAMBLER vein and EMMON vein have generally high ratios of the same pairs of metals.

### Vein Deposits

The LAFORMA deposit is the best known of the district with four levels of development over a vertical range of 180m and some prior production. A shear zone roughly 8m wide and explored for a length of 780m strikes 20 to 25° and dips 80° NW. Within this lenses of brecciated quartz and banded sulphides attain a maximum width for one ore shoot of 120cm and a length of 427m. The host rock is mainly granodiorite but quartz porphyry, granite and syenite are also present.

Notable features of an examination of the mine dumps on all levels was the relative scarcity of quartz, the rubbly nature of much of the ore, low levels of base metals, and the fairly common occurrence of tourmaline - this last of course supporting the aforementioned probable high temperature of emplacement.

Sample Y2-D2R, a composite of the best mineralization from the dumps, yielded 0.974 oz. per ton Au and 3750 ppm As, but only 6.9 ppm Ag. The resulting Au to Ag ratio (4940:1) is remarkable, and the sampling must have been in some way biased towards the Au. Old production records give a more reasonable but still unusual value of 15:1. Two other samples of our own on <sup>quartz</sup> stringers in the vicinity of the LAFORMA gave ratios of 18:1 and 95:1.

Reserves were quoted in June 1983 (GNCL) as 140,000 tons <sup>(indicated)</sup> at 0.44 oz per ton Au. These figures are based on a 168 cm (5.5 foot) mining width, and not without reason. Prior to 1961 reserves were calculated for this deposit on a 120 cm width (Adamson) but this was found impossible to maintain in actual mining. Unanticipated dilution was thus of the order of 37%!

Current development at the LAFORMA is directed towards extending reserves on or below the lowest (#4) level. Exploration drilling has indicated at least some mineralization of suitable tenor and width below this level, and the continuity of host structure is permissive, so some extension of reserves may be possible. However I have the impression - difficult to justify - that higher grades are unlikely and that the depth of emplacement indicators place a definite lower limit for major new reserves below the #4 level. (These opinions are of course formed without access to full property records)

The situation on the S. side of the Pal Fault (on which the LAFORMA structure abuts) may be quite different however, in view of the down-dropping of the rocks S. of the fault. Several drill intersections on what may be an offset segment of the LAFORMA structure had

Au:Ag ratios averaging 1.5 to 1, in strong contrast to those of the deposit itself. This is incidentally further indirect confirmation of a down dip component of fault movement.

My overall conclusion is that overall reserves (N. and/or S. of the fault) will be increased somewhat but that dilution problems will remain an obstacle to a truly profitable operation. Partial mill facilities already in place and the present degree of mine development will obviously help, but <sup>necessary</sup> mining widths and the strikingly monomineralic nature of the ore will make it highly susceptible to fluctuations in the price of Au.

The RAMBLER VEIN, perhaps better described as a vein system, superficially resembles the LAFORMA in that it has roughly the same orientation and follows a similarly well developed structure. It has reportedly been followed by drilling for 1100 m, with mineralized widths from a few cm up to 3m. Mineralogically however it is quite different. Milky, vuggy and occasionally ribbed quartz carries arsenopyrite, pyrite and stibnite in quantities (where seen on surface) of up to a few percent. A composite sample (Y2-J2R) yielded 3400 ppb Au, 20.4 oz per ton Ag, 10,000 ppm As, and 1000 ppm Sb. Total base metals were shown to be roughly 1200 ppm. Obviously the level of emplacement is quite high in this case. The Au to Ag ratio is approximately 1:200.

The implied coolness of deposition of the RAMBLER VEIN is odd because of its close proximity to the presumably high temperature RAMBLER HILL deposit. One can speculate <sup>that</sup> the latter was small and of short duration, or <sup>that</sup> vein deposition occurred somewhat later, after it had cooled.

Exploration drilling on the RAMBLER VEIN has been sparse. It may deserve more attention.

The EMMON vein is also high level but where seen proved to be erratically and poorly mineralized. Nevertheless it may have <sup>a certain</sup> <sup>easily evaluated</sup> potential (which will be outlined at the conclusion of this section). Grab samples by other parties have yielded as high as 0.7oz per ton Au, 0.16 oz per ton Ag, and 3.6% Sb. Our <sup>own</sup> samples, - taken quickly at the end of a long traverse - were much poorer (Y2-L1R and L2R)

The largest of the E-W quartz veins, the MARGARETE, has been estimated to contain 30,000 tons grading 0.42oz per ton Au and 7.05 oz per ton Ag, based on a minimum 150cm width. However a recent report suggests that these grades may be enhanced by surface enrichment. The vein may be continuous with the RED FOX showing a km. further west.

Several reported quartz vein occurrences were briefly examined (Target #4) 13km east of Mt. Freegold <sup>close to the Freegold Road.</sup> The ZERO proved to be unmineralized quartz float and the OPAL to be a series of pits following a 4m wide amygdaloidal-opaline basalt. The WOLF could not be located. Other quartz float found in this area was similarly unproductive.

Although, unhappily, the HAPPY vein near Big Creek could not be located, quartz vein float in Happy Creek yielded one 25ppb Au value. Although not worthy of follow up, the area was interesting in that ultramafics were present on what would be an <sup>southern</sup> extension of the Big Creek lineament.

Two quartz vein deposits peripheral to the Freegold camp do not fit well into our classification. These are the TINTA and the CARIBOU CREEK.

The TINTA is an attractive, well mineralized vein gneissose granodiorite encloses the host structure which is a well defined shear zone 3300 m long and up 30 m wide. It trends  $300^\circ$  and dips  $80^\circ$  to the N. A 1000 m length of this shear is mineralized with individual ore lenses 30 to 100 m long and 54 to 80 cm wide. An estimate of "drill indicated" reserves (GCNL, 19 Nov. 1980) is 843,000 tons grading 5.3 oz per ton Ag, 0.075 oz per ton Au, 4.71% Pb, 6.03% Zn, 0.37% Cu, and 0.049% Cd. Grades are locally higher of course. A 90 m length of the #1 adit has been quoted (NCMI) as having 4.8 oz per ton Ag, 0.2 oz per ton Au, 5.6% Pb, 13.2% Zn and 1.0% Cu over an average of 90 cm. A 30 m length on what may be a parallel structure contains similar values. The main question with respect to the quoted reserves is the depth extent. Of two drill holes intersecting the vein at a depth of about 100 m, one intersected high grade material and one low. Our mineralogical observations gave a mixed result regarding level of emplacement and the distinct possibility of two separate episodes of mineralization. Spectrographic analysis of mixed dump material gave a low Sb/Bi ratio (1.3), a low Ag/Pb ratio and, not surprisingly a high total base metal count. In addition the Au/Ag ratio is 70:1, all these parameters suggesting high temperature emplacement despite the presence of drusy quartz and chalcedony, and <sup>possibly</sup> abundant clay alteration. The depth potential remains then an open question.

This property is currently held jointly by Silver Tusk Mines Ltd and Panther Mines Ltd, but major financing (as of 25th September 1983) is being provided by a private company, Nathan Gold Corp.

The CARIBOU CREEK showing <sup>is</sup> on the other side of Seymour Creek from the main Freegold belt and <sup>somewhat different from the other quartz veins.</sup> It is a  $120^\circ$  trending 20 cm wide quartz stockwork cutting granodiorite and quartz monzonite porphyry intrusives where these intrude older sediments. A  $160^\circ$  rhyolite dyke is also present. The quartz veins are drusy

and up to 5 cm wide. The best of 3 samples we took here yielded 3600 ppb Au. Metal ratios suggest a fairly deep level of emplacement although the base metal content is very low.

### The Breccia Zones

RAMBLER HILL has, unlike the RAMBLER VEIN, received considerable attention. There have been two diamond drill programs totaling 19 holes totalling 2462 m - and the deposit can be considered fairly well delineated.

The major result of the drilling was a number of individual intersections grading about 0.02 oz per ton over lengths of 6 to 27m. The best were:

21m	at	0.067 oz per ton Au,	0.34 oz per ton Ag,	over 21m
and	0.018 " " " "	0.08 " " " "	" " " "	154m

Cu is present in the 0.02 to 0.04% range and Mo is virtually absent.

Surface examination does not reveal a great deal. A topographic dome perhaps 70m in diameter exposes rusty brecciated suboutcrop with rhyolitic feldspar porphyry intrusive into a coarse hornblende syenite, but this is just the tip of the iceberg.

The drilling reports (Antoniuk, 1975 and Carne 1981) reveal a 350m x 850m northeasterly elongated complex consisting rhyolite porphyry and felsite, both variably brecciated, surrounding a core of porphyritic granite. This granite is not described in detail but may possibly correlate with Coffee Creek granite elsewhere in the region. The outer margin of the complex displays chilling against a granodiorite host (and presumably against syenite as well). This contact area is further characterized by a stockwork of vuggy quartz veins. Small pyritic veins are also present.

The complex exhibits alteration ranging from localized potassic through phyllic to propylitic.

The quartz veins comprising the stockwork, some of them up to 30cm wide with a northerly strike, are said to carry visible Au, stibnite

jamesonite, and a bluish black sulphosalt. The presence of stibnite is interesting. Does this imply two stages of mineralization, one contemporaneous with major alteration and one later? The later one if present could correlate with that of the nearby Sb rich RAMBLER VEIN.

Au values correlate with the quartz, with phyllic alteration, and to some extent with kaolinized felsite breccia. One interesting feature is a relative enrichment of Au with respect to Ag at depth, the Au:Ag ratio changing from 0.9:1 to 6.3 to 1 further out and 120m lower in the assemblage. The part played in this by supergene alteration is not clear. Surface oxidation in at least one drill hole can be seen to extend to a depth of some 100m below surface.

The obviously deep leaching and low potential stripping ratio provide some possibility for a heap-leachable operation. This possibility is being examined in more detail by R. Dujardin.

RAMBLER HILL is only one of a series of similar zones spread over a 10km northwesterly trend. Another that has received some attention is the STODDART zone which lies just S. of the Pal Fault, 4km NE of the peak of Mt. Freegold. A zoned porphyry stock is central to a porphyry dyke swarm, the overall area being 400m x 1100m, once again elongated northeasterly. The deposit exhibits weak but typical "porphyry" type alteration, some brecciation and leaching and carries weak Cu and Mo values.

The REVENUE property another 4 km further NW may include a similar zone. Certainly strong widespread oxidation and some associated brecciation was visible on a casual drive through this property. Our only source of information to date (NEMI) describes the property as having a brecciated quartz monzonite stock and a confusing array of mineralization including Cu-Au, Cu-Mo, Au-Ag-W, much of it displaying

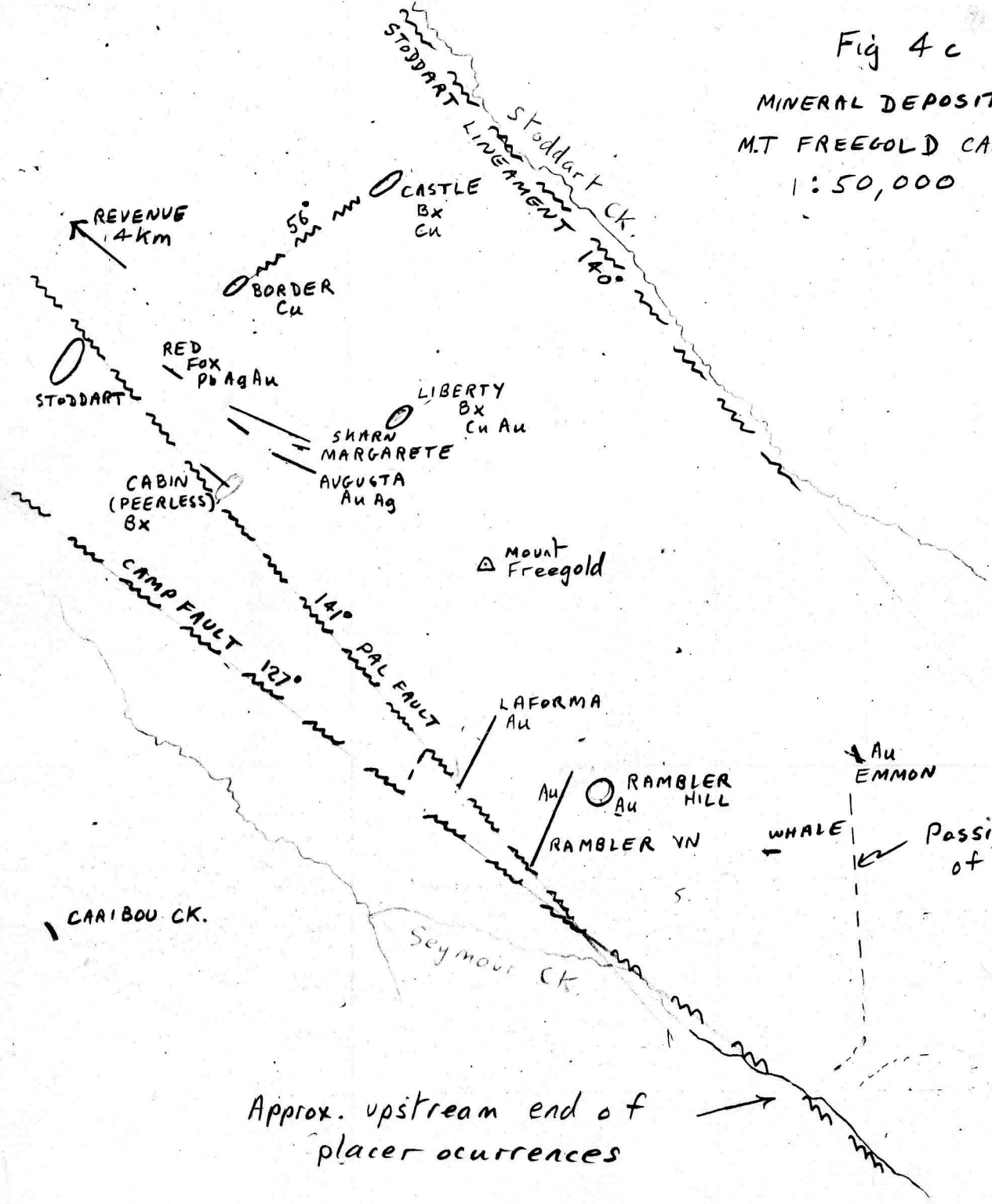
significant grades. This property was optioned by Yukon Revenue Mines Ltd to an unknown buyer in August.

### Skarn Deposits

The SKARN zone is easterly trending, 900m long, and has a maximum width of 120m. It comprises magnetite, chlorite, and specularite with Au averaging approximately and Ag 0.65 oz per ton over a 10m width. ( )

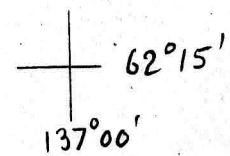
Our own sampling from the (similar but smaller AUGUSTA zone produced only modest precious metal values over a 1.5 to 3m width and 90m length.

Fig 4c  
 MINERAL DEPOSITS  
 M.T FREEGOLD CAMP  
 1:50,000



TINTA \

Possible extension of EMMON



Approx. upstream end of placer occurrences