60001810 4010

Mining District File Summary Sheet

DISTRICT	Rosebud
DIST_NO	4010
COUNTY If different from written on document	Pershing
TITLE If not obvious	Rosebud – South Zone
AUTHOR	Mitchell, P.; Longstaff, G.; Vance R; Muerhoff, C.; Cornelea, R
DATE OF DOC(S)	1998
MULTI_DIST Y / (N?) Additional Dist_Nos:	
QUAD_NAME	Sulphur 7½'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine; Newmont Gold Co.; South Zone Hecla Mining Co.; Rosebud Deposit
COMMODITY If not obvious	gold; silver
NOTES	Property summary; correspondence; geology; 2 copies 14 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)

	Initials	Date
SS:	DD	7/31/08
DB:		
SCANNED:		

Revised: 1/22/08

South Zone / Rosebud

60001810

4010

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Newmont Gold Co. - Rosebud
Winnemucca, Nevada

Memorandum

To: Peter Mitchell
George Langstaff

Date: August 3, 1998

Fr: Randy Vance -RBV

Subj: Memos on the South Zone

Two memos of interest on the South Zone are attached for your interest. I found them today while reviewing a binder that belonged to a SFPG manager. I have not previously seen them.

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Perhaps they will be of use to you. I will also file copies at the exploration trailer.

PAM

HECLA MINING COMPANY - ROSEBUD DEPOSIT

SUMMARY OF ALTERATION & MINERALIZATION - SOUTH ZONE

? ? No

The Rosebud Deposit is a low-temperature, epithermal, quartz-sericite, precious metal deposit which is primarily hosted in volcanic rocks (rhyolitic in composition) of Miocene age.

Polished section examination of core and bench-scale mill concentrates indicates the majority of the gold occurs in three dominant grain size populations: ±10 to 100 microns, ±350 microns, and ±700 microns. Silver occurs over an extremely large range of grain sizes (pyrargyrite (Ag_3SbS_3) crystals up to 1/4 inch in diameter were observed in drill core). The overall silver-to-gold ratio of the deposit is 9.5:1, while the silver to gold ratio in the ore grade portion (>=0.14 Au opt) of the mineral occurrence is 6.2:1.

Alteration associated with precious metal deposition within the volcanic package displays vertical and lateral zonation. In general, there is a core of moderate to intense argillic and ? potassic alteration within the ore zone itself. Extending upward (proximal to structures) and outward (along favorable stratigraphic horizons) is an intermediate zone of propylitic alteration (carbonate-chlorite dominant) which is overprinted by a 'halo' of a quartz/chalcedony-clay alteration assemblage. A hematite-carbonate assemblage comprises an extreme distal alteration package to the mineral deposit. The boundaries of these alteration assemblages are not sharp, as the different alteration zones clearly overlap, suggestive of alteration overprinting due to a fluctuating hydrothermal cell. ?

Alteration began with the diagenetic devitrification of glassy volcanic fragments to quartz, K-feldspar and albite. Early sericitic alteration of both feldspars appears to accompany the introduction of disseminated pyrite, marcasite; sphalerite, and galena. The sericite often contains minor amounts of iron, and therefore, can be classified as illite.

The earliest major mineralizing episode is characterized by stockwork and dissemination of quartz + pyrite + marcasite ± chalcopyrite ± electrum, with traces of arsenopyrite ± sphalerite ± galena ± pyrrhotite ± anatase ± tetrahedrite-tennantite. Fractures containing this mineral assemblage may be the same age of, and feeders for, the disseminated sulfides and sericitization.

A later set of fractures contain the mineralizing assemblage consisting chiefly of manganese- or iron-rich calcite + silver sulfosalts (pyrargyrite, miargyrite, stylotypite, proustite, and polybasite) + silver selenides (naumannite, aguilarite) + silver sulfide (acanthite) + native silver + auriferous silver (Au content < 30%) + and silver-rich electrum (Au content > 30%). Calcite in these veins appears to corrode earlier pyrite and marcasite. While alteration of marcasite to pyrite proceeded from the margins of the marcasite blades inward toward the center, calcite or kaolinite commonly replaces the core of the marcasite blades. The calcite-silver veining phase appears to often incorporate fragments of earlier quartz-sulfide mineralization.

The precious-metal stages of mineralization were followed by minor veining and open-space filling of barite, particularly on the hanging wall of precious metal mineralization. This was followed by the latest stage of mineralization, consisting of veinlets of kaolinite which cut across calcite veins, and replace both the calcite and earlier marcasite; it is uncertain whether the kaolinite is hydrothermal or supergene. It is possible that a portion of the chlorite formed instead of kaolinite where iron was locally available.

In the south half of the South Zone, precious metals occur as a component of stratabound stockwork (the result of preferential brecciation of the more brittle volcaniclastic units) and disseminated within several stratigraphic members. Stratabound ore grade mineralization (stockworked and disseminated) ranges from ten (10) to locally 60 feet in thickness. Higher gold grades are normally associated with chloritized and pyritized planar- and convoluted-laminated tuff and vesicular, flow-banded tuff, and with potassic-altered (alunite-adularia) tuff breccia. There is also a region within one of the flow-laminated tuff/tuff breccia members in which high gold and silver grades are associated with carbon, occurring on fracture surfaces and as a portion of the breccia matrix. Metallurgical tests indicate the carbon is not active and therefore not detrimental to precious metal recoveries. It appears the carbon had been emplaced in the volcanic host rock as a result of remobilization from the underlying graphitic metasediment basement during the epithermal mineralizing process.

Mineralization in the north half of the South Zone occurs structurally controlled along high-angle fractures, stratabound, and disseminated. Several mineralized, northeast-trending, high-angle structures coalesce and define a zone of intense shearing and alteration. High-grade gold (+1.0 opt) and silver mineralization occur within this zone over a vertical extent of 220 feet along the structures and within two preferentially mineralized lithologies. It was in this area that Hecla excavated a 240-foot long cross-cut drift, exposing 120 feet of ore-grade mineralization which averaged 1.3 Au opt.

PAM

Radu's Work ?
SFPG due diligence, 1996

STRUCTURAL DATA

A computer generated structural analysis was performed using the combined structural and assay data, provided by Hecla. The data was collected from "all accessible underground exposures" including the cross-cut exploring the main ore body (South Zone).

The structural data used in this preliminary-type analysis includes only "high-grade" structures (> 0.1 opt Au), compiled on the attached equal area projections (Schmidt net, lower hemisphere). Each pole represents the average of a structural zone ("zone of fractures") or a single strongly mineralized structure (up to 31.29 opt Au). Figure 1 represents the plots of poles to mineralized structures with respect to gold grades in "opt". Figure 2 (Rose Diagram) and Figure 3 (Contour Density) illustrate the orientation of these "high-grade" structures.

Based on the standard orientation analysis and statistical techniques, we offer the following conclusions:

1. The most common measured sets of "high-grade" structures are as follows:
   - N 64°E / 75° NW > SE (0.20 to 6.34 opt Au);
   - N 80°E / 75° NW > SE (0.10 to 3.76 opt Au);
   - N 38° E / 75° NW (0.60 to 31.29 opt Au);
   - N 26° E / 53° NW (0.85 to 2.38 opt Au).

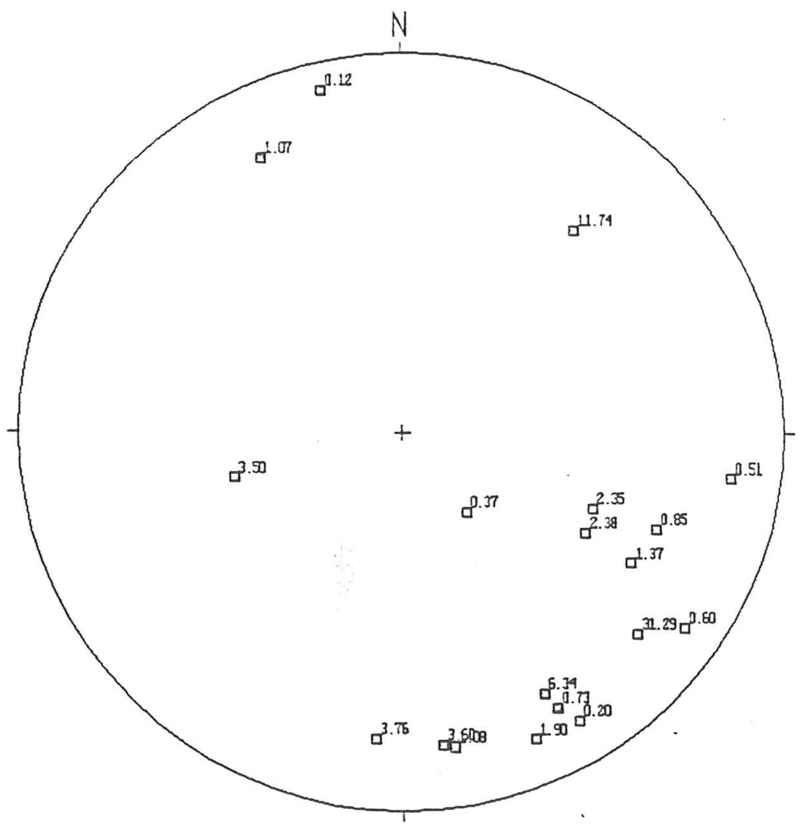
2. Many of the quartz - sulfides veins observed underground follow the above trends. Therefore, it can be suggested that structures sympathetic to this pre-mineral faults and fractures provided the release mechanism for the Tertiary extensional stresses and acted as the primary fluid flow during the mineralizing event.

3. The mean orientation of the above mineralized structures, as defined by the Rose Diagram (fig. 2) is about N50°E. This orientation is approximately parallel to the surface projection of the main ore body (see the attached Target Map).

4. Most of the strongly mineralized structures are steeply dipping (62° mean value) suggesting a structural control on some of the "high-grade" intercepts. Figure 4 illustrates a good correlation between high-angle mineralized structures and gold grades.

5. The "high-grade" structures average to intersect in a common line of steep northwesterly plunge (N15 W°/75° NNW; fig. 3). This suggests that the major axes of ore shuts at the Rosebud mine may be located near the **steeple dipping**, NNW-trending vein intersection line.

It is important to note that the above structural data containing basic "orientation" information regarding the "high-grade" structures was generated by "numbers" provided by Hecla. Additional structural data based on detailed underground mapping and structural sampling , can be provided if needed.



ROSEBUD-AURIFEROUS Structures (>0.1 opt)

Projection	Schmidt
Number of Sample Points	19
Mean Lineation Azimuth	143.9
Mean Lineation Plunge	22.0
Great Circle Azimuth	354.9
Great Circle Plunge	38.1
1st Eigenvalue	0.688
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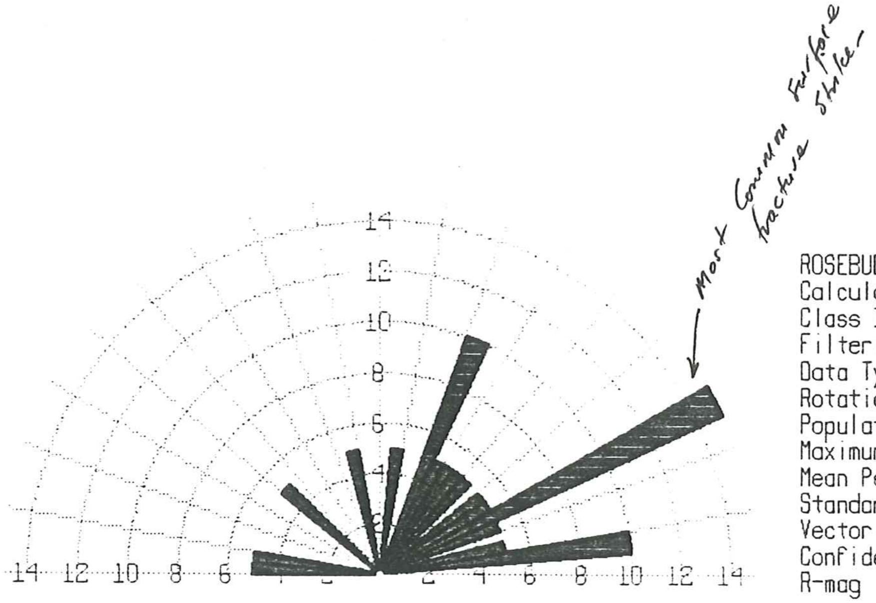
(LN(E1/E2)) / (LN(E2/E3)) ..	2.369
Spherical variance	0.3962
Rbar	0.6538

FRACTURES ± perpendicular to bedding?

FIG. 1.



ROSEBUD-AURIFEROUS Structures (>0.1 opt)

Calculation Method	Frequency
Class Interval	5 Degrees
Filtering	Deactivated
Data Type	Bidirectional
Rotation Amount	90 Degrees
Population	20
Maximum Percentage	15 Percent
Mean Percentage	6.2 Percent
Standard Deviation	2.84 Percent
Vector Mean	54.31 Degrees
Confidence Interval	32.21 Degrees
R-mag	0.51

FIG. 2

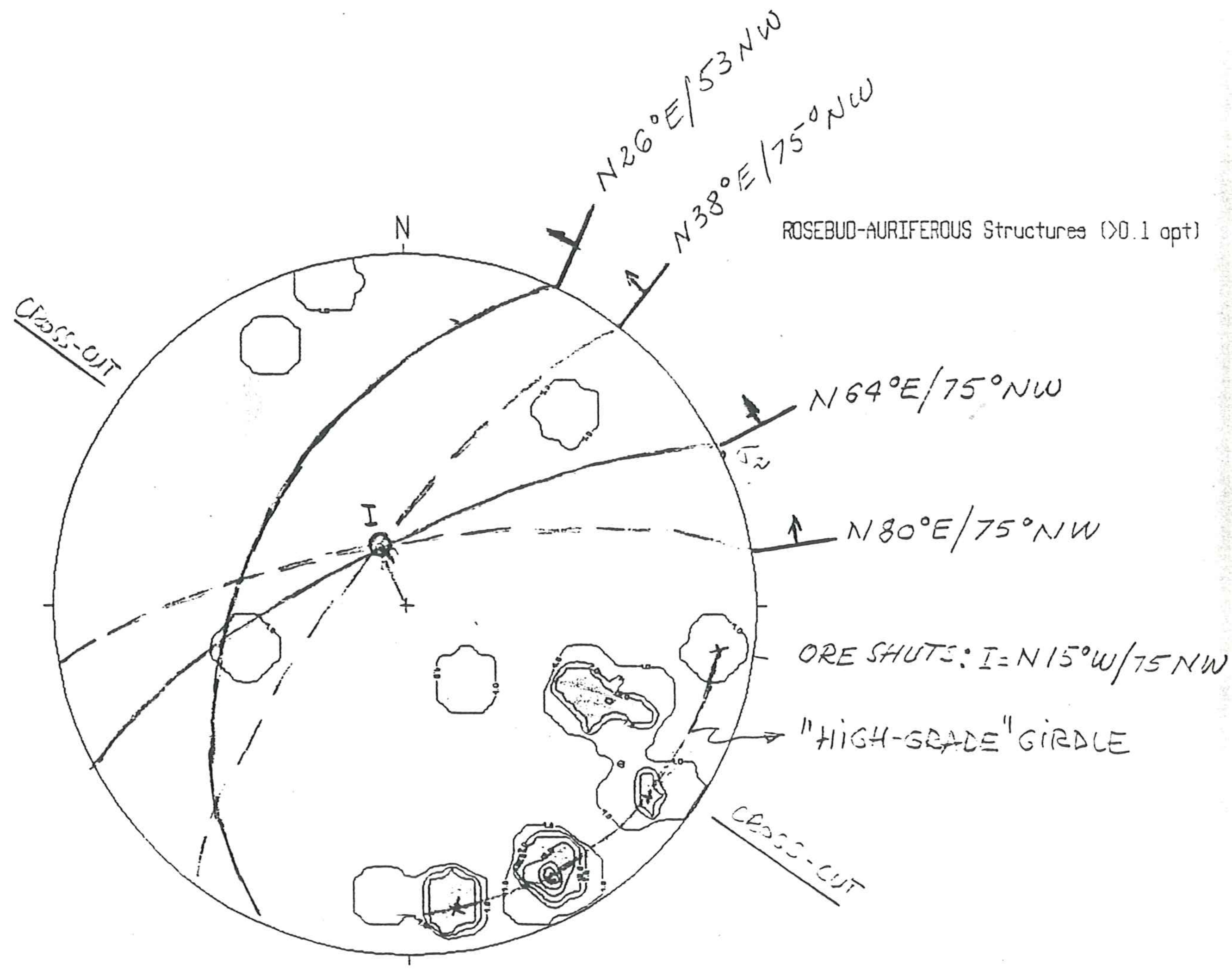
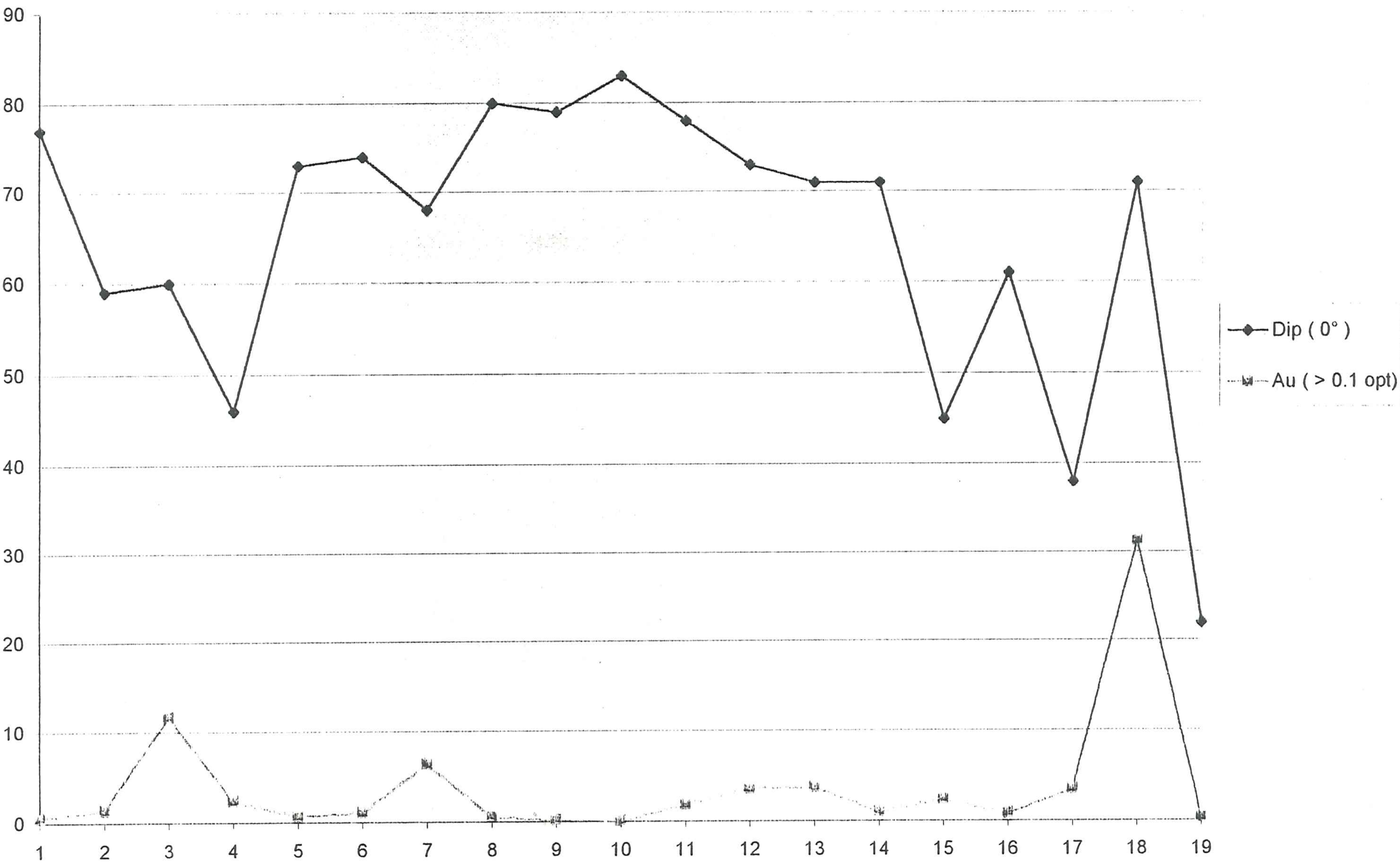


FIG. 3



Rosebud Deposit - Auriferous Structures (> 0.1 opt Au)

FIG. 4

6006 1210 4010

Newmont Gold Co. - Rosebud
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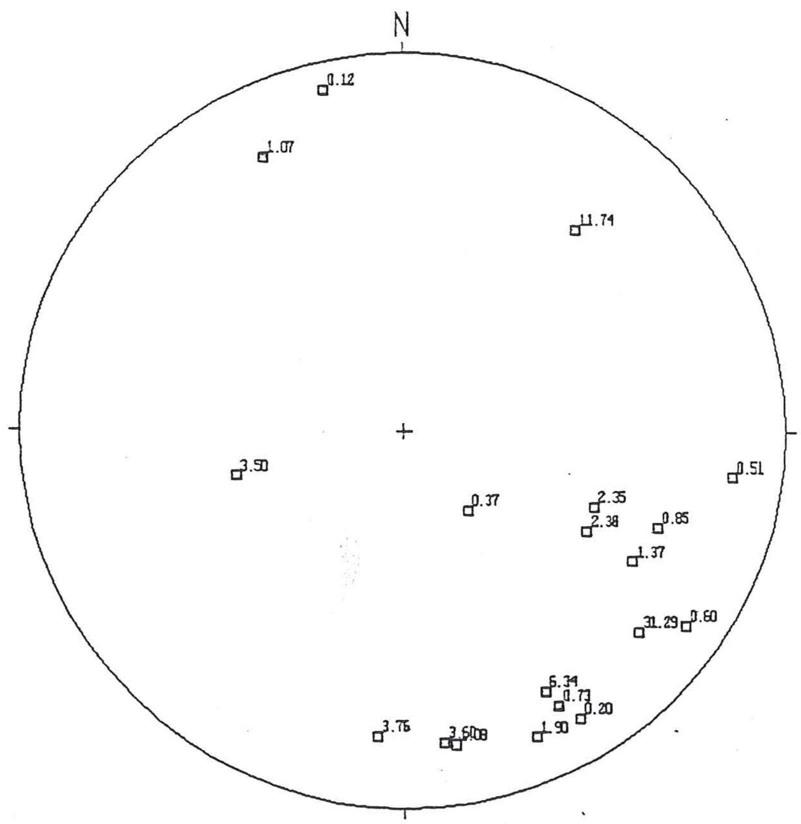

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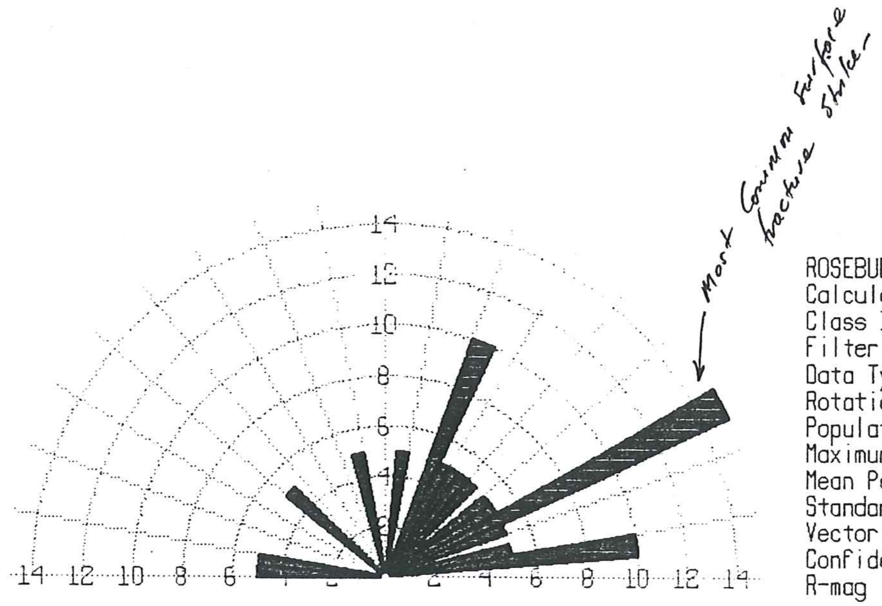

ROSEBUD-AURIFEROUS Structures (>0.1 opt)
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Class Interval .... 5 Degrees
Filtering .... Deactivated
Data Type .... Bidirectional
Rotation Amount ...... 90 Degrees
Population 20
Maximum Percentage ... 15 Percent
Mean Percentage ...... 6.2 Percent
Standard Deviation ... 2.84 Percent
Vector Mean .... 54.31 Degrees
Confidence Interval .. 32.21 Degrees
R-mag 0.51

FIG. 2

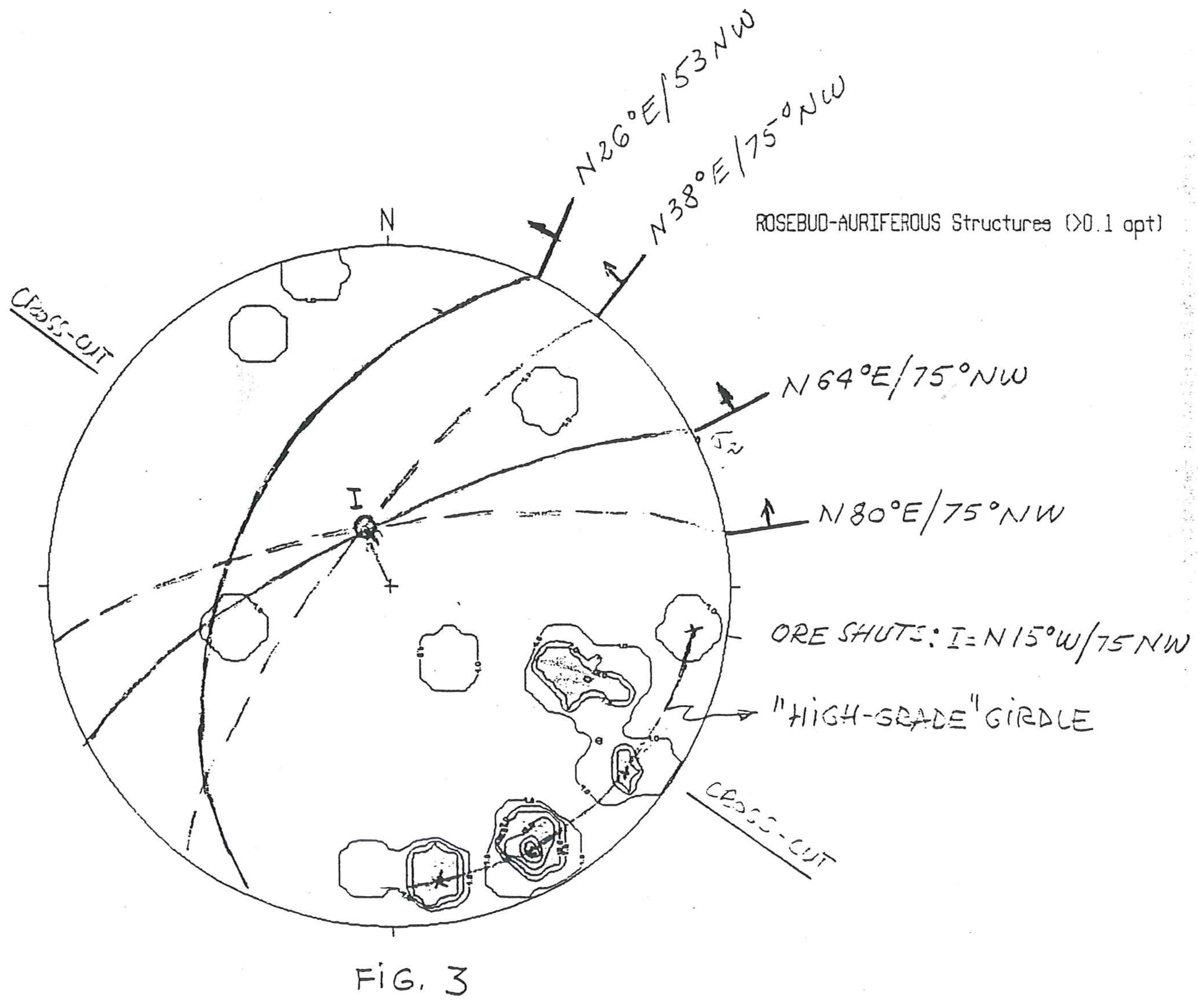
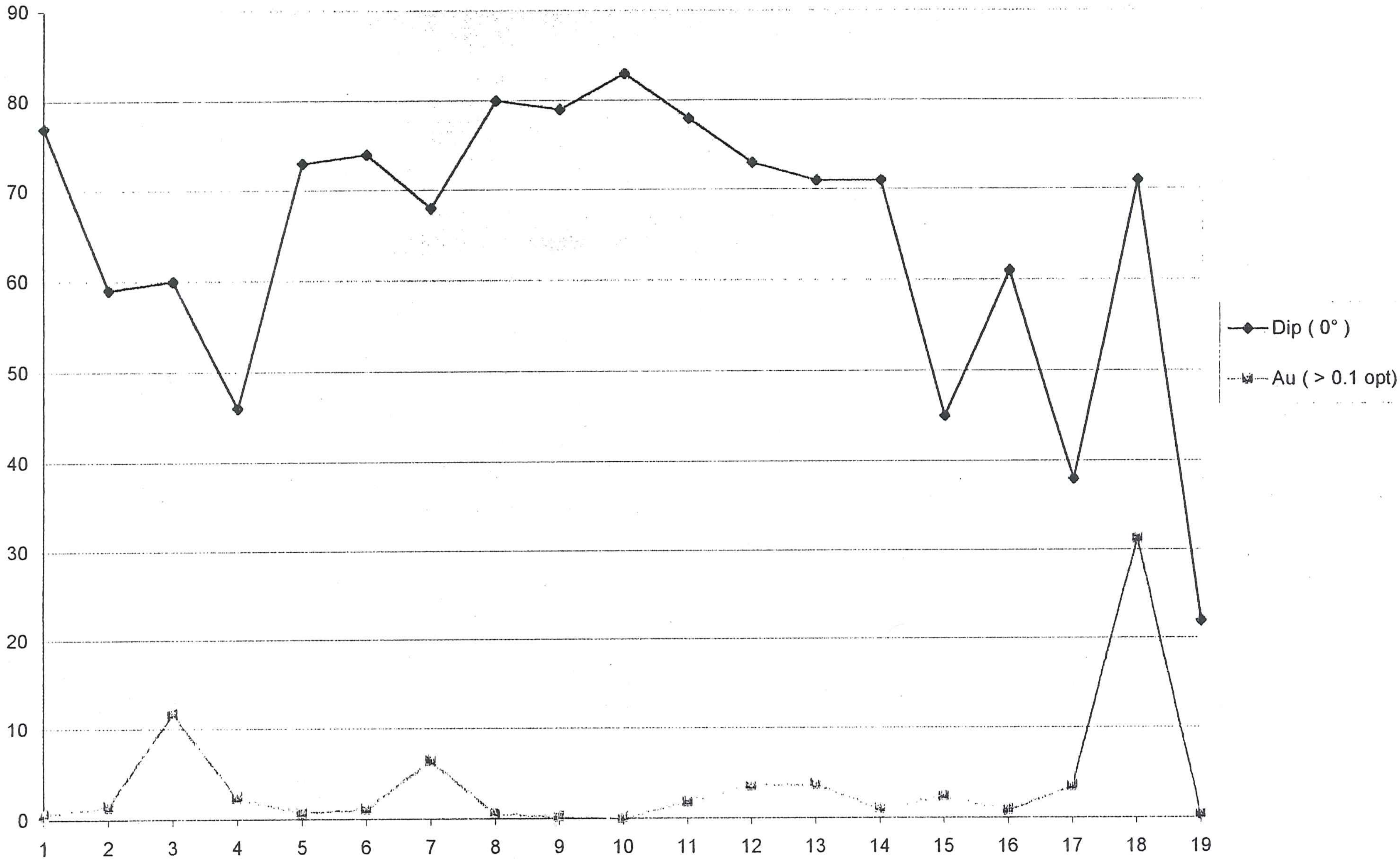


FIG. 3



Rosebud Deposit - Auriferous Structures (> 0.1 opt Au)

FIG. 4