

DISTRICT	Rosebud
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COUNTY	Pershing
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TITLE	Petrography for North Equinox and
If not obvious	Deep RS-422/422.1 Samples
AUTHOR	Vance R; Langstaff G
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P_M_C_NAME	Rosebud Mine; Newmont Gold Co.;
(mine, claim & company names)	North Equinox
COMMODITY	
If not obvious	
NOTES	Petrographic report; geology; correspondence
	4 p.

Keep docs at about 250 pages if no oversized maps attached (for every 1 oversized page (>11x17) with text reduce the amount of pages by ~25)

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NORTH EQUINOX (RS-422/422.1)

This Section Descriptions

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4010

NEWMONT GOLD COMPANY  
ROSEBUD J.V.

To: Randy Vance

Date: October 21, 1998

From: George Langstaff

Subject: Petrography for North Equinox and Deep RS-422/422.1 Samples

North Equinox Samples

**NWRA-2601:** platy outcrop above dense brown rock ("brown flow"/ "Wildrose") northwest of USMM212; variably bleached and grades into reddish brown to very pale grey pseudobreccia above; also sample for whole rock analysis;

- collected to verify that this is the same unit as the dense brown rock below and to determine origin – initially thought to be derived from aphyric glass;

In thin section, the sample has a pilotaxitic fabric with the microlites more or less parallel to faint, sub-mm scale banding defined by variations in the abundance of dusty opaque. The rock has patchy extinction which does not conform to the banding. Equigranular specks of opaque are disseminated throughout. There are very rare, blocky, subhedral feldspar phenocrysts <1 mm, which are severely plucked and locally altered to cryptocrystalline clay(?) – one of four has albite twins. A rectangular opaque grain almost 1 mm long is probably an altered mafic silicate. There are very rare lenses of quartz, probably derived from recrystallization of the matrix. An irregular bleached band has equigranular quartz and opaque and less dusty opaque than nonbleached rock. Otherwise the rock has very minor clay alteration, principally in phenocrysts.

- essentially aphyric, felsic flow, or possibly intrusion, with rare K-spar(?) and plagioclase phenocrysts.

**NWRA-2602:** dense but fractured, pinkish grey outcrop ("brown flow"/ "Wildrose") northwest of USMM212; also sample for whole rock analysis;

- collected for comparison with 2601 and 2603 – initially thought to be derived from essentially aphyric glass;

In thin section, the sample is very similar to 2601 and consists of extremely fine microlites but without strong preferred orientation. The rock is brecciated (synemplacement?) with faintly banded "clasts" and more strongly banded and locally folded "matrix". The rock has patchy extinction. There are a few coarser microlites and one can be identified as plagioclase. Some of the larger, stubby opaque grains may be altered mafic silicates. There are very rare, stubby, subhedral feldspar phenocrysts <2 mm, which are variably altered to clay(?) – one of five has albite twins but another has a moderate 2V(-) and is probably sanidine. There is some very fine disseminated quartz and very irregular small lenses of quartz which are probably due to recrystallization. Some of the lenses have opaque grains and a pleochroic brown mineral, which may be acmite. There is very minor clay alteration.

- essentially aphyric, felsic flow, or possibly intrusion, with rare K-spar and plag phenos.



**NWRA-2603:** outcrop of dense brown ("andesite"/ "intrusion") rock near bottom of draw east of ZZ Top; also sample for whole rock analysis;

- collected to evaluate similarity with visually identical samples 2601 and 2602; pale round spots <5 mm in part of unit led me to believe this was a devitrified vitrophyre; In thin section, this sample is very similar to 2601 and 2602 but banding is extremely faint and there is no patchy extinction (which is probably a nondiagnostic recrystallization phenomenon). Rare coarser feldspar microlites (at least one of which is sanidine) and elongate opaque are foliated but the finer groundmass microlites are not. Blocky to rounded feldspar phenos <2 mm are almost completely altered but one (out of 6) has Carlsbad twins without albite twins and could be sanidine. There are 2 rounded mafic xenoliths 1 mm and 5 mm across. They consist of radial arrays of abundant elongate opaque, altered feldspar, and possibly quartz. The sample has very rare chalcedony veinlets and very minor clay alteration.
- essentially aphyric, felsic flow, or possibly intrusion, with rare K-spar and plagioclase phenos and very rare mafic xenoliths; still indistinguishable from 2601 & 2602.

#### RS-422/422.1 Samples

**1959.1:** feldspar-phyric rock but phenocrysts finer than coarsely porphyritic "BMB-type" rock; also sample for whole rock analysis;

- collected for comparison with "BMB-type" and to identify phenocrysts; may actually be "White Alps intrusion"

In thin section, the sample has about 20% variably altered, fractured, commonly zoned, but rarely twinned, euhedral to anhedral plagioclase phenos .5-2 mm long. The groundmass is altered and has only about 40% distinct feldspar microlites, the rest may be devitrified glass. The sample also has about 5% euhedral-anhedral mafic silicate phenocrysts <1 mm long, which are rimmed by opaque and replaced by chlorite(?), calcite, and high-birefringence clay ("sericite"). The shapes suggest these were mostly hornblende. The plagioclase phenos are variably altered to calcite and lesser clay and rarely have what may be albite rims. The groundmass contains minor chunky opaque and rare apatite. There are rare, very fine prismatic, unaltered grains of a brown mineral which may be acmite.

- hornblende+plagioclase-phyric flow or intrusion; phenoandesite.

**1984.7:** rock with fine mafic phenos and possibly feldspar phenos; also sample for whole rock analysis;

- collected for identification of phenocrysts and to compare with samples which look more like tuffs below;

In thin section, the sample has about 20% subhedral plagioclase phenocrysts <2 mm, about 3% euhedral biotite phenos <.5 mm, and about 1% generally subhedral, poikilitic hornblende <1 mm in an altered microgranular groundmass of quartz and feldspar. Plagioclase is strongly altered to calcite and clay. Hornblende is variably altered to chlorite, colorless high-birefringence clay, calcite, and rarely actinolite(?). Biotite has sphene and opaque inclusions and is commonly discolored to almost colorless but is only

rarely replaced by muscovite. Accessory apatite in matrix and in mafic phenocrysts appears fresh. There are amygdales or xenoliths <1 mm which consist of cryptocrystalline, mosaic quartz+feldspar(?) and chlorite.

- hornblende+biotite+plagioclase-phyric flow or intrusion; phenocrysts; the abundance of biotite suggests this is not the same unit as that at 1959.1 and the abundance of plagioclase indicates it is not the same as that at 2113, 2141, and 2318.

**2005.6:** lithic fragments and rare inconspicuous crystals in a dark red, clayey(?) matrix

- collected to determine if this is pyroclastic or sedimentary and to identify constituents;

In thin section, the sample consists of about 50% matrix which is clouded with abundant opaque, about 28% rock fragments, about 20% crystal fragments and about 2% glass shards. Rock fragments include a pilotaxitic mafic rock, a fuzzy irregularly microgranular rock with quartz(?), a cryptocrystalline rock with some feldspar microlites and larger plagioclase phenocrysts, a trachytic rock with mafic xenoliths, a hornblende+plagioclase-microphyric rock, phyllite, and possibly chert. The crystal fragments are rather coarse and very angular and seem to be derived from a plutonic rock rather than from a porphyritic volcanic rock. They include fresh plagioclase (dominantly andesine?, one fragment has myrmekite), quartz, and K-spar (including perthite, and grid-twinned microcline). There are also rounded to subhedral mafic grains which are variably replaced by chlorite and may be from a different source.

- tuffaceous litharenite; the variety of clast types and rounding of many rock fragments suggest this is not a primary pyroclastic deposit although the glass shards and angular plutonic crystals suggest an explosive event in the source area; the lack of sorting and preservation of angular shards indicates this is probably a mud flow deposit.

**2113:** rock with rare hornblende and fine black squiggles which I thought might be glass shards;

- collected to determine if this is a tuff or not and to compare with 1984.7 and 2141;

In thin section, the sample contains about 15% euhedral to subhedral hornblende and possibly pyroxene <1 mm in a moderately clay- and calcite-altered groundmass of variably oriented feldspar microlites and very fine granular opaque. The mafic phenocrysts are commonly replaced by chlorite, high-birefringence clay, and rare calcite. It contains about 10% irregularly shaped amygdales (the black squiggles) <2 mm long, which are filled with pale green, cryptocrystalline clay(?), calcite, and spherical to hemispherical clots of darker green clay or chlorite(?).

- hornblende-phyric flow, or possibly intrusion; no evidence that this is pyroclastic.

**2141:** has more black squiggles and I didn't see hornblende so I thought this could be a different unit than 2113; also sample for whole rock analysis

- collected to compare with 2113 and 2318.1 and to try to identify glass shards

In thin section, the fabric is similar to that of 2113 but with only about 3% subhedral hornblende in a pilotaxitic groundmass of chlorite, dusty opaque, and feldspar microlites weakly altered to clay and calcite. There are a few coarser opaque chunks and needles.

The rock contains about 15% irregular amygdales, which are filled with chlorite, calcite,



and chalcedony often in banded, concentric patterns. One amygdale is over 10 mm long and 3 mm wide.

- hornblende-phyric flow, or possibly intrusion; same unit as 2113.

**2318.1:** another rock with both hornblende phenos and black squiggles but much deeper than 2113 and possibly less altered; also sample for whole rock analysis;

- collected to compare to 2141 and 2113 and to see if it is less altered;

In thin section, this sample is very similar to 2113 with about 10% hornblende microphenocrysts and 10% amygdales in a trachytic to pilotaxitic groundmass of weakly altered feldspar microlites and fuzzy cryptocrystalline material. One 6-sided grain replaced by chlorite may have been biotite. The hornblende is less altered than in 2113 and 2141 but thin calcite veins cut the sample.

- hornblende-phyric flow, or possibly intrusion; same unit as 2113 and 2141.

#### RS-423 Samples

**1206.5:** variegated white, red and, grey pseudobreccia(?) of uncertain origin;

- collected to determine if grey "matrix" is actually specular hematite and to better establish paragenetic relations of white argillic(?), red hematitic, and grey ? alteration;

In thin section, the white "clasts" consist of fuzzy, cryptocrystalline material with no identified minerals. The grey "matrix" looks similar but does have <10% equant, opaque specks and some coarser grained patches which may have quartz and/or feldspar. There is one rounded, unidentified phenocryst. In reflected light, the "matrix" has only very rare, extremely small, reflective grains which could be specular hematite. Red hematite rims are on some but not all white "clasts" and may not be on all sides of the same "clast". The "clasts" are commonly palest immediately adjacent to the hematite rim.

- rock type is uncertain; although the white alteration cannot be younger than the red and grey, it looks possible that all developed contemporaneously due to chemical gradients or other causes.