60001917

Mining District File Summary Sheet

DISTRICT	Rosebud
DIST_NO	4010
COUNTY If different from written on document	Pershing
TITLE If not obvious	Rosebud Project Review - Prospect Rating and Ranking, February 3-4, 1999
AUTHOR	Mitchell, P.; Allen K.; Vance R
DATE OF DOC(S)	1999
MULTI_DIST Y / N? Additional Dist_Nos:	
QUAD_NAME	Sulphur 7½'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine; Rosebud Project; Newmont Mining Corp. Barrel Springs; Brown Palace; Cave Fault; Chance; Degerstrom; Gator; East Decamland - Gold Hill; Lucky Boy; Far East; Mother Lode; North Dozer; North Equinox; Oscar; School Bus Canyon; Short Shot; Shark Fin; South Kamma; South Ridge Valley; Vertex; White Alps; Wildrose
COMMODITY If not obvious	gold; silver
NOTES	Property report; correspondence; geology; cross sections; assays; resources; geophysics; geochemistry, assays; geochemical maps 175p.

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)

SS: DP 9/10/08
Initials Date

DB:
Initials Date

SCANNED:
Initials Date

Revised: 1/22/08

1999 Rating & Ranking

6000 1917 4010

3 of 22

6000 1917 4010

Newmont Mining Corp. - Rosebud
Winnemucca, Nevada

Memorandum

To: File **Date:** December 15, 1999

Fr: Randy Vance -RBV

Subj: Rosebud Rating and Ranking Report

The Rosebud Rating and Ranking Report is a compilation by Peter Mitchell of a two-day review held on February 3-4, 1999. The objective of the meeting was to rate and rank known exploration targets on the claim block to determine which targets received attention during 1999 exploration.

The report will serve as a formal reference for future explorationists on the property. Original copies (with colored plates) were delivered to Kurt Allen at the Rosebud Mine, the exploration trailer files at the Rosebud mine, and Newmont's Winnemucca office.

ROSEBUD PROJECT REVIEW

Prospect Rating and Ranking

February 3 – 4, 1999

Compiled and edited by

Peter Mitchell

Newmont Mining Corporation
Winnemucca, Nevada

SUMMARY

A review of Rosebud exploration projects was held at the Newmont Gold Company exploration office in Winnemucca, Nevada on February 3rd and 4th. Representing Hecla Mining Company were Don Cameron, Ron Clayton, Kurt Allen and Brian Morris. Participants from Newmont Gold Company included Dave Groves, Rick Lisle, Randy Vance, Gary Massingill, Robert Jackson, Bruce Ferneyhough, Peter Mitchell, Nigel Phillips and George Langstaff. Pete Rogowski, consultant to both Hecla and Newmont, also attended the meeting.

The exploration models and supporting databases (geology, geophysics, geochemistry) for 26 underground, near mine and district exploration prospects were reviewed and discussed, as were the merits of proposed drilling targets. To avoid prejudicing early stage prospects by comparing them to prospects with protracted exploration histories and large databases, the prospects were separated into *Advanced* and *Needs More Work* categories. All of the *Advanced* prospects have identified drill targets, whereas, additional geology, geochemistry and geophysics are needed to identify specific drilling targets in the *Needs More Work* prospects.

The first 11 *Advanced* prospects were assigned priority work status, and exploration was deferred on the two lowest ranking prospects. In the *Needs More Work* category, the top 6 were assigned priority work status, the next two were placed in a *may be deferred* category, and exploration was deferred on the five lowest ranking prospects.

The review committee agreed that work on underground and near mine prospects will be undertaken by the Rosebud mine geology staff, and that exploration on the "district" prospects will be conducted by Newmont Gold Company geologists. Newmont staff were assigned specific prospects to evaluate, and completion deadlines was established.

Commensurate with the increased discovery potential of the underground and near mine targets, the review committee agreed that the combined budget for these prospects should be increased over forecast allocations. The committee also recommended that additional cross sections and, in some cases, level plan maps were needed before drilling was initiated at any of the 17 priority prospects.

Drilling is scheduled to commence on the underground prospects by the end of February, and on the "district" prospects by the end of March.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

A review of Rosebud exploration projects was held at the Newmont Gold Company exploration office in Winnemucca, Nevada on February 3rd and 4th. Representing Hecla Mining Company were Don Cameron, Ron Clayton, Kurt Allen and Brian Morris. Participants from Newmont Gold Company included Dave Groves, Rick Lisle, Randy Vance, Gary Massingill, Robert Jackson, Bruce Ferneyhough, Peter Mitchell, Nigel Phillips and George Langstaff. Pete Rogowski, consultant to both Hecla and Newmont, also attended the meeting. These people comprise the "review committee."

PURPOSE

There were several reasons that a comprehensive review of the Rosebud exploration program was needed. At the end of 1998 there were 26 prospects (Fig. 1) to evaluate within the Rosebud mining district, and it was clear that we would have neither the staff nor the budget in 1999 to assess each prospect. The situation was further encumbered by the magnitude of geologic data that had been collected during a decade of exploration. To insure that the highest priority prospects were evaluated first and as efficiently as possible in 1999, duplicate and conflicting information needed to be removed from the database, the remaining information reorganized, and the 26 prospects rated and ranked. Another reason for conducting the Rosebud exploration review was to improve communication between Hecla and Newmont and to enhance coordination within Newmont's exploration team.

PROSPECT RATING AND RANKING

Exploration models and their supporting databases (geology, geophysics, geochemistry) for 26 underground, near mine and district exploration prospects (Fig. 1) were reviewed and discussed, as were the merits of the proposed drilling targets. To avoid prejudicing early stage prospects by comparing them to prospects with protracted exploration histories and large databases, the prospects were ranked in two categories: *Advanced* and *Needs More Work*. All *Advanced* prospects have identified drilling targets whereas, additional geology, geochemistry and/or geophysics, are needed before drilling targets can be defined at the *Needs More Work* prospects.

The objective of *rating* the prospects is to develop a relatively uniform basis for their comparison and internal *ranking*. The format, definitions and worksheets for rating and ranking prospects are presented in Appendix A.

RESULTS

The final classification, ranking and priority rating of the 26 prospects reviewed are shown in Table 1.

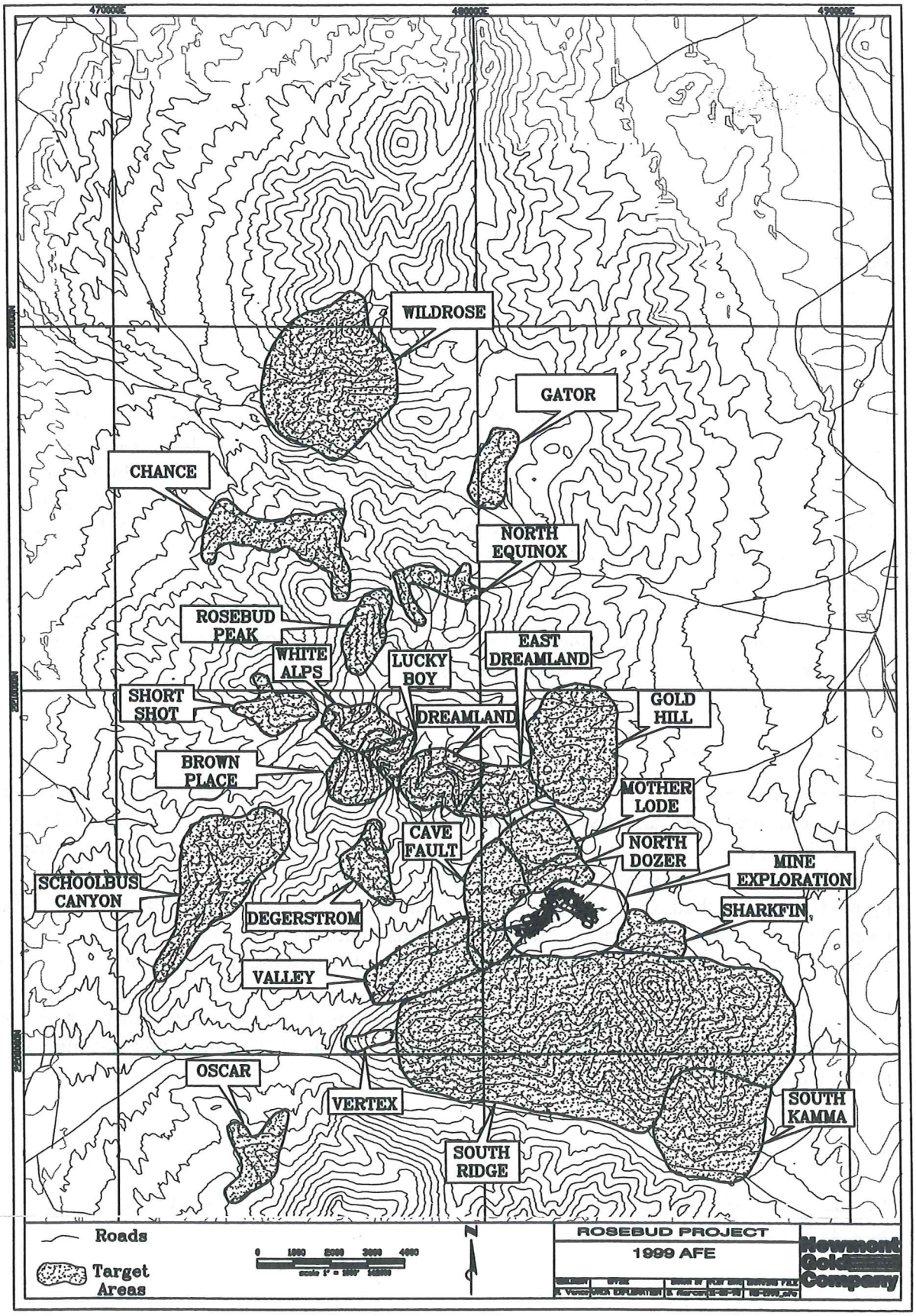

WILDROSE
GATOR
CHANCE
NORTH EQUINOX
ROSEBUD PEAK
WHITE ALPS
LUCKY BOY
EAST DREAMLAND
SHORT SHOT
DREAMLAND
GOLD HILL
BROWN PLACE
MOTHER LODE
CAVE FAULT
NORTH DOZER
MINE EXPLORATION
SCHOOLBUS CANYON
DEGERSTROM
SHARKFIN
VALLEY
OSCAR
VERTEX
SOUTH KAMMA
SOUTH RIDGE
Roads
Target Areas
N
ROSEBUD PROJECT
1999 AFE
Newmont Gold Company

TABLE 1. Prospect Classification, Ranking and Priority Rating.

ADVANCED				NEEDS MORE WORK			
NEAR MINE	1.	2b – North Zone Feeders	*Priority*	DISTRICT	1.	School Bus Canyon	*Priority*
	2.	Far East			2.	Deep Dreamland	
	3.	South Zone Feeders			3.	Degerstrom	
	4.	1b – Northeast of Mine			4.	Valley	
	5.	1a – Southeast of South Zone			5.	Lucky Boy	
	6.	3 – 96 – 356 Intercepts			6.	Chance	
	7.	Shark Fin			7.	Gator	*May Not Work*
	8.	2a – Vent Raise			8.	Brown Palace	
DISTRICT	9.	Mother Lode			9.	Wild Rose	*Defer*
	10.	White Alps			10.	Oscar	
	11.	North Equinox			11.	Short Shot	
	12.	South Kamma	*Defer*		12.	South Ridge	
	13.	Vertex			13.	Barrel Springs	

Note: Target 2b – North Zone Feeders includes #24 fault; Target 1a – Southeast of South Zone includes Shark Fin extension; Mother Lode includes the Cave Fault East, Mother Lode, Gold Hill, and East Dreamland areas; Valley includes Cave Fault West.

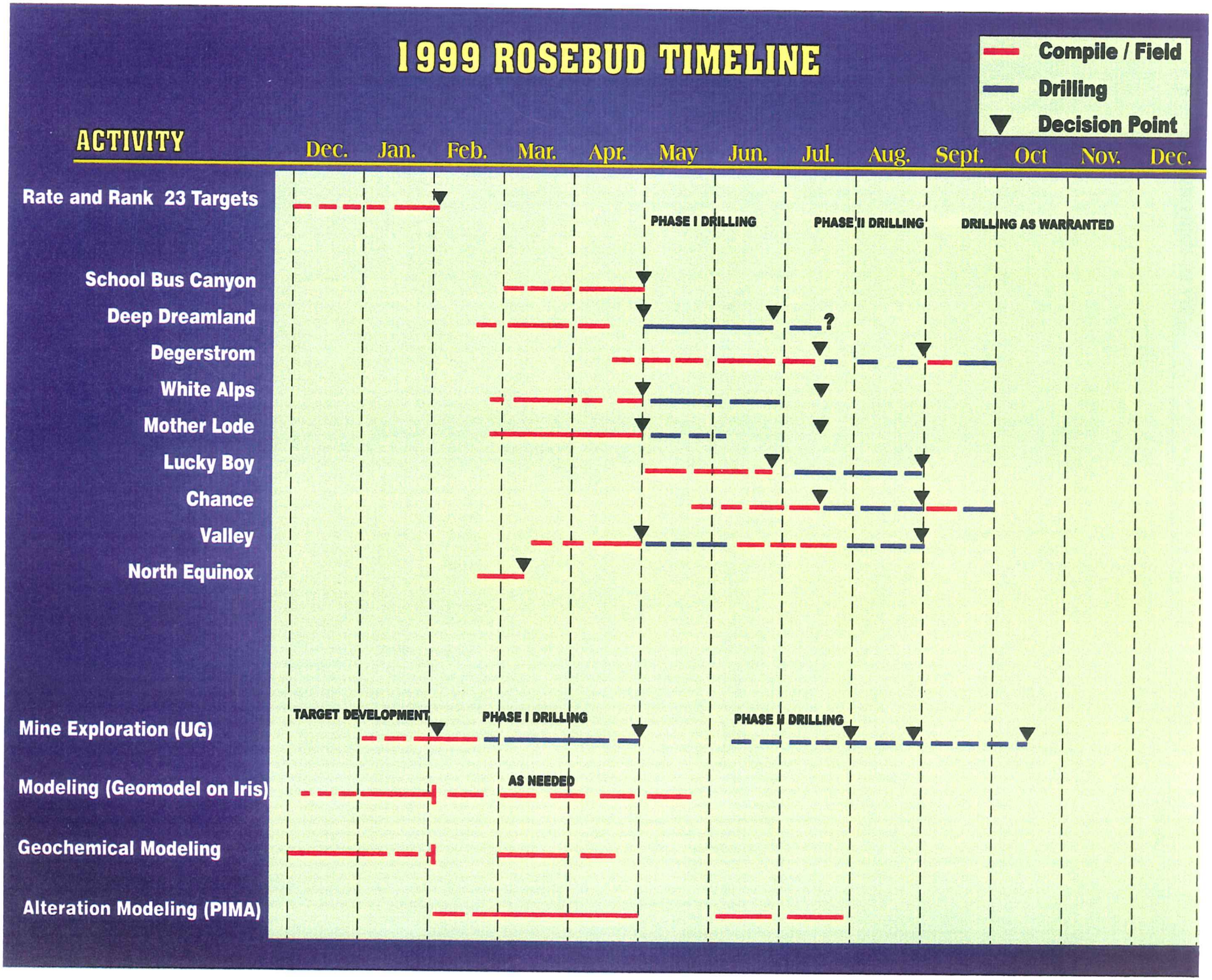
The first 11 *Advanced* prospects were assigned priority work status, and exploration was deferred on the two ranking the lowest. In the *Needs More Work* category, the top 6 were assigned priority work status, the next two were placed in a *may be deferred* category, and exploration was deferred on the five lowest ranking prospects. Summaries of each of the prospects are given in the section "Prospect Descriptions."

Following the reviews, rating and ranking of the prospects, Newmont geologists were assigned specific prospects to evaluate, and the time required to bring the prospects to a decision point was estimated (Table 2). Completion deadlines also were established for the prospects (Table 3).

TABLE 2. Target evaluation time, personnel assignments, and prospect accessibility.

STATUS	STAGE	RANK	PROSPECT	TIME NEEDED	ASSIGNMENT	ACCESS
Advanced	*Priority*	9.	Mother Lode	2 months	Mitchell (1), Rogowski (1)	Yes
		10.	White Alps	3 months	Vance (2), Mitchell (1)	Maybe
		11.	North Equinox	None	Langstaff , Peer Review	No
District		1.	School Bus Canyon	0.2 months	S.W.A.T. Team	Yes
		2.	Deep Dreamland	3 months	Langstaff	Yes
		3.	Degerstrom	3 months	Langstaff	No
		4.	Valley	3 months	Rogowski (2), Mitchell (1)	Yes
		5.	Lucky Boy	2 months	Mitchell	Yes
		6.	Chance	2 months	Vance	No
	May Not Work	7.	Gator	1 month	Mitchell	No
		8.	Brown Palace	2 months	Vance	Yes

Note: Target evaluation time is the *time needed* to gain sufficient encouragement to continue exploration.


1999 ROSEBUD TIMELINE
Compile / Field
Drilling
Decision Point
ACTIVITY
Dec.
Jan.
Feb.
Mar.
Apr.
May
Jun.
Jul.
Aug.
Sept.
Oct
Nov.
Dec.
Rate and Rank 23 Targets
PHASE I DRILLING
PHASE II DRILLING
DRILLING AS WARRANTED
School Bus Canyon
Deep Dreamland
?
Degerstrom
White Alps
Mother Lode
Lucky Boy
Chance
Valley
North Equinox
TARGET DEVELOPMENT
PHASE I DRILLING
PHASE II DRILLING
Mine Exploration (UG)
AS NEEDED
Modeling (Geomodel on Iris)
Geochemical Modeling
Alteration Modeling (PIMA)

RECOMMENDATIONS

The main recommendations agreed to by the review committee are:

- work on underground and near mine prospects will be undertaken by the mine geology staff,
- exploration on "district" prospects will be conducted by Newmont geologists,
- commensurate with the increased discovery potential of underground and near mine targets, the combined exploration budget for these prospects should be increased over forecast levels,
- a temporary geologist should be employed by Hecla's staff to log core, compile data and assist with constructing geologic cross sections for underground and near mine targets,
- multiple cross sections, and in some cases, level plan maps must be constructed before drilling any of the 17 priority prospects.

1999 DRILLING PROGRAM

An underground core drill is on site at Rosebud and drilling is scheduled to commence on the underground prospects by the end of February. The start-up date for surface drilling is more speculative, but rotary drilling should be in progress at the Mother Lode prospect by early May.

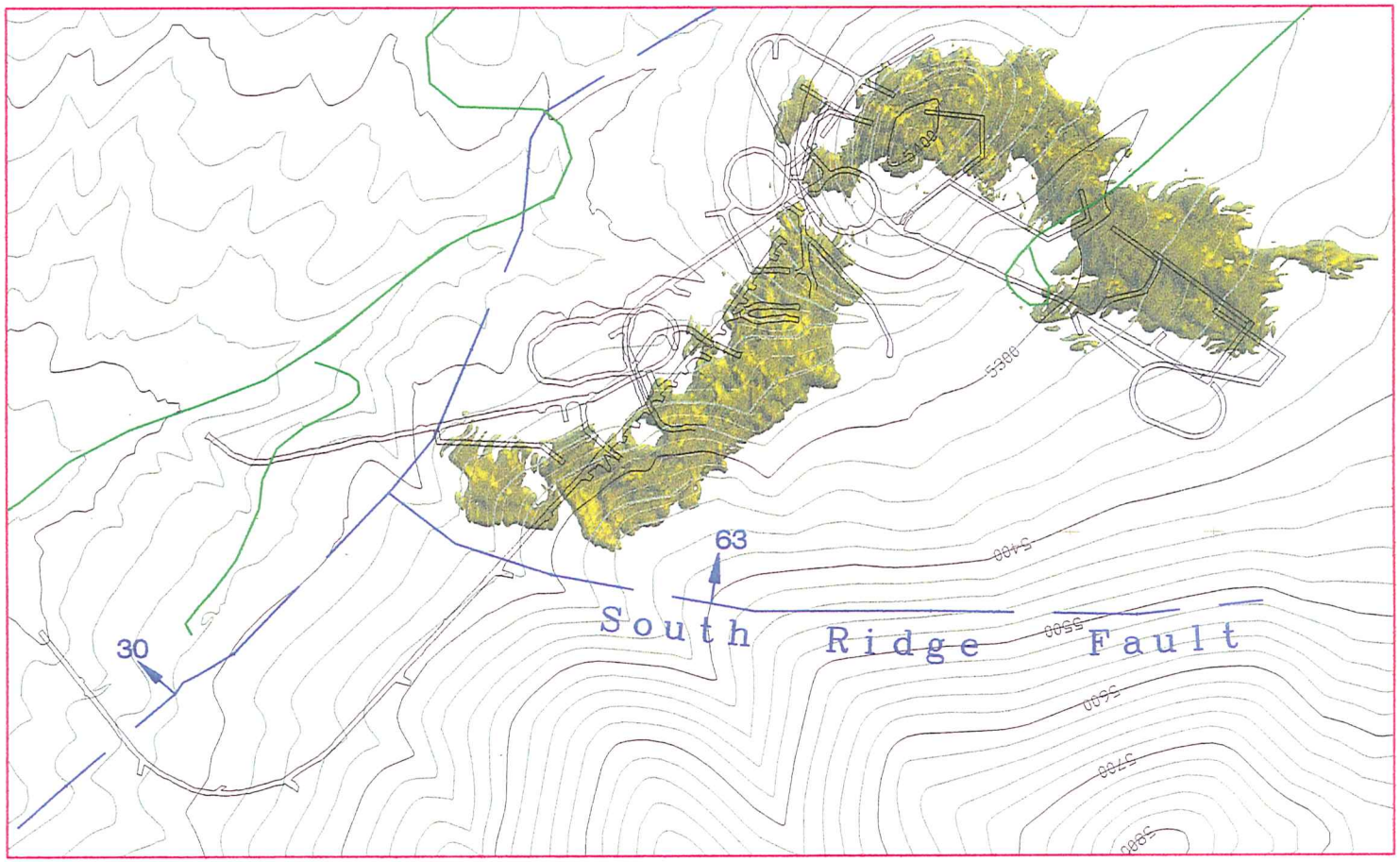
MINE GEOLOGY AND ORE RESERVE UPDATE

GEOLOGY AND MINERALIZATION

The Rosebud district is situated in northwest Pershing county, Nevada, within the Basin and Range physiographic province. It is a low- to moderate-temperature, low-sulfidation, epithermal gold-silver deposit that is generally hosted within a series of Miocene volcanic and volcaniclastic rocks of intermediate to felsic composition (Kamma Mountains Volcanic Group). The volcanic rock package unconformably overlies, and is commonly in fault contact (Foundation fault) with Jurassic to Triassic age, low-grade metasedimentary rocks (Auld Lang Syne Group), which also host precious metal mineralization. Ore-grade mineralization at the Rosebud deposit occurs in three zones (South, East and North), although lower-grade "halo" mineralization generally transcends the spatial boundaries separating these zones. All proven and probable ore reserves reported for the Rosebud desposit are contained within the South, North and East zones (Fig. 2). An area of mineralization proximal to the deposit, the Far East zone, is listed under the *Other Resources* category.

The structural setting of the Rosebud deposit is dominated by the east-trending South Ridge and northeast-trending Cave fault systems. The South Ridge fault is a mineralized, arcuate-striking, fault system with early reverse dextral and later normal sinistral listric (down to the north) displacement, which was the primary conduit for auriferous fluids during the formation of the Rosebud deposit. The fault is the footwall boundary to approximately two-thirds of the ore-grade mineralization in the deposit (South and North zones), and is the hanging wall boundary to the remaining ore-grade mineralization (East and part of the North zones). The South Ridge fault zone coalesces with the Foundation fault in the northern and western portions of the deposit. Inflections in the South Ridge fault plane contributed to ore formation in both the South and East ore zones.

Structure and stratigraphy control precious metal mineralization in the Rosebud district. In the South zone, gold and silver mineralization occur on the hanging wall of the South Ridge fault (1) in northeast-trending (060°)extension fractures produced during the final movement on the fault, (2)east-trending, high-angle joints and faults, (3) along flow-banding planes, and (4) as disseminations in specific intermediate composition volcanic units and in intercalated volcaniclastic horizons, where the clay-rich, silica-poor hydrothermal alteration is associated with precious metal mineralization. In contrast, mineralization in the East zone is characterized by pervasive silica-replacement and silica-illite-nacrite-marcasite ± pyrite network veining in the Dozer rhyolite and porphyritic dikes (Bud Marker Bed). East zone mineralization occurs in the footwall of the South Ridge fault and along high-angle joints and faults. Ore controls and styles of mineralization in the North zone are representative of those in both the South and East zones. The geology of the deposit is illustrated in Figure 3.



0 500 Ft

1:6000

Figure 2. Surface "footprint" of the Rosebud 0.05 oz/t gold shape, projected to plan.

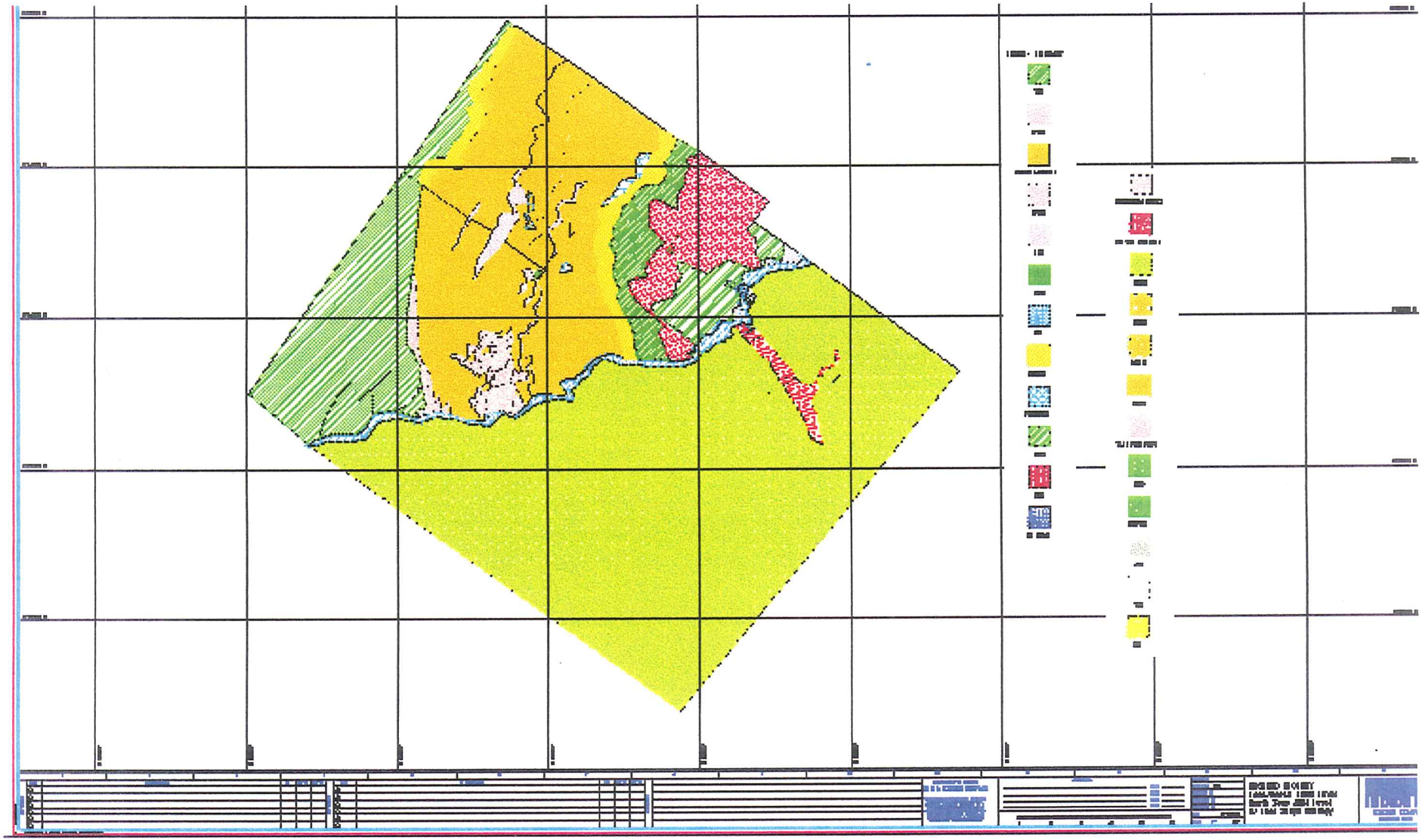


Figure 3. Rosebud deposit geology on the 4609 level.

ORE RESERVE AND RESOURCE

The information in this section was taken from Allen et al. (1999).

1998 Production

During 1998, most of the production at Rosebud came from eight stopes within the South Zone, with minor production from two stopes within the East Zone of the Deposit. Production, including sub-grade must take material, for the year totaled 316,825 tons at an average grade of 0.451 oz Au/ton and 3.43 oz Ag/ton, for 134,026 ounces gold and 1,085,961 ounces of silver. Mill recoveries for gold and silver averaged 97% and 54% respectively.

1999 Measured and Indicated Resource

The 1999 *measured and indicated global resource* (0.01 Au oz/t resource cut off) for the Rosebud deposit (South, North and East Zones) is 8,426,869 tons at an average grade of 0.053 ounces Au per ton and 0.44 ounces Ag per ton, containing 444,853 ounces gold and 3,673,121 ounces silver (Table 4a,b).

At a resource cut off of 0.180 Au oz/t, the 1999 *measured and indicated resource* is 411,841 tons grading 0.462 ounces Au per ton and 2.25 ounces Ag per ton, containing 190,171 ounces gold and 925,835 ounces silver.

Inferred Resource

In addition to the 1999 *measured and indicated resource*, there is a *inferred global resource* (0.01 Au oz/t cut off) of 1,084,590 tons at an average grade of 0.065 Au oz/t and 0.41 Ag oz/t, containing 69,995 ounces gold and 441,424 ounces silver (Table 4a).

At a 0.180 Au oz/t cut off, the 1999 *inferred resource* includes 102,296 tons averaging 0.406 Au oz/t and 1.78 Ag oz/t, containing 41,549 ounces gold and 182,391 ounces silver.

Proven and Probable Ore Reserve

The 1999 *proven and probable ore reserve* is 483,853 tons at an average grade of 0.392 Au oz/t and 1.80 Ag oz/t, containing 189,615 ounces gold and 872,503 ounces silver (Table 4b).

The 1999 *ore reserve* is the result of a detailed reconciliation in the South Zone, where the bulk of the 1998 production occurred, and a new East Zone resource and reserve model based on new drilling.

1999 Reconciliation

Production during 1999 continues to substantiate the 1997 South Zone reserve model, and has shown the model to be slightly conservative (Table 6). A comparison of actual production and the 1998 reserve model for the South Zone using a cut off grade of 0.150 opt Au shows that the mine out performed the model, producing 67,447 tons (+40.2%) and 963 ounces gold (+8%) more than predicted. Given this relatively close agreement between the South Zone production

Table 4a. Estimated resources and ore reserves as of January 1, 1999.

RESOURCES [1] (0.01 opt Au cut off)						UNMINEABLE RESOURCE				
Category	Tonnage	Au oz/t	Ag oz/t	Au ounces	Ag ounces	Tonnage	Gold oz/t	Silver oz/t	Gold Ounces	Silver Ounces
Measured and Indicated	8,426,869	0.053	0.44	444,853	3,673,121	7,943,016	0.032	0.35	255,238	2,800,618
Inferred [2]	1,084,590	0.065	0.41	69,995	441,424					
TOTAL	9,511,459	0.054	0.43	514,848	4,114,545					

(1) Reported resources are for the Rosebud deposit only (South, North and East zones). Far East and East zone hanging wall mineralization is reported separately in Table 5.
(2) Dilution is included in proven and probable reserve tables.

Table 4b. Estimated resources and ore reserves as of January 1, 1999.

DILUTION [3]						PROVEN and PROBABLE RESERVE [4, 5]				
Category	Tonnage	Au oz/t	Ag oz/t	Au ounces	Ag ounces	Tonnage	Gold oz/t	Silver oz/t	Gold Ounces	Silver Ounces
Measured and Indicated	74,963	0.095	0.50	7,119	37,140	483,853	0.392	1.80	189,615	872,503

(3) Proven and probable reserves constitute in-place material at 0.18 oz Au/t cut off, corrected for dilution and mining recovery.
(4) Average process recovery is 97% for gold and 54% for silver.
(5) Inferred resources include 102,296 tons grading 0.406 oz Au/t and 1.78 oz Ag/t (41,549 Au ounces) at 0.18 oz Au/t cut off.

Table 5. Other Rosebud resources reserves as of January 1, 1999.

AREA	CATEGORY	TONNAGE	GOLD oz/t	SILVER oz/t	GOLD ounces	SILVER ounces
Rosebud Deposit	Unmineable[1]	7,943,016	0.032	0.35	255,238	2,800,618
	Inferred[2]	1,084,590	0.065	0.41	69,995	441,424
	TOTAL	9,027,606	0.036	0.36	325,233	3,242,042
Far East East Zone Hangingwall	Unmineable[3]	1,010,364	0.034	0.21	34,352	212,982
	Inferred[4]	576,220	0.034	0.21	19,591	121,464
	TOTAL	1,586,584	0.034	0.21	53,943	334,446
UNMINEABLE TOTAL		8,953,380	0.032	0.34	289,590	3,013,600
INFERRED TOTAL		1,660,810	0.054	0.34	89,586	562,888
GRAND TOTAL		10,614,190	0.036	0.34	379,176	3,576,488

(1) Includes measured and indicated resource of 36,639 tons grading 0.352 oz Au/t and 2.85 oz Ag/t (12,903 Au oz; 104,511 Ag oz) at 0.15 oz Au/t cutoff.
(2) Includes 102,296 tons grading 0.406 oz Au/t and 1.78 oz Ag/t (41,549 Au oz; 182,391 Ag oz) at 0.18 oz Au/t cut off, as reported in Table 4b.
(3) Includes indicated resource of 14,117 tons grading 0.696 oz Au/t and 4.32 oz Ag/t (9,826 Au oz; 60,921 Ag oz) at 0.18 oz Au/t cut off.
(4) Includes 8,051 tons grading 0.696 oz Au/t and 4.32 oz Ag/t (5,604 Au oz; 34,745 Ag oz) at 0.18 oz Au/t cut off.

Table 6. Changes to the Ore Reserves

ITEM	TONNAGE	GOLD oz/t	SILVER oz/t	GOLD oz	SILVER oz
Reserves as of January 1, 1998	943,042	0.420	2.92	395,634	2,756,402
1998 Production					
December 1997 - November 1998 ore mill settlements [1]	267, 217	.0482	3.78	128,930	1,011,028
December 1997 - November 1998 sub-grade [2]	49,610	0.103	1.51	5,096	74,932
December 1997 - November 1998 segregated waste [3]	56,262	0.067	0.75	3,748	42,185
Total Production [4]	267,217	0.482	3.78	128,930	1,011,028
1998 Adjustments [5]	(191,972)	0.402	4.55	(77,089)	(872,871)
Reserve as of January 1, 1999	483,853	0.392	1.80	189,615	872,503

(1) December 1997 through November 1998 tonnage from mine production accounting and December 1997 through October 1998 ounces from mill settlements; November 1998 ounces from mine production accounting.
(2) Sub-grade ore sent to the mill was "must take" material, not part of the 1998 reserve, and therefore is not subtracted from the reserve.
(3) Segregated waste was that material below "must take" grade that was directed to the waste dump. This is part of the dilution reduction from the 1998 reserve, and will therefore not be subtracted from the 1999 reserve.
(4) December production will not be milled until January, 1999 and remains in reserve totals. This total production number for 1998 does not include sub-grade "must take" material sent to the mill or waste sent to the waste dump.
(5) Negative tonnage adjustment is due to dilution removed from reserves, increased cut off grade, revised tonnage factor in the East zone, reclassified reserve blocks, ore sent to the waste dump, and changes due to new East zone drilling.

and the reserve model, a reconciliation of the South Zone ore reserve, rather that a complete remodel of the South Zone, was completed to estimate the South Zone portion of the 1999 resource and reserve. The South Zone reconciliation was completed by tabulating all *measured and indicated resource* model blocks above a 0.180 Au oz/t cut off grade that are located within the current mine production plan, and excluding those blocks that were situated within the mined-out areas of the deposit.

Limited production from the East Zone also substantiates the 1999 updated East Zone reserve model. A comparison between actual production in the East Zone and the updated East Zone reserve model shows that the mine outperformed the model by producing an additional 361 tons (14.7%) and 54 ounces gold (7.1%) than was predicted by the model.

Since all production during 1998 came from the South Zone and East Zone, no changes were made to the North Zone resource and reserve, with the exception of applying a revised economic cutoff grade of 0.180 Au oz/t.

Compared to the reported 1998 Rosebud proven and probable ore reserve, the 1999 proven and probable ore reserve contains 459,189 fewer tons, 206,019 fewer ounces gold, and 1,883,889 fewer ounces silver. These changes in the reserve can be attributed to the following conditions.

- Reduction resulting from 1998 production.
- A decrease in dilution applied to the South Zone. The 1998 reserve incorporated 13.8% dilution, but mining experience over the past year has shown that dilution can be held to an average 9.4%. This lower dilution was used in calculating the reserve. The result is the exclusion of 9,632 tons of uneconomic material from the reserve.
- An increase in cutoff grade from 0.150 to 0.180 oz/t gold.
- Reclassification of ore blocks, i.e., blocks that were classified as proven and probable in the 1997 reserve that no longer meet that criteria.
- Remodeling the East Zone using 108 new drill holes consisting of 27 surface holes and 81 underground core holes.
- An increase in the East Zone tonnage factor from 13.4 ft^3/ton to 13.6 ft^3/ton.

The net effect of the above listed items (excluding 1998 production) is a decrease of 191,972 tons averaging 0.402 oz/t Au and 4.55 oz/t Ag (77,089 ounces gold and 872,871 ounces silver).

A review of production data was completed by Mine Development Associates, Inc., who also assisted in the 1999 South Zone reconciliation and calculation. Don Cameron of Hecla Mining Company also reviewed the 1999 updated East Zone resource and reserve calculation.

REFERENCE

Allen, K.D., Clayton, R.W. and Moore, C.R., 1999, Rosebud resource and reserve estimate as of January 1, 1999: Unpublished Rosebud Mining Company, LLC. Report, 31 p.

EXPLORATION GEOCHEMISTRY

DATA AND DATABASE QUALITY

The geochemical database for the Rosebud deposit represents the results of more than a decade of soil, rock-chip and drilling sampling. The samples were collected by more than fifteen different geologists and/or technicians, and the samples were analyzed in four laboratories, which used different analytical procedures. An additional complication with the database is that not all of the samples were analyzed for the same suite of elements. Data incompatibility is inherent with this type of database. Care is needed to insure that elemental zoning patterns are real and not an artifact of variable sampling techniques and/or analytical procedures, or due to plotting or typing errors.

Drilling Samples

Chemical data for diamond drill core and reverse circulation rotary cuttings were determined by inductively coupled plasma spectroscopy (ICP), fire assay (FA) and flame atomic absorption spectrophotometry (FAAS). The quality of these data is variable, and there is no documentation of the precision or accuracy of the data because duplicate samples and standards, respectively, were not submitted for anlaysis. Data generated by GSI is particularly suspect.

Most of the samples from the drill holes in and adjacent to the Rosebud deposit were analyzed using a total digestion technique involving hydrofluoric, perchloric, and nitric acids. The remaining exploration drill holes (post RS-369) were analyzed using a partial digestion technique in which only hydrochloric and nitric acids are used to dissolve the rock. The two databases are comparable for most trace elements, but there are significant differences in the abundances of the major (Al) and the minor (Ti, Na, K, Ca) elements. Because of nondissolution of silicate phases by partial digestion, this method should produce lower values than would the total digestion technique for elements primarily contained in silicate minerals. Calcium occurring as $CaCO_3$ will be readily extracted by both digestions, whereas most Ca in plagioclase, typically >50% of the total calcium in the rock, will not be liberated by partial digestion.

To reduce assay costs, partial and total digestion ICP data were determined for composited samples rather than for the standard three foot interval. Additionally, the compositing interval for total digestion (10 to 75 ft. averaging 50 ft.) and partial digestion (generally 20 ft.) were different. The use of composite samples and variable sample intervals tends smooth, and may obscure, "down-hole" geochemical trends because samples may include multiple lithologies, types of alteration and veins.

There are few problems with the locations of the drill holes and samples of drill core and cuttings. Assay results for a few of the early drill holes are missing.

Rock-chip Samples

The quality of the rock-chip data is uncertain because duplicate samples and standards were not submitted to verify the analytical results. The quality of ICP data from the GSI laboratory is highly variable, and their detection limits were relatively high. The principal problem with the district-scale rock-chip data is that the elements assayed varies between sample batches. Nearly all of the samples were analyzed for Au, Ag, As, Sb, Hg ± Se, but ICP data were determined for only a small percentage of the samples.

There are problems with the locations of rock-chip samples contained in the database. The most common problem is that of double entries, which resulted from merging redundant databases.

Soil Samples

The soil data suffers from a number of problems. The data were generated from multiple surveys that employed different samplers, laboratories and analytical procedures. This resulted in variable detection limits and relative accuracy shifts amongst surveys. Distinct differences are observed between both adjacent and overlapping surveys. Some of the mercury and selenium data are unreliable, and the precision and accuracy of the other elements is unknown because duplicate samples and standards were not submitted. Another problem is that the soil fraction that was analyzed was –80#. This fraction may contain a considerable amount of wind-blown material that dilutes and obscures the geochemical signature of soil derived from local bedrock. Consequently, only the highest contrast features are recognizable, and subtle but important trends in the data are not discernable.

There are also significant problems with the locations of the samples. Many soil sample sites were incorrectly digitized, and all database locations must be verified by comparing the plotted locations with those on the original field sheets.

TRACE AND MINOR ELEMENT ZONING

Geologic Framework

The Rosebud deposit formed in mildly alkaline volcanic rocks of the Kamma Mountains Volcanic group (KMV). In the vicinity of the deposit, the KMV consists of a thick sequence of dominantly felsic composition lava flows and domes, which are interbedded and intercalated with pyroclastic and volcaniclastic deposits. The eruptive rocks were deposited on a low-grade metasedimentary terrane (Auld Lang Syne Group; ALS) with low to moderate topographic relief. The contact between the KMV and ALS is interpreted from diamond drill core to be a low-angle fault (Foundation fault) that strikes northeasterly and dips ~25° to the northwest. The effect that late faulting has had on this contact is not clear. In most instances, the slope of the basement contact may be explained by either pre-KMV erosion or post-early deposition faulting.

Hydrothermal Alteration and Geochemistry

Argillization and silicification overprints hematitic alteration within the volcanic sequence in the vicinity of precious metal mineralization. Although hydrothermal alteration is associated with strong selective cation leaching, different precursor lithologies can be identified by major and minor element analysis of the altered rocks. Hydrothermally altered rocks spatially associated with precious metal mineralization are characterized by the depletion of Ca, Mn, K, Na, Sr and locally P, relative to the precursor (unaltered?) bulk chemistry of the rocks. Depletion in these elements is directly related to argillization, silicification and decalcification of the volcanic rocks. The intensity of cation leaching by weakly acidic fluids increases systematically toward the main identified (and inferred) hydrothermal conduits, and thus provides mineralogical and chemical guides to high-grade precious metal mineralization. The highest gold grades within the Rosebud system and at the Dreamland and Far East prospects occur within or proximal to inferred hydrothermal conduits. This association is interpreted to indicate that gold precipitation occurred due to cooling of the fluids as they mixed with local groundwater. Changes in the pH and/or oxygen fugacity of the hydrothermal fluid may have also contributed to gold precipitation.

Enrichment in several trace metals accompanied hydrothermal alteration and depletion of many incompatible and some high-field strength (HFS) elements, i.e., P. Elements enriched in the altered rocks relative to their precursor compositions include Au, As, Ag, Se, Sb, Hg, W, U, Cu, Mo, Te, Pb and, to a lesser extent, Zn, Ni, Co, and Bi.

Geochemical Modeling

Level plan contouring of geochemical data within and adjacent to the Rosebud deposit identified several trace and minor elements, which may be effective guides to gold mineralization on a district scale. The principal limitations of interpretations of the distribution geometries of these "pathfinder" are (1) inconsistencies in the near-mine and district databases, (2) a lack of geological control, and (3) the paucity of drilling along the southern boundary of the deposit. We are in the process of developing a new geochemical model based on deposit geology. Although the revised model will be a significant improvement over the contoured geochemical data, its effectiveness as an exploration tool will be diminished by limitations (1) and (3).

The underground drilling program currently in progress will generate additional geochemical data for the southern, eastern, northeastern and northwestern margins of the ore deposit.

EXPLORATION MODEL

The geochemical exploration model discussed below was developed for the Rosebud district through a detailed study of the elemental distribution patterns adjacent to and within and the Rosebud deposit. The model, which was developed by R. Jackson and A. Sjoekri, is displayed on a series of imaged level plan maps that were constructed at 100 foot topographic elevations between 5,200 and 4,300 feet. Geochemical data were compiled using weighted geometric averages of all analyses occurring within a 50 foot window centered on the respective level. This technique provides documentation of the geochemical signatures of the upper and peripheral portions of the deposit in the mine area, and provides insight into potential fluid

migration paths by comparing geochemical trends to lithology, hydrothermal alteration patterns and rock structure.

Rosebud Deposit

The Rosebud deposit occurs along the inner margin of a weak gold halo and the outer margin of roughly coincident zones of strongly depleted calcium and sodium and moderately depleted K, Sr, and Mn (written communication). Preliminary observations indicate that the upper expression of the deposit is characterized by: (1) Hg and Ag plumes above the South zone, (2) an Sb plume above the East zone, (3) As and Se plumes elongated in an east-west direction over the South and East zones, and (4) Ca, Na, K, Sr Mn, Ti and Zr depletions over the North, South and East zones. These signatures neck down with depth to the KMV–ALS contact and terminate immediately below the Foundation fault (FF) in the North zone and the South Ridge fault (SRF) in the South zone. In both cases, termination of the deposit's geochemical signature beneath a major fault zone coincides with a dramatic change in lithology and a significant decrease in drill hole density, and be more apparent than real. Within the limits of strong hydrothermal alteration the rocks are locally anomalous in Au, Ag, Se, As, Sb, Hg, Mo, and Pb. Minimum, maximum and mean values for 41 trace elements are given for the Rosebud deposit, and for the East, North and South zones separately in Tables 7 through 12.

The geochemical signature of the Rosebud deposit described above is a small part of the district zoning pattern, and additional interpretive work is needed to place deposit-scale trace element zoning in context with the district-wide geochemical patterns.

Au

The "modeled" gold signature over the top of the deposits is weak, unfocused, and does not provide a direct exploration target (Fig. 4a-d). These gold patterns are misleading because they are based on wide-spaced drilling. When surface rock-chip data are included in the level plan contours coherent gold anomalies are present. The gold shapes outlining the deposits begin to form 300 feet below the surface (5,000 ft level) for the East and South zones, and at the 4,900 foot level for the North zone. The spatial extent of anomalous gold is most extensive above 5,000 feet, and narrows with depth to the basement (KMV–ALS) contact. The ore deposits form elliptical shapes that plunge toward the north-northeast. The North and South zones appear to be a single deposit and all three zones coalesce below the 4,600 feet. The surface projection of the three ore zones falls within the area of background Au values.

The Rosebud deposits occur at the intersection of geochemical lineaments trending north-northeast, east-northeast and east-southeast. There is no obvious northwesterly trend to the hydrothermal system depicted in the element maps. The gold system appears to be open in an east-southeast direction where there is evidence for a "structural" intersection involving the north-northeast-trending geochemical lineament that passes through the Rosebud deposits. The northeastern edge of the hydrothermal system is truncated by an inferred northwest-trending normal fault.

Table 7. Trace element statistics for the Rosebud deposit.

Element	Units	Det. Limit	<.1 ppm 0.0034 opt	.1 to .5 ppm .0034 to .0146 opt	.5 to 6.0 ppm .0146 to .175 opt	6.0 to 12.0 ppm .175 to .350 opt	>12.0 ppm >.350 opt
Au	ppm	0.034	0.017	0.199	1.375	8.300	22.313
Ag	ppm	0.34	0.48	2.02	6.51	18.70	63.21
Al	%	0.01	6.95	6.35	6.25	6.72	7.04
As	ppm	0.1	20	70	84	109	157
Ba	ppm	1	754	545	545	504	518
Be	ppm	1	3	2	2	2	2
Bi	ppm	0.1	0.1	0.1	0.1	0.1	0.1
Ca	%	0.01	0.64	0.27	0.37	0.46	0.44
Cd	ppm	0.4	0.4	0.4	0.3	0.2	0.3
Co	ppm	2	2	2	2	2	2
Cr	ppm	2	21	28	32	27	34
Cu	ppm	2	9	9	13	21	38
Fe	%	0.01	2.43	2.47	2.44	2.62	2.87
Ge	ppm	0.1	0.1	0.1	0.1	0.1	0.1
Hg	ppm	0.005	0.063	0.117	0.078	0.010	0.013
K	%	0.01	3.13	2.58	2.61	2.76	2.81
La	ppm	2	22	20	21	22	22
Mg	%	0.01	0.23	0.22	0.22	0.21	0.21
Mn	ppm	5	360	141	144	142	169
Mo	ppm	2	2	3	4	5	9
Na	%	0.01	0.50	0.16	0.22	0.20	0.32
Nb	ppm	2	15	14	13	14	14
Ni	ppm	1	3	4	3	3	3
P	%	0.002	0.033	0.032	0.034	0.037	0.043
Pb	ppm	5	24	24	19	20	21
Sb	ppm	0.1	4	9	12	16	27
Sc	ppm	1	4	4	3	3	3
Se	ppm	0.1	1.9	12.5	13.9	15.3	6.8
Sn	ppm	2	2	2	2	1	2
Sr	ppm	2	117	95	106	100	102
Te	ppm	0.1	0.2	0.2	0.2	0.3	0.3
Th	ppm	2	8	7	6	6	6
Ti	%	0.01	0.13	0.13	0.13	0.14	0.15
U	ppm	10	7	7	8	7	6
V	ppm	2	8	8	8	7	8
W	ppm	4	4	5	5	6	7
Y	ppm	2	12	11	11	12	12
Zn	ppm	2	90	87	83	73	79
Zr	ppm	1	87	82	95	104	98
			n=651	n=492	n=220	n=25	n=27

N.B. 3-acid digestion and ICP analysis of drill hole samples of 10-90 feet.

Table 8. Trace element statistics for peripheral-, low- and ore-grade mineralization at Rosebud.

Element	Units	<.1 ppm 0.0034		.1 to .5 ppm .0034 - .0146 opt		.5 to 6.0 ppm .0146 to .175 opt		6.0 to 12.0 ppm .175 to .350 opt		>12.0 ppm >.350 opt	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Au	ppm	0.001	0.099	0.100	0.493	0.508	5.831	6.06	11.94	12.35	128.54
Ag	ppm	0.15	48.40	0.15	193.70	0.15	468.70	2.60	883.50	5.40	410.10
Al	%	3.60	10.53	3.15	12.18	0.01	9.09	3.88	8.07	3.71	9.05
As	ppm	1	216	4	738	0	613	45	279	64	558
Ba	ppm	85	6863	95	4331	1	1520	140	2709	159	1791
Be	ppm	1	8	1	7	1	8	1	4	1	4
Bi	ppm	0.1	127.0	0.1	27.7	0.1	44.3	0.1	2.3	0.1	0.7
Ca	%	0.02	9.40	0.01	10.63	0.01	9.94	0.05	5.89	0.10	3.82
Cd	ppm	0.2	16.1	0.2	11.4	0.2	9.1	0.2	0.8	0.2	1.3
Co	ppm	1	56	1	95	1	113	1	5	1	20
Cr	ppm	1	234	1	187	1	179	7	91	14	91
Cu	ppm	1	494	1	324	1	111	5	61	6	597
Fe	%	0.97	7.14	1.06	5.11	0.01	5.07	1.00	3.32	1.58	6.01
Ge	ppm	0.1	0.6	0.1	0.6	0.1	0.5	0.1	0.4	0.1	0.3
Hg	ppm	0.003	0.905	0.003	73.175	0.003	17.000	0.003	0.160	0.003	51.600
K	%	0.57	5.44	0.95	5.37	0.01	4.88	1.11	4.64	0.94	4.54
La	ppm	5	77	5	74	1	72	12	59	14	37
Mg	%	0.03	1.45	0.05	0.66	0.01	0.71	0.08	0.43	0.13	0.37
Mn	ppm	22	1942	3	2179	3	4300	30	733	33	1554
Mo	ppm	1	66	1	109	1	400	1	28	1	116
Na	%	0.02	4.07	0.01	3.33	0.01	2.49	0.02	2.31	0.02	2.32
Nb	ppm	1	26	1	24	1	21	6	18	9	22
Ni	ppm	2	110	2	202	2	109	2	7	2	162
P	%	0.007	0.107	0.005	0.324	0.001	0.126	0.008	0.065	0.007	0.114
Pb	ppm	3	178	3	468	3	109	6	41	10	55
Sb	ppm	0	872	1	1908	0	1126	6	1548	3	917
Sc	ppm	1	15	1	13	1	13	2	4	2	8
Se	ppm	0.1	122.9	0.1	119.1	0.1	58.3	5.8	28.7	0.3	16.5
Sn	ppm	1	30	1	18	1	8	1	5	1	10
Sr	ppm	13	535	22	2347	1	861	22	537	40	705
Te	ppm	0.2	2.6	0.2	1.2	0.2	0.9	0.2	0.8	0.2	0.9
Th	ppm	1	28	1	26	1	22	3	14	1	16
Ti	%	0.04	0.44	0.02	0.45	0.01	0.46	0.03	0.22	0.04	0.22
U	ppm	5	90	5	85	5	125	5	30	5	50
V	ppm	1	415	1	301	1	202	1	18	1	20
W	ppm	2	1139	2	1115	2	2175	2	15	2	700
Y	ppm	3	47	1	28	1	29	4	20	7	23
Zn	ppm	7	1145	15	952	1	899	48	156	48	475
Zr	ppm	8	231	7	211	2	259	49	191	29	218

N.B. 3-acid digestion and ICP analysis of drill hole samples of 10-90 feet.

Table 9. Trace element statistics for the East zone deposit at Rosebud.

Element	Units	<.1 ppm (0.0034 opt)			.1 to 6.0 ppm (.0034 to .175 opt)			>6.0 ppm (.175 opt)		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Au	ppm	0.003	0.096	0.013	0.102	4.452	0.36	9.03	60.54	21.37
Ag	ppm	0.15	9.5	0.7	0.15	468.7	3.6	5.4	230.0	32.5
Al	%	4.74	10.53	7.08	2.16	9.68	6.20	3.71	6.95	5.44
As	ppm	2	120	16	22	476	85	64	101	75
Ba	ppm	116	2335	701	111	1520	490	337	738	457
Be	ppm	1	8	3	1	4	2	1	3	1
Bi	ppm	0.1	5.2	0.1	0.1	1.0	0.1	0.1	0.1	0.1
Ca	%	0.09	3.47	0.69	0.05	1.89	0.24	0.10	0.17	0.12
Cd	ppm	0.2	8.1	0.4	0.2	11.4	0.4	0.2	0.5	0.3
Co	ppm	1	7	1	1	113	2	1	20	2
Cr	ppm	4	96	17	6	130	35	8	51	28
Cu	ppm	3	53	10	1	273	12	40	597	130
Fe	%	1.46	4.63	2.66	0.88	5.11	2.41	1.58	5.04	2.53
Ge	ppm	0.1	0.4	0.1	0.1	0.4	0.1	0.1	0.2	0.1
Hg	ppm	0.003	0.195	0.035	0.003	73.175	0.069	0.003	51.600	0.042
K	%	1.52	4.89	3.17	0.78	4.59	2.36	0.94	2.42	1.71
La	ppm	8	36	22	6	74	25	21	59	33
Mg	%	0.12	0.77	0.28	0.12	0.53	0.23	0.13	0.22	0.17
Mn	ppm	43	1497	461	33	939	130	33	304	93
Mo	ppm	1	29	2	1	42	3	3	10	4
Na	%	0.02	2.49	0.41	0.02	1.62	0.08	0.03	0.13	0.06
Nb	ppm	5	26	17	4	23	14	9	15	12
Ni	ppm	2	68	3	2	202	4	2	162	9
P	%	0.009	0.079	0.037	0.007	0.324	0.023	0.007	0.029	0.013
Pb	ppm	9	123	29	6	80	24	17	21	18
Sb	ppm	1	872	6	5	1908	19	14	917	42
Sc	ppm	2	9	5	1	13	4	2	4	3
Se	ppm	0.1	122.9	1.4	3.0	49.8	14.1	3.4	13.2	7.3
Sn	ppm	1	7	2	1	6	2	1	5	2
Sr	ppm	33	453	130	34	2347	105	52	123	71
Te	ppm	0.2	0.5	0.2	0.2	0.4	0.2	0.2	0.3	0.2
Th	ppm	1	28	10	1	26	8	7	12	9
Ti	%	0.05	0.26	0.15	0.02	0.45	0.10	0.04	0.11	0.05
U	ppm	5	90	7	5	65	8	5	13	6
V	ppm	1	297	12	1	301	6	1	8	3
W	ppm	2	16	4	2	2175	6	2	700	16
Y	ppm	5	33	16	4	29	13	11	17	13
Zn	ppm	70	731	118	43	952	104	58	475	112
Zr	ppm	12	173	79	19	195	86	60	162	84
		n=95			n=99			n=4		

N.B. 3-acid digestion and ICP analysis of drill hole samples of 10-90 feet.

Table 10. Trace element statistics for the North zone deposit at Rosebud.

Element	Units	<.1 ppm (0.0034 opt)			.1 to 6.0 ppm (.0034 to .175 opt)			>6.0 ppm (.175 opt)		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Au	ppm	0.003	0.099	0.020	0.102	5.323	0.370	6.53	22.21	10.00
Ag	ppm	0.15	24.7	0.5	0.15	271.8	3.0	2.6	883.5	21.7
Al	%	4.17	8.97	7.08	0.01	8.76	5.82	3.88	7.66	6.28
As	ppm	1	141	16	0	246	59	70	133	99
Ba	ppm	85	6863	725	1	2779	474	140	553	367
Be	ppm	2	5	3	1	5	3	2	4	3
Bi	ppm	0.1	127.0	0.3	0.1	27.7	0.2	0.1	2.3	0.2
Ca	%	0.02	2.87	0.66	0.01	2.60	0.29	0.07	0.40	0.16
Cd	ppm	0.2	16.1	0.5	0.2	11.3	0.4	0.2	1.3	0.3
Co	ppm	1	56	2	1	21	3	3	9	4
Cr	ppm	5	234	22	1	187	37	19	77	44
Cu	ppm	1	199	7	1	59	11	25	60	40
Fe	%	1.05	7.14	2.35	0.01	5.07	2.26	1.00	3.07	2.09
Ge	ppm	0.1	0.4	0.1	0.1	0.5	0.1	0.1	0.2	0.1
Hg	ppm	0.003	0.470	0.065	0.003	0.410	0.090	0.003	0.015	0.004
K	%	1.52	5.35	3.15	0.01	5.37	2.33	1.11	2.74	1.81
La	ppm	5	67	20	1	62	17	13	25	18
Mg	%	0.07	1.45	0.28	0.01	0.71	0.30	0.16	0.34	0.23
Mn	ppm	24	1942	346	3	1060	125	30	177	62
Mo	ppm	1	63	2	1	84	4	1	11	4
Na	%	0.02	2.86	0.37	0.01	2.36	0.12	0.02	0.51	0.05
Nb	ppm	1	21	12	1	21	10	6	17	12
Ni	ppm	2	110	4	2	109	5	2	9	4
P	%	0.010	0.107	0.037	0.001	0.127	0.039	0.017	0.114	0.049
Pb	ppm	8	44	20	3	49	17	6	22	15
Sb	ppm	0	39	4	0	1126	14	9	1548	48
Sc	ppm	2	15	4	1	13	4	2	4	3
Se	ppm	0.1	24.0	1.6	0.1	119.1	11.5	1.4	28.7	11.2
Sn	ppm	1	9	2	1	6	1	1	3	1
Sr	ppm	22	295	115	1	632	90	80	705	244
Te	ppm	0.2	2.6	0.2	0.2	0.7	0.2	0.2	0.2	0.2
Th	ppm	1	18	8	1	18	5	4	14	7
Ti	%	0.04	0.44	0.13	0.01	0.46	0.14	0.06	0.22	0.14
U	ppm	5	50	7	5	55	8	5	50	12
V	ppm	1	415	11	1	289	16	4	18	11
W	ppm	2	1139	3	2	19	3	2	8	4
Y	ppm	4	47	12	1	24	9	4	16	9
Zn	ppm	10	1145	98	1	839	102	49	114	78
Zr	ppm	16	219	86	2	201	76	50	176	107
		n=140			n=104			n=4		

N.B. 3-acid digestion and ICP analysis of drill hole samples of 10-90 feet.

Table 11. Trace element statistics for the South zone deposit at Rosebud.

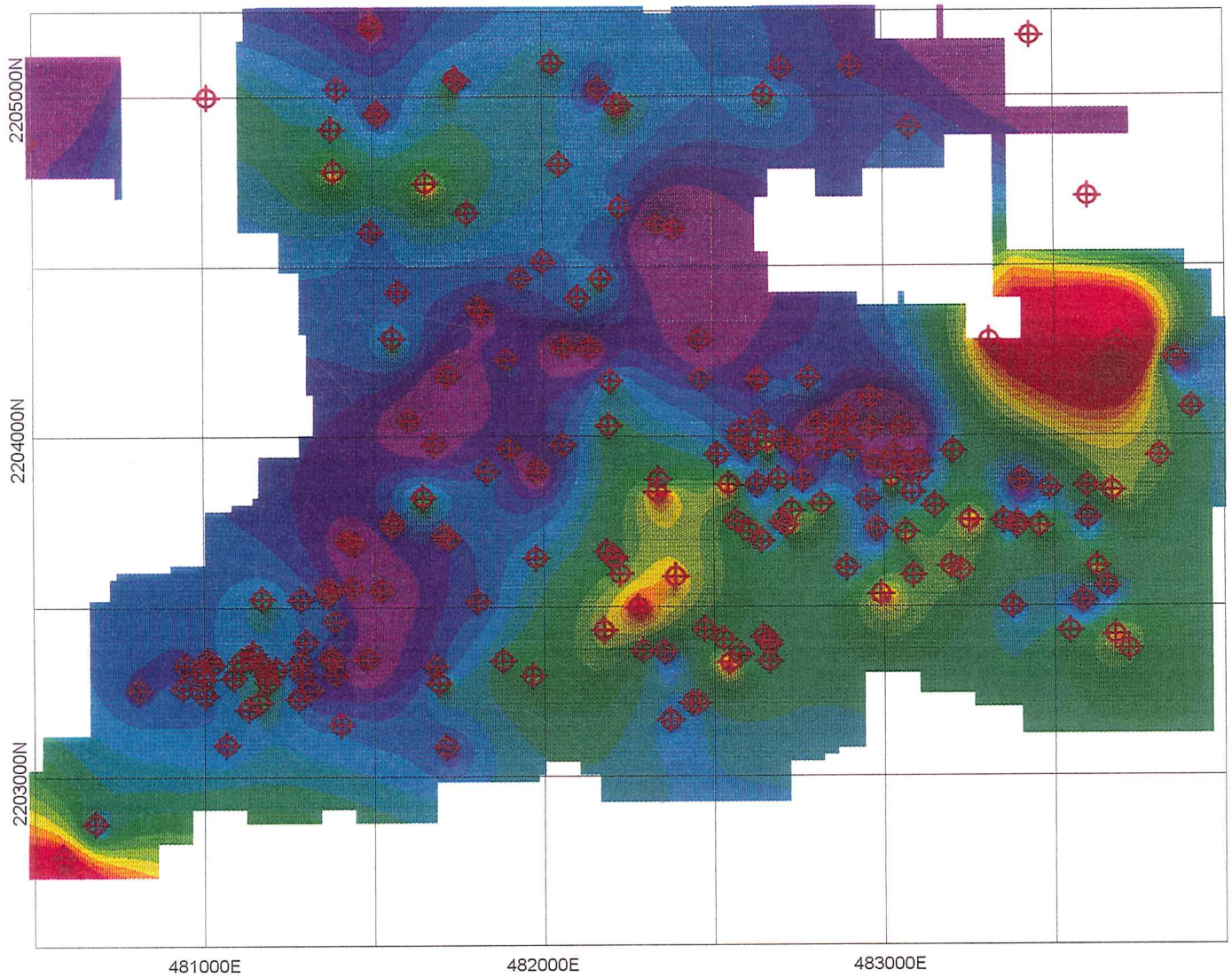
Element	Units	<.1 ppm (0.0034 opt)			.1 to 6.0 ppm (.0034 to .175 opt)			>6.0 ppm (.175 opt)		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Au	ppm	0.002	0.099	0.021	0.100	5.831	0.433	6.06	128.54	14.15
Ag	ppm	0.15	48.4	0.4	0.15	340.6	3.1	4.0	410.1	37.9
Al	%	3.60	8.62	6.84	3.70	12.18	7.05	4.82	8.34	7.11
As	ppm	2	162	28	4	613	72	51	558	144
Ba	ppm	142	2886	786	119	1911	625	159	2709	529
Be	ppm	1	6	2	1	8	2	1	4	2
Bi	ppm	0.1	5.3	0.2	0.1	44.3	0.1	0.1	0.7	0.1
Ca	%	0.02	9.40	0.64	0.03	10.63	0.56	0.12	5.89	0.58
Cd	ppm	0.2	3.4	0.3	0.2	5.4	0.3	0.2	1.3	0.3
Co	ppm	1	9	2	1	15	2	1	4	2
Cr	ppm	6	129	26	5	175	27	11	91	31
Cu	ppm	1	138	8	1	324	8	6	156	23
Fe	%	0.97	3.79	2.32	1.17	4.18	2.62	1.90	3.85	2.82
Ge	ppm	0.1	0.6	0.1	0.1	0.6	0.1	0.1	0.4	0.1
Hg	ppm	0.003	0.905	0.086	0.003	4.595	0.106	0.003	0.160	0.012
K	%	1.19	5.40	3.00	1.16	5.31	2.89	1.59	4.16	2.96
La	ppm	8	77	22	8	73	21	12	26	20
Mg	%	0.06	0.71	0.23	0.10	0.65	0.24	0.14	0.43	0.22
Mn	ppm	22	1837	326	33	4300	195	39	1554	174
Mo	ppm	1	21	2	1	400	3	1	116	8
Na	%	0.02	2.79	0.51	0.02	3.33	0.33	0.02	2.32	0.32
Nb	ppm	9	23	14	1	24	14	10	18	14
Ni	ppm	2	23	3	2	52	3	2	5	2
P	%	0.008	0.086	0.032	0.008	0.103	0.044	0.020	0.065	0.048
Pb	ppm	3	95	20	3	468	18	10	34	20
Sb	ppm	0	23	3	1	84	7	3	187	19
Sc	ppm	1	8	3	1	8	3	2	4	3
Se	ppm	0.1	29.5	3.5	1.7	52.0	13.4	0.3	24.8	10.0
Sn	ppm	1	8	2	1	18	2	1	6	2
Sr	ppm	23	535	116	24	828	111	35	537	98
Te	ppm	0.2	1.0	0.3	0.2	1.2	0.2	0.2	0.9	0.3
Th	ppm	1	22	7	1	19	6	1	12	5
Ti	%	0.04	0.30	0.12	0.04	0.32	0.16	0.10	0.22	0.17
U	ppm	5	70	6	5	125	6	5	19	5
V	ppm	1	47	7	1	151	9	3	18	9
W	ppm	2	18	4	2	554	5	2	15	6
Y	ppm	5	33	12	4	29	13	7	23	13
Zn	ppm	16	245	77	19	800	78	48	108	71
Zr	ppm	17	231	102	17	259	109	35	218	106
		n=258			n=309			n=40		

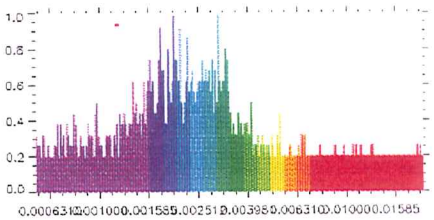
N.B. 3-acid digestion and ICP analysis of drill hole samples of 10-90 feet.

Table 12. Trace element statistics for mineralization peripheral to the Rosebud deposit.

Element	Units	<.1 ppm (0.0034 opt)			.1 to 6.0 ppm (.0034 to .175 opt)			>6.0 ppm (.175 opt)		
		Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Au	ppm	0.003	0.099	0.020	0.102	5.323	0.370	6.53	22.21	10.00
Ag	ppm	0.15	24.7	0.5	0.15	271.8	3.0	2.6	883.5	21.7
Al	%	4.17	8.97	7.08	0.01	8.76	5.82	3.88	7.66	6.28
As	ppm	1	141	16	0	246	59	70	133	99
Ba	ppm	85	6863	725	1	2779	474	140	553	367
Be	ppm	2	5	3	1	5	3	2	4	3
Bi	ppm	0.1	127.0	0.3	0.1	27.7	0.2	0.1	2.3	0.2
Ca	%	0.02	2.87	0.66	0.01	2.60	0.29	0.07	0.40	0.16
Cd	ppm	0.2	16.1	0.5	0.2	11.3	0.4	0.2	1.3	0.3
Co	ppm	1	56	2	1	21	3	3	9	4
Cr	ppm	5	234	22	1	187	37	19	77	44
Cu	ppm	1	199	7	1	59	11	25	60	40
Fe	%	1.05	7.14	2.35	0.01	5.07	2.26	1.00	3.07	2.09
Ge	ppm	0.1	0.4	0.1	0.1	0.5	0.1	0.1	0.2	0.1
Hg	ppm	0.003	0.470	0.065	0.003	0.410	0.090	0.003	0.015	0.004
K	%	1.52	5.35	3.15	0.01	5.37	2.33	1.11	2.74	1.81
La	ppm	5	67	20	1	62	17	13	25	18
Mg	%	0.07	1.45	0.28	0.01	0.71	0.30	0.16	0.34	0.23
Mn	ppm	24	1942	346	3	1060	125	30	177	62
Mo	ppm	1	63	2	1	84	4	1	11	4
Na	%	0.02	2.86	0.37	0.01	2.36	0.12	0.02	0.51	0.05
Nb	ppm	1	21	12	1	21	10	6	17	12
Ni	ppm	2	110	4	2	109	5	2	9	4
P	%	0.010	0.107	0.037	0.001	0.127	0.039	0.017	0.114	0.049
Pb	ppm	8	44	20	3	49	17	6	22	15
Sb	ppm	0	39	4	0	1126	14	9	1548	48
Sc	ppm	2	15	4	1	13	4	2	4	3
Se	ppm	0.1	24.0	1.6	0.1	119.1	11.5	1.4	28.7	11.2
Sn	ppm	1	9	2	1	6	1	1	3	1
Sr	ppm	22	295	115	1	632	90	80	705	244
Te	ppm	0.2	2.6	0.2	0.2	0.7	0.2	0.2	0.2	0.2
Th	ppm	1	18	8	1	18	5	4	14	7
Ti	%	0.04	0.44	0.13	0.01	0.46	0.14	0.06	0.22	0.14
U	ppm	5	50	7	5	55	8	5	50	12
V	ppm	1	415	11	1	289	16	4	18	11
W	ppm	2	1139	3	2	19	3	2	8	4
Y	ppm	4	47	12	1	24	9	4	16	9
Zn	ppm	10	1145	98	1	839	102	49	114	78
Zr	ppm	16	219	86	2	201	76	50	176	107
		n=145			n=185			n=4		

N.B. 3-acid digestion and ICP analysis of drill hole samples of 10-90 feet.





Data Processing

BENCH COMPOSITING
windows : 50ft.

GRIDDING
grid cell spacing : 20ft.
spline tension : 0.8
cutoff radius : 300ft.

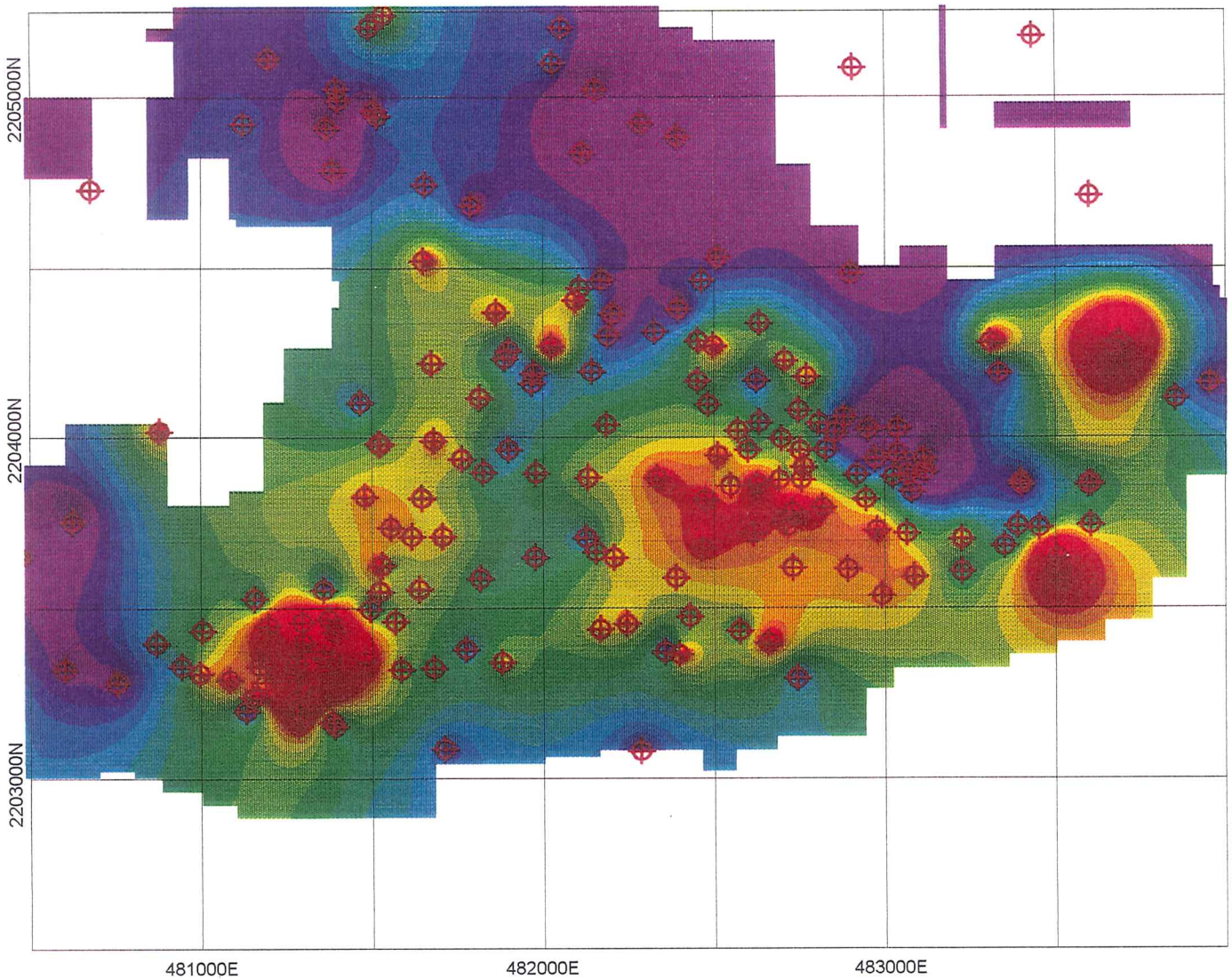
NELVIS DATA STRETCH
minimum clip : -2.8
maximum clip : -2.15

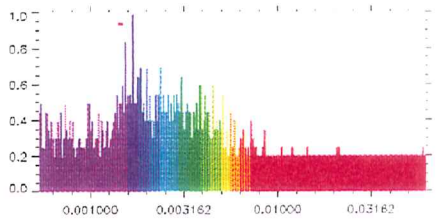
ROSEBUD FOLIO

Gold (opt)

Level Plan 5200 Ft.

Figure 4a. Spatial distribution of gold on the 5,200 foot level within and around the Rosebud deposit. Plotted values are geometric averages in ounces per ton of all drill core assays occurring within a 50 foot window centered on the level.





Data Processing

BENCH COMPOSITING
windows : 50ft.

GRIDDING
grid cell spacing : 20ft.
spline tension : 0.8
cutoff radius : 300ft.

NELVIS DATA STRETCH
minimum clip : -2.8
maximum clip : -2.15

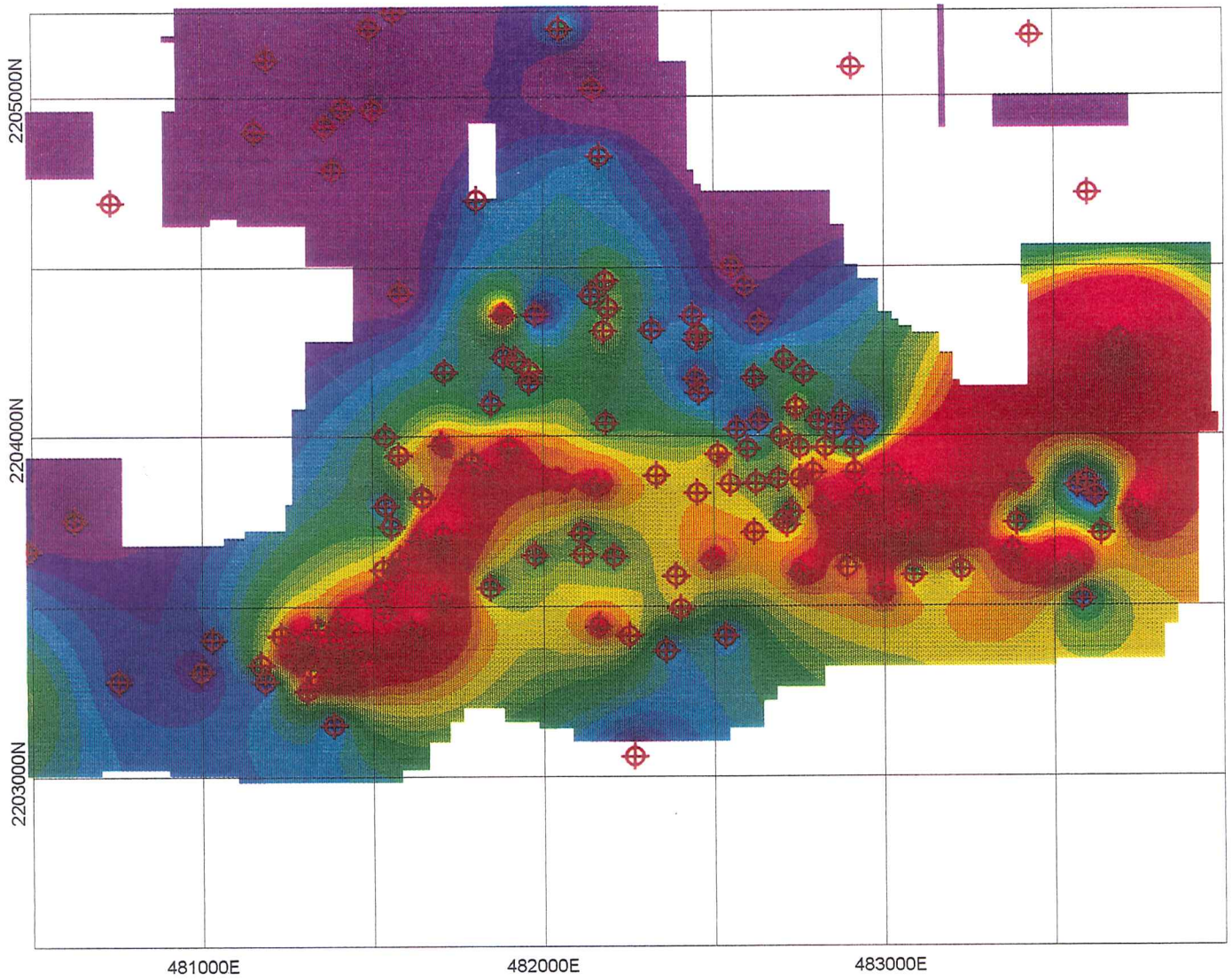
ROSEBUD FOLIO

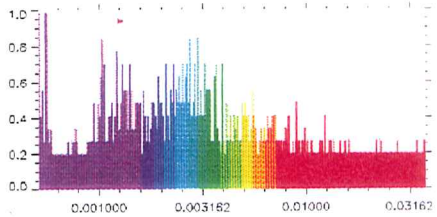
Gold (opt)

Level Plan 4900 Ft.

500 0 500 1000 1500 2000 Feet

Figure 4b. Spatial distribution of gold on the 4,900 foot level within and around the Rosebud deposit. Plotted values are geometric averages in ounces per ton of all drill core assays occurring within a 50 foot window centered on the level.





Data Processing

BENCH COMPOSITING
windows : 50ft.

GRIDDING
grid cell spacing : 20ft.
spline tension : 0.8
cutoff radius : 300ft.

NELVIS DATA STRETCH
minimum clip : -2.8
maximum clip : -2.15

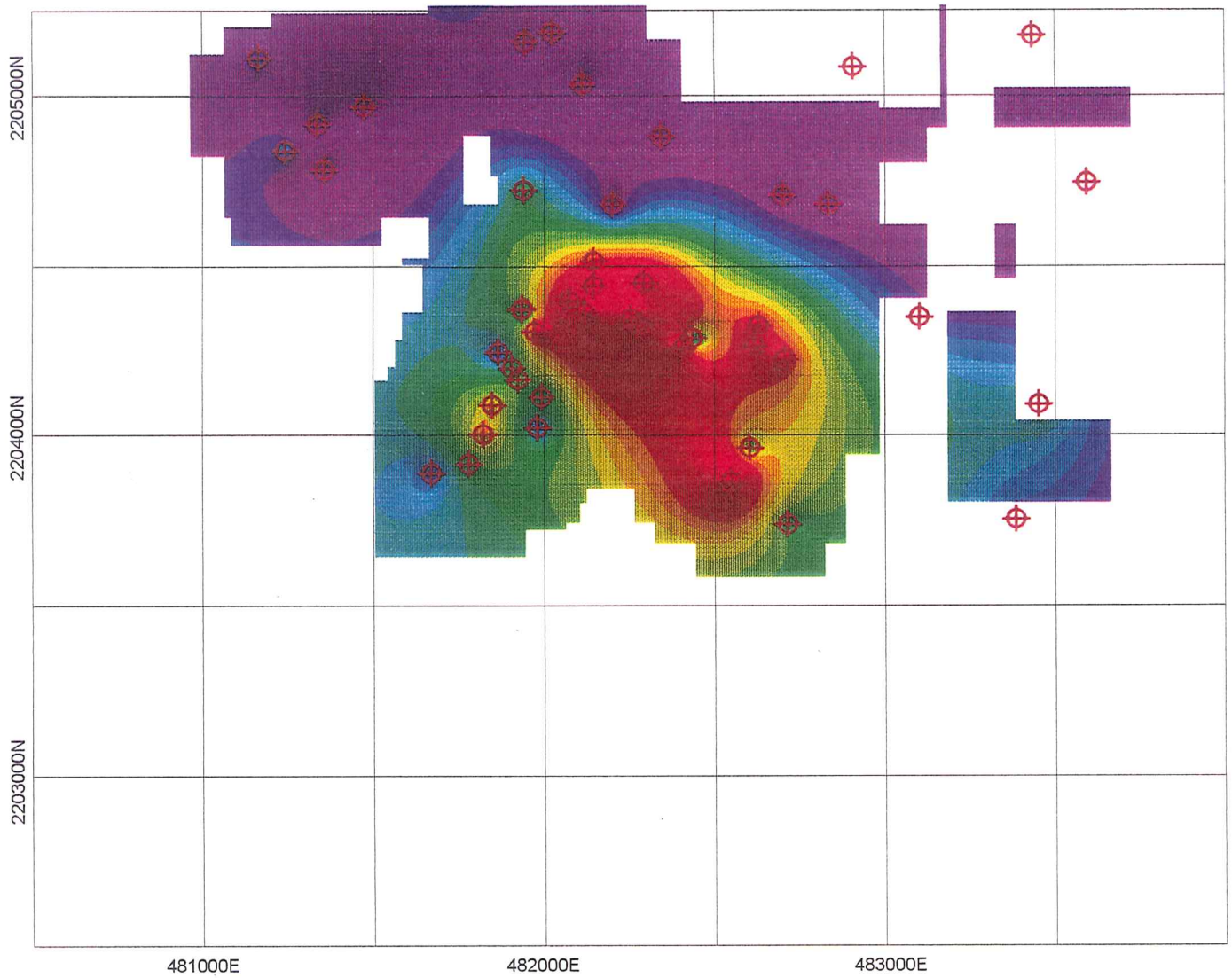
500 0 500 1000 1500 2000 Feet

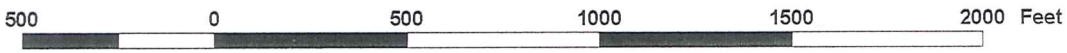
ROSEBUD FOLIO

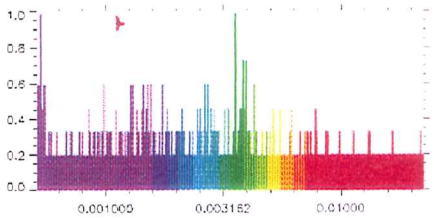
Gold (opt)

Level Plan 4800 Ft.

Figure 4c. Spatial distribution of gold on the 4,800 foot level within and around the Rosebud deposit. Plotted values are geometric averages in ounces per ton of all drill core assays occurring within a 50 foot window centered on the level.







Data Processing

BENCH COMPOSITING
windows : 50ft.

GRIDDING
grid cell spacing : 20ft.
spline tension : 0.8
cutoff radius : 300ft.

NELVIS DATA STRETCH
minimum clip : -2.8
maximum clip : -2.15

ROSEBUD FOLIO

Gold (opt)

Level Plan 4400 Ft.

Figure 4d. Spatial distribution of gold on the 4,400 foot level within and around the Rosebud deposit. Plotted values are geometric averages in ounces per ton of all drill core assays occurring within a 50 foot window centered on the level.

Ca, Na, K, and Sr

Comparison of the combined ≥0.05 opt Au shapes (Fig. 4e, in pocket) to the distribution patterns for Ca, Na, K, and Sr shows that the gold shapes coincide with the outer margin of a relatively large area of moderate depletion in these elements (Jackson, written communication; i.e., Fig 5). The majority of Ca, Na, K and Sr depletion is spatially restricted to Dozer alkali rhyolite, but there are areas of alkali rhyolite that do not show significant depletion, indicating that Ca, Na, K and Sr depletion is not strictly a function of lithology.

In rocks of intermediate to felsic compositions, the distributions of calcium, sodium, potassium and strontium are controlled by feldspar. Depletion of Ca, Na, K, and Sr indicates that plagioclase and alkali feldspar was destroyed by hydrothermal alteration. The main alteration products associated with precious metal mineralization are the clay minerals illite, montmorillonite, and to a lesser extent kaolinite, dickite and nacrite. Both illite ($K_y(Al,Fe,Mg)_4[Si_{8-y}Al_yO_{20}](OH)_4$; y<2) and montmorillonite ($(0.5Ca,Na)_{0.7}(Al,Mg,Fe)_4[(Si,Al)_8O_{22}](OH)_4 \bullet nH2O$) may contain a significant amount of Ca, Na and K (Table 13), which is the reason that intensely altered rocks show only moderate depletion in these elements. Glauconite ($(K, Na, Ca)_{1.2-2}(Fe^{3+},Al, Fe^{2+}, Mg)_4[(Si_{7-7.6}Al_{1-0.4}O_{22}](OH)_4 \bullet nH2O$) is another secondary mineral that may help conserve K^+, Na^+, and Ca^{2+} during hydrothermal alteration. Depletion in the feldspar-controlled elements reflects the formation small amounts of kaolinite ($Al_4[Si_4O_{10}](OH)_8$) and its well crystallized polymorphs dickite and nacrite.

Table 13.Representative K, Na, Fe, Mg, and Ca contents of clay and mica-like minerals.

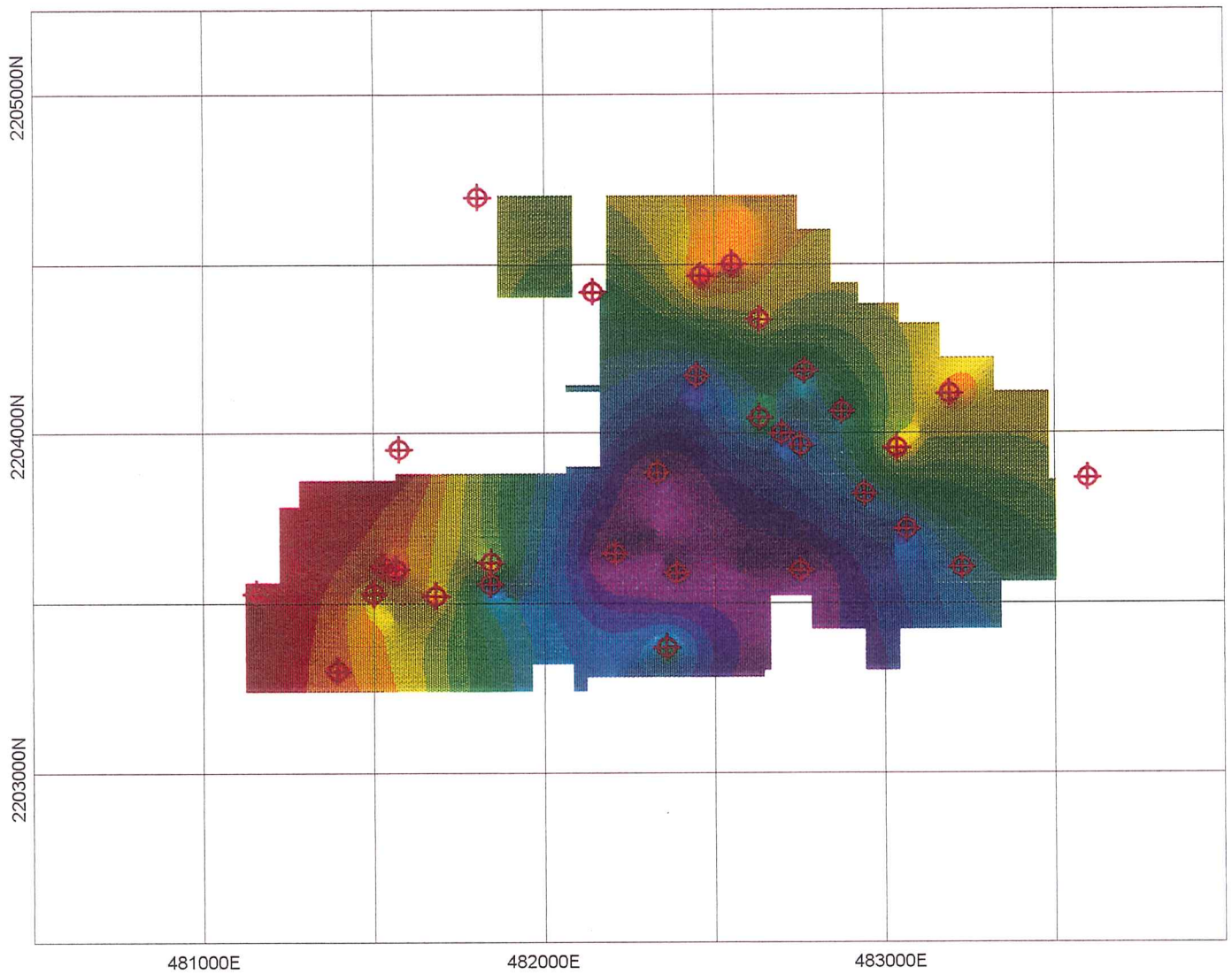
Mineral		Illite	Glauconite	Kaolinite	Dickite -Nacrite	Montmorillonite
Weight %	K_2O	3.25 - 7.47	4.04 - 8.31	0.40 - 0.84	0.0 - 0.60	0.0 - 0.60
	Na_2O	0.13 - 1.05	0.0 - 1.40	0.0 - 0.44	0.0 - 0.20	0.0 - 2.75
	Fe_2O_3*	2.82 - 12.81	10.47 - 23.22	0.33 - 2.00	0.03 - 1.50	0.06 - 7.41
	MgO	1.32 - 6.86	3.50 - 4.76	0.14 - 0.47	Trace - 0.19	2.49 - 6.53
	CaO	0.0 - 0.89	0.53 - 0.62	0.13 - 0.52	0.13 - 3.96	0.50 - 3.28

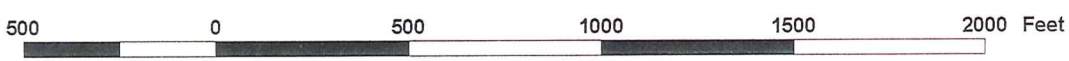
Data from Grim (1953) pages 370-372; Fe_2O_3* denotes total iron calculated as Fe_2O_3.

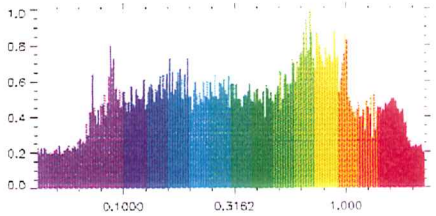
The major, minor and trace element zoning patterns shown in figures 5 through 7 are controlled by the hydrolysis (oxidation) reactions shown in Table 14 (page 40).

Zr and Ti

The quality of the total digestion data for zirconium and titanium(?) is very poor. Bulk-rock XRF data indicate that even altered rocks have >200 ppm Zr, whereas total digestion data indicate that the same rocks contain <150, and commonly <100 ppm, Zr. It may be possible to use the total digestion ICP data for zirconium and titanium if the values are proportional to the actual concentration, in the rocks. A comparison of the Zr and Ti distribution patterns with level plan geology may help resolve whether or not the Zr and Ti data provides a useful exploration parameter.







Data Processing

BENCH COMPOSITING
windows : 50ft.

GRIDDING
grid cell spacing : 20ft.
spline tension : 0.8
cutoff radius : 200ft.

NELVIS DATA STRETCH
minimum clip : -1.00
maximum clip : 0.15

ROSEBUD FOLIO

Calcium (%)

Level Plan 4800 Ft.

Figure 5. Spatial distribution of calcium on the 4,800 foot level within and around the Rosebud deposit. Plotted values are geometric averages of all drill core assays occurring within a 50 foot window centered on the level.

Table 14. Reactions showing the relationship between alteration mineralogy and element zoning.

Alteration of Feldspar

$$5(\underset{\text{andesine}}{NaAlSi_3O_8 \bullet CaAl_2Si_2O_8}) + \underset{\text{magnetite}}{Fe_3O_4} + 6H_2S + 5CO_2 + 3K^+ + 0.5O_2 \;==\; \underset{\text{illite}}{3(KAl_4[Si_7AlO_{20}](OH)_4)} + \underset{\text{calcite}}{5CaCO_3} + \underset{\text{quartz}}{4SiO_2} + \underset{\text{marcasite (pyrite)}}{3FeS2} + 5Na^+ \quad (1)$$

$$\underset{\text{orthoclase}}{2(KAlSi_3O_8)} + \underset{\text{andesine}}{2(NaAlSi_3O_8 \bullet CaAl_2Si_2O_8)} + \underset{\text{magnetite}}{1.67\,Fe_3O_4} + 12H_2S + Mg^{2+} + 5.66O_2 \;==\; \underset{\text{montmorillonite}}{Na_{0.7}(Al_3Mg)[Si_8O_{20}](OH)_4 \bullet 8H_2O} + \underset{\text{illite}}{KAl_4[Si_7AlO_{20}](OH)_4} + \underset{\text{anhydrite}}{CaSO_4} + \underset{\text{marcasite (pyrite)}}{5FeS_2} + \underset{\text{quartz}}{SiO_2} + 1.3Na^+ + 3K^+ \quad (2)$$

Alteration of Mafic Minerals

$$\underset{\text{biotite}}{2(K_2(Mg_3Fe_2Al[Si_5Al_3O_{20}](OH)_4)} + \underset{\text{quartz}}{5SiO_2} + 8H_2S + 0.7Na^+ + 8O_2 \;==\; \underset{\text{montmorillonite}}{Na_{0.7}(Al_3Mg)[Si_8O_{20}](OH)_4 \bullet 8H_2O} + \underset{\text{illite}}{KAl_4[Si_7AlO_{20}](OH)_4} + \underset{\text{marcasite (pyrite)}}{FeS_2} + 5Mg^{2+} + 3K^+ \quad (3)$$

$$\underset{\text{hornblende}}{NaCa2(Mg2FeAl2)[Si7AlO22](OH)2} + \underset{\text{quartz}}{SiO2} + \underset{\text{magnetite}}{5Fe3O4} + 9H2S + 9O2 \;==\; \underset{\text{montmorillonite}}{Na_{0.7}(Al_3Mg)[Si_8O_{20}](OH)_4 \bullet 8H_2O} + \underset{\text{anhydrite}}{CaSO_4} + \underset{\text{marcasite (pyrite)}}{4FeS_2} + Mg^{2+} + Ca^{2+} + 0.3Na^+ \quad (4)$$

Alteration of Montmorillonite and Illite

$$\underset{\text{montmorillonite}}{Na_{0.7}(Al_3Mg)[Si_8O_{20}](OH)_4 \bullet 8H_2O} + 7H^+ \;==\; \underset{\text{Kaolinite}}{Al_2[Si_2O_5](OH)_4} + \underset{\text{quartz}}{5SiO_2} + \underset{\text{water}}{10.5H_2O} + 0.7Na^+ + Mg^{2+} \quad (5)$$

$$\underset{\text{illite}}{2(KAl_4[Si_7AlO_{20}](OH)_4)} + 5H_2O + 2H^+ \;==\; \underset{\text{kaolinite}}{5(Al_2[Si_2O_5](OH)_4)} + \underset{\text{quartz}}{4SiO_2} + 2K^+ \quad (6)$$

Alteration of Magnetite

$$\underset{\text{magnetite}}{2Fe_3O_4} + 0.5H_2O \;==\; \underset{\text{hematite}}{3Fe_2O_3} \quad (7)$$

$$\underset{\text{Magnetite}}{Fe_3O_4} + 6H_2S + 3O_2 \;==\; \underset{\text{pyrite}}{3FeS_2} + 6H_2O \quad (8)$$

Hg, Ag As, Sb and Se

The high-level geochemical signature of the Rosebud deposit is characterized by elevated Hg, Sb and Ag values. Mercury values are highest in the upper levels of the system, dissipating below the 4,800 foot level where the abundances of silver and antimony increase. Anomalous Ag and Sb values form a zone that strikes north-northeast and dips to the northwest, indicating a strong structural control on their occurrence in the upper portion of the deposit. With depth (~4,400 ft. level) the Ag and Sb halos expands dramatically, probably due to increased fracture densities related to the intersection of the north-northeast-trending, northwest dipping structure with multiple low angle structures (SRF, FF). Antimony values >10 ppm closely parallel the gold >0.05 ounce per ton shapes for all three ore zones. This association is best developed around the North zone orebody. Selenium and silver have similar distributions to the extent that the 4ppm Se contour mimics the Ag >1.6 ppm contour.

In plan view on the 4,800 foot elevation, >0.05 opt gold mineralization occurs within the inflection between high and low values for Hg, As, Sb and Se; (compare Fig. 4e to Fig. 11). The highest trace metal values occur south of the >0.05 opt Au shapes. It appears that there is an arsenic "front" to high-grade gold mineralization, in that there is a very close match between the 30 ppm As and 0.003 opt Au contours.

Auld Lang Syne Group

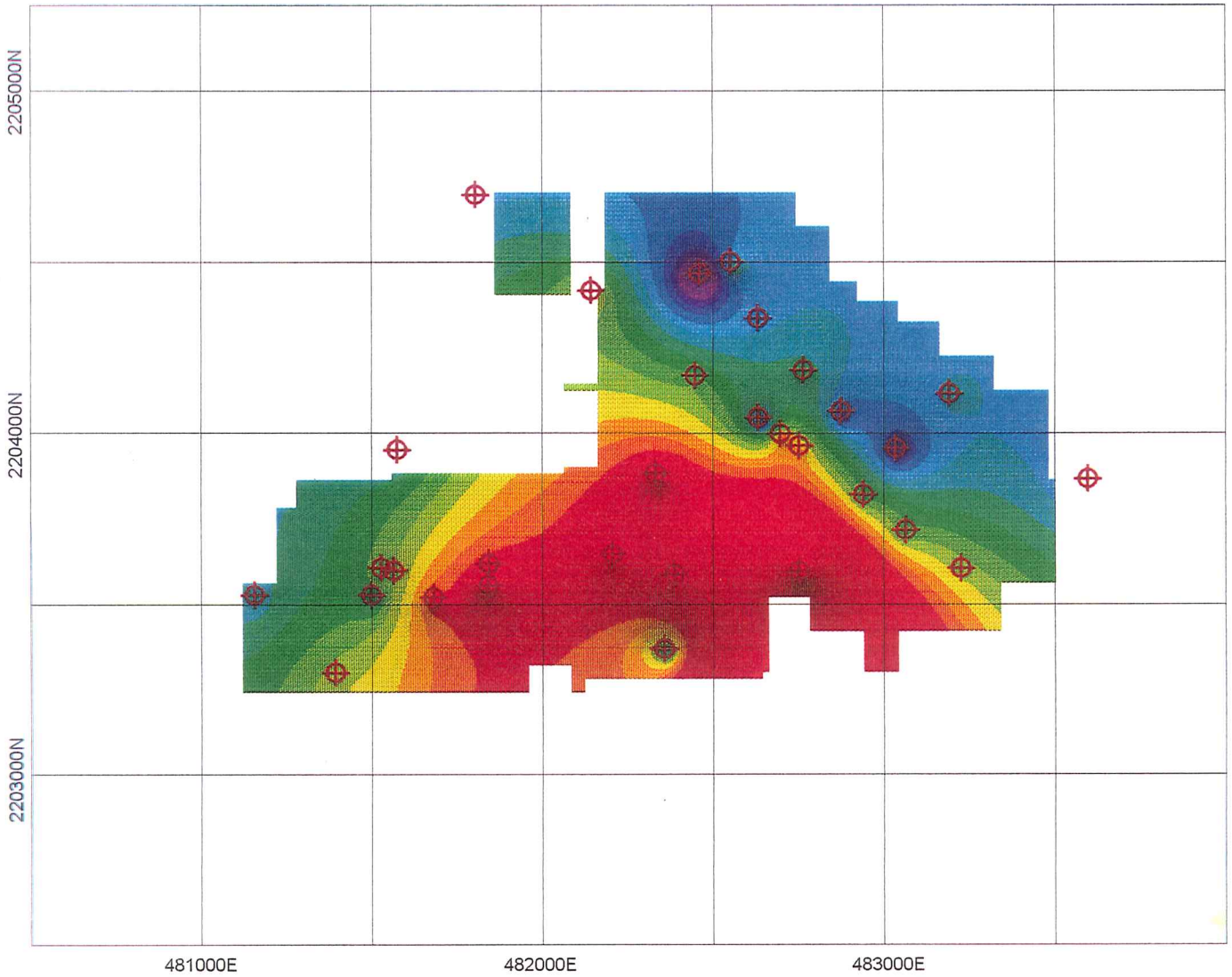
Compared to the volcanic rocks, the metasedimentary rocks of the Auld Lang Syne Group are enriched in Se, As, Sb, Ag, Cu, Co, Mo and Zn, and harbor low-level gold values. ALS rocks also show enrichment in Al, Ca, Mg, P, Cr, Ni, Sr and Ba, and depletion in K, Na, La, and Th in the partial digestion ICP data. There are insufficient data to demonstrate trace metal distribution patterns in the basement rocks around the Rosebud deposit with statistical confidence because very few drill holes penetrate significant thickness of ALS rocks beneath and ore zones.

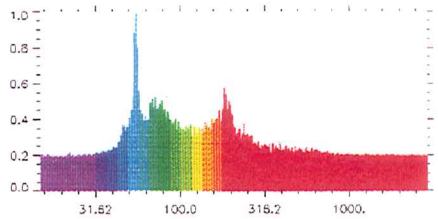
Structural Controls on Mineralization

At the deposit scale, the spatial distribution of hydrothermal alteration and trace metal geochemistry associated with the Rosebud deposit appears to be controlled by the intersection of a 085°-trending topographic lineament (Cave fault?) and both topographic and geochemical lineaments of various orientations. The footwalls of the South and North zone orebodies are truncated at the 4,600 foot level by the South Ridge fault. The East zone shape extends through the South Ridge fault zone to the KMV-ALS contact (Foundation fault).

DISTRICT EXPLORATION

The following prospect targeting criteria were developed by applying the geochemical model for the Rosebud deposit to district-wide trace element anomaly patterns in the rock chemistry database. The most important exploration criteria are outlined below (page 47).



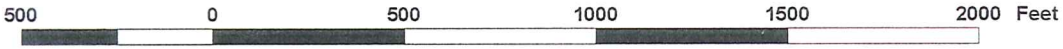


Data Processing

BENCH COMPOSITING
windows : 50ft.

GRIDDING
grid cell spacing : 20ft.
spline tension : 0.8
cutoff radius : 300ft.

NELVIS DATA STRETCH
minimum clip : 1.5
maximum clip : 2.25



ROSEBUD FOLIO

Mercury (ppb)

Level Plan 4800 Ft.

Figure 11. Spatial distribution of mercury on the 4,800 foot level within and around the Rosebud deposit. Plotted values are geometric averages of all drill core assays occurring within a 50 foot window centered on the level.

District-scale exploration criteria

(a) multiple structural intersections involving regional fault zones,

(b) calcium and potassium depletion,

(c) strong anomlous multielement geochemistry, in particular Au, As, Sb, Hg, Ag, Se,Cu, Mo, Pb

(d) felsic volcanic host rocks,

(e) proximity to the conntact between the Kamma Mountains Volcanic Group and the Auld Lang Syne Group.

Applying this geochemical model to the limited rock-chip database and using the airborne radiometric data to identify areas with potassium depletion, seven high priority targets were identified in the Rosebud district (Fig. 16).

RECOMMENDATIONS

- Develop an integrated geologic model for the Rosebud deposit by relating elemental zoning patterns to mine geology (lithology and rock structure) and hydrothermal alteration.

- Construct plan maps on 100 foot vertical intervals through the Rosebud deposit showing geology, hydrothermal alteration, geochemistry and the <0.05, 0.05 to 0.13 and >0.13 opt gold shapes.

- Construct 305° cross sections on 100 foot intervals through the Rosebud deposit showing geology, hydrothermal alteration, geochemistry and the <0.05, 0.05 to 0.13 and >0.13 opt gold shapes.

- Construct two 035° long sections through the Rosebud deposit showing geology, hydrothermal alteration, geochemistry and the <0.05, 0.05 to 0.13 and >0.13 opt gold shapes.

- Develop a hydrothermal alteration zoning pattern for the Rosebud deposit (and district) using an extensive number of PIMA and XRD analyses.

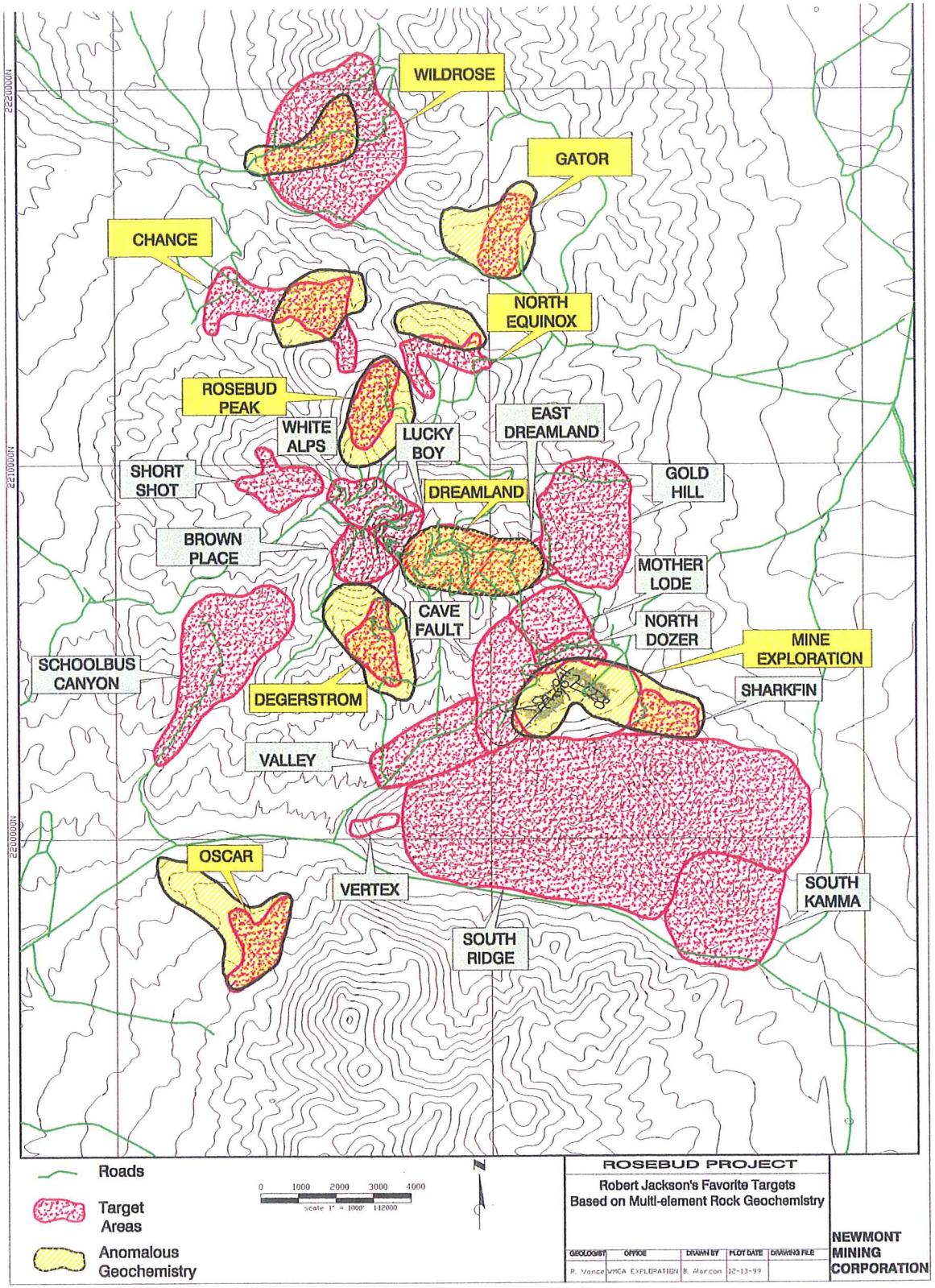


Figure 16. Location of the highest priority exploration areas in the Rosebud district based on geochemical zoning patterns.

REFERENCES

Cox, K.G., Bell, J.D. and Plankhurst, R.J., 1981, The interpretation of igneous rocks: George Allen & Unwin (Publishers) Ltd., London, 450 p.

Deer, W.A., Howie, R.A. and Zussman, J., 1971, An introduction to the rock-forming minerals: John Wiley and Sons, Inc., New York, 528 p.

Grim, R.E., 1953, Clay mineralogy: McGraw-Hill Book Company, Inc., New York, 384 p.

Wilson, W., 1995, Igneous petrology: Chapman & Hall, London, 466 p.

PROSPECT DESCRIPTIONS

This section contains summaries of the 28 prospects in the current exploration inventory for the Rosebud district. The prospect summaries follow the topic outline shown below. The prospects are presented in alphabetical order.

- INTRODUCTION
- TARGET CONCEPT
  - Potential Target Size
  - Grade Potential
- GEOLOGY
  - Lithology
  - Rock Structure
- HYDROTHERMAL ALTERATION
  - Alteration Type and Intensity
  - Areal Extext
- GEOCHEMISTRY
  - Surface Geochemistry
  - Drill Hole Geochemistry
- GOLD MINERALIZATION
  - Past Production
  - Distance from the Rosebud Mine
- GEOPHYSICS
  - Induced Polarization
  - Resistivity
  - Magnetics
  - Radiometrics
  - Gravity
  - Thematic Mapper
- DRILL HOLES
- ACCESSABILITY
- LAND STATUS
  - Ownership
  - Royalities
- COST TO FIRST DECISION POINT
- RECOMMENDATIONS
- REFERENCES

BARREL SPRINGS

INTRODUCTION

Barrel Springs is a large (>50 mi^2), dominantly alluvial covered area, which may conceal large-tonnage, low- to moderate-grade, and small- to medium-tonnage, high-grade gold deposits. The area has the potential to host large, near-surface oxide reserves in both Tertiary gravel and the volcanic pediment.

TARGET CONCEPT

- Multi-million ounce, disseminated and fracture-controlled gold mineralization in Tertiary gravels, i.e., Hycorft-type deposits
- Multi-million ounce, disseminated and fracture-controlled gold mineralization in pumiceous ash flow and tephra-fall tuff, i.e., Round Mountain-type deposits
- Several hundred thousand to multi-million million ounce, moderate- to high-grade, fracture-controlled gold mineralization, i.e., Rosebud-type deposits
- Several hundred thousand to multi-million ounce, high-grade, epithermal quartz lode minealization, i.e., Midas-type deposits

Potential Target Size

The potential size of the deposits varies from small (<5 million tons) for Rosebud- and Midas-type deposits to very large (>500 million tons) for Hycroft- and Round Mountain-type deposits.

- Multi-million ounce gold deposits (Hycroft- and Round Mountain-type systems)
- Multi-hundred thousand ounce gold deposits (Rosebud- and Midas-type systems)

Grade Potential

The potential grade of these deposits is highly variable depending on the type of mineralization.

- Average grades ranging from 0.04 to 0.08 opt Au (Hycroft- and Round Mountain-type systems)
- Average grades ranging from 0.2 to >1.0 opt Au (Rosebud- and Midas-type systems)

GEOLOGY

Limited reconnaissance-style geologic mapping and geophysical modeling indicates that the Barrel Springs area consists of an extensive volcanic pediment, most of which is concealed by Tertiary age and younger alluvial gravels.

Lithology

Sulfur Group

Tertiary gravels exposed in the Barrel Springs area are similar in composition and texture to gravel sequences in the Camel Conglomerate within and adjacent to the Crowfoot-Lewis mine, and are considered to be the southern extension of the unit

- The Tertiary gravels within the prospect area are mainly fanglomerates, and may be several hundred feet thick

Kamma Mountains Volcanic Group

Volcanic rocks exposed along the basement high to the west of Barrel Springs differ from rocks units in the Dozer and Chocolate formations in both texture and composition, and may be part of the basal sequence of the Kamma Mountains Volcanic Group. These rocks, informally designated the Barrel Springs Formation, were separated into two members, Rabbithole Creek and the younger Barrel Springs members.

- The Barrel Springs Member is comprised of a lower sequence of lacustrine ash tuffs and intercalated volcaniclastic deposits. At the top of the unit is a thick (>50 ft.) bed (beach lag?) of pebble conglomerate consisting of only Auld Lang Syne material. The upper(?) sequence of the Barrel Springs Member is a thick (>1400 ft.) sequence of primary and redeposited, vitric, pumice, crystal tuffs, intercalated with tuffaceous volcaniclastic units deposited from lake turbidites.

- A thick (>1800 ft.), basal(?) sequence of rheomorphic ignmbrite and associated tephra-fall pumiceous tuff was informally designated the Rabbithole Creek Member.

Rock Structure

The structural setting of most of the Barrel Springs prospect area is unknown.

- The major faults, which were conduits for auriferous hydrothermal fluids at the Hycroft deposits project into the Barrel Springs prospect area.

- The western boundary of the Rabbithole Creek Member is a steep, west-dipping normal fault. This fault may be the southern extension of one of the range-bounding faults that control alteration and mineralization in the Crowfoot-Lewis mine.
- The Rabbithole Creek Member dipped between 5 and 25° to the west prior to deposition of the Barrel Springs Member. Both units now dip between 25 and 55° to the east.

- The Tertiary gravels dip at shallow angles to the east, documenting very late eastward rotation of the Kamma Mountains

- Folding of the Barrel Springs Formation may have occurred before the overlying units were deposited.

- All of the units within the Barrel Springs Formation are separated by erosional unconformities.

HYDROTHERMAL ALTERATION

The Tertiary gravels are hydrothermally and mineralized near the creast of the alluvial fan along the road between Barrel Springs and Sulfur. This alteration and mineralization may be the southern extension of the Hycroft gold system.

Alteration Type and Intensity

- Argillic alteration (kaolinite?) with earthy hematite, goethite and jarosite (after pyrite?), and locally silicification is pervasive in relatively large areas of Tertiary gravel.

- Iron oxides and sulfate minerals form matirx cement within the more porous beds in the gravels, and locally form irregular and discontinuous veins which occur at high angles to bedding.

- The mineralized gravels locally are covered by shallow, unmineralized colluvium shedding from the east.

Areal Extent

- The distribution and areal extent of hydrothermal alteration and mineralization within the Barrel Springs area are unknown.

GEOCHEMISTRY

Surface Geochemistry

Rock

Three rock samples were collected from exposures of hydrothermally altered fanglomerate in the Barrel Springs area (Table 7). Arsenic, antimony, mercury, silver, molybdenum and selenium are anomalous in at least one of the samples.

Table 15. Barrel Springs rock-chip assays

Sample Number	Au (ppb)	Ag (ppm)	As (ppm)	Sb (ppm)	Hg (ppb)	Cu (ppm)	Zn (ppm)	Mo (ppm)	Se (ppm)
NWRA – 2786	<0.005	<0.2	138	218	2950	53	38	6	0.2
NWRA – 2788	<0.005	<0.2	50	22	4660	35	82	<1	1.4
NWRA – 2789	<0.005	0.2	32	2	6240	11	8	1	0.2

Soil

- The only soil surveys in the area were completed by Vista Gold, and the Rosebud joint venture does not have access to these data.

- Several soil gold anomalies were identified by Vista Gold, but none of the anomalies were followed-up with additional sampling, mapping, or drilling.

Drill Hole Geochemistry

- The Rosebud joint venture does not have geochemical data for drill holes completed in the Barrel Springs area.

GOLD MINERALIZATION

The fineness (895 to 900) of most of the gold recovered during placer operations in the Barrel Springs area is much higher than that of gold produced from the "hard rock" mines in the Rosebud district (McCulla, 1997). This difference may reflect silver leaching in the supergene environment, or may indicate a different (epithermal?) source for the gold.

Past Production

- Placer gold was produced from both surface and underground workings, which exploited the thick sequence of Tertiary alluvium.

- Most of the gold produced in the Barrel Springs region is credited to the Rabbithole district (McCulla, 1997).

Distance from the Rosebud Mine

- The center of the Barrel Springs area is approximately three miles west of the Rosebud mine.

GEOPHYSICS

Induced Polarization

No induced polarization data are available for the Barrel Springs area.

Resistivity

No resistivity data are available for the Barrel Springs area.

Magnetics

Airborne

A major north-trending magnetic high reflects the volcanic rocks. The magnetic high is bounded to the north and south by 050°-trending magnetic lineaments, which transect the colluvium and propagate into the volcanic rocks. Modeling of the airborne magnetic data (Fig. 8) indicates two major volcanic rock packages which dip 25 and 50° to the east. Significantly, the modeling indicates that the volcanic (magnetic) rock overlie nonmagnetic (colluvium) material. If this is true, the volcanic rocks were "thrust" over the colluvium. Additional mapping and geophysical surveys are needed to evaluate this possiblity.

Ground

No ground magnetic data are available for the Barrel Springs area.

Radiometrics

Low potassium and high thorium may indicate hydrothermal alteration.

Potassium

Potassium values vary from low to medium. Widespread low-K anomalies may reflect lithology. Isolate low-K anomalies may indicate the destruction of potassium feldspar.

Thorium

The radiometric response for thorium varies from medium to high, with the higher values in the eastern portion of the area. One 050°-trending lineament has a distinct signature of medium to high Th values.

Uranium

Uranium values are generally low, but are higher along the margins and in the southern part of the area.

Gravity

Insufficient gravity data are available for the Barrel Springs area to warrant modeling.

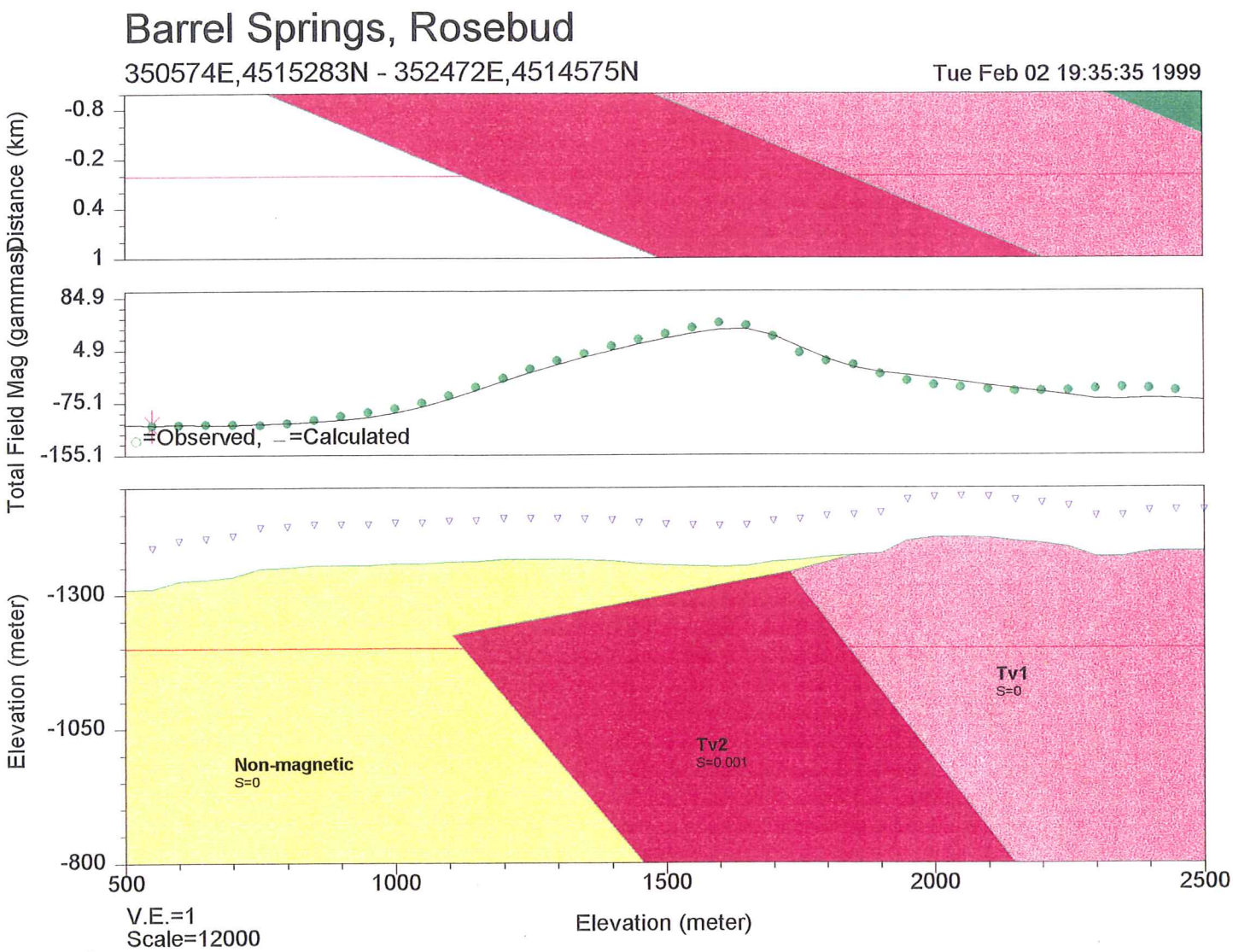


Figure 17. Geophysical model for the Barrel Springs area.

Thematic Mapper

The 050°-trending magnetic lineaments are accentuated by strong TM color anomalies. Clay end-member analysis indicates the presence of hydrothermal alteration on the north and south ends of the north-trending magnetic high. PIMA meassurements indicate the occurrence of NH-bearing minerals, possibly budingtonite or zeolites, are partly responsible for the TM anomalies.

DRILL HOLES

Two rotary drill holes were located were located in the north central part of the Barrel Springs prospect.

- The holes were sited on hydrothermally altered Tertiary colluvium, and appear to have been completed within the past three to four years.
- Drill cuttings indicate that the drill holes were shallow (probably < 500 ft.), and intersected agrillically altered rock (gravel?) containing a moderate amount of pyrite and possibly marcasite.

ACCESSIBILITY

All of the Barrel Springs area is easily accessed from existing roads with a minimal amount of excavation.

LAND STATUS

Ownership

Property ownership within the Barrel Springs area is complex. There are both placer and lode claims, problems with over-staking, and open ground. Lease-purchase agreements must be completed before significant ground work can be initiated.

- Vista Gold controls ~30% of the prospect
- Rosebud joint venture controls ~25% of the prospect
- Mr. J.A. Peterson controls ~9% of the prospect area with a combination of placer and lode claims.

Royalties

The property areas lies within the limits of Euro-Nevada's royalty agreement.

RECOMMENDATIONS

- Determine if acquisition agreements can be secured from the various claim owners.
- Secure the open ground between current claims.
- Acquire Vista Gold's soil and rock-chip (if any) geochemistry.
- Locate and acquire as much drilling information as possible.
- Compelet a reconnaissance-style geological map of the Barrel Springs region.

COST TO FIRST DECISION POINT

- Legal review geological map of the Barrel Springs region.
- Claim staking will cost ~$4,500 (7 fractions, ~30 claims at $150 per claim).
- Rock-chip sampling conducted in conjunction with reconnaissance geologic mapping will cost ~$1,000.

REFERENCES

McCulla, M., 1998, Gold potential on the Hycroft property south of the Crofoot-Lewis mine: Unpublished Newmont Gold Company Memorandum, May 20, 4 p.

BROWN PALACE

COMMENT

Brown Palace was not identified as a separate target in previous work, therefore there are no references specifically to it.

TARGET CONCEPT

The targets at Brown Palace include bonanza-grade stockworks, veins and disseminations in the footwall of the Degerstrom fault. The geometry of the target is somewhat analogous to that of the South Ridge fault. High-angle feeder structrues in the footwall will be challenging to find.

'Hydrothermal alteration at Brown Palace appears to extend down-dip towards the Degerstrom target. With further work these prospects may be combined as a single target.

Potential Target Size

Orebodies at Brown Palace will be in the range of 300,000 to 800,000 ounces of Gold.

Grade Potential

Grades will vary from 0.2 to multiple ounces, averaging 0.4 oz/st Au and 1 oz/st Ag.

GEOLOGY

Lithology

Middle to upper Chocolate lava flows are exposed at the surface. These flows rest on the Wild Rose alkali rhyolite. The volcanic sequence includes epiclastic interbeds.

Rock Structure

Low-angle normal faults are exposed at the surface. These faults appear to have small offsets. The lower alteration contact in the top of the drill hole correlates well with the resistivity , and may be related to a major fault. There are many subvertical extension joints exposed at the surface, and these commonly control alteration.

HYDROTHERMAL ALTERATION

Type and Intensity

- Strong to intense silicification associated with widespread argillization and iron oxide staining.

- Surface outcrops and the resistivity anomaly indicate that the body of silicification is one of the largest in the district. It extends from Brown Palace southwest onto Degerstrom.

Areal Extent

- Extensive colluvium masks much of the bedrock, but the minimum extent of the target is 800 by 1,200 feet.
- The geometry of the resistivity body is interpreted to be related to a silicified zone that is at least 400 feet thick.

GEOCHEMISTRY

Surface Geochemistry

Rock

Only a dozen rock-chip samples were collected across the property, due in part to talus cover. Two of the samples have 100 to 500 ppb Au and the rest are <100 ppb. One Ag value is in the 1 to 5 ppm range. Nearly all of the samples have 1 to5 ppm Se. Hg is high, Sb is >10 ppm and As values are modest.

Soil

Four northwest-trending soil lines spaced 400 feet apart cross the Brown Palace prospect. Gold is generally low (below detection to 30 ppb) with a few samples between 30 and 50 ppb. There are no As anomalies, weak Ag anomalies and anomalous Se is spotty. Around the edges of the target Se assay values locally attain 1 to 5 ppm. There are also weak (5 to 10 ppm) Sb and moderate (0.1 to 1ppm) Hg anamolies.

Drill Hole Geochemistry

One drill hole (RS-445c) intersected a long interval of hydrothermal alteration (clay, silica, sulfides) with anomalous Au, Ag and Se across four zones totaling 600 feet.

GOLD MINERALIZATION

Past Production

There has been no gold production from the Brown Palace prospect. The claims were surveyed for patent, but it was not issued.

Distance from the Rosebud Mine

Brown Palace is ~600 feet west-northwest of the Rosebud deposit.

GEOPHYSICS

Induced Polarization

There is a broad (800 ft wide), low magnitude (15 msecs) chargeability anomaly on the property. The anomaly is bounded by 050°-trending structures to the north and south.

Resistivity

There is a large resistivity high dipping at a shallow angle to the southeast. The anomaly is interpreted to be silicification up to 400 feet in depth. The anomaly is bounded by a southerly dipping, east-trending structure to the north and a 050°-trending structure to the east. The south-southwest portion of the silicified body may be offset onto the Degerstrom prospect.

Magnetics

Airborne

The target is located on a 050°-trending structure, which is defined more accurately by the resistivity data. Low magnetic relief coincides with silicification.

Ground

No ground magnetic surveys were conducted in the Brown Palace area.

Radiometrics

All three elements (K, Th, U) are quite low, which is interpreted to reflect the abundance of silica.

Gravity

Small variations in the regional gravity patterns my reflect silicification.

Thematic Mapper

Weak thematic mapper anomalies are present. A 030°-trending linear feature terminates within the silicified zone. Some clay alteration is predicted by endmember analysis of the TM data.

DRILL HOLES

One reverse circulation rotary drill hole with a core tail (RS-445) was completed to a depth of 2,276 feet.

ACCESSIBILITY

Access to the area is fair. Drill roads lead to the egdges of the property, but do not cross it. The only road connecting Brown Palace with Degerstrom was relcaimed by LAC Minerals. Road building in the area could be a challenge.

ROYALTIES

The northern edge of the target is on patented claims, hence there is a 4% net smelter royalty to Euro-Nevada. The central and southern parts of the target have the 4% Euro-Nevada royalty and an additional 5% royalty to Degerstrom.

COST TO FIRST DECISION POINT

The estimated cost to the first decision point is approximately $75,000. Two reverse circulation rotary drill holes, each about 500 feet deep, will test the resistivity anomaly and the rock beneath its lower contact. If the alteration continues , i.e., does not end on a flat fault, the drill holes may need to be deepened. One deep reverse circulation rotary drill hole with a core tail located about 1,000 feet south of RS-445 will test the main portion of the resistivity high in the precollar, and a projection of a lower altered zone similar to that at the bottom of RS-445. A 2,400 foot drill hole will reach down to the 3,500 foot elevation, which is approximately the base of the altered zone as intersected in RS-445.

REFERENCES

Walck, C., 1991, Geologic map of the Dreamland East folio map: Unpublished LAC Mineals (USA) map, 1 plate.

CAVE FAULT

TARGET CONCEPT

The Cave fault was encountered in both declines at the Rosebud mine. The >40 feet of altered gouge and broken rock indicate that it is a major structural feature with a northeast- strike and ~25° dip to the northwest. In reality, the Cave fault is probably the elusive, steeply dipping Rosebud shear. Only one Cave fault outcrop has been found in the area and this exhibits strong argillization with pyrite and moderate silicification developed around major slickensides.

Numerous drill holes in the mine area are thought to cut the Cave fault. Drill hole RL-265C, just north of #2 decline has assays of 0.01, 0.04 and 0.01 opt Au in the intensely altered gouge of the Cave fault. The Cave fault apparently cuts off the South Ridge fault (SRF) just to the west of the South ore zone, but in the vicinity of the North ore zone, it appears to lie parallel to and 1000 feet above the SRF.

In theory, if the SRF was a major control on the emplacement of the Rosebud orebodies, then the Cave fault may do the same in other areas. Finding a Cave fault ore zone will require the identification of anomalous alteration and geochemistry associated with the fault and chasing these down-dip by drilling.

Potential Target Size

Orebodies related to the Cave Fault are expected to be very similar in size or larger than those in the Rosebud mine.

Grade Potential

Grades are presumed to be the same as in the Rosebud mine.

GEOLOGY

Lithology

Stratigraphic units along the Cave Fault will be similar to those that host the Rosebud orebody.

Rock Structure

Ground preparation is expected to be similar to the Rosebud mine.

HYDROTHERMAL ALTERATION

Type and Intensity

Hydrothermal alteration is expected to be similar to that found within and around the Rosebud mine. Hydrothermal alteration associated with the Cave fault is expected to be similar to that at

Rosebud where epithermal alteration can be traced down-dip along the Sharks Fin (Office) fault to the ore zones. Ideally, alteration will be zoned from a large argillic zones up-dip from silicification and ore.

Areal Extent

The areal extent of hydrothermal alteration is expected to e similar or larger than the alteration found in the Rosebud mine.

GEOCHEMISTRY

Surface Geochemistry

Both rock and soil geochemistry should be the same as that found in other epithermal systems. Au and Ag will be of primary importance. Do to poor exposure, almost all geochemical and alteration data must be obtained from drill holes.

Drill Hole Geochemistry

Numerous drill holes have encountered anomalous Au and Ag in what is thought to be the Cave fault. Drill holes RL-265C with 0.04 opt Au and WW-4 with 14 opt Ag are two examples of mineralization interpreted to be related to the Cave fault.

GOLD MINERALIZATION

Past Production

There has been precious metal production from the Cave fault area.

Distance from the Rosebud Mine

The Cave fault passes through the Rosebud mine

GEOPHYSICS

Induced Polarization

On several profiles that cross the Cave Fault prospect there are indications of a shallow north-dipping zone that has a limited IP response. There is a strong (>40msec) IP response to the south of the prospect area.

Resistivity

On several profiles that cross the Cave fault there are indications of a shallow north-dipping zone of lower resistivity.

Magnetics

Airborne

Low magnetic relief characterizes the Cave Fault area due to gravel cover. Two northeast-trending structures (015° and 045°) are interpreted from the magnetic data.

Ground

There are several magnetic lows located near the surface projection of the postulated Cave fault.

Radiometrics

Almost all of the projected surface expression of the Cave fault is under gravel cover and the radiometric response in this situation may be misleading. Lower magnetism in some areas is interpreted to signify clay alteration at the surface.

Gravity

The target may be at too shallow and too small of a density contrast to identify.

Thematic Mapper

No TM response is expected from a buried fault.

DRILL HOLES

Numerous drill holes probably penetrate the Cave fault. By Relogging and reinterpreting the drill hole data, it should be possible to follow the fault down-dip and along strike from hole to hole on north-northwest-oriented cross sections.

ACCESSIBILITY

It is assumed that roads and drill pads will have to be built if a Cave fault study is successful in identifying anomalous zones of alteration and geochemistry. No significant problems should be encountered during road and drill pad excavation

ROYALTIES

There is a 5% NSR on any production outside of the Degerstrom area of interest, and 9% NSR on the Degerstrom lease.

COST TO FIRST DECISION POINT

The Cave fault study should be an ongoing program to determine the exact location of the fault. The initial phase of exploration will entail constructing a structural contour map of the fault plane and building cross sections. The cost of a re-logging program is unknown, but it will be relatively inexpensive.

REFERENCES

There are no references discussing the Cave fault.

CHANCE

TARGET CONCEPT

Geochemically anomalous zones of rock fracturing and brecciation in the Chance area may contain high-grade veins. Mineralization at may be related to the Crofoot-Lewis hydrothermal system.

Potential Target Size

There is potential for multiple targets similar to the RL-113/153 intercept: (1) 1,700,000 short tons at an average grade of 0.03 oz/st, and (2) 170,000 tons at an average grade of 0.15 oz/st.

Grade Potential

The best expected grade is 0.216 oz/st Au.

GEOLOGY

Lithology

- Rhyolite lava flows and possibly intrusions with very rare or no feldspar phenocrysts. The rock is commonly fractured and locally brecciated.
- Conglomerate ("Td" of Moore, Tp2 of Tullar, Twp of Maynard) crops out just north of Yes Canyon, but its continuity is uncertain.
- Possibly west-trending dikes.

Structure

- Steeply northwest-dipping normal fault at the range front. A much larger range front fault cuts alluvial fans more than 1 mile to the west.
- Discontinuous, steep(?), west- and north-northeast-trending faults have been mapped.
- Moderately (30-45°) southwest- to west-dipping, slickensided surfaces (e.g., Great Wall).
- Hydrothermal alteration is associated with the range front fault. To the east hydrothemal alteration is irregular and discontinuous, and commonly has secondary west- and northwest-trends.

HYDROTHERMAL ALTERATION

- Strong, pervasive bleaching and local silicification along range front, decreases to SW.

- A 3500 ft. (E-W) by 1500 ft. (N-S) zone of sporadic alteration from range front to upper Goblin Gulch is characterized by variable bleaching, local silicification, minor white clay-filled fractures, reported alunite and chalcedony, locally strongly limonite-stained fractures, rare barite in open fractures, and breccia with hard pale grey matrix. Similar small zones of alteration occur in lower Goblin Gulch and Yes Canyon.

- PIMA spectra interpreted by H. MacLachlan (personal communication) indicate:

  1. montmorillonite in 'strong "illitic" argillic alteration' (CPK) or 'clay gouge in conglomerate' (HSM) associated with .005-.010 oz/st Au at 55 ft. in RL-230 and montmorillonite and kaolinite lower in the hole,

  2. montmorillonite in green "surge tuff" in RL-231, which did not intersect detectable gold, and

  3. montmorillonite in 'propylitically altered flow-banded rock with chlorite' (CPK) in an interval in RL-232 with no detectable gold.

GEOCHEMISTRY

Goblin Gulch was dentified as area of anomalous Au, Ag, Sb, Hg (Cu, Pb, Zn) by R. Jackson (personal communication).

Surface Geochemistry

Rock

Anomalous rock-chip samples are widely distributed throughout the Chance and South Chance areas to Short Shot, Rosebud Peak, North Equinox, and Wild Rose.

- Anomalous Sb is the most common at South Chance with many samples of 20-889 ppm Sb, some of these have 50-171 ppm As and, rarely, 0.10-0.30 ppm Au.

- Yes Canyon, NE range front, Chance Hill, and lower Goblin Gulch areas have several samples with both anomalous Au (0.10-0.30 ppm) and Sb (30-400 ppm). Yes Canyon also has 3 samples with 0.50-0.80 ppm Au, 1 sample at Chance Hill has 1170 ppm Sb, and 1 sample at NE range front has 425 ppm As. An exceptional sample at lower Goblin Gulch has 2.68 ppm Au, 2.9 ppm Ag, 166 ppm As, and 104 ppm Sb.

- Au, Ag, As, and Sb are all anomalous in 2 of 4 samples from upper Goblin Gulch, i.e., 0.229-.507 ppm Au, 2.4-14.2 ppm Ag, 88-96 ppm As, and 628-1900 ppm Sb.

- As the geochemically most attractive samples are from smaller areas of alteration (lower Goblin Gulch, Yes Canyon), the lack of a clear relation with area or intensity of alteration makes prospecting difficult.

- A dominance of anomalous Sb with lower As is also characteristic of illite-smectite-altered rocks, which lie up to 1500 ft. below low-grade gold mineralization at Crofoot-Lewis (Ebert, Groves, and Jones, 1996).

Soil

The oldest soil grid targeted the range front fault. Some lines were extended to the SE and others added to the NE later, but the data for these are not in the Newmont database. Multielement data are available for the original grids, but only paper maps with gold data are available for the later extensions.

- Au. Ten distinct anomalies with >.050 ppm Au have been identified and these commonly coincide with areas of anomalous rock chip samples; several soil samples have 0.100-0.400 ppm Au; the largest anomalies are Yes Canyon, Chance Hill, and an anomaly extending E from the NE end of the original grid on the range front; only 4 of the smaller anomalies have not been drilled.

- Ag. A few samples in the original grid have 0.10-0.30 ppm Ag.

- Se. Several 0.30-0.46 ppm samples in the NE range front anomaly; maximum is 0.68 ppm in the SW part of the grid.

- As. Values are <5 ppm in the original grid.

- Sb. Scattered samples with 5-8 ppm.

- Hg. Several samples in the NE range front anomaly have 1-3 ppm Hg.

Drill Hole Geochemistry

Significant gold and silver intercepts in the Chance drill holes are listed in Table 16. Multi-element data are available only for SFPG drill holes, which all have <0.01 ppm Au.

- Au results are summarized in Appendix A. The most significant result is 0.216 oz/st in RL-113 within a broad envelope of >0.01 oz/st Au.

Other results include:

- 97-390: 220-240 feet (may be the downward continuation of the surface zone in lower Goblin Gulch with 2.68 ppm Au sample) has barely anomalous Au (0.002-0.004 oz/st), and Sb (11 ppm), low As (10 ppm) and high U (6 ppm). Compared to samples above and below the interval has low Ca (0.68%), high Fe (4.19%), and low K (0.11%) and Na (0.01%).

- 97-389: 400-420 feet (angled underneath anomalous samples in upper Goblin Gulch contains <0.001-0.006 oz/st Au, 6 ppm As, 30 ppm Sb, 3.06 ppm Hg, 4 ppm Mo, <5 ppm U, low K (0.07%) and Na (0.01%), and moderate Mn (595 ppm), in broader zone (360-

460 feet) with >1 ppm Hg and >10 ppm Sb. The interval at 800-1000 ft. has >1 ppm Hg, >10 ppm Sb and up to 10 ppm U, but <6 ppm As and <5 ppb Au.

- 97-394 (angled underneath Chance Hill) has an anomalous zone at 580-680 feet with 5-10 ppm As and 9-30 ppm Sb, but only 0.060-0.235 ppm Hg, low Ca (0.10-0.15%), Na (0.01-0.03%), P (0.004-0.006%), Al (0.58-0.66%) and Mn down to 316 ppm. There is a zone containing 0.004-0.007 oz/st Au at 580-590 feet.

- 97-395 and 97-396 (Yes Canyon) Au and Ag below detection except for 3 samples with 10-12 ppb Au. Other trace and minor element values include As <10 ppm, Sb<6 ppm, Hg <0.50 ppm, Ca >0.55%, Mn >500 ppm and P >0.028%.

GOLD MINERALIZATION

Past Production

There is a small prospect pit at the NE end of the range front. The map by Maynard also shows a prospect pit S of Chance Hill.

Distance from Rosebud Mine

Chance is 12,000 to 13,000 feet from the Rosebud mine.

GEOPHYSICS

Induced Polarization

There are limited IP data.

- Five IP lines perpendicular to the range front have broad, low-amplitude chargeability highs which coincide with magnetic lows probably reflect alteration.

- Oxidation of pyrite by meteoric water circulating along the range front fault may account for the lack of IP highs along the altered range front zone.

- Modeling of 1 NW-SE line near RL-113 indicates 2 small (<200 ft. across in the plane of the line) bodies of higher chargeability (13-18 msec) within a near-surface zone underlain by lower chargeability. One of these bodies may coincide with the zone of 0.03 oz/st Au in RL-113 and RL-153 but does not extend NW or SE of the intercept in the plane of the profile.

- Resistivity within the volcanic rocks is relatively uniform along the IP lines but may increase slightly away from the range front.

TABLE 16. Drill hole results for the Chance target.

Hole Number	Type	T.D. (ft)	Au @ 0.01 oz/st cut off			Ag @ 0.29 oz/st cut off		
			Thickness	Grade	Interval	Thickness	Grade	Interval
RL-113	RC	800	15 10 40 325 15 35	.01 .01 .016 .027(.22) .02 .016	70-85 270-280 320-360 390-715 740-755 760-795			
RL-114	RC	800						
RL-115	RC	715						
RL-116	RC	510	20	.01	490-510			
RL-117	RC	600	10	.01	485-495			
RL-153	RC	600	145	.030(.14)	420-565			
RL-154	RC	645	30 10	.01 .01	55-85 100-110			
RL-155	RC	505						
RL-156	RC	405	10	.03	5-15			
RL-228	RC	600	40	.01	215-255			
RL-229	RC	620	10 10 15	.01 .02 .01	245-255 280-290 300-315			
RL-230	RC	630	10 10	.01 .01	55-65 70-80			
RL-231	RC	500						
RL-232	RC	595	15	.01	540-555			
RL-233	RC	640						
97-389	RC	1000						
97-390	RC	1000						
97-394	RC	1200						
97-395	RC	1000						
97-396	RC	1000						

Note: gold and silver are reported in ounce per short ton; values in parentheses (.077) are maximum sample results for the interval.

Resistivity

There are limited data.

- Alluvial fan debris east of the range front has low resistivity on the IP lines and may be less than 500 ft. thick.

Magnetics

There is high relief in the magnetic data due to magnetic flows and intrusions.

- Ground and aerial data show broad, low-amplitude lows (<200 gammas) associated with alteration along the range front and extending E to upper Goblin Gulch.
- Breccia which yielded the 2.68 ppm Au in lower Goblin Gulch is marked by a sharp low (400 gammas) only 1200 ft.(E-W) by 400 feet (N-S) and there is a smaller lows associated with the alteration in Yes Canyon.
- Large bodies of low susceptibility are inconsistent with models of a N-S profile across the eastern part of the magnetic anomalies. Variations in the magnetic profile are accounted for by topography alone.
- A magnetic linear suggests a 50°-trending structure through the area of alteration.

Radiometrics

- There is a weak E-trending K low, which corresponds approximately with the magnetic low, but it also extends out across the alluvial fan W of the range front.
- There is a weak E-trending U high with a peak over the range front.
- There is a medium Th high.

Gravity

- The range front is marked a NW-dipping gradient related to lower density alluvial fans NW of the range front fault.
- Models of a N-S profile indicate the gentle N-dipping gradient within the volcanic rocks is probably caused by a gently N-dipping basement contact and that the volcanic section is approximately 200 ft. thick (Fig. 18).

Thematic Mapper

There are no distinctive anomalies in the Chance area. A zone of surface alteration is bounded by 300°- and 060°-trending faults.

DRILL HOLES

- The most significant soil and rock chip anomalies have been targeted by at least one drill hole each. Lac drilling concentrated on the NE range front area and Chance Hill. SFPG drilled the Yes Canyon, lower Goblin Gulch (their Wash-out Canyon), upper Goblin Gulch, and Chance Hill anomalies.

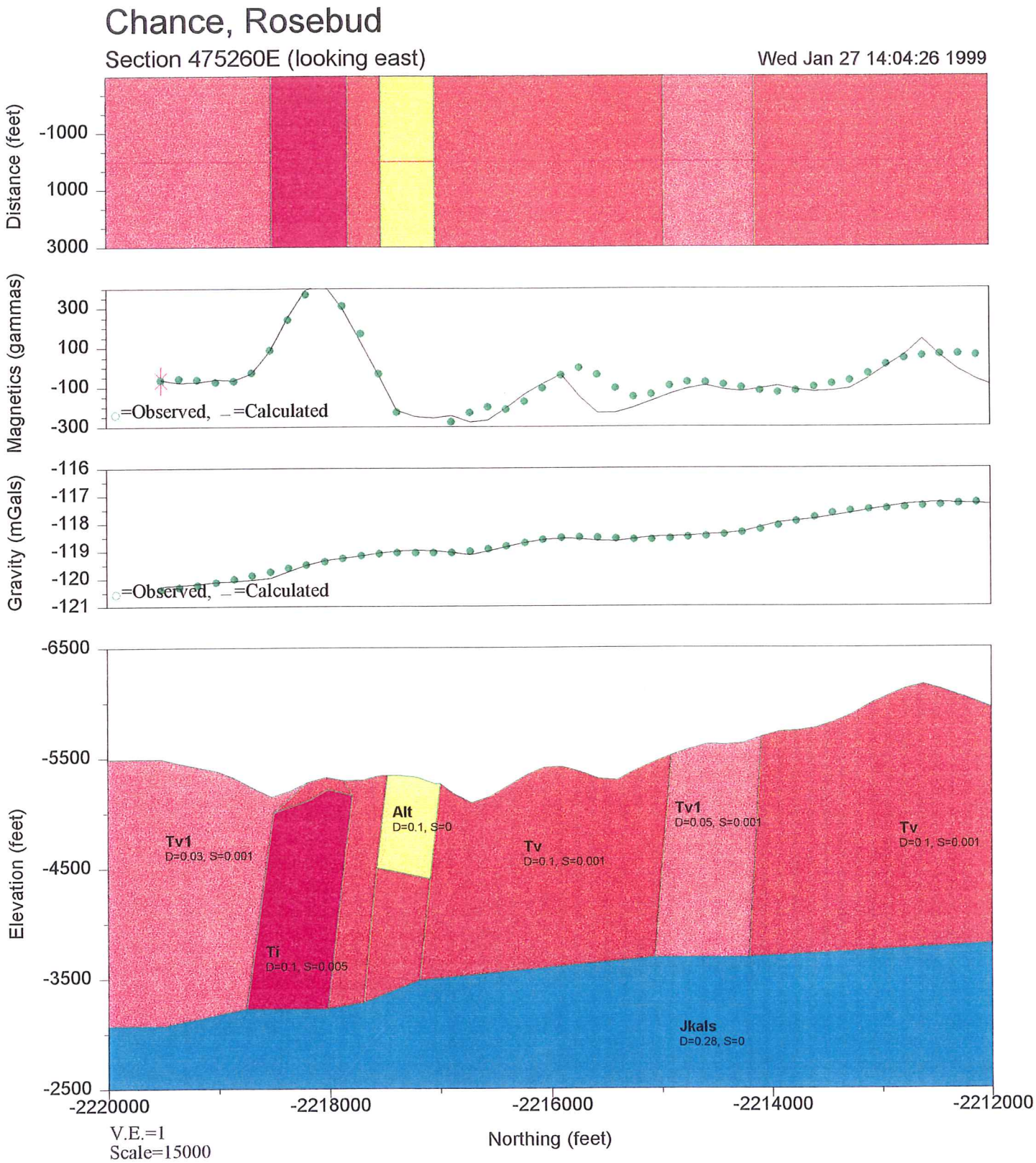


Figure 18. Geophysical model for the Chance area.

- The lack of drilling success (see below) is probably due to the erratic nature of mineralization. Except for the range front fault, the anomalies are not related to major, continuous faults or fracture zones. Fracturing is widespread but only locally mineralized, and the mineralization itself may have different orientations in different areas.

- The thick interval of anomalous gold in RL-113 is constrained above 500 feet by surrounding drill holes. If Brady's interpretation of a W-trending zone dipping 65°S (as shown on his cross-section; the text says 30-45°) is correct, then RL-228 should have intersected the zone at about 215 feet; drill hole RL-228 has 0.01 oz/st Au at 215-255 feet. The anomalous zone is also constrained to the W by RL-154 and to the SE by RL-233. How far the zone may extend down-dip from RL-113 is not known.

ACCESSIBILITY

- Easiest access is from the site of Sulphur, on the county road to Gerlach. Most of the drill roads have been reclaimed, but the road from Wild Rose Canyon may be passable to pickups to as far as the area of earliest drilling.

- Extensive road building would be required for all potential targets, except for those along the range front. Terrain around upper Goblin Gulch, Chance Hill, and upper Yes Canyon is steep and rocky.

ROYALTIES

There is a 4% NSR royalty due to Euro-Nevada.

COST TO FIRST DECISION POINT

The costs are for drilling 2 RC holes to test the higher grade intecept in RL-113.

1,500 feet RC drill hole @ $10.00/ft	15,000
1,000 feet RC drill hole @ $12.35/ft	12,350
2,500 feet of down-hole surveys @ $0.50/ft	1,250
2 drill pads @ $1000 each	2,000
Drill pad reclamation @ $1500 each	3,000
4,000 feet drill road reclamation road @ $2/ft.	8,000
500 Au assays of RC samples @ $8.78/sample	4,390
125 ICP analyses for RC samples	
(1 every 20 ft. on average) @ $4.88/sample	610
composite 500 samples @ $1.00/sample	500
Total:	55,100

Estimates of the amount of time it will take to evaluate Chance to the first decision point are shown below.

Geologist time for picking drill sites and road alignment	2 days
Geologist time for logging 2500 ft RC samples @ 1000 ft/day	2.5 days
Geologist time for making and interpreting sections	2 days
Total man-days:	6.5 days

REFERENCES

Brady, M.W., 1996, Drill proposal for the Rosebud Property, Pershing and Humboldt County, Nevada; submitted to Hecla Mining Company, 3-ring binder, many pages.

Ebert, S.W., Groves, D.I., and Jones, J.K., 1996, Geology, alteration, and ore controls of the Crofoot/Lewis Mine, Sulphur, Nevada: A well-preserved hot-spring gold-silver deposit, *in* Coyner, A.R. and Fahey, P.L. (eds.), Geology and ore deposits of the American Cordillera: Geological Society of Nevada, Symposium Proceedings, p. 209-234.

Maynard, S., 1991, East Chance area geology map, 1:2400.

Tullar, K. 1991, Chance area geology map (with soil grid and gold values added by hand), 1:2400.

---, 1991, Chance area gold soil geochem (contoured and colored), 1:2400.

---, 1991, Chance area rock sample locations with Au, Ag, As, Sb geochem values, 1:2400.

---, 1991, Chance south area rock sample locations with Au, Ag, As, Sb geochem values, 1:2400.

DEGERSTROM

TARGET CONCEPT

Bonanza-grade stockworks, veins, and disseminations adjacent to the Degerstrom fault, possibly with geometries similar to the South Ridge fault. Secondary targets are high-angle feeder structures in the footwall.

The alteration here appears to extend up-dip towards Brown Palace. With further work they could be combined into a single target.

Potential Target Size

Orebodies are expected to be in the range of 200,000 to 800,000 ounces of gold.

Grade Potential

Grades will range from 0.2 to multiple opt Au. Estimated average grades are 0.4 oz/st Au and 5 oz/st Ag.

GEOLOGY

Lithology

Previous mapping shows the bedrock as Chocolate tuff. The northeast corner of the property has a green epiclastic unit cropping out on the ridge and dipping to the southeast.

Rock Structure

A major low-angle normal fault (Degerstrom fault) mapped at the surface was intersected in at least two drill holes. The fault strikes NW and dips moderately SSW. The fault is exposed in the northern part of the target area. Slicks along the footwall rake west. Numerous other small-scale faults are mapped in the area.

HYDROTHERMAL ALTERATION

Type and Intensity

Silicification and argillization are present around the Degerstrom fault. Hydrothermal alteration seems to be strongest in the footwall, due in part to better exposure. There are numerous areas of alteration that are largely structurally-controlled.

Areal Extent

Degerstrom covers an area that exceeds 2000 by 1500 feet.

GEOCHEMISTRY

Degerstrom has strong geochemical values in soils and rocks. The intensity and patterns at 6000 scale resemble Dozer Hill.

Surface Geochemistry

Rock

There are many rocks with 10-500 ppb gold, with a single sample 0.5-1 ppm. Ag shows many values >5 ppm, Se has many >1 and several >5 ppm values, Hg is high to very high, Sb and As are strongly anomalous. The open-ended soil anomaly (on the NE end of the property) needs more rock-chip samples.

Soil

Many soils have 50-500 ppb gold values with a few >500. The anomaly is open on the NE end, towards Brown Palace. Many Se values are >0.5 ppm and a few are 1-5 ppm. Sb ranges from 5-25 ppm, and one value is >100 ppm. Many Hg values are >1 ppm.

Drill Hole Geochemistry

Table 17 presents the significant precious metal intercepts in the the Degerstrom drill holes.

Table 17. Significant drill hole intercepts at Degerstrom.

Drill Hole	Interval (ft)	Depth (ft)	Au oz/st	Ag oz/st	Comment	Trace elements
RL-46	20	70-90	0.013	<0.10	430' T.D.	none available
RL-47	5	165-170	0.01	<0.10	490' T.D.	none available
RL-48	25	30-55	0.034	0.1	440' T.D.	none available
RL-49	5	500-505	0.01	0.14	545' T.D.	none available
RL-151	10	170-180	0.013	0.09	500' T.D.	none available
	5	205-210	0.03	0.27		
	10	240-250	0.04	0.09		
	15	275-290	0.011	0.25		
RL-152	nil				700' T.D.	none available
RL-234	nil				700' T.D.	none available
RL-235	nil				525' T.D.	none available
RL-236	nil				365' T.D.	none available
RL-237	10	5-15	0.02	0.06	445' T.D.	none available
	15	80-95	0.015	<0.02		
	5	135-140	0.026	0.02		

GOLD MINERALIZATION

Past Production

Prospects and minor underground workings are widespread, but no production is known from the area.

Distance from the Rosebud Mine

The Degerstrom prospect is approximately 5,000 feet northwest of the Rosebud mine.

GEOPHYSICS

Induced Polarization

Chargeability values are moderate throughout the area. There is a significant high 1,000 feet in the southeast at about 300 feet depth. Previous drilling did not test this anomaly.

Resistivity

A resistivity low occurs in the center of the prospect area, and is surrounded by resistivity highs. A N15E structure lies to the west of the prospect (Schoolbus Canyon fault?). A structure strikes N60W across the north of the prospect. Two parallel 055-060°-trending structures terminate within the prospect.

Magnetics

Airborne

Low magnetic relief could indicate magnetite destruction. A major 050°-trending structure is present to the south (see resistivity section)

Ground

There are no ground magnetic surveys that cross the Degerstrom prospect.

Radiometrics

The correct ratio of the three elements indicates clays to the north and possibly alteration.

Potassium

Potassium values are low.

Thorium

Throium values are medium high.

Uranium

Uranium values are high

Gravity

The prospect is within a gravity low that is interpreted to indicate a thicker sequence of volcanic rocks.

Thematic Mapper

Hydrothermal alteration is interpreted to occur at the surface, as are 015°- and 030°-trending lineaments. Endmember analysis predicts a large area of clay alteration.

DRILL HOLES

Ten drill holes with depths of 450-700 feet. Several bottomed in unaltered volcanic rock. There are several 0.0X oz/st gold intercepts.

ACCESSIBILITY

Accessibility is good. Existing roads lead to the lower and upper parts of the prospect area, but additional road building may be needed in the western and northern part of the prospect area.

ROYALTIES

Royalties are high. There is a 4% NSR to Euro-Nevada plus a 5% NSR to Degerstrom on the GP claims.

COST TO FIRST DECISION POINT

Total cost to the first decision point is estimated to be about $100,000. Degerstrom shows strong geologic, geophysical and geochemical similarities when compared to the Rosebud deposits. The exploration strategy is to follow the silicified fault up- and down-dip, looking for structural traps (inflections, dilatent bends, or feeder structures) and/or geochemical vectors toward more favorable host rocks. Drilling costs are estimated to be approximately $85,000, based on three 1,500 and two 1,000 foot deep reverse circulation rotary drill holes.

REFERENCES

Brady, M. W., 1996, Drill proposal for the Rosebud property, Pershing and Humboldt County, Nevada: Unpublished Consulting Report for Hecla Mining Company dated 1/15/96, >100 p. (Degerstrom is discussed on p. 30-32).

Brewer, N.H., 1991, 1990 annual progress report, Rosebud project, Pershing County, Nevada: Unpublished LAC Minerals report, 28 p.

Kenner, K. L., and Brewer, N. H., 1990, 1989 annual summary report, Rosebud project, Pershing County, Nevada: Unpublished LAC Minerals Report, 15 p., 1 pl. (Degerstrom is discussed on p. 10).

Kuhl, T. O., 1992, 1991 summary report, Rosebud project, Pershing County, Nevada: Unpublished LAC Minerals Report, 14 p., figs, plates.

---, 1993, Summary report, Rosebud project, Pershing County, Nevada: Unpublished LAC Minerals Report, 17 p., 5 Appendices, 4 plates. (Degerstrom is discussed on p. 4, 14).

Turner, S. J., 1997, Rosebud property, Pershing County, Nevada: technical review: Unpublished Newmont Exploration Ltd Report, 19 p.

EAST DREAMLAND -- GOLD HILL

GENERAL COMMENT

The East Dreamland – Gold Hill area borders the Mother Lode prospect to the south and the Dreamland prospect to the west. The boundaries between these area overlap and were arbitrarily established based on the limits of past drilling.

TARGET CONCEPT

- Structurally-controlled lode mineralization associated with strong silicification and/or quartz veins. Lode deposits may begin at shallow (<200 feet) levels.

- Rosebud-style, fracture network mineralization associated with argillic alteration.

Potential Target Size

- Lode gold will probably occur in small to moderate (<200,000) tonnage deposits.

- The potential size of fracture network-style mineralization is unconstrained by the prospect geology, but probably will not exceed 5 to 6 hundred thousand tons.

Grade Potential

- High-grade (>0.5 opt Au) for lode mineralization.

- Moderate-grade (~0.4 opt Au) for fracture network mineralization.

GEOLOGY

The geology of the East Dreamland – Gold Hill area is characterized by multiple, high-level porphyritic intrusions of intermediate composition. The intrusions were probably emplaced into a sequence of trachyte(?) lavas and pyroclastic(?) deposits, but unequivocal contact relationships were not observed. It is possible that the intrusions vented, and that the eruptive phases are cogenetic.

Lithology

- The intrusive phases include the Kamma andesite, Rosebud quartz latite, and a flow-banded trachyte(?).

- Extrusive rocks include multiple trachyte(?) lava flows and quartz latite pyroclastic breccia.

- The Badger Formation appears to overly the trachyte lava flows and post-dates the intrusions, but contacts conclusively establishing these temporal were not observed.

Rock Structure

- Platy flow-banding in the trachyte(?) lava strikes northwest and dip 20° to 30° east. This trend is approximately perpendicular to the regional strike of unit contacts and bedding.

- Joint sets and small faults trend approximately east west and dip steeply (>80°)east and west.

- Structures which control hydrothermal alteration trend east, northeast, or northwest, and mainly dip southward.

HYDROTHERMAL ALTERATION

Type and Intensity

Propylitic alteration (chlorite-epidote-calcite ± albite) is the most common type of hydrothermal alteration in the East Dreamland – Gold Hill area, and may be related to the emplacement and cooling of the various porphyritic intrusions. Moderate to strong argillic alteration and silicification appear to be controlled by close-spaced joint sets, small faults and unit contacts.

Areal Extent

- Weak to moderate argillic alteration is locally pervsasive in the latite(?) pyroclastic breccia, but structurally-controlled in the other units, and are generally restricted to relatively narrow halos to fracture zones and faults.

- Weak to moderate propylitic alteration is widespread to pervasive in Rosebud quartz latite(?) forming the gorilla, and in the body of flow-banded trachyte.

- Weak to strong (jasperoid) silicification is structurally-controlled, and limited to within a few meters of the controlling structure.

GEOCHEMISTRY

Surface Geochemistry

Rock

Rock-chip sampling is restricted to three main areas: (1) the area of shallow drilling completed by Freeport and Lac Minerals, (2) the top of Gold Hill and down slope to the east and southeast, and (3) in the northwest and northern portions of the prospect area where the Badger Formation is exposed. Additional rock-chip sampling is needed to more fully delineate the geochemical anomalies.

- All three areas had relatively widespread, weak (10 to 50 ppb) gold anomalies, with strong (100 to >1000 ppb) gold values occurring in the area of previous drilling.

- Samples from both the area of previous drilling and Gold Hill were anomalous in Ag (1 to >5 ppm), As (25 to >1,000 ppm), Sb (5 to 100 ppm), and Se (0.5 to >5 ppm). The Gold Hill anomalies were weaker and more wide spread than those in the area drilled by Freeport and Lac Minerals.

Soil

Most of the the East Dreamland – Gold Hill area is covered by soil lines, which are spaced 150 to 300 feet apart. Samples were collected approximately every 100 feet along the traverse lines. Anomalous soil values form three discrete multielement anomalies within the prospect area.

- A cluster of anomalous Au (30 to 500 ppb), Ag (1 to 5ppm), As (10 to 500 ppm), Sb (5 to 25 ppm) and Se (0.2 to 0.5 ppm) values covers a 600 by 600 foot zone that is roughly centered on the area of shallow drilling completed by Feeport and Lac Minerals. This is the strongest anomaly.

- There is a relatively large (~900 by ~1,000 ft.) area of anomalous soil values for Au (10 to 100 pppb), Ag (0.1 to 5 ppm), Sb (5 to 25 ppm), and Se (0.2 to 0.5 ppm) covering the eastern slope of the east-west elongated hill in the northwestern part of the prospect. The anomalous geochemistry appears to be restricted to the Badger Formation.

- The third soil anomaly begins on the top of Gold Hill and trends eastward for ~900 feet, and is ~300 feet wide. The anomalous elements include Au (10 to 100 ppb), Ag (1 to 5 ppm) and As (1 to 10 ppm).

Drill Hole Geochemistry

Significant drill intercepts are summarized in Table 18. Data for all of the drill holes except RS – 424C are from Kuhl (1993). Data for RS – 424C is from the Rosebud database. Data for the RA drill holes was not located.

GOLD MINERALIZATION

Past Production

There are several short adits and prospect pits in the East Dreamland – Gold Hill area, but there was no significant precious metal production.

Distance from the Rosebud Mine

The center of the East Dreamland – Gold Hill prospect area is ~2,500 feet northwest of the Rosebud mine.

Table 18. Significant drill hole intercepts at East Dreamland -- Gold Hill.

Drill Hole	Interval (ft.)	Depth (ft.)	Au (opt)	Ag (opt)
RA – 1	?	?	?	?
RA – 2	?	?	?	?
RA – 3	?	?	?	?
RA – 4	?	?	?	?
RB – 9	**30**	75 – 105	**0.099**	No Record
	15	75 - 90	**0.186**	No Record
RL – 12	15	30 – 45	0.027	**1.51**
	5	365 – 370	0.013	Bd
RL – 13	--	--	--	--
RL – 14	--	--	--	--
RL – 132	--	--	--	--
RL – 133	5	70 – 75	0.011	0.19
	5	95 - 100	0.015	Bd
RL – 134	5	10 – 15	0.013	**0.51**
RL – 135	5	95 – 100	0.013	0.35
RL – 137	--	--	--	--
RS – 424C	5	75 – 80	0.029	0.48
	5	100 – 105	0.010	0.29
	5	115 – 120	0.016	**0.62**
	5	190 – 195	0.034	0.11
	5	205 – 210	0.010	0.15
	5	260 – 265	0./011	0.16

GEOPHYSICS

Induced Polarization

A chargeability anomaly coincides with the inferred, 045°-striking "Gold Hill" structure in the East Dreamland area. The chargeability anomaly atenuates toward the northeast, and is not present on Gold Hill.

Resistivity

Results of inversion modeling of the resistivity data indicates that a resistivity high coincides with the inferred "Gold Hill" structure in the East Dreamland area. The high weakens when the inferred structure intersects crosses into resistive bedrock in the Gold Hill area.

Magnetics

Airborne

A 050°-trending, magnetic (low) lineament occurs along the southern margin of East Dreamland and transects Gold Hill. Low magnetic relief indicates magnetite destructive alteration.

Ground

A small area of high magnetic relief may be related to unaltered lava flows. The boundaries of the magnetic high trend 050° and north-south.

Soil Susceptibility

A soil susceptibility low to the east of the prospect area may indicate the presence of a rhyolite lava flow.

Radiometrics

There are no significant radiometric (K, Th, U) anomalies in the East Dreamland – Gold Hill area.

Gravity

A north-trending gravity lineament crosses Gold Hill. The lineament may represent a fault zone.

Thematic Mapper

Weak hydrothermal alteration is present to the north of East Dreamland and to the east of Gold Hill. A north-trending alteration zone is present on the western side of East Dreamland. A 300°-trending, linear TM anomaly terminates at Gold Hill, possibly indicating the presence of a cross structure. PIMA analyses document the occurrence of alunite in the East Dreamland area.

DRILL HOLES

Geologic and drill hole collar maps indicate that 13 shallow, reverse circulation rotary drill holes were completed in the East Dreamland – Gold Hill prospect area. The data in Table 19 are from Kuhl (1993), and from the drill log for RS – 424C. Drill hole RL – 424C has a 1500 foot reverse circulation precollar and 809 foot core tail.

ACCESSIBILITY

East Dreamland and Gold Hill are easily accessible from the existing roads drill roads. The hillsides are steep and road construction away from the ridges, valleys and existing roads will involve moderate excavation and significant reclamation work.

LAND STATUS

Ownership

The property is controlled by lode claims owned by the Rosebud joint venture company.

Royalties

All of the prospect area is within the boundary of Euro-Nevada's 4% net smelter return royalty.

Table 19. Drill hole statistics for East Dreamland -- Gold Hill.

Drill Hole	Company	Azmuth (°)	Angle (°)	TD (ft.)
RA – 1	Freeport	000	-90	500
RA – 2	Freeport	000	-90	500
RA – 3	Freeport	000	-90	500
RA – 4	Freeport	000	-90	500
RB – 9	Freeport	000	-90	305
RL – 12	Lac	005	-58	405
RL – 13	Lac	000	-60	385
RL – 14	Lac	000	-60	285
RL – 132	Lac	020	-45	200
RL – 133	Lac	000	-45	300
RL – 134	Lac	020	-45	145
RL – 135	Lac	020	-45	300
RL – 137	Lac	170	-45	400
RS – 424C	Newmont	000	-70	2309

RECOMMENDATIONS

The near-surface precious metal target, although not totally defined, does not warrant additional work, unless the emphasis of exploration is changed to focus on low-grade, oxide heap leachable mineralization.

The decision to proceed with exploration in East Dreamland – Gold Hill area depends on the evaluation of the Mother Lode prospect. The primary target at East Dreamland – Gold Hill is the possible high-grade vein that is inferred to pass though drill hole RB – 9 and the Gold Hill adit. Where intersected by RB – 9, the structure is relative relatively narrow, probably less than 10 feet true thickness, but it averaged 0.186 opt Au. Geophysical modeling and geologic mapping indicate that the inferred "Gold Hill" structure may be laterally continuous for more than 2,500 feet. It is also significant that the "Gold Hill" structure trends subparallel to the veins and mineralized structures in the Mother Lode area.

- Attempt to more closely define the limits of the "Gold Hill" by geological mapping.

- If geologic mapping in not successful and the decision to proceed is made, additional close-spaced EM-resistivity and/or dipole-dipole IP-resistivity may more accurately delineate the structure.

- If the decision to drill the "Gold Hill" structure is made, at least four drill holes will be needed. The vein should be drilled in at least two locations with two hole fans.

COST TO FIRST DECISION POINT

The first decision point is deciding whether or not to collect additional geophysical data, or to drill the structure. The cost to get to this point is ~$1,000.

- Rock-chip sampling: $420 (20 samples at $21.50 per sample).

- Soil sampling: $570 (30 samples at $19 per sample).

REFERENCES

Kuhl, T., 1993, 1992 Summary Report, Rosebud Project, Pershing county, Nevada: Unpublished Lac Minerals Report, 17 p.

GATOR

TARGET CONCEPT

Three possible targets exist in the Gator area: (1) high-grade narrow epithermal veins, (2) low-grade fracture-controlled network veining-type ore zones, and (3) Rosebud-type orebodes in the mine sequence host rocks at depth.

Potential Target Size

The sizes of the orebodies described above are (1) epithermal veins: 2,000 by 5 by 300 feet, or 240,000 tons, (2) network vein zones: 2,000 by 500 by 300 feet, or 24,000,000 tons, and (3) Rosebud-type: ~500,000 tons.

Grade Potential

Potential grades are unknown, but minimum grades are (1) epithermal veins will have to be 0.20 opt Au or better, (2) network vein zones must have open pit grades (>0.02 opt Au), and (3) for Rosebud-type deposits the grade will have to be similar to the present Rosebud mine.

GEOLOGY

Volcanic rocks exposed at the Gator prospect are mapped as BUD, LBT and Chocolate, but on inspection the rocks are breccias of the lower Badger Formation, or possibly one of the units in the upper part of the Chocolate Fm. Clasts within the unit were predominately source from the Chocolate Formation.

Lithology

The only mapping in the area that is realistic is by Brady in 1996 and he assigns the rocks to the Chocolate Formation, which are overlain to the east by the Badger Formation. and a dark rhyolite lava flow of unknown stratigraphic position.

Rock Structure

Within the Au geochemical anomaly there are two and possibly more 010°-trending lineaments identifiable on air photos. These may be the faults associated with the geochemical anomalies.

HYDROTHERMAL ALTERATION

Type and Intensity

The clastic rocks in the area of the Gator geochemical anomaly exhibit moderate to weak argillization (bleaching). Several iron oxide-filled fractures were found in the area. Silicification was found in float at one locality near the south end of the area.

Areal Extent

Using air photos and limited observations obtained during one visit, a bleached area approximately 2,000 x 500 feet is indicated.

GEOCHEMISTRY

Surface Geochemistry

Lac Minerals and Hecla both obtained soil data from this area. A moderate intensity Au anomaly was found. Au values show a 12 ppb closed contour with a high value of 186 ppb. There are also several low-value outlayers. Trace element maps for Cu, Pb, Zn, Ag, Mn and Sb indicates that these elements do not correspond with the Au values. Very little rock chip data is available for the Gator area, but the highest values (>1 g/t) occur along the boundary between planar laminate Wild Rose rhyolite and alluvium.

Drill Hole Geochemistry

There are no drill holes in the Gator area.

GOLD MINERALIZATION

Past Production

There has been precious metal production from the Gator area.

Distance from the Rosebud Mine

The Gator prospect area is ~12,000 feet due north of the Rosebud mine.

GEOPHYSICS

Induced Polarization

There may be an IP survey covering part of the prospect, but these data is not available.

Resistivity

Resistivity data, if it exists, is missing from the files.

Magnetics

Airborne

High magnetic relief suggests the presence of an intrusive or unaltered flow to the east of this area.

Ground

Zonge Geophysical conducted a ground magnetic survey in 1997 (Zong Job # 9724). Interpretation of these data suggests that there are dominant 045°-, north- and 050°-trending structures with magnetic destructive hydrothermal alteration at their intersections.

Radiometrics

K, Th, U, and total count surveys are available for this area. There are no significant anomalies, although potassium is moderately low, suggesting some silicification.

Gravity

A gravity survey was conducted by Newmont over this prospect during 1998. The prospect lies on the east edge of a gravity high, which could be caused by either a lithologic or fault contact. The gravity gradient trends 0°, indicating a north-south contact.

Thematic Mapper

Data from recent interpretation of this imagery indicates a small anomaly at the southern end of the Gator Prospect. Clay alteration is predicted with a 330°-trending lineament bounding the south edge of the alteration zone.

DRILL HOLES

There are no drill holes within the limits of the Gator prospect.

ACCESSIBILITY

Access to the prospect is excellent.

ROYALTIES

There is a 4% NSR royalty due to Euro-Nevada on any production from the prospect.

COST TO FIRST DECISION POINT

The area needs to be mapped and sampled before drilling can be contemplated. The cost to map and sample the Gator area is estimated to be $7500.00.

Two weeks mapping by one geologist	$3500
200 rock-chip samples	$3,000
Miscellaneous	$1,000
Total	$7,500

REFERENCES

Brady, M. 1996. Project Evaluation – Rosebud Area, Pershing County, Nevada: Unpublished. Hecla Mining Co. Report.

Zong Geophysical. 1997. Zong Job # 9724, Gator Prospect – Pershing County, Nevada: Unpublished. Santa Fe Report.

LUCKY BOY

COMMENT

Lucky Boy was not previously identified as a separate target, therefore there are no references specifically to it.

TARGET CONCEPT

Structurally controlled bonanza-grade stockwork veining and veins.

Potential Target Size

The expected target size is in the range of 200,000 to 600,000 ounces Au.

Grade Potential

Grades are expected to be ~0.2 to multiple ounce Au, averaging 0.4 oz/st Au and 5 oz/st Ag.

GEOLOGY

The Lucky Boy target extends from the Lucky Boy mine north to the claim boundary with the White Alps #1 claim. The west edge of the target is the N45W linear drainage, abutting the Brown Palace target.

Lithology

Bedrock at the surface is mapped as Chocolate flows and flow breccia. A drill hole shows aphyric flows and volcanic breccias cut by minor porphyritic volcanic rock (RQL?) and interbedded with epiclastics.

Rock Structure

Few faults are mapped at surface. The strike and dips of numerous faults in drill holes are not known. Major faults were intersected at 1748-1780 ft and 1922-1926 ft.

HYDROTHERMAL ALTERATION

Type and Intensity

At surface, much of the rock is bleached bluish-gray (LAC's "blues and grays"). This is incipient argillization in which the red earthy hematite is removed. The bluish-gray color is due to very fine-grained specularite. Where argillization is stronger, the rock becomes light gray, tan or white. Argillization is moderate to strong in the top 1900 feet of drill hole RS-422c, and weakens

from there to the TD. Silicification is weak to moderate across narrower zones, but locally is strong.

Areal Extent

The surface alteration is 600 by 500 feet, encompassing nearly all of the target area.

GEOCHEMISTRY

Surface Geochemistry

Rock

Only 4 rocks come from the Lucky Boy mine workings. All have 5-5000 ppm Ag, >5 ppm Se. Sb and Hg are high in 3 of 4. Arsenic is modest.

Soil

Anomalous gold 50-100 ppb (a few 100-500 ppb); >1 ppm Ag around RS-422c; Se a few > 1 ppm; several Sb > 5 ppm; Hg low.

Drill Hole Geochemistry

Alteration intensity in the precollar in RS-422c increases at about 900 feet. The hole contains nearly continuous anomalous gold-silver-arsenic-selenium mineralization from 950-1950 ft. Anomalous gold in the 30-160 ppb range occurs across two intervals totaling 890 feet. A few discrete intervals contain up to 0.025 oz/st gold. Silver values in the last 15 feet of the precollar averaged 3.5 oz/st silver and 0.003 oz/st gold. Pyrargyrite crystals are present in the top of the core tail in vuggy fractures. Mercury decreases from 1-7 ppm up high to less than 1 ppm at the bottom. Calcite comes and goes down hole, and seems to overprint argillization, at least locally.

RS-426 contained a black sulfidic breccia above a sharp fault contact at 1203.9 ft. The breccia ran 2.2 ft of 0.09 oz/st gold, with anomalous Se (13.2 ppm), As (274 ppm), Sb (16 ppm) and Mo (12 ppm) in composited pulps.

GOLD MINERALIZATION

Past Production

There probably was minor from the Lucky Boy mine.

Distance from the Rosebud Mine

Lucky Boy is ~1000 feet from the Rosebud mine.

GEOPHYSICS

Induced Polarization

No significant anomalies. (Target is too deep).

Resistivity

A low resistivity anomaly is coincident with a ground magnetic anomaly. A 050°-trending structure bounds east edge.

Magnetics

Airborne

Prospect is positioned on the west edge of a large magnetic low. A fault contact or alteration boundary could define the edge of the low.

Ground

Ground Ground magnetic low is coincident with resistivity anomaly.

Radiometrics

All elements are generally high with no clay alteration predicted from ratios.

Gravity

Small gradients loosely define the intersection between N40E and N50W structures within the volcanic package. The N50W structure projects or is parallel towards the regional N50W lineament that bounds the NE edge of the deposit.

Thematic Mapper

Surface alteration is present. A N-S structure is defined to the west of the prospect area. There is some possibility of clay alteration assemblages from the end member analysis.

DRILL HOLES

There are two drill holes on the property, RS-422c -90° (2380 ft T.D) and RS-426c -90 ° (1542 ft T.D.).

ACCESSIBILITY

Good. Existing roads lead to the target. Drill pad and sump construction will be expensive due to knobs of hard bedrock.

ROYALTIES

Fee land inside Euro-Nevada's 4% royalty.

COST TO FIRST DECISION POINT

The cost to the first decision point is estimated to be $60,000.

Lucky Boy requires detailed geologic interpretation in light of positive results from RS-422 and RS-426, and the adjoining Brown Palace and White Alps targets. There is a very subtle suggestion that alteration and mineralization strengthen to the northwest or northeast. One additional hole is proposed (about 500 feet away from RS-422?), with exact placement to be determined. A 1500-ft precollar and 700-foot core tail will be adequate.

REFERENCES

Walck, Cyndie, 1991, Geologic map of the Dreamland East folio map: unpublished mapping by LAC Minerals (USA), 1 pl.

Pete Rogowski

NEAR MINE

INTRODUCTION

Exploration adjacent to the Rosebud orebodies has been an ongoing project that has evoloved to a point where, with the limited mine life remaining, past ore and near ore intercepts within 1,000 feet of the mine access are promising underground drill targets. A second group of underground targets that has received little attention in the past, are the possible feeder structures that cut both the Auld Lang Syne and the Dozer alkali rhyolite.

Surface drilling for near mine targets may be limited to areas that are up-dip on the South Ridge fault (SRF) from known mineralization. A second surface target will be testing below the outcrops of the South Ridge, Sharks Fin and Office faults. This second surface target may be tested from underground.

SOUTH OF THE SOUTH ORE ZONE

A single hole (+42°, >1000 ft.) was drilled from the 2300 access station. This is the third of three holes proposed to test the footwall of the SRF where previous surface drilling intersected 0.40 opt Au in silicified Dozer alkali rhyolite. This intercept was similar in appearance to ore in the East ore zone that led to the theory that the ore zones were displaced by post-mineral movement on the SRF. A second target for this hole is the possible down dip extension of the Office fault.

VENT RAISE 97-379 INTERCEPT

Three holes drilled from the East Zone drift just northwest of the turnout to the bottom of the vent borehole. This area was recommended in 1998 as part of the # 2 Target.

1. Drilled at 145Az –15 degrees, 150 feet. Designed to hit the 379 intercept in order to determine the true thickness and verify the grade.

2. Drilled at 145Az -45 degrees, 300 feet. Designed to test the possible downdip extension of the 379 intercept.

3. Drilled at 115Az –30 degrees,350 feet. If the first two holes warrant additional work then this hole will test the 379 structure along strike to the east.

96 356 INTERCEPT AND BASEMENT

Two holes drilled from the North ore zone access.

1. Drilled at 305°, –26 degrees (1,100 ft. t.d.) was designed to cut the 356 intercept and the Relay fault, also to test for any ore between 356 and the North ore zone. This hole was recommended in 1998 as part of the # 3 Target.

2. Drilled in the same direction as (1) at –35degrees (1,000 ft. t.d.) was designed to test the footwall under the 356 area for possible feeder structures.

3. A third 1,000 foot hole at a steeper angle also may need to be drilled here.

SOUTH ORE ZONE FEEDERS

Three holes drilled from the 2300 access drill station.

1. Drilled at 320Az –28 degrees, 600 feet. Designed to test for feeder veins in the Dozer below the chimney ore zone.

2. Drilled at 310Az -30 degrees, 1,500 feet. Designed to test for feeder veins in the Auld Lang Syne.

3. Drilled at 310Az –40 degrees, 1200 feet. Designed to test for feeder veins in the Aauld Lang Syne.

FAR EAST

Three holes drilled from a station at the East zone turn.

1. Drilled at 100Az +40 degrees, 700 feet (Drilled directly at the RL-220 intersection). Designed to test the true width of the RL-220 mineralized zone.

2. Drilled directly at the RL-273 intersection, 100Az +15 degrees, 500 feet. Designed to test the high-grade 273 zone for true width and verify the grade.

3. Drilled directly at the Rl-214 intersection, 100Az –30 degrees, 1000 feet. Designed to test both the 214 intersection for width and grade and continue on to the downward projection of the Sharks Fin/Office fault.

COST TO FIRST DECISION POINT

The cost to the first decision point is not known, Testing the targets will require ~10,600 feet of core drilling.

MOTHER LODE

TARGET CONCEPT

Three targets exist in the Mother Lode area:

1. An epithermal vein in the Mother Lode structure.

2. Rosebud-like orebodies associated with the intersection of the Cave fault and the Mother Lode structure.

3. Assuming the Cave fault does not cut off the Mother Lode structure, then where the Mother Lode and the South Ridge intersect may also host Rosebud-like ore zones.

Potential Target Size and Grade

An epithermal vein in the Mother Lode structure could have dimensions of 600 x 300 x 5 feet or 72,000 tons. Grade will have to be Mineable (+0.25 opt Au).

Ore associated with the Cave or South Ridge faults could be as large as individual ore zones in the Rosebud mine, similar grade also.

GEOLOGY

Lithology

Hanging wall and footwall along the Mother Lode structure are probably the mine sequence rocks (Dozer through Bud). One of the prophyrys similar to the Gorilla porphyry is exposed on the surface and is the hanging wall in drill hole RB-3.

Rocks in the hanging wall of the Cave fault could be either the Chocolate flows and breccias or the Badger Formation. The footwall will probably be the mine sequence also.

Rocks in the hanging wall of the SRF will be Dozer rhyolite and the footwall will be ALS phyllite.

Structure

Four known structures exist in the Mother Lode area. The Cave and SRF are shallow dipping normal faults thought to be essentially parallel to each other. The displacement on the Mother Lode structure is unknown. The Relay fault is down-thrown on the NW side 100 feet and may be a reverse fault or vertical at best. The Relay fault cuts off the east end of the Mother Lode structure, and further to the SW it cuts the SRF.

HYDROTHERMAL ALTERATION

Type and Intensity

Silicification and argillization are well documented in the Mother Lode structure. Drill holes shown on Sections 25 & 2900 NE also indicate that silicification and argillization may be associated with the Cave fault. Alteration on the South Ridge fault in the Mother Lode area is unknown.

Areal Extent

The extent of known alteration on the Mother Lode structure is limited to its 500 feet of exposure. In a few places, argillization can be seen extending up to 50 feet into the wall rock. Silicification is confined to the structure itself.

The extent of alteration on the SRF and Cave fault is unknown but thought to be large.

GEOCHEMISTRY

Surface Geochemistry

Soil

There are soil anomalies for Au, Ag, As, Sb & Hg that cover a zone from drill hole RL-136 to the Relay fault (See overlays).

Rock

Rock-chip geochemical values for the same elements are very impressive, with Au having some of the highest values seen in the Rosebud area, 0.5 to 7.0 ppm are common.

Drill Hole Geochemistry

The four drill holes in the Mother Lode area were assayed for Au and Ag only.

GOLD MINERALIZATION

Past Production

Production from the Mother Lode is unknown, but it is assumed that any production would have been predominantly in silver values. There was not any production from either the Cave fault or the SRF in the Mother Lode area.

GEOPHYSICS

IP and Resistivity

Lac Minerals conducted a frequency domain survey over a very large area at Rosebud. There is a large resistivity low associated the Mother Lode structure, but the area is lacking a significant IP response.

Magnetics

Airborne

A large magnitude low is present to the north and magnetic destruction is suggested to the south. A N70W linear feature is present and a N50E linear is present to the north (this is parallel to the Mother Lode structure).

Ground

A ground magnetic low is coincident with a resistivity low that delineates the Mother Lode structure.

Radiometrics

A radiometric survey was flown in conjunction with the air mag. Values for K, U, Th and total count are available but there are no significant anomalies.

Gravity

A gravity survey was conducted by Newmont during 1997. The prospect is on a N55W structure that could be a continuation of the Hidden fault.

Thematic Mapper

A recent interpretation of the thematic imagery is available for the mine area and the Mother Lode. No surface alteration is interpreted. The prospect is on the edge of a large interpreted concentric feature centered at the intersection of Dozer Valley and Rosebud Canyon.

DRILL HOLES

Existing Drill Holes

There are three short RC holes in the Mother Lode vein: RL-121, 122 and RB-3. All three of these holes intersected the vein and RL-122 had several intervals of 2 to 14 opt Ag starting at 230 feet below the surface. RL-136 may also have cut the ML structure further to the west, but a re-log of this hole will be necessary.

Drill holes RL-110, RL-143, RS-448 and RS-451 all indicate that there is very strong alteration and weak mineralization in the vicinity of what is thought to be the Cave fault, and it is assumed that this will carry northward to the Mother Lode area.

Proposed Drill Holes

On Section 2600 NE three holes are recommended (See Section 2600NE). Essentially these holes "chase" the silica and clay to the NW or downdip on both the Cave fault and the SRF. A fourth angle hole that intersects the Mother Lode below the RL-122 intersection is also recommended.

ASSCESSIBILITY

1800 feet of road and four drill sites will need to be constructed.

ROYALITIES

A 5% NSR burden exists on the Mother Lode area.

COST TO FIRST DECISION POINT

$ 7,200.00	1800 feet of road and four drill sites at $4.00/foot.
45,000.00	4500 feet of RC drill hole at $10.00/foot.
9,000.00	900 Assays at $10
5,000.00	Misc
$66,200.00	Total

REFERENCES

None

NORTH DOZER

TARGET CONCEPT

The North Dozer target area lies between the 96-356 drill hole Au intersection and the North ore zone of the Rosebud mine. The main targets lie above and below the South Ridge fault (SRF) and may be similar to the Rosebud orebodies. (NOTE: This is the #3 Target Area).

Potential Target Size and Grade

400,000 tons @ 0.50 opt Au or similar to one of the present Rosebud orebodies.

GEOLOGY

Lithology

The area around the SRF will have Dozer rhyolite in the hanging wall and Auld Lang Syne (ALS) in the footwall.

Structure

At present, the only known faults in North Dozer target area are the SRF and the Relay fault. The Relay structure drops the SRF approximately 100 feet on the NW side and is steeply dipping with a N15 to 20E strike.

HYDROTHERMAL ALTERATION

Type and Intensity

Existing drill holes in the area of the SRF indicate moderate to strong rgillic alteration in the hanging wall of the SRF. The footwall ALS phyllite as usual has moderate pyrite and trace element geochemistry. Drill hole 96-356 has some moderate silicification.

Areal Extent

Unknown, but existing drill holes in the area indicate at least 600 x 800 feet.

GEOCHEMISTRY

Surface Geochemistry

Surface rock and soil geochemistry are probably not applicable to this target. Most of the area is covered by gravel, and the depth to target is 1200 feet.

Drill Hole Geochemistry

Hole 96-356 has several ore-grade intersections from 1340 to1400. Assays of 0.35, 0.10, 0.10 opt Au are from 10 foot intervals. The SRF is at 1440 feet. Trace elements from this and other drill holes in the area indicate strong alteration in the vicinity of the SRF.

GOLD MINERALIZATION

Past Production

None

Distance from Rosebud Mine

0 to 900 feet.

GEOPHYSICS

IP and Resistivity

The depth to this target is 1200 feet. The IP survey that was conducted here in the past almostcertainly did not see below 400 feet.

Magnetics

There is an airborne survey that indicates a large low in the area probably due to the Badger Formation.

Radiometrics

Probably not applicable for a target at this depth.

Gravity

A gravity survey was conducted by Newmont during 1997. The prospect is at the intersection of northeast and northwest gravity gradients (lithologic or fault contacts).

Thematic Mapper

There is a recent interpretation of this imagery, but this may not be useful in the North Dozer area because most of it is covered by gravel.

DRILL HOLES

Existing Drill Holes

Numerous attempts have failed to find an extension of the mineralization found in hole 96-356. Approximately 12 holes are shown on the drill hole plan. Drill hole 96-356 encountered ore-grade intercepts over 10 foot intervals of 0.35, and two of 0.10 opt Au.

Proposed Drill Holes

One underground hole is proposed in the hanging wall of the SRF and parallel to the fault surface. A second hole is optional to test the footwall for feeder structures.

ACCESSIBILITY

There is an existing underground drill station on the north side of the North ore zone that is ideal for all the North Dozer targets.

ROAYALITES

A 5% NSR burden exists on the North Dozer area.

COST TO FIRST DECISION POINT

$52,000.00	– Two 1000 foot core holes at $26.00/foot
2,400.00	– 200 Au-Ag assays at $12.00
2,000.00	– Misc
$56,400.00	Total

REFERENCES

Brady, M. 1996. Prospect Evaluation – Rosebud Area, Pershing County, Nevada: Unpublished. Hecla Mining Co. Report.

Rogowski, J.P. 1998. Near Mine Exploration Targets – Rosebud Mine, Pershing County, Nevada: Unpublished. Hecla Mining Co. Report.

NORTH EQUINOX NORTH ROSEBUD PEAK

TARGET CONCEPT

1. Geochemically anomalous zones (1000 ft. x 800 ft. at North Equinox; 1200 ft. x 300 ft. at North Rosebud Peak) of advanced argillic alteration.

2. 2000-ft. long W-trending and 1500-ft. long NNW-trending zones of silicification, which bound the advanced argillic(?) alteration at North Equinox.

3. Blind target where hydrothermal fluids from the NNW-trending silicified fault have been trapped below matrix-supported conglomerate ("Badger").

Potential Target Size

1. 30,000,000 tons at North Equinox and 3,000,000 tons at Rosebud Peak.

2. Silicifed zones could be up to 600,000 tons.

3. Blind target is unlimited unless shallowly dipping fault with unaltered footwall at ZZ Top continues west.

Grade Potential

1. .008 oz/st in advanced argillic(?) alteration; if the alteration is due to steam-heated ground water, there may be no gold mineralization with >.10 oz/st Au within several thousands of feet.

2. In silicified zones, highest grade in rock chips is .044 oz/st and in drill cuttings is .035 oz/st gold.

3. No data for blind target; .074 oz/st (RS-425) if analogous to Dreamland shallow zone.

GEOLOGY

Rock type

- Weakly porphyritic feldspar-phyric flow or intrusion above clayey conglomerate at North Equinox and North Rosebud Peak.

- Matrix-supported conglomerate caps ZZ Top and extends W to flank of Rosebud Peak.

- Moderately porphyritic feldspar-phyric plug crops out on S edge of the North Equinox alteration.

- Flow with rare feldspar phenocrysts <1 mm occurs E of ZZ Top, NW of North Equinox, and W of Rosebud Peak.

Structure

- Steeply dipping (>60°) W-trending, NNW-trending, SW-trending, and possibly N-trending normal faults.
- Shallowly (<40°) W-dipping faults (W- to NW-plunging slicks) on W side of Rosebud Peak and on SE side of ZZ Top.
- Silicified fault zones have numerous joints, which dip steeply W, NE, N, or SW or shallowly to N or S; slickensides plunge moderately W or NW.
- Veins dip steeply N, SE, or SW or dip moderately SW or SE.

HYDROTHERMAL ALTERATION

- Inferred advanced argillic with hard, pink to grey quartz and alunite(?) and white kaolinite(?) (veinlets and replacing phenocrysts) possibly caused by steam-heated ground water perched above a clayey conglomerate.
- Local replacement silicification.
- Minor vuggy quartz veins and breccias, "chalcedony" (S. Maynard and C. Walck, 1990 and 1992), rare barite, locally strong Fe staining.
- Hematitic, matrix-supported conglomerate is bleached and possibly weakly silicified in places on ZZ Top and strongly bleached at NE edge of outcrop, E of Rosebud Peak.

GEOCHEMISTRY

- Areas of anomalous Au, Ag, Se (As, Sb, Hg, Pb, Mo) at North Equinox and of anomalous Au, Ag, As, Sb, Cu, (Se, Hg, Mo, Pb) at North Rosebud Peak identified by R. Jackson.

Surface Rock

Several samples with Au >.10 ppm or Ag >1.0 ppm occur at North Rosebud Peak (NRP), North Equinox (NE), NW of ZZ Top (NWZ), and E of ZZ Top (EZ) but samples rarely have both; compared to the Rosebud ore bodies, rock samples have comparable As but much higher Sb and Hg and lower Se.

- Au: anomalous values tend to be erratically distributed; up to .448 ppm at NRP, .316 ppm at NE, 1.51 ppm at NWZ, and .362 ppm at EZ.

- Ag: distinct anomalous zones at NRP, NWZ, and EZ; up to 11.5 ppm at NRP, 1.4 ppm at NE, 46 ppm at NWZ, and 2.8 ppm at EZ.

- Se: up to 6.0 ppm at NRP, 4.3 ppm at NE, and 11 ppm at NWZ.

- As: generally high in all altered areas, up to 450 ppm at NRP, 254 ppm at NE, 210 ppm at NWZ, and 300 ppm at EZ; also high in bleached conglomerate E of NRP (up to 80 ppm) and on S side of ZZ Top (up to 283 ppm).

- Sb: commonly anomalous in all areas but EZ (no data); up to 179 ppm at NRP, 165 ppm at NE, 539 ppm at NWZ and 122 ppm in the bleached conglomerate E of NRP.

- Hg: >1 ppm samples particularly abundant at NRP; up to 22 ppm at NRP, 9.4 ppm at NE, 34 ppm at NWZ, 13 ppm (mislocated sample?) at EZ, and 5.6 ppm in the bleached conglomerate E of NRP.

- S to N zoning on NRP is defined by a cluster of 4 samples with anomalous Au (.20-.40 ppm), Ag (1-4 ppm), As (75-182 ppm), Sb (69-122 ppm), and Hg (<1 to 5 ppm) with As>Sb; a cluster of 13 samples with high Sb (44-150 ppm), Hg (1.2-22 ppm), and Ag (1.2-11.5 ppm), with Sb>As and rarely anomalous As and Au; and by a cluster of 11 samples with high As (51-450 ppm) and Sb (21-144 ppm), with As>Sb (usually As>2xSb) and some anomalous Au and Hg but not Ag.

- Similar types of anomalous samples are present at NE but the patterns are less apparent; there may be zoning from high Au+Ag+As+Sb+Hg at NWZ to high Sb+Hg on the E side of NE to high As (+Sb±Hg±Au) on the W side of NE.

- Anomalous values at NRP, NE, and NWZ are similar to or below average for As, Sb, and Hg in "mineralized acid sulfate" rocks at Crofoot-Lewis (Ebert and others, 1996) and much lower than average Au and Ag; grades in "acid-sulfate veins" decrease with depth; these results are consistent with the hypothesis that NRP and NE alteration was caused by steam-heated ground water and does not overlie higher grade mineralization at depth.

Soil

There are 2 coherent, multi-sample anomalies with >.050 ppm Au, one of 700 ft. x 500 ft. at NE and one of 800 ft. x 150 ft. at NRP; a sample at the end of a line on NRP has .080 ppm Au, .34 ppm Ag, 13 ppm As, and 5 ppm Sb and may be part of a valid anomaly.

- Au: the NE anomaly has up to .316 ppm and the NRP anomaly up to .133 ppm.

- Ag: the NE anomaly has up to .75 ppm but the NRP anomaly has <.27 ppm Ag

- As: the NE anomaly has up to 28 ppm and the NRP anomaly up to 37 ppm; there is a distinct As anomaly (11-29 ppm) on top of ZZ Top, which also has some anomalous Sb and Au.

- Sb: the NE anomaly has up to 24 ppm and the NRP anomaly up to 21 ppm; there are also distinct Sb anomalies on the N end of NRP (5-9 ppm Sb) with up to 21 ppm As and .036 ppm Au and on the E side of NE (9-35 ppm Sb) with up to 17 ppm As and .045 ppm Au – both have low Ag.

- Hg: although there are .84 and .95 ppm samples on NE, outside and inside the Au anomaly, and a .80 ppm sample on ZZ Top, in the As anomaly, anomalous Hg values are related more to individual soil lines than to geological factors.

- Soil samples from NWZ, which has the most anomalous rock chip samples, have .002-.013 ppm Au and Ag, As, and Sb all below their 80th percentiles; this raises questions about the validity of the soil survey results - what else have they missed?

- Several 1-sample anomalies of various elements, individually and in combination suggest the data lack precision; long strings of anomalous Hg or Se on some lines suggest lab calibration problems.

Drill Hole Rock

Anomalous Au of .005-.03 oz/st occurs in many holes (Table 20).

- Trace element data are available only for RS-447, which lacks anomalous Au, and for 97-387; 97-387 has up to .17 oz/st Ag and several intervals down to 800 ft. with 10-103 ppm As, 8-44 ppm Sb, and >1 ppm Hg (max. 7.4 ppm); even at 980 ft. a sample has 1.4 ppm Hg (with 46 ppm As and 10 ppm Sb).

GOLD MINERALIZATION

Past Production

A few small prospect pits at North Equinox and North Rosebud Peak and one even on ZZ Top.

Distance from Rosebud Mine

8000 to 9000 ft.

GEOPHYSICS

Induced Polarization

- Chargeability high (>15 units?) with shallow dip lies east of the main area of alteration and mostly north of the W-trending fault at North Equinox; 97-387 drilled through it but does not appear, from the drill logs, to have more alteration or sulfides than drill holes to the south; the high is above a logged, possibly clay-rich, conglomerate.

- No anomaly associated with North Rosebud Peak.

TABLE 20. Drill hole results for the NorthEquinox / North Rosebud Peak target (Au and Ag in oz/st).

Hole No.	Type	T.D. (feet)	Au @.01 oz/st cutoff			Ag @.29 oz/st cutoff		
			Thick.	Grade	Interval	Thick.	Grade	Interval
North Equinox								
RL-84	RC	620		.007	325-330		.24	345-350
RL-85	RC	530	10 30 45 25 10	.01(.006) .01(.009) .01(.011) .01(.009) .01(.007)	255-265 350-380 400-445 470-495 500-510			
RL-86	RC	665	15 10 10 45 15 15 10 10	.01(.011) .01(.007) .01(.011) .01(.022) .02(.035) .01(.011) .01(.006) .01(.009)	65-80 85-95 105-115 140-185 265-280 410-425 510-520 525-535		.31(.37) .86 .27	220-230 445-450 510-515
RL-87	RC	945	10 10	.01(.008) .01(.006)	265-275 500-510		.55	725-730
97-387	RC	1000	20	.01(.011) .01	295-315 765-770			
RS-447	RC	1600						
North Rosebud Peak								
RL-225	RC	630						
RL-226	RC	245						
RL-227	RC	565	10 10 10	.01 .01 .01	140-150 475-480 510-520			

Note: (0.023) – values in parentheses are maximum sample results for the interval.

Resistivity

- Resistivity high (>400 units?) coincides with the main area of alteration at North Equinox; it is about 300 ft. thick and is flat or gently NW-dipping on NW-SE pseudosections – the inferred position of the lower boundary is at approximately the same elevation as the sharp cutoff of anomalous gold in RL-87.

- Smaller high (200 units?) is associated with the alteration at North Rosebud Peak.

- A resistivity low south of North Equinox and east of Rosebud Peak is probably due to the conglomerate.

Magnetics

- Within a broad magnetic low east of a high associated with relatively unaltered felsic flows; the low deepens to the E, SE, and SW away from the area of strongest alteration at the surface.

- A N50E linear NW of Rosebud Peak and USMM212 corresponds approximately to the upper contact of unaltered felsic flows of "Wildrose"/"brown flow".

- A small low over Rosebud Peak has a sharp N-trending boundary on the W side.

- The aeromagnetic data may have poor resolution; the feldspar-phyric plug S of USMM212 has much higher susceptibility (2000 x 10-6 cgs) than the altered rocks (<50 x 10-6 cgs) to the N and the conglomerate (500 x 10-6 cgs) to the S but is not evident in the aeromagnetic data; the brown, unaltered felsic flow E of ZZ Top has a susceptibility of about 1000 x 10-6 cgs and is a weak high but the same unit is a low E of Gator.

Radiometrics

- K: distinct lows over North Equinox and North Rosebud Peak; the low extends over the alluvium-filled basin to the NE.

- U: North Rosebud Peak is part of a N-trending low but North Equinox is on the same W-trending high as Chance; the U high extends NW from North Equinox over essentially unaltered rock.

- Th: lows occur at both North Rosebud Peak and North Equinox and a high separates them, possibly due to the less altered rock on the lower topographic slopes; the Th high extends NW from North Equinox over essentially unaltered rocks.

- North Equinox is a distinct low on the ternary cluster image, similar to a small area along the range front at Chance but not to Rosebud Peak.

Gravity

In area of low relief.

- A weak, NW-trending low separates North Equinox and North Rosebud Peak.

- There is a N-trending structure on the W side of Rosebud Peak.

- A N120E linear coincides with Wildrose Canyon.

Thematic Mapper

- North Rosebud Peak, North Equinox and ZZ Top have similar signatures (blue); M. Goosens interpreted ZZ Top as weak alteration.

- Alteration on North Rosebud Peak is bounded to the E and S by N-trending and N120E linears, respectively.

DRILL HOLES

- RL-84 and RL-87 tested the main alteration at North Equinox and encountered extensive anomalous gold (max. .008 oz/st).

- RL-85 and RL-86 tested the WNW-trending zone of silicification and encountered almost pervasive anomalous gold (max. .035 oz/st)

- 97-387 tested the IP high and encountered sporadic anomalous gold (max. .011 oz/st).

- 3 holes on North Rosebud Peak were not sited well for testing the origin of the mineralization; 2 had almost no detectable gold and the other encountered rare anomalous gold up to .01 oz/st.

- Zones of anomalous gold have sharp lower boundaries: at an elevation of about 5550 ft. in RL-87, in the footwall of the W-trending fault along the N side of North Equinox in RL-86, and in the footwall of a hypothetical NNE-trending fault in 97-387.

ACCESSIBILITY

- An existing road provides access to North Equinox but would have to be improved for water trucks and truck-mounted drill rigs; most drill sites would require 200-1000-ft. roads but slopes are not rugged.

- Road building to reach drill sites on North Rosebud Peak would be difficult as the terrain is steep, outcrop is common, and the roads would be >1000 ft.

ROYALTIES

- 4% Euro-Nevada

COST TO FIRST DECISION POINT

- Drill two 1500-ft. RC holes to test fault intersections NW side of USMM212 and on the NE side of ZZ Top.

- Drill two 1500-ft. RC holes to test the W-trending silicified zone at depth.

- Drill one 1000-ft. RC hole to determine whether there is alteration under conglomerate S of USMM212.

Estimated costs and man-day requirements:

	NORTH EQUINOX	NORTH ROSEBUD PEAK
6000 ft. RC drilling @ $12.35/ft	37,050	
1000 ft. RC drilling @ $10.00/ft	10,000	
7000 ft. down-hole surveys @ $0.50/ft	3,500	
5 drill pads @ $1000 each	5,000	
and reclamation @ $1200 each	6,000	
2000 ft. roads @ $2/ft.	4,000	
and reclamation @ $2/ft.	4,000	
1200 Au assays of RC samples @ $8.78/sample	10,540	
300 ICP analyses of RC samples (1 every 20 ft. on average) @ $4.88/sample	1,465	
Composite 1200 samples @ $1.00/sample	1,200	
Total:	**82,800**	

Geologist for picking drill sites and roads	4 days
Geologist for logging 6000 ft RC samples @ 1000 ft/day	6 days
Geologist for making and interpreting sections	3 days
Total man-days:	**13 days**

REFERENCES

Ebert, S.W., Groves, D.I., and Jones, J.K., 1996, Geology, alteration, and ore controls of the Crofoot/Lewis Mine, Sulophur, Nevada: A well-preserved hot-spring gold-silver deposit, *in* Coyner, A.R. and Fahey, P.L. (eds.), Geology and ore deposits of the American Cordillera: Geological Society of Nevada, Symposium Proceedings, p. 209-234.

Maynard, S. and Walck C., 1990 and 1992, Geologic map of White Alps East quadrangle, 1:2400.

Randy Vance

OSCAR

TARGET CONCEPT

Oscar is a high-level, very low-grade epithermal hot-spring system with strong silicification, As, Sb and Hg. The bulk-tonnage potential has been tested with 23 drill holes. The remaining target is bonanza-grade stockworks or veins beneath the sinter, in the hanging wall of a ±50° west-dipping range-front fault. This fault may have been the conduit for hydrothermal fluids. Alternatively, a high-angle feeder structure coming out of the basement was decapitated by the west-dipping fault and displaced an unknown amount. In general, the holes drilled to date are only 500-600 feet deep.

This prospect has geologic similarities to Crofoot-Lewis (+1 million ounces), Hasbrouck Mtn., NV, and Cinola, B.C. (2-3 MM oz resource), on a smaller scale.

Potential Target Size

200,000 to 300,000 ounces Au

Grade Potential

0.2 to 0.5 oz/st Au and <1 oz/st Ag

GEOLOGY

Lithology

Clastic sedimentary rocks of Pliocene(?) age overlie late Pliocene to early Pleistocene(?) age fanglomerate and silica sinter. The Auld Lang Syne basement occurs beneath these younger Tertiary rocks.

Rock Structure

A 45-50° west-dipping, range-bounding fault offsets the younger Tertiary clastic rocks from the Kamma Mountain volcanic rocks, which are exposed only on the east side (footwall) side of this fault. The altered sedimentary rocks form a syncline west of the silicified knob. Two WNW secondary faults (Manganese and Elbow faults of Moore's) may bound the strongest silicification.

HYDROTHERMAL ALTERATION

Type and Intensity

Silicification is intense on the main NW-trending ridge. Argillization is present distally. Logs report acid leaching in the upper parts of the drill holes.

Areal Extent

The altered rocks cover an area about 1.5 by 1 mile. The main area of silicification is 800 by 2000 ft. The silicification is 150-300 ft thick.

GEOCHEMISTRY

Surface Geochemistry

Rock

Hundreds of rocks contain 50-300 ppb Au and 5-20 ppm Ag. Several of the highest rocks collected by USMX contained 690 ppb Au and 38 ppm Ag. The highest rock values collected by St. Joe were 0.08, 0.04, 0.075, and 0.045 oz/st Au. The following trace elements are common: Hg values of 1-6 ppm, As of 150-400 ppm, and Sb of 20-100 ppm. Only a few Se analyses are present; they range from 2 to >20 ppm.

Soil

Soils contain anomalous Au-Ag-As-Sb-Hg-Se-Tl.

Drill Hole Geochemistry

Major precious metal intercepts in the Oscar drill holes are summarized in Table 21 on page 113.

GOLD MINERALIZATION

Past Production

None.

Distance from the Rosebud Mine

10,000 feet southwest

GEOPHYSICS

Figures 18 and 19 (pages 112 and 113) show representative geology based on the Modeled gravity and magnetic data.

Induced Polarization

Defines basement (high chargeability) and suggests the fanglomerate is fault bounded. A deep chargeability high is present within sequence of deep sediments.

Resistivity

Defines silicified fanglomerate unit and identifies fault contact against the deep sediments to the southwest.

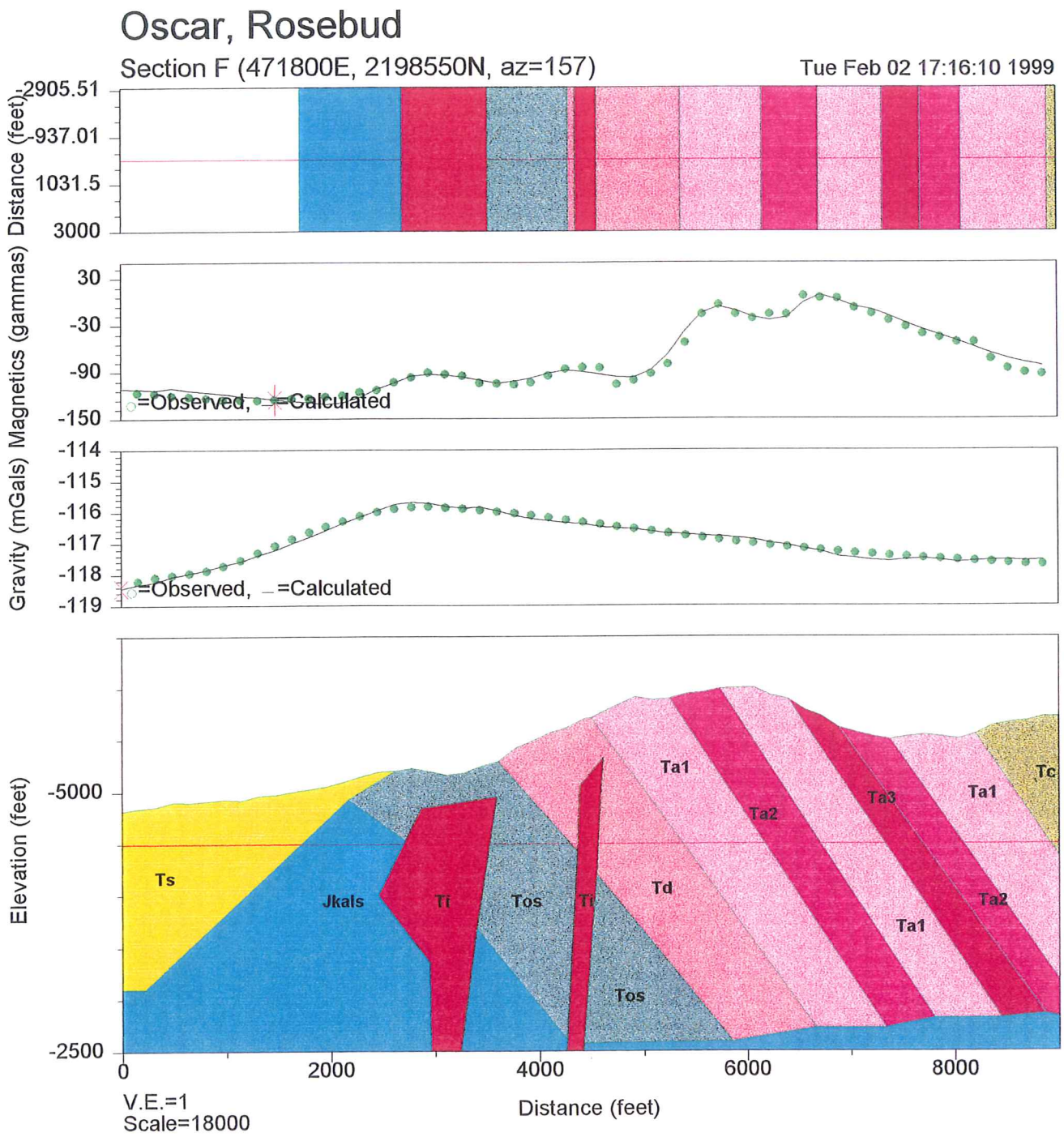


Figure 19. Representative geology of the Oscar prospect based on modeling of the gravity and magnetic data.

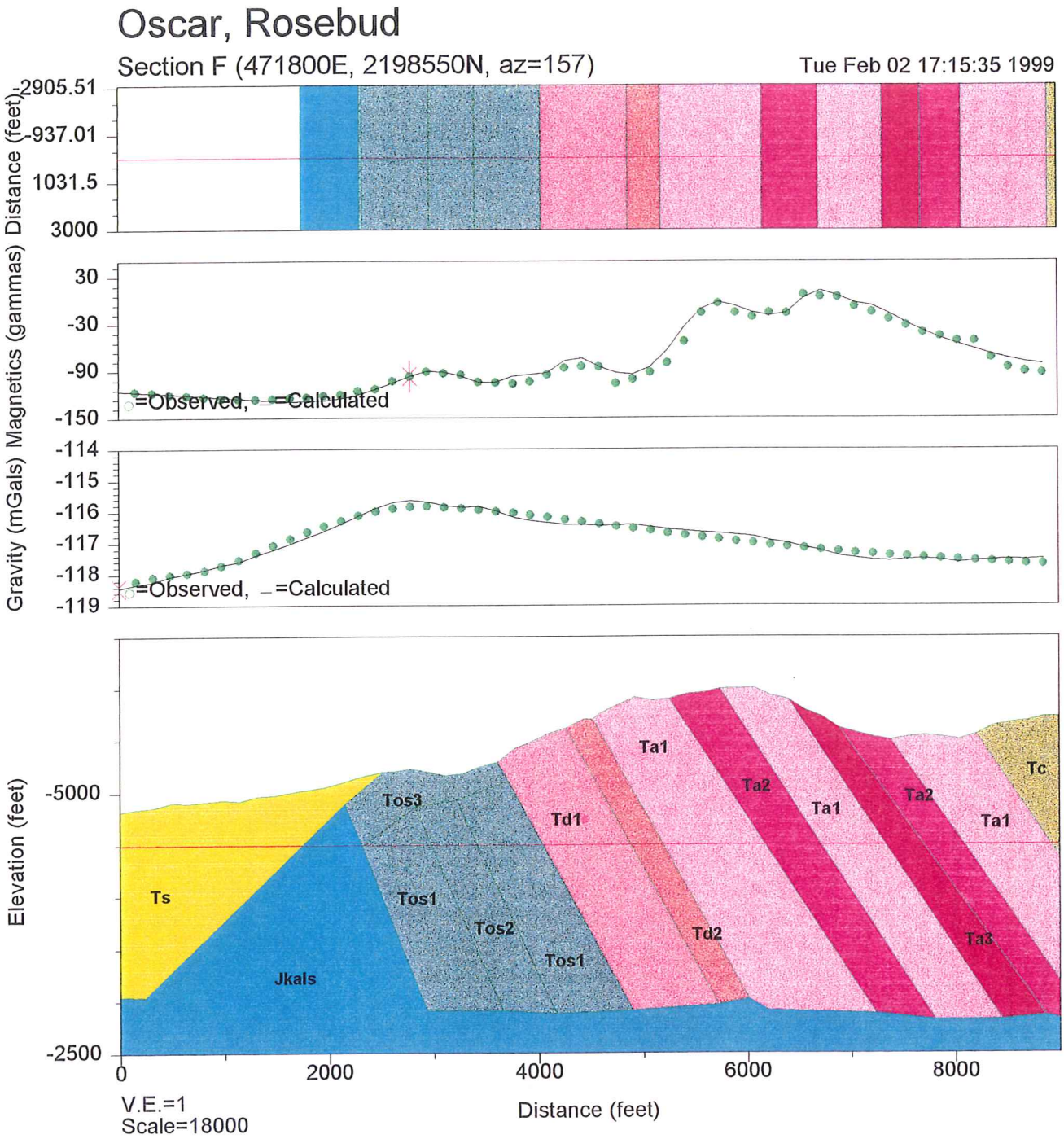


Figure 20. Representative geology of the Oscar prospect based on modeling of the gravity and magnetic data.

Table 21. Significant drill hole intercepts at the Oscar prospect.

Drill Hole	Interval (ft)	Depth (ft)	Au oz/st	Ag oz/st	Comment	Trace elements
OS1-OS5			0.01	<1.0	St. Joe American	strong As-Sb-Hg
OS6-OS12					USMX	
OS7	15	25-40	**0.048**	0.69	sinter reported	
O13	110	65-175	0.01	0.19	**incl 5' of 0.033**	
O14	15	125-140	0.009	0.69		
	90	185-275	0.006	0.37		
	110	420-530	0.014	0.48		
Including	5	450-455	**0.031**	0.71		
	5	465-470	**0.034**	0.34		
	5	495-500	0.016	2.14		
O15	30	190-220	0.007	0.19		
	55	275-330	0.005	0.10		
	85	375-460	0.008	0.21		
O16	35	305-340	0.006	0.22		
	15	365-380	0.007	0.40		
O17	5	195-200	**0.022**	0.03	School Bus Canyon	
	10	435-445	0.019	0.03		
	25	475-500	0.008	0.07		
O18	Nil					
O19	75	420-495	0.005	0.017		
O20	Nil					
O21	5	45-50	0.007	0	School Bus Canyon	
O22	15	600-615	0.007	0.05	School Bus Canyon	
O23	Nil				School Bus Canyon	

Magnetics

Airborne

Range front fault identified. Intrusive bodies within the ALS are needed to explain long wavelength magnetic anomalies. The intrusions terminate 300 ft below surface or become non-magnetic because of weathering.

Ground

Area of low relief is coincident with the fanglomerate indicating silicification.

Radiometrics

Sediments to west are generally low, although have the correct ratio for alteration, as determined by the cluster analysis.

Potassium

Low. The K map shows a sharp N-S lineament parallel to the range-front fault, indicating that Kamma Mountain volcanic rocks have not been eroded into the basin to the west.

Thorium

Low.

Uranium

Low.

Gravity

Wedge of Auld Lang Syne dipping to the west, east and north. The overlying sediments are 300 ft thick in the center of the prospect and the ALS outcrops to the south.

Thematic Mapper

Color alteration along range-front fault. Some alteration clay assemblages identified using endmember analysis. Area within a segment of possible concentric feature.

DRILL HOLES

There are 23 holes drilled to date. See table above.

ACCESSIBILITY

Generally good. The road to the top of the Oscar knob was reclaimed by LAC. The prospect lies outside of the current exploration Plan of Operation, and will need permitted with a Notice of Intent.

ROYALTIES

None. Most of the Oscar target is an "inholding" inside of the Euro-Nevada royalty boundary.

COST TO FIRST DECISION POINT

The cost to the first decision point is estimated to be $50,000.

Drill 3 angled RC holes into the "roots" of the hydrothermal system looking for the bonanza horizon, where a structure tightening at depth might have throttled the hydrothermal system: 3

holes, averaging 800 ft each X $13 each=$32,000. Recon mapping, surveying, minor geochemical sampling, possible road building, and data compilation are needed.

All data in Newmont's hands are in paper form. Charles Muerhoff received the data from USMX; it may be in digital form in Hecla's Rosebud database.

REFERENCES

Brady, M. W., 1995, Reconnaissance geology of the Rosebud property, Pershing and Humboldt County, Nevada: unpublished consulting report for Hecla Mining Company dated 12/1/95, 25 p., 3 plates, appendices. (Oscar is on p. 19)

Brady, M. W., 1996, Drill proposal for the Rosebud property, Pershing and Humboldt County, Nevada: unpublished consulting report for Hecla Mining Company dated 1/15/96, >100 p.

Brewer, N.H., 1991, 1990 annual progress report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 28p.

Conelea, R., and McCulla, M., 1996, Rosebud target rankings: draft report by Santa Fe Pacific Gold Corporation, 19 p., 1 location map.

Dreier, J. E., 1984?, Oscar claims, T.34N., R. 29E., Pershing County, Nevada: U. S. Minerals Exploration Company report, 4 p. 1 fig.

Kuhl, T. O., 1993, 1992 summary report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 17 p., 5 appendices, 4 plates.

Moore, S. C., 1991, Rosebud structural study, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report dated 8/20/91, 39 p., 5 pl.

Turner, S. J., 1997, Rosebud property, Pershing County, Nevada: technical review: unpublished Newmont Exploration Ltd report, 19 p.

USMX, 1985?, Oscar claim group summary report, Rosebud Mining district, Pershing County, Nevada: unpublished report, 6 p., assay data.

Randy Vance

SCHOOL BUS CANYON

TARGET CONCEPT

The Schoolbus Canyon target is not particularly remarkable except for a series of rock samples with high gold, and widespread bleaching (argillization) of the favorable LBT stratigraphy. The target is not advanced, but there may be potential for sulfide stockwork and/or structurally controlled mineralization similar to the South or East zones. LAC believed the altered stratigraphy was offset left-laterally from the mine area across the Rosebud shear.

Potential Target Size

Approximately 200,000 to 300,000 ounces Au, but not constrained.

Grade Potential

Between 0.1 to 0.4 oz/st Au and 1 oz/st Ag.

GEOLOGY

Lithology

Favorable mine sequence (Dozer to Chocolate)

Rock Structure

Not many faults mapped in this area, except for the major Schoolbus Canyon fault, which strikes sub-parallel to bedding.

HYDROTHERMAL ALTERATION

Type and Intensity

Moderate argillization causes bleaching of outcrops.

Areal Exten

Large area.

GEOCHEMISTRY

Surface Geochemistry

Rock

Highly auriferous rock samples were distributed across the Schoolbus Canyon target area in early plots of the rock geochemistry file given to us by the SFPG-Reno office. In fact, the values were so high (many > 1 ppm, ranging up to 10-15 ppm) that a close look at the database was undertaken over a period of many months. The data are suspect. The area lacks anomalous trace-elements to support the high gold values. Silver is also confusing, as there are many three-digit ppm values, which equate to 3-10s of oz/st. A one-page table was found in the files; it is titled "BOGUS", and states "suspect values currently plotted along School Bus Canyon".

In an effort to get back to the original data, historic paper maps and the Rosebud diskettes were searched, without success. Not a single paper copy of the assay certificates can be found. The sample locations were found plotted on an old LAC rock-chip location map. The rocks are thought to have been analyzed by GSI Labs, which sometimes reported gold in ppb and sometime in ppm, depending on the report. The rock ID sequence of the suspect samples ranges from C2901S to C2955S. Based on the above description, it is concluded that the data were incorrectly converted from ppm to oz/st (or ppb to oz/st) by SFPG. One way to check the high values is to resample several of the locations using SFPG's "UTM feet" coordinates, or the original locations as posted on LAC's map.

Separate from the above samples, there are a few rock samples that contain 0.005-0.024 oz/st gold with <1 oz/st silver, including two samples collected with high grade values: 0.1 and 0.14 oz/st gold. Two other samples contain 1.82 and 2.48 oz/st silver. About a dozen have >1 Se, >1 Hg, and >50 As.

Soil

None. Soil lines end just short of the target area.

GOLD MINERALIZATION

Past Production

Small placer workings are noted on Brady's geology map. The source of the placer gold, if any, is unknown.

Distance from the Rosebud Mine

10,000 feet.

GEOPHYSICS

Induced Polarization

No anomalies.

Resistivity

No significant targets

Magnetics

The prospect is south of magnetic high (intrusive?). Areas of low magnetic relief could reflect magnetite destruction. A N50E structure is interpreted to the north of the area.

Radiometrics

No significant anomalies

Gravity

gradients reflect changing densities through lithologic and fault contacts within the volcanic package.

Thematic Mapper

Alteration at surface. N30-40E striking linear probably reflects stratigraphy. End member analysis predicted clay alteration assemblages in this area. PIMA work identified gypsum and illite/muscovite to the west and alunite and montmorillonite to the east.

DRILL HOLES

None drilled to date. LAC's "Chalcedony" target (RL-281) is near the mouth of Schoolbus Canyon. Several "Oscar" drill holes, not in the database, are several hundred feet southwest of RL-281.

ACCESSIBILITY

Fair to Good. An unimproved road leads up the canyon.

ROYALTIES

The lower part of the canyon is in the Euro-NV 4%. The upper part of the canyon has no royalty.

COST TO FIRST DECISION POINT

The cost to the first decision point is estimated to be $5,000 .

There are no obvious drill targets at this time. The data need compiled and checked, and the geology mapped in better detail. Rock sampling is needed, and a soil grid may be warranted later.

REFERENCES

Brady, M. W., 1996, Drill proposal for the Rosebud property, Pershing and Humboldt County, Nevada: unpublished consulting report for Hecla Mining Company dated 1/15/96, >100 p. (Schoolbus Canyon is discussed on p. 8).

Kuhl, T. O., 1993, 1992 summary report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 17 p., 5 appendices, 4 plates. (Schoolbus Canyon is discussed on p. 15).

Moore, S. C., 1991, Rosebud structural study, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report dated 8/20/91, 39 p., 5 pl.

SHARK FIN

TARGET CONCEPT

1. South Zone analogue – hydrothermal fluids trapped in fractured, massive flow below less permeable clayey conglomerate with gold deposited by cooling and mixing with connate or meteoric water.

2. Gold deposited in silicified high-angle faults (e.g., Sharkfin) or their hanging wall splays and extension fractures by mixing of hydrothermal and cooler fluids.

3. High-grade veins occur in upper plate of South Ridge fault and may be minable if they occur near other larger deposits.

Potential Target Size

1. South Zone analogue – 330,000 tons.

2. Fault deposit – 22,000 tons (No.7 fault); 1,000,000 tons (Sharkfin).

3. High-level vein deposit – 36,000 tons (220 vein); possibly 100,000 tons.

Grade Potential

1. South Zone analogue - .60 oz/st (RL-213), .90 oz/st (RL-217).

2. Fault deposit - .51 oz/st (RL-214), .56 oz/st (RS-453A).

3. High-level vein deposit – 1.25 oz/st (RL-220).

GEOLOGY

Rock type

- Massive rhyolite flows ("Dozer" and "Chocolate") overlain by thick conglomerates.
- Porphyritic felsic intrusions.

Structure

Complex structural intersection.

- NW-dipping (20-30°) South Ridge fault.
- Steeply N-dipping (60-80°) Sharkfin and related faults.

- Steeply NE-dipping Hidden fault.

HYDROTHERMAL ALTERATION

- Dominantly green-clay alteration ("propylitic") with argillic alteration and silicification locally near faults.
- >100 ft. of pervasive, moderately intense argillic alteration in some areas below SRF.
- Hematitic and relatively unaltered rocks are common, particularly above SRF but also below.

GEOCHEMISTRY

- Area of anomalous Au, Ag, Se, As, Cu (Sb, Hg) identified by R. Jackson.

Surface Geochemistry

Rock

Due to extensive colluvial cover only 3 areas have been sampled: in and around the Sharkfin itself, a small outcrop along the Office fault (possibly the western continuation of the Sharkfin fault), and subcrop with a barite-bearing vein N of the Far East drilling.

- Au: 4 samples with >1 ppm Au on the Sharkfin (up to 2.12 ppm), 3 on the N subcrop (up to 4.40 ppm), and 1 with 1.53 ppm on the Office fault.
- Ag: several samples >1.0 ppm, including 258 ppm and 1682 ppm on the Sharkfin, 16 ppm on the N subcrop, and 6 ppm on the Office fault.
- Se: over a dozen samples with >1 ppm, many in the 5-20 ppm range, including 96 ppm and 153 ppm on the Sharkfin, 19.4 ppm on the N subcrop, and 6.8 ppm on the Office fault.
- As: many >100 ppm, including 903 ppm on the Sharkfin, 1901 ppm on the N subcrop, and 80 ppm on the Office fault.
- Sb: many >50 ppm, including 448 ppm on the Sharkfin and 112 ppm on the N Subcrop but only up to 13.7 ppm on the Office fault.
- Hg: several samples >1.0 ppm, including 5.5 ppm on the Sharkfin, 1.3 ppm on the N subcrop, and 1.9 ppm on the Office fault.

Soil

Results are much less impressive than those for rock chips.

- Au: only one significant anomaly >.020 ppm (5 samples), which is associated with the N subcrop; 3 1-sample anomalies are probably related to float from the Sharkfin or Office faults; a sample in the gap in the Sharkfin outcrop has only .024 ppm Au.

- Ag: several .1-.2 ppm samples and a few erratic samples >.7 ppm, including 1.95 and 2.1 ppm samples.

- Se: rarely >.3 ppm; .83 ppm in N subcrop anomaly.

- As: generally 5-10 ppm with a few higher values but only 1 sample has >17 ppm (i.e., 30 ppm).

- Sb: all but a few samples have <2 ppm but the maximum is 5.7 ppm.

- Hg: only a few samples have >.10 ppm and the maximum is .19 ppm.

Drill Hole Geochemistry

Four-acid digestion ICP data are available for some holes but are not comparable to the partial digestion data and were composited over 15 to 50 ft.

The significant drill hole intercepts are shown in Table 22.

- Results for gold and silver are summarized in Appendix A; because of extensive low-grade intercepts only those >.10 oz/st gold are listed; >.50 oz/st gold occurs as shallow as 5160 ft. (250 ft. depth) and as deep as 4595 ft. (780 ft. depth) and is not commonly related to the South Ridge fault.

- Higher level gold mineralization in RL-220:250-275 (.06-1.25 oz/st Au) and RL-270:258-278 (.002-.60 oz/st Au) has higher K and Al than rocks immediately above and below and Ag/Au of 9.7-7.7, 215-65 ppm As, 26-5 ppm Sb, 17-15 ppm Se, 93-32 ppm Cu, and 7-19 ppm Mo, respectively and <50 ppb Hg; RL-220:250-275 has higher Ca (calcite is present) and Fe than adjacent rocks and 550 ppm Mn.

- Deeper level gold mineralization in RL-214:835-850 (.11-.51 oz/st Au) has lower K and Al than adjacent rocks and also lower Na, P, Mn, and Ba, similar Ca and Fe, and higher Cr; it has Ag/Au of 1, 106 ppm As, 8 ppm Sb, 9.6 ppm Se, 5 ppm Cu, and 4 ppm Mo and <50 ppb Hg.

TABLE 22. Drill hole results for the Sharkfin target (Au and Ag in oz/st)

Hole No.	Type	T.D. (feet)	Depth to SRF* (feet)	Au @.10 oz/st cutoff			Ag @1.0 oz/st cutoff		
				Thick.	Grade	Interval	Thick.	Grade	Interval
KM-1	RC	605	Above						
KM-2	RC	605	555?				5	1.03	395-400
RL-142	RC	845	555		.21	565-570	5	1.09	70-75
RL-146	RC	665					15	2.74	165-180
RL-147	RC	605	Above						
RL-213	RC	865	640	5	.590	775-780	35	1.49	745-780
RL-214	RC	1000	465	15	.33 (.51)	835-850	5	2.32	190-195
RL-215	RC	825	405?		.10	345-350			
RL-217	RC	825	630	10 20	.185 (.24) .543 (.96)	665-675 725-745	40	13.4	785-825
RL-218	RC	940	620?						
RL-219	RC	1000	760				10	2.28	400-410
RL-220	RC	865	405?	20	.73 (1.25)	250-270	20	8.96	250-270
RL-245	RC	900	595						
RL-246	RC	240	Above						
RL-248	RC	525	335?				25	1.65	270-295
RL-249	RC	785							
RL-253	RC	560	405						
RL-254	RC	380	260?						
RL-255	RC	500					5	1.37	155-160
RL-258	RC	900	640	10	.160 .130	240-245 305-315	5	2.53	310-315
RL-259	RC	920	560	5	.110	780-785	20	3.43	595-615
RL-266	RC	700	575	20	.318 (.47)	160-180	30	22.7	155-185
RL-270	Core	933	445	5	.600	258-263	10	2.20	665-675
RL-273	RC	700	475	15 75	.220 (.36) .350 .166 (.28) .220 .200	100-115 280-285 505-580 650-655 690-695	5 10	4.61 1.03	258-263 550-560
RL-277	RC	500							
RL-278	RC	605	315?	5	.260 .110	330-335 365-370	10	5.63	325-335
RL-279	RC	805							
RL-286	Core	1077							
RL-288	Core	1012							
95-345	Core	540	495						
95-346	Core	1130	470		.08 .04	293-295 480-485		7.35	293-295

TABLE 22. Continued

95-347	Core	598	460		.08	259			
95-348	Core	770	495		.05	432			
95-350	Core	1168	368		.13 .06	290 685			
95-352	Core	922	698		.33 .130 .165	261-266 795-800 872-878			
95-353	Core	922	594						
95-355A	Core	850	696?		.16	806			
95-355C	Core	710	704						

Note that gold mineralization occurs both well above and well below but uncommonly in the South Ridge fault.

GOLD MINERALIZATION

Past Production

A small adit in the Sharkfin itself.

Distance from Rosebud Mine

500 to 1000 ft.

GEOPHYSICS

Induced Polarization

Expected IP responses of targets are not known.

- Target is at south edge of weak chargeability high which may be related to high resistivity zone (see below) and north of area of low chargeability.
- A narrow N-trending chargeability (and resistivity) low lies to NE (East Ridge).

Resistivity

Targets are deep and are not expected to give strong resistivity responses.

- Sharkfin fault bounds south edge of broad high resistivity zone which dips shallowly to the north or northwest and is probably due to silicification in the South Ridge fault.
- A deep resistivity low lies to the NE.
- Low resistivity near the surface may be related to alluvium and colluvium.

Magnetics

At transition between high relief (unaltered?) area to south and low relief (altered?) area to north.

Radiometrics

Targets are not at surface.

- No distinct K anomaly and K is higher than in mine area.
- Distinct U low over Far East zone north of Sharkfin.
- No distinct Th anomaly.

Gravity

On gravity high between NW- and NE-dipping gradients possibly suggestive of basement high south of intersection of Hidden and Sharkfin faults.

Thematic Mapper

Targets are not at surface.

- No distinct anomaly.

DRILL HOLES

- Several drill holes have one or more intervals of .10 oz/st, up to a maximum of 1.4 oz/st (see Table 22).
- In spite of intensive drilling, unrecognized 20,000-300,000 ton gold deposits may connect ore-grade intercepts.
- The highly anomalous Sharkfin and Office faults have never been tested farther than 100 ft. from outcrop.

ACCESSIBILITY

- South Zone analogue can be drilled from East Zone workings.
- Drilling for fault deposit in Sharkfin may be complicated by existing surface structures (e.g., vent shaft) but is easily accessible.

ROYALTIES

- 4% Euro-Nevada

COST TO FIRST DECISION POINT

South Zone analogue

- Relog Far East zone holes to verify concept and identify drill sites.
- Reassay selected intervals to verify previous results.

Geologist for relogging 20,000 chips and core @ 1500 ft/day	14 days
Geologist for making sections and picking drill sites	5 days
Total man-days	**29 days**

- Drill 4 underground holes from SE end of East Zone to test South Zone analogue.

4 750-ft. underground core holes for total of 3000 ft. core drilling @ $16.00/ft	48,000
Construction of underground drill station	?
50 Au reassays of pulps @ $5.20/sample	260
1800 Au assays for core samples (1 every 5 ft. on average) @ $8.13/sample	4,900
300 ICP analyses for core samples (1 every 10 ft. on average) @ $4.88/sample	1,465
Composite 600 samples @ $1.00/sample	600
Total	**55,250**

Geologist for logging 3000 ft. core @ 120 ft/day	25 days
Geologist for making and interpreting sections	3 days
Total man-days	**28 days**

Fault deposit (Sharkfin/Office only)

- Drill 6 angle holes from surface spaced approximately 600 ft. apart to test 3000-ft. strike length of Sharkfin and Office faults (program can be abandoned if these faults don't exist).

Estimated costs:

6 1500-ft. drill holes (at 600-ft. spacing) with no core tails for a total of 9000 ft. RC drilling @ $12.35/ft	111,150
9000 ft down-hole surveys @ $0.50/ft	4,500
6 drill pads @ $1000 each	6,000
and reclamation @ $1000 each	6,000
400-ft. roads @ $2/ft	800
and reclamation @ $2/ft	800
1800 Au assays of RC samples @ $8.78/sample	15,810
450 ICP analyses of RC samples (1 every 20 ft. on average) @ $4.88/sample	2,200
Composite 1800 samples @ $1.00/sample	1,800
Total	**50,000**

Geologist for picking drill sites	3 days
Geologist for logging 9000 ft RC samples @ 500 ft/day	18 days
Geologist for making and interpreting sections	5 days
Total man-days	23 days

REFERENCES

Rogowski, P., 1998, Geologic map of the mine area, 1:1200.

Maynard, S., 1990?, Geologic map of the Dozer West quadrangle, 1:2400.

SOUTH KAMMA

TARGET CONCEPT

Moderate- to high-grade (>0.35 opt Au) structurally-controlled precious metal deposit(s) associated with moderate to strong silicification.

- Small- to moderate-volume, bulk tonnage mineralization localized within district-scale fracture zones and at fault intersections.
- Discrete veins localized along major faults.

Potential Target Size

Assuming ore-grade gold (silver) mineralization extends outward from the center and along the dip of the structure for 50 and 300 feet, respectively, then the ore body would host ~675 ounces per linear foot strike lenth.

- South Kamma has the potential to host multiple 200,000 ounce ore deposits.

Grade Potential

Gold and silver grades similar to those currently being mined at Rosebud are assumed.

- The highest gold assay in the prospect area is 160 ppb determined for calcareous siltstone with minor silty limestone interbeds within the Auld Lang Syne Group.
- The 160 ppb assay occurs along the eastern extension of one of the 070°-trrending fracture zones that control silicification within the prospect.

GEOLOGY

Volcanic units exposed in at South Kamma include the Kamma alkali rhyolte (≥30%), lava flows, pyroclastic and minor volcaniclastic deposits of the Chocolate Formation (≥30%), hypabyssal intrusions (≤30%), and greenschsit facies metamorphic rocks of the Auld Lang Syne Group.

- Age relationships between the various volcanic units, and between the volcanic and metamorphic terranes are poorly constrained.
- Important unknowns are (1) the relative age of the Kamma alkali rhyolite, and (2) the nature of the contacts between the Kamma Mountains Volcanic Group and the Auld Lang Syne Group.

Lithology

Auld Lang Syne Group

Metasedimentary rocks belonging to the Auld Lange Syne Group (ALS) are exposed in the eastern third of the prospect area.

- The main rock type is silty mudstone (phyllite) which is interbedded with thin mudstone, calcareous siltstone and silty limestone horizons, and medium to thick beds of quartzose sandstone.

- The rocks are metamorphosed to upper(?) greenschist facies

Kamma Mountains Volcanic Group

Most, if not all of the volcanic rocks belong to the Chocolate Formation.

- The youngest rocks are dikes and pipe-like bodies of intermediate and felsic composition. The largest intrusion is a pipe-like body of quartz-poor, glomeroporphyritic trachyte(?), which is very similar in composition and texture to the Kamma Trachyte intrusion forming the Gorilla landmark.

- The youngest volcanic rocks exposed are thick flow or flows of Rosebud Quartz Latite and the Chocolate Peak Alkali Rhyolite(?).

- Several relatively thin, trachytic(?) lava flows intercalated with much thicker pyroclastic deposits and thin volcaniclastic horizons separatte the Chocolate Peak Alkali Rhyolite(?) from the Kamma Alkali Rhyolite.

- The oldest(?) volcanic unit exposed is the Kamma Alkali Rhyolite (KAR). The unit is a fine- to medium-grained, relatively aphyric alkali rhyolite(?) lava containing <1% microphenocrysts of hornblende and feldspar.. KAR is a strongly flow-foliated lava or lava-dome, is texturally similar to the *LBT,* but it lacks sanidine phenocrysts. The composition of KAR is similar to that of the lava domes in the Dozer Formation, and it is possible that KAR predates the Chocolate Formation.

Rock Structure

Contact Relationships

The contact between the ALS and Kamma Mountains Volcanic Group (KMV) trends approximately north, but is irregular suggesting that the contact between the two units occurs at a relatively shallow ($\leq 30^{o}$) angle.

- If there is a high-angle fault separating the two groups, as indicated by the geophysical model, then the contact must be offset by multiple northeast-trending normal faults.

Folds

Variable bedding attitudes indicate that moderate amplitude, relatively broad folds are a common feature of ALS rocks within the prospect area.

Faults and Fracture Zones

Fracture densities and silicification trends indicate that there are two dominant structural trends within the prospect area, northerly (345-355 ^{o}) and east-northeasterly (065°). Northerly-trending structures dip at moderate to steep (≥50°) angles to the east, tend to be "discrete" structures, and appear to control most of the silicification. The east-northeasterly-trending structures occur as closely spaced (~1cm), steeply west-dipping joint sets, which vary from a few meters to several 10's of meters in width. These fracture zones are the eastern extension of a major joint-fracture system that is intermittently exposed along the base of the southern flank of South Ridge from South Kamma to the Pinnacles.

Hydrothermal Breccia Dikes

Hydrothermal breccia dikes are characteristic of the South Kamma area. Most of these dikes strike northerly and dip steeply east or west. In areas where breccia dikes are abundant, pervasive brecciation is several 10's of meters wide.

Quartz and Carbonate Veins

Relatively thin (<5 cm) calcite stringers and bull quartz veins are common in ALS rocks. The calcite stringers and small quartz veins typically cross-cut bedding. Relatively thick (0.3 to 1.0 m wide) quartz veins preferentially intrude along fold axial planes in the ALS.

HYDROTHERMAL ALTERATION

Type and Intensity

Silicification

Silica ± calcite metasomatism is most well developed in the *Kamma Alkali Rhyolite*.

- The surface distribution of silicified rock appears to be controlled by fault and fracture zones.
- Hydrothermal breccia dikes are common, and are invariably silicified to some degree.
- Iron oxide (goethite > jarosite, or hematite >> goethite ± jarosite) is common along fractures in silicified rock, and is probably the oxidation product of iron sulfide minerals.
- Calcite may be a trace to minor component of silicification.

Argillization

Clay alteration is widespread in within the *Kamma Alkali Rhyolite*, but the types and distribution of the different types of clay were not determined.

Carbonatization

Structurally-controlled carbonate (mainly calcite) ± quartz veins and minor disseminated alteration are common in the ALS.

Areal Extent

Moderate to strong silicification and weak to moderate argillic alteration crops out over an area ~1,000 wide and ~1,500 feet long.

GEOCHEMISTRY

Surface Geochemistry

Rock

Rock-chip samples (109) collected during 1998. Gold, arsenic and selenium values for the samples are low, but weakly elevated values for these elements occur along traces of major(?) structural features.

- The contact between ALS and KMV appears to be one focal point for hydrothermal alteration ± mineralization.
- The contact zone is characterized by strong calcium and strontium depletion and locally trace amounts of gold, arsenic and selenium are present.
- Turner (1997) reported 3.65 ppm Au and 8.7 ppm Se in a rock-chip sample from an old working.

Soil

No soil samples have been taken in the South Kamma area. A soil sampling program is planned for the first quarter of 1999.

Drill Hole Geochemistry

There has been no drilling at South Kamma..

GEOPHYSICS

Induced Polarization

No induced polarization surveys were competed within the South Kamma prospect area.

Magnetics

No ground magnetic surveys were completed in the South Kamma area. Modeling of the airborne magnetic and gravity data (Fig. 20) shows that the KMV overlies ALS low-grade metamorphic rock throughout the western two-thirds of the prospect, and abut ALS rocks along the inferred Kamma fault in the eastern portion of the prospect.

- A 050°-trending magnetic lineament transects the prospect.
- There are several areas of low magnetic relief, which may reflect magnetite distruction.
- The contact between the two groups is a planar, relatively flat-lying contact, possibly the "Foundation" fault.
- The eastern contact is a near vertical, westward-dipping normal fault.
- Two mafic(?) lava flows or intrusions occur within the volcanic sequence, and one dike-like intrusion cuts the contact between the two terranes.
- The Kamma Mountains Volcanic rocks are ~1000 feet thick in the South Kamma area.

Radiometrics

Ternary cluster algorithm modeling of the airborne radiometric data shows a potassium low and associated uranium high along the inferred Kamma fault zone. The combination of a K low and U high may indicate argillic alteration.

Gravity

See section on *Magnetics* above.

Thematic Mapper

End-member analysis of the thematic mapper data indicates identified argillic alteration within the prospect area. Interpretation of PIMA spectra indicates the presence of montmorillonite, illite-muscovite and kaolinite in rocks collected in the South Kamma area.

DRILL HOLES

No drilling has occurred within the boundaries of the prospect.

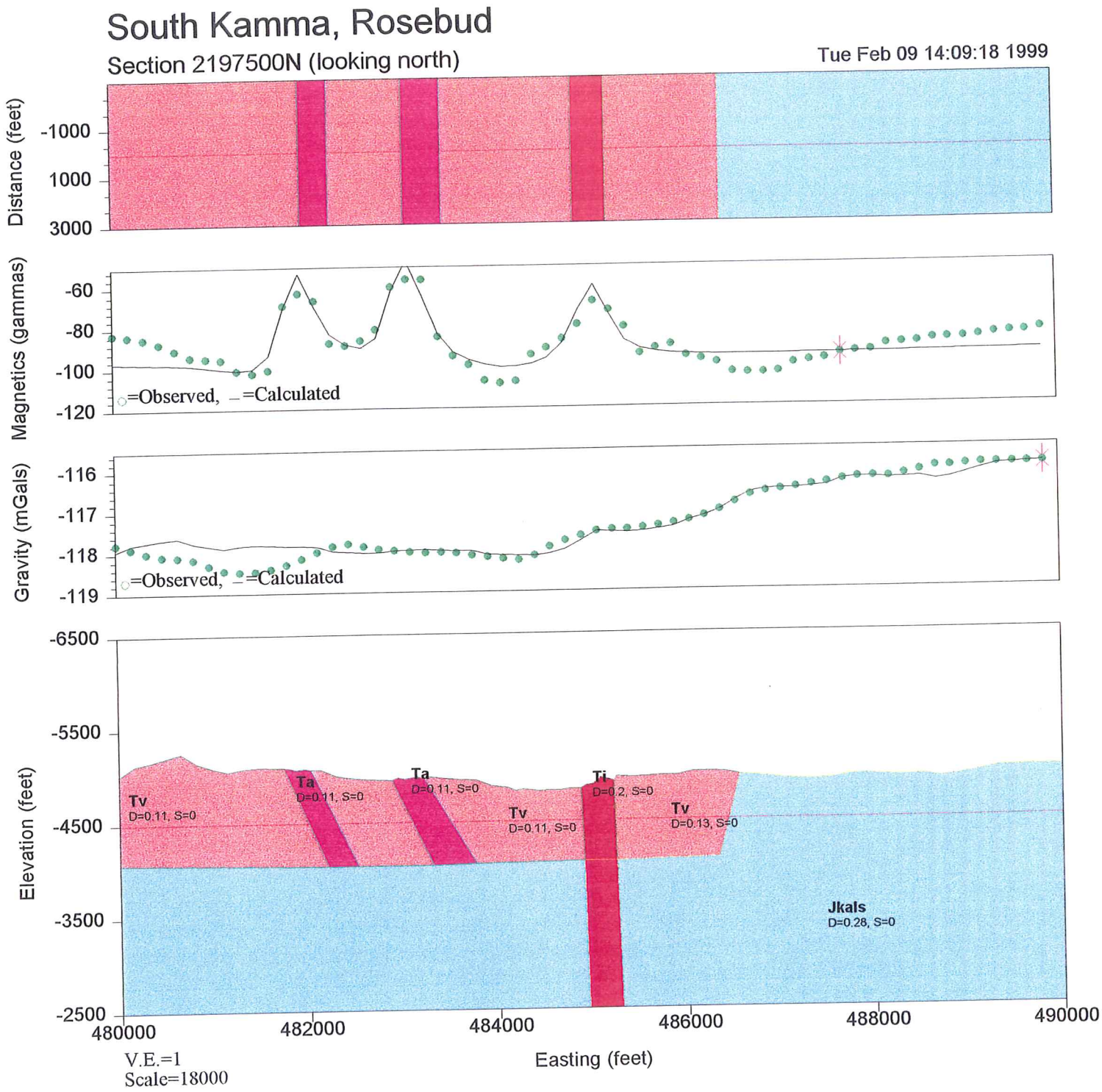


Figure 21. Geophysical model for the South Kamma area.

ACCESSIBILITY

Much of the prospect area is easily accesible, but the tops of the ridges and upper reaches of the streams will require long access roads.

LAND STATUS

Ownership

The Rosebud joint venture controls all of the claims covering the South Kamma prospect.

Royalties

- The prospect is covered by located claims with an overriding 4% net smelter return royalty to Euro-Nevada.

RECOMMENDATIONS

- Drill three, relatively shallow (<1,500 ft.), reverse circulation rotary drill holes angled at –45° toward the potential mineralized structures. Two of the drill holes are to test the 070°-trending fracture zone that may control the orientation of Rosebud Canyon. The third drill hole is sited to test the intersection of the inferred Kamma fault, a north-trending, east-dipping (45 °) normal fault, and the contact between the Auld Lang Syne and Kamma Mountains Volcanic groups.

- If the drilling program is successful, it will be necessary to finish the rock-chip sampling program, and complete collect soil samples over the entire prospect area.

COST TO FIRST DECISION POINT

The total cost to the first decision point on South Kamma is estimated to be ~$67,000.

- $50,400Reverse circulation rotary drilling (3 holes totaling 3,600 ft. at $14 per ft.)

- $11,840Road and drill site construction (2,960 ft. at $4.00 per ft.)

- $2,700 Drill sample assays (180 samples at $15.00 per sample)

- $1,836 Drill hole surveying (3,600 ft. at $0.51 per ft.)

REFERENCES

Turner, S., 1997, Rosebud property, Pershing County, Nevada: technical review: Unpublished Newmont Gold Company Report, 19 p.

SOUTH RIDGE – SADDLE

COMMENT

The Saddle portion of South Ridge has not been remapped, and the geology portrayed relies on interpretations made by Brady (1995, 1996) and Moore (1991), and comments made by Turner (1997). The southwestern side of the cross section passes through a portion of South Ridge that was remapped in 1998. The only additional new data are from a reconnaissance traverse along the crest of South Ridge (Mahood, 1998).

TARGET CONCEPT

Rosebud-style precious metal deposit.

Potential Target Size

It is reasonable to expect an orebody, if it exists, to be similar to Rosebud, i.e., 250,000 to 600,000 ounces of contained gold.

Grade Potential

Gold grades similar to those at Rosebud are likely to occur in an orebody in the Saddle area. The expected average grade is ~0.4 opt Au.

GEOLOGY

Lithology

Very little of the Saddle area has been remapped. Brady's (1995) geologic map indicates that most of the area is underlain by Dozer Formation. Remapping indicates that there are more than one "Dozer" Members within the formation. Unconformialy overlying the Dozer flow-dome complex is a sequence of intercalated volcaniclastic and ignimbrite units near the base and intercalated trachyte(?) lavas and volcaniclastic units near the top of the section. The trachyte(?) lavas are texturally and compositionally similar to the LBT unit.

Rock Structure

A north-trending fault is inferred to transect Saddle area of South Ridge. The location of the fault is based on mapped fault planes and a moderate to strong multielement geochemical anomaly.

HYDROTHERMAL ALTERATION

Type and Intensity

- Moderate to strong argillic alteration (kaolinite, illite ± smectite)

- Weak to moderate silicification
- Weak to moderate, calcite-dominant, carbonate alteration

Areal Extent

- Rock bleaching and argillic alteration is relatively widespread in the lava flows and domes in the Saddle area. The volcaniclastic and intercalated ignimbrite deposits are less altered, and the alteration is generally smectite ± chlorite. The distribution of the clay minerals must be varified by PIMA or x-ray diffraction analyses.
- Silicification appears to be restricted to relatively narrow halos along small(?) faults and fracture zones.
- Carbonate alteration is is common in the 070°-trending fracture zone that occurs near the base of the southern flank of South Ridge.

GEOCHEMISTRY

Surface Geochemistry

Rock

The results of widely spaced rock-chip sampling in the Saddle area outline:

- A ~2,000 by ~2,000 foot area of generally weak to moderate Au, As and Se values that is centered on the ridge crest.
- A 300 to 500 feet wide and ~3,500 feet long zone of weakly to moderately anomalous Au, As and Se values. The zone trends along the western boundary of the large area of anomalous rock-chip chemistry, and may be related to a north-trending fault that dips ~75° to the west.

Soil

The results of extensive soil sampling in the Saddle area defined an extensive, northwest-trending area (~2,000 by ~3,000 ft.) that covers nearly all of the prospect. The geochemical anomaly consists of weak to moderate Au and Ag values associated with moderate Hg and weak Se values. Only one soil sample was moderately anomalous in As.

Drill Hole Geochemistry

Significant drill intercepts for holes completed in the Saddle area of South Ridge are summarized in Table 1.

Table 23. Significant drill intercepts.

Drill Hole	Interval (ft.)	Depth (ft.)	Au (opt)	Ag (opt)
RL – 42	--	--	--	--
RL – 43	--	--	--	--
RL – 43	15	40 – 55	0.017	0.02
RL – 44	10	55 – 65	0.029	0.02
	5	240 -- 245	0.014	0.04

GOLD MINERALIZATION

Past Production

There are numerous prospect pits and one shallow shaft in the Saddle area of South Ridge, but there was no significant past production from the area.

Distance from the Rosebud Mine

The Saddle area is between 1,500 and 3,000 feet from the Rosebud mine.

GEOPHYSICS

Induced Polarization

There are no significant IP anomalies in the Saddle area.

Resistivity

Moderate resistivity anomalies do not follow mapped lithology and may reflect silicification. There is a north-striking resistivity low in the eastern portion of the prospect area.

Magnetics

Airborne

The airborne magnetic data may be a useful tool in extrapolating geologic contacts through areas with little or no outcrop.

- Magnetic susceptibility contrasts strike 030° and appear to reflect lithologic units.
- A 050°- and 090°-striking magnetic lineaments truncate prospect-scale magnetic trends to the north and south of the prospect, respectively. The magnetic lineaments may reflect faults.

Ground

There is no ground magnetic data for the Saddle area of South Ridge.

Radiometrics

Cluster analysis of the radiometric data produced element ratios indicative of hydrothermal alteration on the crest of South Ridge.

Potassium

There is a potassium low on the crest of South Ridge, and potassium highs on the northern and southern flanks of the ridge.

Thorium

Thorium values are variable and do not form discrete anomalies.

Uranium

Uranium mimics potassium with a low on the crest of South Ridge and high on the flanks of the ridge.

Gravity

The Saddle area of South Ridge occurs within a large gravity high.

- The prospect area is bounded to the north and south by major gravity lineaments, which may reflect regional-scale structure, possibly fracture or shear/faults zones.
- Small-scale gradients in the contoured gravity data may reflect the trace of relatively thin fracture zones and/or discrete faults.

Thematic Mapper

Thematic mapper data indicates that hydrothermally altered rocks occur in a large portion of the Saddle area.

- There is a significant north-striking fault within the prospect area.
- There are large-scale, concentric TM lineaments on South Ridge, one of which coincides with a segment of the inferred Rosebud Canyon structural (fault?) zone.
- End member analysis variable alteration assemblages within the prospect area.
- PIMA analyses identified smectite clays in samples collected in the Saddle area.

DRILL HOLES

In November, 1989, four reverse circulation rotary drill holes (5.5 in. hammer) were completed by Gustin Corporation in the Saddle area of South Ridge (Table 2).

Table 24. Drill hole statistics.

Drill Hole	Company	Azmuth (°)	Angle (°)	TD (ft.)
RL – 42	Lac	000	-90	450
RL – 43	Lac	076	-60	310
RL – 44	Lac	224	-60	430
RL – 45	Lac	226	-61	490

ACCESSIBILITY

The difficulty of accessing South Ridge is strongly dependent on the location within the prospect area. There are reclaimed roads from the Rosebud mine area to the crest of South Ridge, and along the crest of the ridge. Access to other areas will be difficult and require significant amounts of excavation and reclamation, particularly on the southern flank of South Ridge.

LAND STATUS

Ownership

The entire Saddle area is covered by either Bud or RB lode claims controlled by the Rosebud joint venture company.

Royalties

The Wild Rose prospect area is completely within the limits of Euro-Nevada's 4% net smelter return royalty.

RECOMMENDATIONS

Finish remapping the Saddle area. Specifically concentrating on locating potential mineralized structures and identifying the various clay minerals and their spatial distribution.

COST TO FIRST DECISION POINT

The cost to the first decision point is ~$1,100.

- 50 rock-chip samples at $21.50 each

REFERENCES

Brady, M. W., 1995, Reconnaissance geology of the Rosebud property, Pershing and Humboldt County, Nevada: Unpublished Hecla Mining Company Report, December 1, 25 p.

---, 1996, A geologic study and drilling project at the Rosebud property, Pershing County, Nevada: Unpublished Hecla Mining Company Report, May 29, 19 p.

Culbert, R.R., 1991, Report on geophysical and soil geochemisty surveys, Wildrose property, Pershing county, Nevada: Unpublished Equinox Operations Group Report, 14 p.

Kuhl, T., 1993, 1992 summary report, Rosebud project, Pershing county, Nevada: Unpublished Lac Minerals Report, 17 p.

Mahood, G.A., 1998, Topics in volcanic geology related to the Rosebud mine: Unpublished Newmont Gold Company Report, 17 p.

Moore, S. C., 1991, Rosebud structural study, Rosebud project, Pershing County, Nevada: Unpublished LAC Minerals Report, August 20, 39 p.

Turner, S., 1997, Rosebud property, Pershing County, Nevada: technical review: Unpublished Newmont Gold Company Report, 19 p.

VALLEY (ROSEBUD SHEAR CORRIDOR SW)

TARGET CONCEPT

1. Blind ore body below the Cave fault - hydrothermal fluids trapped in fractured, massive felsic flows or intrusions below less permeable clayey conglomerate (South Zone analogue) or below thick zone of silicification in the Cave fault (East Zone analogue) with gold deposited by cooling and mixing with connate or meteoric water; potential hydrothermal conduits are the WSW- to WNW-striking westward continuations of the Mother Lode and Office faults and a hypothetical W-trending fault along the N side of South Ridge.

2. Gold deposited in silicified high-angle faults (e.g., Office, Mother Lode) or their hanging wall splays by mixing of hydrothermal and cooler fluids.

3. Geochemically anomalous zones in the hanging wall of the Cave fault.

Potential Target Size

- Cave fault footwall: 300,000 tons by analogy with South and East Zones; 2000 ft. x 1500 ft. area between mud trailer and RBW-16 has no holes deeper than 500 ft.

- Cave fault hanging wall: unknown.

Grade Potential

- Cave Fault footwall: .50 oz/st by analogy with South and East Zones.

- Cave fault hanging wall: .08 oz/st (MW-4).

GEOLOGY

Rock type

Felsic flows and intrusions and various sedimentary rocks and breccias in unknown proportions.

Structure

- moderately to shallowly NW-dipping Cave fault inferred.

- steeply dipping W- and SW-trending normal faults probably present.

HYDROTHERMAL ALTERATION

- Weak to strong argillic alteration and weak to moderate green clay or propylitic alteration with local silicification (descriptions vary according to who does the logging).
- In RL-274 and 96-360, Cave fault hanging wall is weak to moderate argillic alteration and footwall is "propylitic".
- 80 ft. of "silicification" in RL-260 may be related to Cave fault.
- 100+ ft. intervals of essentially unaltered rock in some drill holes.

GEOCHEMISTRY

- The geochemical expression of the target at the surface, if any, would be masked by alteration and weak gold mineralization associated in the hanging wall of the Cave fault.

Surface Rock

- A 5.1 ppm Au sample 150 ft. S of KM-9/RL-274 is probably float from South Ridge.
- Samples with 1.0-1.7 ppm Ag and up to 185 ppm As were collected north of the present waste pile.
- Samples with .20-.40 ppm Au and 1.6-7.6 ppm Ag were collected north of the present ore pile.
- Samples with <.10 ppm Au but 1.0-6.7 ppm Ag, 50-110 ppm As, and locally up to 14 ppm Sb or 2.5 ppm Hg were collected below the water tank and are probably from the Cave fault outcrop.
- 2 samples with about .13 ppm Au, 4.7 ppm Ag, 80 ppm As, and 30 ppm Sb were collected from the bottom of the gully near where the office now is.

Soil

Most soil samples are probably not representative of bedrock.

- A W-trending Ag anomaly lies between RL-150 and 96-360; it has .18-1.01 ppm Ag, <.03 ppm Au, As up to 15 ppm, Sb up to 5 ppm, and Se up to .97 ppm.
- 4 samples on an E-W soil line on the N edge of the ore pad define an anomaly with .015-.114 ppm Au, up to 3.27 ppm Ag, up to 28 ppm As, up to 10 ppm Sb, and up to 1.94 ppm Se.

- The soil sample data are suspect because of the numerous single-sample anomalies (with Au up to .287 ppm) and line anomalies with unusually high Au, Ag, Hg, or Se in many samples along one line but not on adjacent lines.

Drill Hole Rock

Au and Ag results are summarized in Table 26.

- Drill hole samples have not been analyzed for elements other than gold and silver.
- Samples from drill holes numbered RL-165 and lower were analyzed by GSI and the results are irreproducible (Table 27); 16 repeat assays of pulps eliminated or significantly reduced 6 Au anomalies and added 1.

GOLD MINERALIZATION

Past Production

3 prospect pits (C. Walck, 1992, 1:2400 map) near surface trace of Cave fault (P. Rogowski, 1999) not related to target.

Distance from Rosebud Mine

500 to 3000 ft.

GEOPHYSICS

Induced Polarization

- A NNE-trending chargeability high of 1200 ft. x 2000 ft. (identified by Lac and confirmed by Newmont's gradient array IP survey) is centered over the portal of the No. 1 decline; modeling indicates the high is caused by a NE-plunging body about 600 ft. wide x 1400 ft. long (depth extent is not known) whose top is at an elevation of about 4650 ft., about 400 ft. below RL-291 in the footwall of the Cave fault; the anomalous body was penetrated by 96-361 and RL-260, which intersected barren, weakly altered volcanic rock with <1% sulfide at that depth.
- the southwestern part of the target area has low chargeability.

Resistivity

- An extensive low in the 200-ft. inversion has a linear southern boundary which could be a W-trending fault; the low persists in the 400-ft. inversion and continues, with irregularities, NE toward Mother Lode and could be related to the Cave fault.

TABLE 26. Drill hole results for the Valley target (Au and Ag in oz/st).

Hole No.	Type	T.D. (feet)	Depth to CF* (feet)	Au @.01 oz/st cutoff			Ag @.29 oz/st cutoff		
				Thick.	Grade	Interval	Thick.	Grade	Interval
KM-9	RC	365			.024 .027 .056 .025 .028	165-170 185-190 325-330 350-355 360-365			
WW-1	RC	530	Above	10 10 10 30 20 30	.11 .008 .007 .011 (.018) .015 (.023) .010 (.014)	200-210 260-270 310-320 330-360 410-430 460-490	30 10 40	.857 .57 .468	130-160 200-210 430-470
MW-4	RC	425	Above	60 20 10 50	.014 (.028) .045 (.077) .01 .013 (.029)	210-270 310-330 340-350 380-430	130 50	2.36 (17) .50 (1.2)	200-330 380-430
MW-5	RC	420	Above	60 10 10 20	.01 .01 .01 .025 (.039)	50-110 140-150 210-220 280-290			
RB-94-04	RC	355	Above	10	.01	205-215			
RB-94-05	RC	400	Above	10 10	.01 .01	305-315 340-350		.67	335-340
RB-95-10	RC	300	South of	10	.01	170-180			
RB-95-18	RC	300	Above	10 10 10 10	.013 .010 .008 .007	180-190 220-230 240-250 290-300			
RB-95-33	RC	300	Above	10 10	.01 .01	100-110 230-240			
RB-10	RC	485							
RL-11	RC	480			*.049 (.056)*	465-475			
RL-33	RC	465	South of	65 60	.019 (.10) .011	105-170 180-240		2.54	140-145
RL-34	RC	300	South of	20	.01	105-125	10	.52	20-30
RL-38	RC	296	South of						
RL-39	RC	370	South of?					.33	315-320
RL-42	RC	450							
RL-56	RC	450	Above	50 15 30	.013 .01 .022 (.06)	55-105 115-130 285-315	10	.71 (.84)	300-310
RL-64	RC	335	South of	25	.014	175-200		.36	85-90

RL-74	RC	935	680?	10 10 10 10 35 10 35	.01 *.095* .04 (.053) .015 .01 .079 .013 .01 .013	140-150 320-325 415-425 455-465 495-505 525-530 630-665 675-685 695-730		.44	525-530
RL-76	RC	625	350?	10 10 20	.01 .015 .015	100-110 155-165 335-355	10 30	.34 .398	45-55 85-115
RL-77	RC	765	570?	20 10 10 40 20	.027 (.06) .03 .01 .013 .015	135-155 235-245 490-500 570-610 660-680	10	.505	310-320
RL-78	RC	745		10 10 10 10	.01 .01 .015 .01	195-205 420-430 515-525 545-555		2.14	355-360
RL-111	Core	957		 15	*.039* .034 .025 *.068*	252-257 879-884 907-912 922-927			
RL-144	RC	625		10 10 10	.01 .015 .01	70-80 115-125 600-610			
RL-150	RC	700		25	.014	580-605			
RL-152	RC	700	Above ?		.01	410-415			
RL-160	RC	400		75 10	.025 (.051) .015 (.018)	150-225 345-355	 15	.25 .81 (1.22) .23	75-80 170-185 340-345
RL-161	RC	405	South of	50	.030 (.18)	100-150			
RL-172	RC	375	South of	40	.013 (.039)	15-55			
RL-173	RC	200	South of						
RL-174	RC	500	100-160?	15	.027 (.038)	385-400			
RL-175	RC	600		40	.013 *(.034)*	115-155	10	.94 (1.57)	135-145
RL-260	RC	800	325?	10 10	.015 .01	35-45 320-330			
RL-265	Core	913		24	.018 (.041)	134-158		.40	120-125
RL-274	RC	600	530?	10	.013 (.014) .024 .022	195-205 410-415 505-510		.161	425-430
RL-291	RC	405		10 10	.01 .01	210-220 365-375	10	.48	170-180

RL-292	RC	305	South of					.	
96-360	RC	1200		10	.01	370-380			
96-361	RC	605	430?		.02	120-125	10	.68 (.83)	195-205

Note: Geotech drill holes with < 10 ft. of .01 oz/st gold are not included in table. (.077) – values in parentheses are maximum sample results for the interval. *0.039* – italicized values are irreproducible; reassay values were ½ or less.

TABLE 27. Results of repeat analyses of pulps (Gold in oz/st).

Hole No.	Interval	Original (Lab)	AAL Results(1998)	AAL Avg.	Change
RL-11	465-470	.056 (GSI)	.028, .011, .012	.017	DOWN
	470-475	.041(GSI)	.036, .013, .025	.025	Down
	475-480	.01 (GSI)	.005, .030, .010	.015	Up
RL-33	130-135	.008(GSI)	.022, .020	.021	UP
	140-145	.100 (GSI)	.098	.098	<20%
RL-74	285-290	.002 (GSI)	.003	.003	Up
	320-325	.095 (GSI)	.032	.032	DOWN
RL-111	252-257	.039 (GSI)	.003	.003	DOWN
	257-262	<.001 (GSI)	.002	.002	Up
	922-927	.068 (GSI)	.049, .027, .003	.026	DOWN
RL-172	45-50	.039 (BC)	.036	.036	<20%
	50-55	.02 (BC)	.014	.014	Down
RL-174	105-110	<.002 (BC)	.002	.002	<20%
	390-395	.038 (BC)	.035	.035	<20%
	395-400	.010 (BC)	.010	.010	<20%
RL-175	140-145	.034 (BC)	.004 (BC)		DOWN

Magnetics

Low relief, possibly due to alluvium and conglomerate at surface or possibly to alteration in the hanging wall of the Cave fault; not related to target below Cave fault.

- Suggestion of N45E and N15E faults.

Radiometrics

Target not at surface.

Gravity

- NW-dipping gravity gradient may reflect a NW-dipping basement surface or offset along the Office or other normal faults.

- unusually shallow depths to basement in RBW-16, RS-407, RS-421, and RS-406 (Mother Lode) are not evident in the gravity data.

Thematic Mapper

Target not at surface.

DRILL HOLES

- Numerous intervals of .01-.05 oz/st Au have been intersected in drilling (Appendix A) but only 3 holes have samples with >.10 oz/st; 2 of those are in the "Dozer" near or south of the surface trace of the Cave fault and suggest the potential for ore grades in the footwall of the Cave fault.

- No drill holes have hit basement SW of the batch plant and no more than 3 have reached the footwall of the Cave fault.

- The rock types, alteration, and mineralization in the footwall of the Cave fault are, for the most part, unknown.

ACCESIBILITY

- The entire target area is easily accessible although existing surface structures may complicate siting drill holes.

- Significant road building would be required for sites on slopes above the powder magazine.

ROYALTIES

- 4% Euro-Nevada

COST TO FIRST DECISION POINT

- Relog 4 representative drill holes through the South and North Zones to better understand the significance of alteration in the Valley drill holes, submit samples for ICP analyses, and determine clay mineralogy with PIMA.

- Relog drill holes of interest in the Valley area, submit samples for ICP analyses and for reassay, and determine clay mineralogy.
- Compare geologic and geochemical sections from the Valley area with those for the South, North, and East Zones to develop targets in the Valley area.

- Decide whether any targets merit drilling.

250 ICP analyses of pulps for 4 holes (3500 ft.) through the South and North Zones (1 every 14 ft. on average) @ $4.88/sample	$1,220
Composite 700 samples @ $1.00/sample	700
400 Au reassays of pulps (10% of samples) @ $5.20/sample	2,080
500 ICP analyses of pulps (1 every 20 ft. on average for 10,000 ft., about ½ of holes; no composites) @ $4.88/sample	2,440
Total	**$6,440**

Geologist for relogging and selecting ICP sample intervals (and PIMA samples?) for 3500 ft through South and North Zones @ 200 ft/day	18 days
PIMA analysis	4 days
Geologist for relogging 20,000 ft. RC samples @ 1500 ft/day	14 days
Geologist for making and interpreting sections to define target	8 days
Total man-days	**44 days**

REFERENCES

Walck, C., 1992, Geologic map of the Degerstrom East quadrangle, 1:2400.

VERTEX

CONCEPTUAL TARGET

A) Vein type high-grade epithermal mineralization along steeply dipping E-NE discontinuous structures.

B) Disseminated low-grade gold/silver associated with fracturing and argillic alteration.

Potential Target Size Vein type resource tonnage potential is small: (1200 x 300 x 5) 144,000 tons of minable Au/Ag, grade would have to be + 0.25 opt.

A) Resource tonnage potential for disseminated mineralization may be as much 3.84 million tons (1200 x 200 x 200) of very low grade Au/Ag (<0.02).

GEOLOGY

Lithology

Dozer rhyolite, latite dikes, the Oscar andesites and sediments, and the ALS potentially could host ore in the Vertex area.

Structure

Known gold mineralization lies along N50E and N70E discontinuous faults. The two main surface structures were prospected by shallow pits and one 50 foot shaft. The Vertex mine workings also drifted on these structures approximately 300 feet below the surface with negative results. The Dozer rhyolite is strongly fractured throughout the area.

HYDROTHERMAL ALTERATION

Structurally controlled argillic alteration is dominant, extending from 5 to 100 feet out from the main mineralized faults at the surface. Underground, this argillization is more prevalent. Silicification is very weak to absent. Strong argillization is also found at depth in the 96–365 drill hole (950 feet TD). Disseminated pyrite also occurs within the argillic envelopes and along the structures. XRD and PIMA data on the clays is not available at this time.

GEOCHEMISTRY

Soil surveys

The Vertex surveys were conducted by Lac Minerals (See Overlays). Au, Ag, As, Sb and Hg data are available. Unfortunately, the line spacing (500 feet) was too large to allow for outlining definitive anomalies. Most of the higher values found are down-slope from the surface

prospects. Values from 50 to 400 ppb Au occur over the western end of the South Ridge and along projection of the surface structures to the NE. Other trace elements are very weak.

Surface rock-chip

Samples apparently came from the prospects where anomalous gold corresponds well with the workings (See Overlay). Strongly anomalous Ag, As, Sb and Hg also occur with the rock-chip Au values.

Underground in the Vertex Mine

Au ranges from 50 to 470 ppb (See attached 1" = 25' level map) along structures that are the downward projections of two of the surface faults. Moderate trace elements also correspond with the higher Au and Ag values.

Drill hole 96-365

Assayed for Au and Ag only. The only significant value was 0.045 oz/ton Au from 940 to 945 in a narrow pyritic silicified zone within one of the Tl-1 dikes.

GOLD MINERALIZATION

Past Production

Ore was not stoped in any quantity from the Vertex underground workings. The 12 surface digging are only shallow prospects with the exception of one shaft down to approximately 50 feet.

Distance from Rosebud Mine

5000 feet southwest

GEOPHYSICS

Geophysical models for the Vertex area are shown in figures 20 and 21.

IP

No significant anomalies.

Resistivity

The cave fault is interpreted along a break in resistivity between high values in south (Dozer formation) and low values in north (Badger formation). This fault lies to the northwest of this prospect and trend N70E.

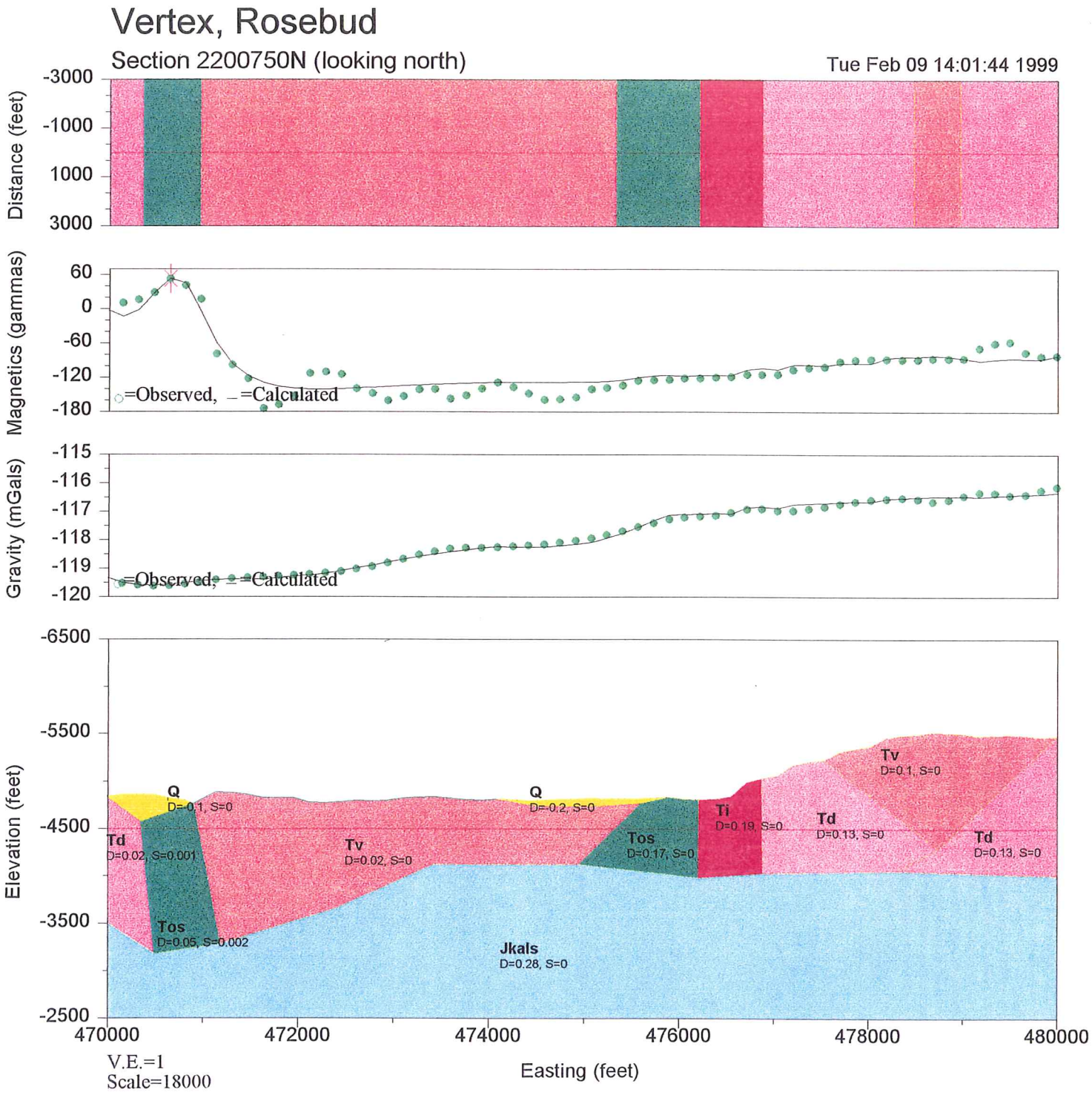


FIGURE 22. Geophysical model for the Vertex area.

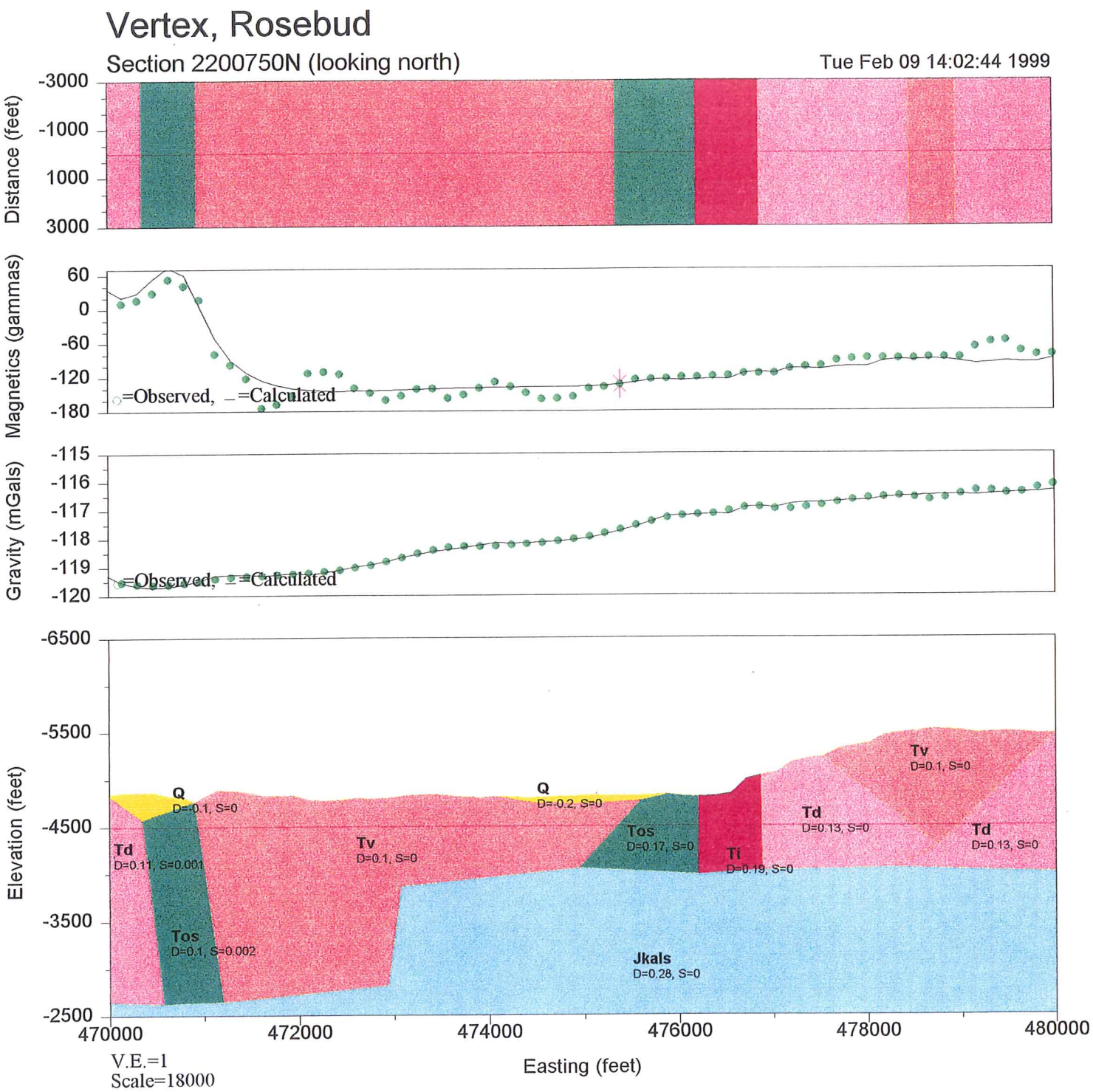


FIGURE 23. Geophysical model for the Vertex area.

Magnetics

Low magnetic relief suggests magnetite destruction. The prospect lies to the south of an interpreted N50E linear feature.

Gravity

Newmont geophysicists recently modeled an E-W line through the Vertex area (See attached memo). Nothing corresponding to mineralization was indicated, but it is suggested that the ALS basement is approximately 500 feet deep in the Vertex area. The prospect is bounded on the north, south, and west by gravity gradients (structures). It is on a broad gravity high (shallow depth to basement) and in a localized gravity low (less dense flows).

Radiometrics

K, Th, U, and total counts are available for the Vertex area. No significant anomalies are present.

Thematic Mapper

The prospect lies to the southeast of a N55E linear. Alteration is present to the east. The prospect lies near the center of a large concentric feature. Clay alteration assemblages are predicted in the north part of prospect.

DRILL HOLES

Past Drilling

One RC hole, 96-365, was collared S40E –45 (See Section AA'). The only significant intersection was 0.045 oz/ton Au from 940 to 945 feet.

Proposed Drill Holes

One-1000 foot low priority core hole is proposed (See Geology Overlay) at N2,200,420, E.47776,325 collared at S70 E -45. This will test both targets in the Vertex area.

ACCESSIBILITY

A 500-foot road will need to be built in difficult material.

ROYALTIES

A royalty burden of 5% NSR is on the Vertex area.

COST TO FIRST DECISION POINT

Total cost for one hole in the Vertex area is approximately $49,500.00

$35,000	1000-foot core hole
5,000	Mobe/demobe
5,000	Road construction
1,500	100 assays
3,000	Misc

REFERENCES

Brady, M. 1996. Prospect Evaluation – Rosebud Area, Pershing County, Nevada: Unpublished. Hecla Mining Co. Report.

Conelea & McCulla 1996. Prospect Evaluation – Rosebud Mine Area: Unpulished Santa Fe Report.

Turner, S. 1997. Evaluation of the Rosebud Mine Area: Unpublished. Newmont Exploration Report.

Randy Vance

WHITE ALPS

TARGET CONCEPT

Bonanza-grade stockworks, veins, and disseminations adjacent to a major fault.

Potential Target Size

400,000 to 1,000,000 ounces Au

Grade Potential

0.2 to multiple ounce Au, averaging 0.4 oz/st Au and 5 oz/st Ag

GEOLOGY

Lithology

Planar-laminated rhyolite (of the Wildrose) correlates with LBT. Multiple green-to-gray epiclastic units are interbedded with the rhyolite. Rosebud quartz latite is mapped at the surface and was intersected in a pre-collar drill hole. White Alps porphyry is also mapped at the surface.

Rock Structure

White Alps occurs at the intersection of a major NE-trending fault zone (Schoolbus Canyon fault) and an ENE extensional joint set. The latter contains iron-oxide coated fractures cutting less-altered rock. Several major faults were intersected in drill holes; some are low- to moderate-angle. The fault geometry is poorly understood, given that only two deep holes have been drilled and the shallow holes are RC. More data are needed. Resistivity also shows strong lineaments in plan and interpreted sections.

HYDROTHERMAL ALTERATION

Type and Intensity

Moderate to strong silicification extends along an ENE trend. Argillization is weak to strong at the surface, consistent with high-level epithermal alteration. Alteration intensity down hole is weak to strong, consisting of silicification, argillization, and pyritization.

Areal Extent

Large: at least 1000 by 800 ft of discontinuous to strong alteration

GEOCHEMISTRY

Surface Geochemistry

Rock

Many rock chip samples contain 0.01-0.5 ppm Au, and 5 contain 0.5-1.0 ppm. A dozen Ag values are >1 ppm. The NW side of White Alps has 15 rocks with Ag > 5 ppm. Strong Se values occur in silicified outcrops in the NE part of the target area. Hg is high, Sb is spotty high, and a few As values are >50 ppm.

Soil

Many are > 50 ppb Au; Sb is moderate (10-50 ppm); several Se are 1-5 ppm; As and Ag are generally low; Hg is spotty with several 0.5-1 ppm.

Drill Hole Geochemistry

A series of narrow but significant structurally controlled veins with sub-economic Au-Ag values were intersected in the first deep hole drilled at White Alps. The highest values occur along silicified veins, clay-sulfide veins, and shears. These mineralized structures are approaching Au-Ag values seen around the Rosebud deposits, and they may represent leakage from nearby deposits. Significant drill hole intercepts in the White Alps area are given in Table 28 on page 160.

GOLD MINERALIZATION

Past Production

None.

Distance from the Rosebud Mine

6000 feet

GEOPHYSICS

The geology of the White Alps area as predicted by the magnetic and gravity models is shown in Figure 22 (page 161).

Induced Polarization

Small chargeability anomaly of 20 msecs striking N70E dipping gently to the west. Coincident with resistivity high and ground magnetic low.

Resistivity

High anomaly (>150 ohm-m). Resistivity defines N15E and N70W linear features. Resistivity highs correlate well with subcropping silicified bodies. LAC's shallower drill holes intersected strongly silicified and pyritic rock, which appears to be fault-bounded on several sections.

TABLE 28. Significant drill hole intercepts, White Alps.

Drill Hole	Interval (ft)	Depth (ft)	Au oz/st	Ag oz/st	Comment	Trace elements
RL-18	10	275-285	0.021	1.87	hole lost at 465	none available
RL-19	5	20-25	0.016	0.25	hole lost at 445	none available
	5	75-80	0.013	0.52		
	15	120-135	0.016	1.13		
	20	195-215	**0.052**	1.04	**incl 10' of 0.075 Au**	
RL-20	5	150-155	0.01	1.24	625' T.D.	none available
	5	375-380	0.011	0.5		
	5	395-400	0.016	0.36		
RL-21	5	550-555	0.015	<0.10	645' T.D.	none available
	5	560-565	0.012	<0.10		
	5	570-575	0.011	<0.10		
RL-79	5	260-265	0.012	0.13	705' T.D.	none available
	10	290-300	0.011	0.89		
	15	490-505	0.014	1.47		
RL-80	5	265-270	0.01	0.77	675' T.D.	none available
	5	295-300	0.012	1.11		
RL-81	nil				805' T.D.	none available
RL-83	5	410-415	0.01	<0.10	815' T.D.	
RS-446 precollar	1100		Detectable		cumulative intervals	
	0.8	1756.2-1757.0	**0.037**	**32.85**	pyrarg + cp	314 As, 1140 Sb, 218 Se, 1.47 Hg
	2.4	1759.7-1762.1	0.011	**3.52**	pyrarg + cp + stib	
	2.3	1766.8-1769.1	**0.024**	**16.8**	py-ba-clay-Si	592 As, 351 Sb, 201 Se
	0.7	1817.7-1818.4	0.006	**7.15**	black silica	
	4.6	1883.2-1887.8	0.009	**4.44**		
	1.5	1887.8-1889.3	0.017	**8.42**	Si-gouge-gray-sulfidic	168 As, 65 Sb, 31 Se
	1.0	2339.4-2340.4	0.015	0.32	Sulfidic slfd bxa	342 As, 70 Sb,118 Se
RS-456	1.5	2373.7-2375.2	0.006	**2.13**		145 As, 18 Sb, 22 Se

Magnetics

Airborne

Maps lithology; low magnetic relief suggests magnetite destruction at surface.

Ground

Poor coverage; low anomaly may be magnetite destruction (i.e., argillization).

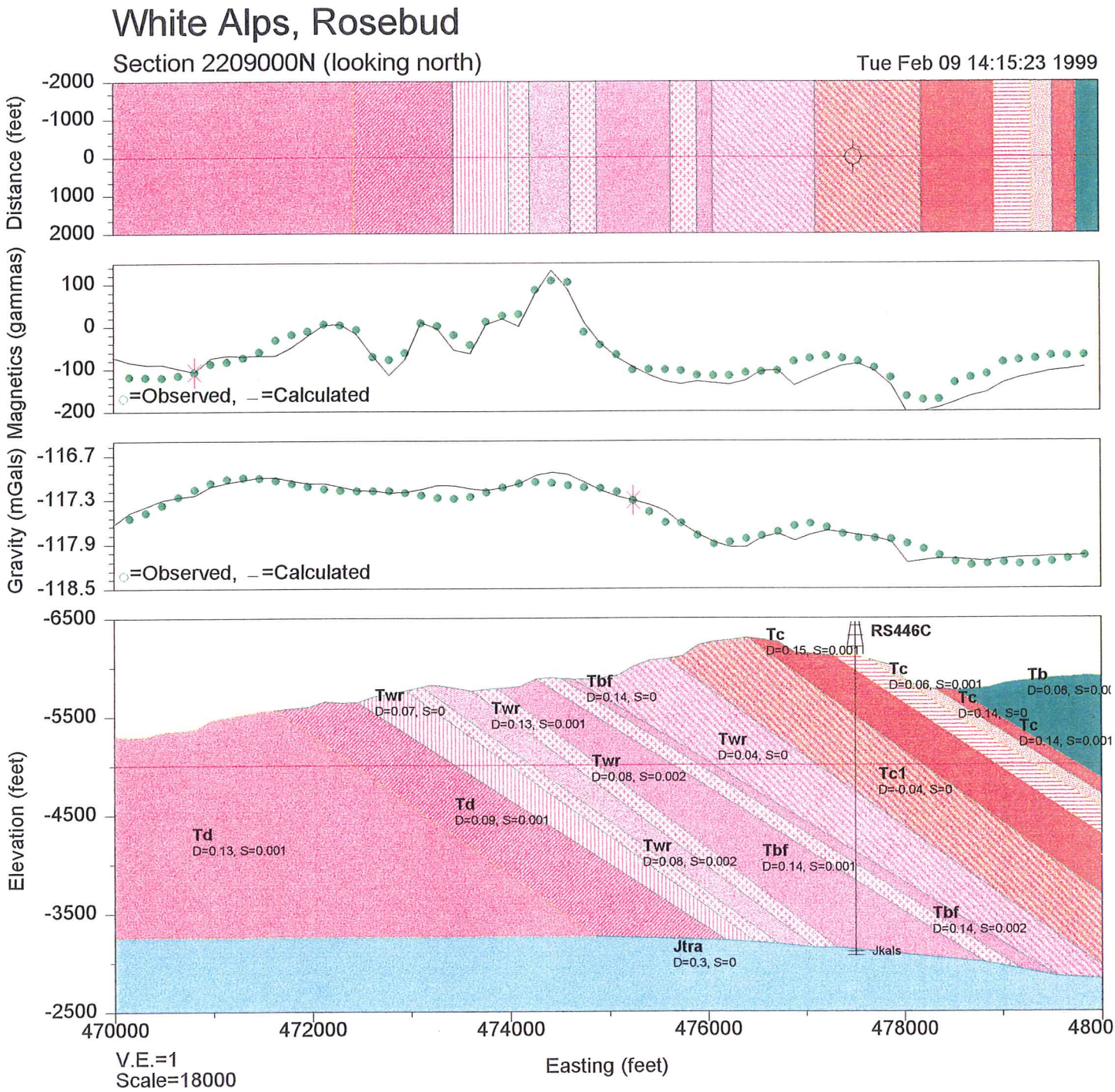


FIGURE 24. Geophysical model (magnetics and gravity) for the White Alps area.

Radiometrics

No significant anomalies, lithology mapped.

Gravity

White Alps is on a N35E gradient that could be caused by increasing densities at depth to the northwest. The prospect is also on a N50W lineament which runs along the north-east side of the Rosebud deposit.

Thematic Mapper

Good surface alteration and N-S linear identified to the east of prospect. Good probability of clay alteration at surface. PIMA work identifies kaolinite at surface. (Note: LAC geologists also visually identified alunite in outcrops; SFPG identified some alunite using PIMA.)

DRILL HOLES

See Table 28. NGC has drilled two holes: RS-446 (-90°, 3070 ft. t.d.) was a straight hole to the basement, and RS-456 (-90°, 2620 ft. d.t.)flattened to the northwest.

ACCESSIBILITY

Good roads, but locally steep. Building sumps is challenging.

ROYALTIES

4% to Euro-Nevada on all; plus 5% to Degerstrom on GP claims

COST TO FIRST DECISION POINT

The cost to the first decision point is estimated to be $120,000.

Two deep holes (1 angle, 1 vertical?): 1600 foot precollars plus 900 foot core tails. Additional holes are needed to provide (1) offsets of good mineralization, (2) constraints on the structural setting, and (3) geochemical vectors towards higher grades.

REFERENCES

Brady, M. W., 1996, Drill proposal for the Rosebud property, Pershing and Humboldt County, Nevada: unpublished consulting report for Hecla Mining Company dated 1/15/96, >100 p. (White Alps is discussed on p. 39-43).

Brewer, N.H., 1991, 1990 annual progress report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 28 p.

Conelea, R., and McCulla, M., 1996, Rosebud target rankings: draft report by Santa Fe Pacific Gold Corporation, 19 p., 1 location map.

Kenner, K. L., and Brewer, N. H., 1990, 1989 annual summary report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 15 p., 1 pl. (White Alps is discussed on p. 12, 13).

Turner, S. J., 1997, Rosebud property, Pershing County, Nevada: technical review: unpublished Newmont Exploration Ltd report, 19 p.

WILD ROSE

COMMENT

The Wild Rose prospect area includes all of the northern portion of the Rosebud claim block north of Wild Rose canyon and west and north of the Gator prospect. The area includes Brady"s North Kamma and Wild Rose South, West and East prospects.

TARGET CONCEPT

Without a more compete understanding of the prospect geology, the target concept is relatively unconstrained. Because much of the mineralization appears to be structurally-controlled, and the Wild Rose alkali rhyolite is similar in texture and composition to the LBT unit, Rosebud-type deposits are the principal exploration target.

Potential Target Size

The area easily could host a deposit 0.5 to 1.0 million ounces gold.

Grade Potential

Gold grades similar to those at Rosebud (0.35 to >1.0 ounces Au per ton) can be expected.

GEOLOGY

Descriptions and distributions of the major rock units shown on the various geologic maps of the Wild Rose area are inconsistent, and the prospect must be remapped.

Lithology

It appears from the geologic maps that the rocks exposed in the Wild Rose region can be grouped into five "units," all of which probably unit within the Chocolate Formation. The units are listed below in probable stratigraphic sequence beginning with the youngest(?) unit.

- Kamma andesite(?): intermediate lava flows and hypabyssal intrusions
- Wild Rose quartz latite(?): rhyolite porphyry lava flows and hypabyssal intrusions
- Lower Bud Sequence(?): pyroclastic breccias (Knob Gulch breccia), welded ashflow tuff and minor vitrophyre
- Wild Rose alkali rhyolite(?): fine-grained, relatively aphyric, flow-banded, fissile rhyolite

Rock Structure

Geochemical, airborne magnetic and restivity anomalies all indicate a dominant northeast-trending structural fabric in the Wild Rose area. A second order structural fabric trends in a northwest direction.

- The locations of major faults on the Wild Rose geologic maps show only a modest correlation with the geochemical and geophysical anomalies.

HYDROTHERMAL ALTERATION

Type and Intensity

Geologic maps indicate that much of the hydrothermal alteration within the Wild Rose area resulted from relatively low-temperature fluids that were mildly to strongly acid.

- Silicification and argillization/bleaching are the main types of alteration recorded on the geologic maps. Of these, silicification is by far the most common alteration type.

- Alunite is commonly occurs within silicified fault zones, but whether alunite is hypogene or supergene is not known.

Areal Extent

Hydrothermal alteration occurs within an area that is ~3,000 feet wide and ~4,000 feet long.

- Silicification ± argillization mainly occurs as discontinuous halos along most of the mapped fault zones.

GEOCHEMISTRY

Surface Geochemistry

Rock

Rock-chip geochemistry is available for a large portion of the Wild Rose area. The data show a very strong northeast to east-northeast structural fabric in several elements.

- Gold values >50 ppb form conherent anomalies ranging from 100 to 400 feet wide and 2,500 to >5,000 feet long.

- One cluster of three rock-chip gold values ~50 feet across varied form 1.79 to 3.34 ppm.

Soil

There is relatively good soil geochemical data for the western portion of the Wild Rose prospect.

- Soil gold values >10 ppb form a very large (~3,000 by ~3,000 feet), coherent anomaly. Within this area there are several >50 ppb gold anomalies ~500 feet wide and ranging form 500 to 1,000 feet in length.

Drill Hole Geochemistry

Significant drill intercepts are summarized in Table 1. Data for drill hole RL – 120B(?) are in the drilling database, but drill log and sample geochemistry could not be located.

Table 29. Significant drill hole intercepts in the Wild Rose area.

Drill Hole	Interval (ft.)	Depth (ft.)	Au (opt)	Ag (opt)
RL - 119	5	465 - 470	0.010	--
RL - 120A	5	40 - 45	0.035	0.10
	15	110 - 125	0.015	0.09
	20	155 - 175	0.015	0.06
	5	265 - 270	0.042	0.27
RL - 120B?	10	125 – 135	0.010	--
	10	195 – 205	0.010	--
RL 157	10	225 – 235	0.010	--
	15	275 – 290	0.010	--
	10	295 – 305	0.010	--
	40	320 – 360	0.011	--
97 - 392	10	215 – 225	0.10	--

GOLD MINERALIZATION

Past Production

There is no known precious metal production from the Wild Rose area.

Distance from the Rosebud Mine

The prospect area is ~6,500 feet northeast of the Rosebud mine.

GEOPHYSICS

The geophysical model of the magnetic and gravity data that was developed for the Chance prospect crosses onto the Wild Rose area in the northern portion (right side) of the cross section, and is reproduced below (Fig. 23, page 167).

Induced Polarization

No induced polarization data.

Resistivity

A resistivity survey was conducted at Wild Rose, but the data can not be located. Hand-contoured data shows a strong correlation between low resistivity values, positive geochemical anomalies, and exposed and inferred geologic structures.

Magnetics

Airborne

Dominant set of 050°-trending structures are coincident with anomalous rock-chip geochemistry, and intersect east-trending structures. Areas of low magnetic relief may reflect hydrothermal alteration. Modeling indicates the presence of an intrusive body, represented by K values ≈ 5000 $x10^{-6}$ cgs and hydrothermal alteration (K = 0 $x10^{-6}$ cgs).

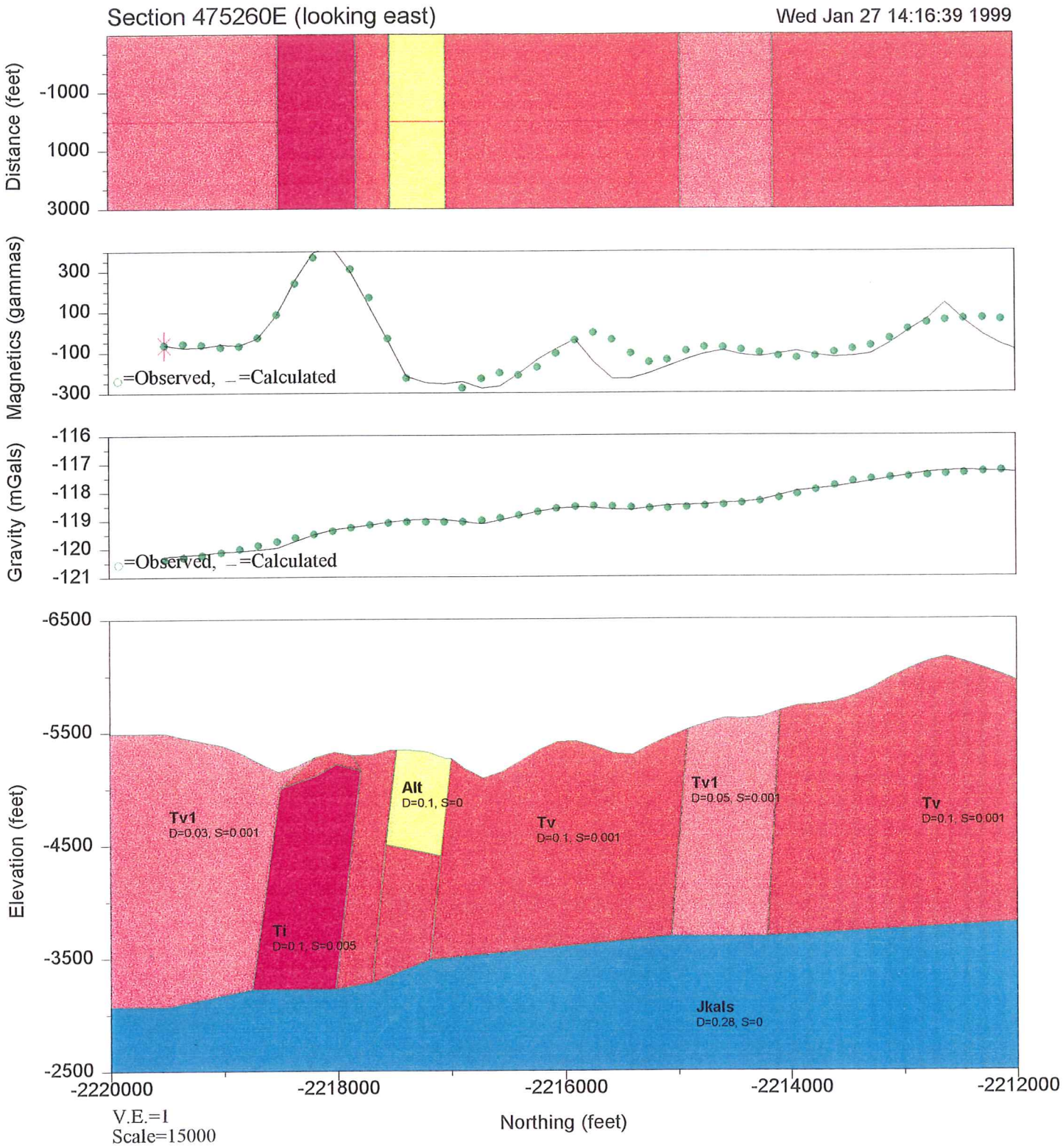


FIGURE 25. Geophysical model (magnetics and gravity for the Chance and Wild Rose areas.

Ground

No ground magnetic data were collected.

Radiometrics

The ratio of the three elements (K, Th, U) identifies surficial hydrothermal alteration. The radiometric signature is similar to alteration-related anomalies in other parts of the Rosebud mining district. Radiometric anomalies may be related to hydrothermal clay minerals.

Potassium

There is a strong potassium signature that reflects 2 to 4 wt.% K .

Thorium

The thorium data shows high relief.

Uranium

The uranium data shows high relief.

Gravity

There is poor gravity coverage in the Wild Rose area. Small gravity features may reflect lithologic contacts and areas of hydrothermal alteration.

Thematic Mapper

End member analysis identified clay alteration, and 070°- and 090°-striking lineaments.

DRILL HOLES

Geologic and drill hole collar maps indicate that eight reverse circulation rotary drill holes were completed within the Wild Rose prospect area (Table 30, page 169). Drill hole RL – 120B? is plotted on the drill hole collar map, but the drilling statistics could not be located.

ACCESSIBILITY

The Wild Rose area is relatively inaccessible. The only roads are four-wheel-drive tracks along the stream valleys of Juniper and Wild Rose canyons.

LAND STATUS

Ownership

The prospect is covered by unpatented (Bud Group) lode claims.

Table 30. Drill hole statistics for the Wild Rose area.

Drill Hole	Company	Azmuth (°)	Angle (°)	TD (ft.)
RL – 118	Lac	035	-45	640
RL – 119	Lac	180	-45	500
RL - 120A	Lac	020	-60	495
RL - 120B?	Lac	157	?	?
RL 157	Lac	020	-60	405
97 - 388	Santa Fe	155	-70	920
97 – 391	Santa Fe	180	-60	1400
97 - 392	Santa Fe	180	-60	1200

Royalties

The Wild Rose prospect area is completely within the limits of Euro-Nevada's 4% net smelter return royalty.

RECOMMENDATIONS

- Collect gravity data on a 400 by 400 foot grid.
- Complete a detailed geologic of the prospect area.

COST TO FIRST DECISION POINT

The cost to complete the recommended work is approximately $14,000.

- Gravity survey: $6,000; 200 stations at $30 per station.
- Geochemistry: $7,950; 100 rock-chip assays at $21.50 each, 200 soil samples at $10 each, and 200 soil assays at $19 each.

REFERENCES

Brady, M.W., 1996, Drill proposal for the Rosebud property, Pershing and Humboldt Counties, Nevada: Unpublished Hecla Mining Company Report, 81 p.

Brewer, N.H., 1991, 1990 Annual progress report, Rosebud project, Pershing County, Nevada: Unpublished Lac Minerals company report, 28 p.

Conelea, R., and McCulla, M., 1996, Rosebud target rankings: Unpublished Santa Fe Pacific Gold Corporation, 19 p.

Culbert, R.R., 1991, Report on geophysical and soil geochemisty surveys, Wildrose property, Pershing county, Nevada: Unpublished Equinox Operations Group Report, 14 p.

Kuhl, T., 1993, 1992 summary report, Rosebud project, Pershing county, Nevada: Unpublished Lac Minerals Report, 17 p.

Turner, S., 1997, Rosebud property, Pershing County, Nevada: technical review: Unpublished Newmont Gold Company Report, 19 p.

SHORT SHOT

TARGET CONCEPT

Bonanza-grade stockworks and veins within structurally controlled bodies adjacent to a Rosebud quartz latite dike. Proximity to the School Bus Canyon fault zone may be important.

Potential Target Size

200,000 to 400,000 ounces Au

Grade Potential

0.2 to multiple ounce Au, averaging 0.4 oz/st Au and 1 oz/st Ag

GEOLOGY

Lithology

A WNW-trending dike of Rosebud quartz latite cuts a thick (~1200 ft) sequence of Wildrose rhyolite. Local interbeds of gray or green epiclastics ("Bud-type") occur within the section. To the east, and up section, are interbedded tuff, vitric tuff, ignimbrite(?) and flows (previously assigned to "Bud volcanics").

Rock Structure

No major faults associated with alteration are recognized. A splay of the School Bus Canyon fault projects into the area, but different mappers do not agree on its presence.

HYDROTHERMAL ALTERATION

Type and Intensity

Moderate silicification occurs in the vicinity of a historic prospect, and silicification is noted down-hole in RS-455, closely associated with dikes of Rosebud quartz latite. Argillization occurs at the surface along the Rosebud quartz latite dike, mostly in the footwall.

Areal Extent

Weak to strong alteration exposed 2000 ft by 800 ft.

GEOCHEMISTRY

Relative to other target areas, Short Shot has a robust geochemical anomaly at surface.

Surface Geochemistry

Rock

Eleven rocks contain anomalous gold: one is 0.5-1 ppm, seven are 0.1-0.5 ppm, and three are 0.01-0.1 ppm. All contain anomalous trace elements (Sb, Se, Ag, Hg, As). High Ag values occur in the draw above RS-455 (towards White Alps).

Soil

Gold-in-soil anomaly 1500 by 800 ft ranging from detectable to 341 ppb. Many Se values 1-5 ppm; Sb 5-10 ppm; Hg 0.5-1.0 ppm; Ag 0.5-5 ppm; and As a few values from 25-100 ppm.

Drill Hole Geochemistry

The significant intercepts in drill hole in the Short Shot area are given in Table 31.

Table 31. Significant drill hole intercepts at Short Shot.

Drill Hole	Interval (ft)	Depth (ft)	Au oz/st	Ag oz/st	Comment
RL238	Nil				
RL239	20	45-65	0.01		
	40	120-160	0.01		
RL240	Nil				
RL244	Nil				
RS455	20	275-295	0.001		2.2 ppm Se
	5	340-345	0.013	0.06	11.7 ppm Se
	10	385-395	0.01		18 ppm Se

GOLD MINERALIZATION

Past Production

None that is known. Only a few minor workings are present.

Distance from the Rosebud Mine

8000 feet northwest

GEOPHYSICS

Induced Polarization

One IP line (of three over the prospect) has small chargeability anomalies of greater than 25 msecs at 250 ft depth.

Resistivity

Southwest-dipping N50E-striking structure to 400 ft depth along the south of the prospect bounding high resistivity to the north and low resistivity to the south. A north-dipping fault with a similar azimuth could also be present.

Magnetics

Airborne

Prospect is positioned on the north end of a magnetic high (intrusive?). Also lies on a major N50E structure.

Ground

N/A

Radiometrics

Potassium

No significant anomalies.

Thorium

No Significant anomalies.

Uranium

Very high anomaly which also extends to the south (intrusive? – see magnetics).

Gravity

On a gravity high suggesting denser volcanic package (no alteration). The earlier identified gravity gradient between Short Shot and White Alps is attributed to >1200 ft of denser unaltered flows of the Wildrose rhyolite, in juxtaposition with argillized rock at White Alps.

Thematic Mapper

Alteration prevalent. N115E linear defined to the north. End member clay prediction suggests some clay alteration.

DRILL HOLES

See Table 31.

ACCESSIBILITY

Road access is fair. Additional road building may be needed.

ROYALTIES

Mostly within the 4% Euro-Nevada plus 5% Degerstrom boundary. Part of the target to the northwest carries no royalty.

COST TO FIRST DECISION POINT

The estimated cost to the first decision point is $50,000.

The first deep hole (RS-455) drilled at Short Shot is disappointing because it failed to intersect long intervals of argillized rock, even within favorable stratigraphy, in contrast to other deep holes between Dreamland and White Alps. The hole may be on the NW (footwall?) side of the Schoolbus Canyon fault system. The trace is parallel to the margin of the altered northwest-striking RQL dike. The remaining drill targets are envisioned to be the silicified margins or interior of the dike.

Two or three 1000-foot RC holes would advance the target to the next decision point. The cost of this work is about $50,000 (3000 X $13/ft = $39,000, plus assays, site prep, etc).

REFERENCES

Brady, M. W., 1996, Drill proposal for the Rosebud property, Pershing and Humboldt County, Nevada: unpublished consulting report for Hecla Mining Company dated 1/15/96, >100 p. (Short Shot is discussed on p. 13).

Brewer, N.H., 1991, 1990 annual progress report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 28p.

Conelea, R., and McCulla, M., 1996, Rosebud target rankings: draft report by Santa Fe Pacific Gold Corporation, 19 p., 1 location map.

Kenner, K. L., and Brewer, N. H., 1990, 1989 annual summary report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 15 p., 1 pl. (Short Shot is discussed on p. 12).

Kuhl, T. O., 1992, 1991 summary report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 14 p., figs, plates.

Kuhl, T. O., 1993, 1992 summary report, Rosebud project, Pershing County, Nevada: unpublished LAC Minerals report, 17 p., 5 appendices, 4 plates. (Short Shot is discussed on p. 4.)

Turner, S. J., 1997, Rosebud property, Pershing County, Nevada: technical review: unpublished Newmont Exploration Ltd report, 19 p.

APPENDIX

Prospect Rating and Ranking

WORKSHEET DEFINITIONS

The objective of *rating* the prospects within the Rosebud district is to develop a relatively uniform basis for their comparison and internal *ranking*. The prospects are rated by assigning a very favorable (++), favorable (+), neutral (0) or unfavorable (-) rating to the most important attributes of the prospect. This process is clearly qualitative, but adherence to a standard questionnaire ensures that comparable data are compiled for each prospect, and that ranking process is as quantitative as possible. Because the databases used for the prospects are at different stages of completion, and it is not possible to evaluate all of the rating categories for each area, and because the significance of the various attributes varies, the final ranking may not necessarily reflect the mathematical sum of the ratings. Ranking is a collective effort made by simultaneously comparing the ratings data for all of the prospects. The position of a prospect within the priority seriatim reflects the groups "belief" that there is a higher probability that economic gold will be discovered at the prospect than at the those positioned below it.

TARGET CONCEPT

Explain the target concept in two to three sentences.

Potential Target Size

The resource tonnage potential, in million short tons, given the current understanding of the target style and geometry, and assuming underground gold grades.

+ >1.0 million tons
0 0.2 to 1.0 million tons
- <0.2 million tons

Grade Potential

The ore grade potential in ounces per short ton Au equivalent, for the deposit style and geometry modeled.

++ >1.0 ounce per ton
+ 0.5 to 1.0 ounce per ton
0 0.25 to 0.4 ounce per ton
- <0.25 ounce per ton

GEOLOGY

Lithology

Briefly describe the geologic setting of the prospect. Include descriptions of the units which are suspected to host ore.

+ Favorable setting with significant thickness of favorable host rocks
0 Permissive setting and\or limited thickness of favorable host rocks
- Unfavorable setting and\or host rocks

Rock Structure

Briefly describe the structural setting of the prospect. Emphasize the structural features that control, or may control hydrothermal alteration and mineralization, ie. bedding, joints, faults and folds.

+ Structural setting is highly favorable for hosting a large ore deposit
0 Unknown or permissive structural setting for hosting a large ore deposit
- Unfavorable structural setting for hosting a large ore deposit

HYDROTHERMAL ALTERATION

Describe the type, intensity and arial extent of hydrothermal alteration exposed at the surface and identified core or cuttings. Note whether or not the alteration type associated with the target is associated with ore elsewhere in the district, and if there is quantitative (XRD, PIMA) confirmation of the clay minerals present.

+ Large areas of strong hydrothermal alteration of a type favorable for hosting ore
0 Unknown type of hydrothermal alteration, moderate extent of hydrothermal alteration of type that is favorable for hosting ore, or hydrothermal alteration of a type that is only permissive for hosting ore
- Unaltered, or limited extent of weak hydrothermal alteration

GEOCHEMISTRY

The geochemical ranges that should be used during prospect ranking and to prepare the prospect compilation worksheets are: ore-grade gold , Au ≥0.18 opt; strongly anomalous, Au ≥ 500 ppb, Ag ≥0.25 opt, Se ≥5 ppm, As ≥50 ppm, Sb ≥10 ppm, Mo ≥5 ppm.

Surface Geochemistry

Briefly discuss the annalyzed elements, detection limits and laboratories (if more than one), areal extent of the survey(s), sample intervals, and results of both surface rock-chip and soil sampling programs.

++ Multiple ore-grade Au assays within a discrete area of strongly anomalous multielement geochemistry
+ Strongly anomalous Au, Ag, Se and As ± Sb and Mo within a discrete area
0 Detectable Au, Se and As ± Ag, Sb and Mo
- Gold assays <5ppb associated with weakly anomalous Ag, As, Se, Sb and Mo values that do not form a coherent spatial pattern

Drill Hole Geochemistry

Summarize the drilling results for the prospect, emphasizing significant gold and/or silver grade-thickness intervals. Briefly discuss intensity and extent of significant isolated intervals or continuous zones (multiple drill hole intercepts) of anomalous Au, Ag, Se, As, Sb and Mo in both reverse circulation rotary cuttings and/or diamond drill core.

++ Drill holes which intersected extensive intervals of strong hydrothermal alteration with multiple ore-grade gold and/or silver intercepts
+ Drill holes which intersected extensive intervals of strong hydrothermal alteration with detectable Au and Ag
0 Undrilled or varied drilling results
- Dominantly negative drilling results

GOLD MINERALIZATION

Past Production

Describe the type and extent of prospecting and/or past production within the prospect area.

++ Past production, abundant ore-grade surface rock-chip values, or significant ore-grade intercepts in multiple drill holes
+ Extensive prospect pits and/or short adits and shallow shafts, scattered ore-grade Au values in surface rock-chip samples, or significant intervals of strongly anomalous Au in multiple drill holes
0 Sparse and/or small prospect pits, detectable Au in surface rock-chip samples, no significant drilling results
- No obvious prospecting activity

Distance from the Rosebud Mine

Is it possible to access the proposed deposit from the existing underground workings?

+ The proposed deposit is within 4000 feet of the existing mine workings
0 The proposed deposit is between 4000 and 6000 feet of the existing workings
- The proposed deposit is >6000 feet from the existing mine workings

GEOPHYSICS

Induced Polarization

Describe the intensity, extent and significance of all chargeability anomalies.

+ The modeled chargeability data supports the target concept
0 No data, or the modeled chargeability data does not alter the target concept
- The modeled chargeability data does not support the target concept

Resistivity

Describe the intensity, extent and significance of all resistivity anomalies.

+ The modeled resistivity data supports the target concept
0 No data, or the modeled resistivity data does not alter the target concept
- The modeled resistivity data does not support the target concept

Magnetics

Describe the ground and airborne magnetic signature of the prospect area.

+ The modeled magnetic data supports the target concept
0 No data, or the modeled magnetic data does not alter the target concept
- The modeled magnetic data and the target concept

Radiometrics

Describe the intensity, extent and significance of any radiometric anomaly (K, Th, U, total counts.

+ The modeled radiometric data supports the target concept
0 No data, or the radiometric data does not alter the target concept
- The modeled radiometric data does not support the target concept

Gravity

Describe the gravity signature of the prospect area

+ The modeled gravity data supports the target concept
0 No data, or the modeled gravity data does not alter the target concept
- The modeled gravity data does not support the target concept

Thematic Mapper

Describe the type (mineral) and extent of the alteration anomaly.

+ Strong, spatially extensive anomaly that supports the target concept
0 Weak, moderately extensive anomaly that does not alter the target concept
- No alteration anomaly

DRILL HOLES

Briefly summarize the extent to which the prospect has been drilled, and amount of area that remains "untested." If drilling has occurred on the prospect, include a table showing the number, type and depth of all drill holes.

+ Very limited or no drilling
0 Moderately drilling
- Extensively drilled

ACCESSIBILITY

Summarize the difficulty in accessing the prospect due to terrain and weather constraints.

+ Easily accessible from existing roads with a minimal amount of surface disturbance and permitting
0 Not accessible from existing roads, but requires only modest surface disturbance and permitting
- Difficult accessibility requiring extensive surface disturbance and permitting

LAND STATUS

Ownership

Give the names of the people or organization that controls the property if the prospect is outside the boundaries of the Rosebud joint venture agreement.

+ The property is open for claim staking
0 The property status is unknown, or the property may be acquired through a relatively simple and inexpensive agreement
- The property is not available for acquisition, or may be acquired only through a complex and expensive agreement

Royalties

Describe any royalty agreement, other than Euro-Nevada's 4% net smelter return, that may adversely effect profitability if the joint venture company were to produce from the conceptual deposit.

+ No royalty
0 Combined royalty payments are <5% of the net smelter return
- Combined royalty payments are ≥5% of the net smelter return

RECOMMENDATION

What should be done with the prospect? If it is recommended to continue exploration on the property, describe in detail how to proceed to the "first decision point."

COST TO FIRST DECISION POINT

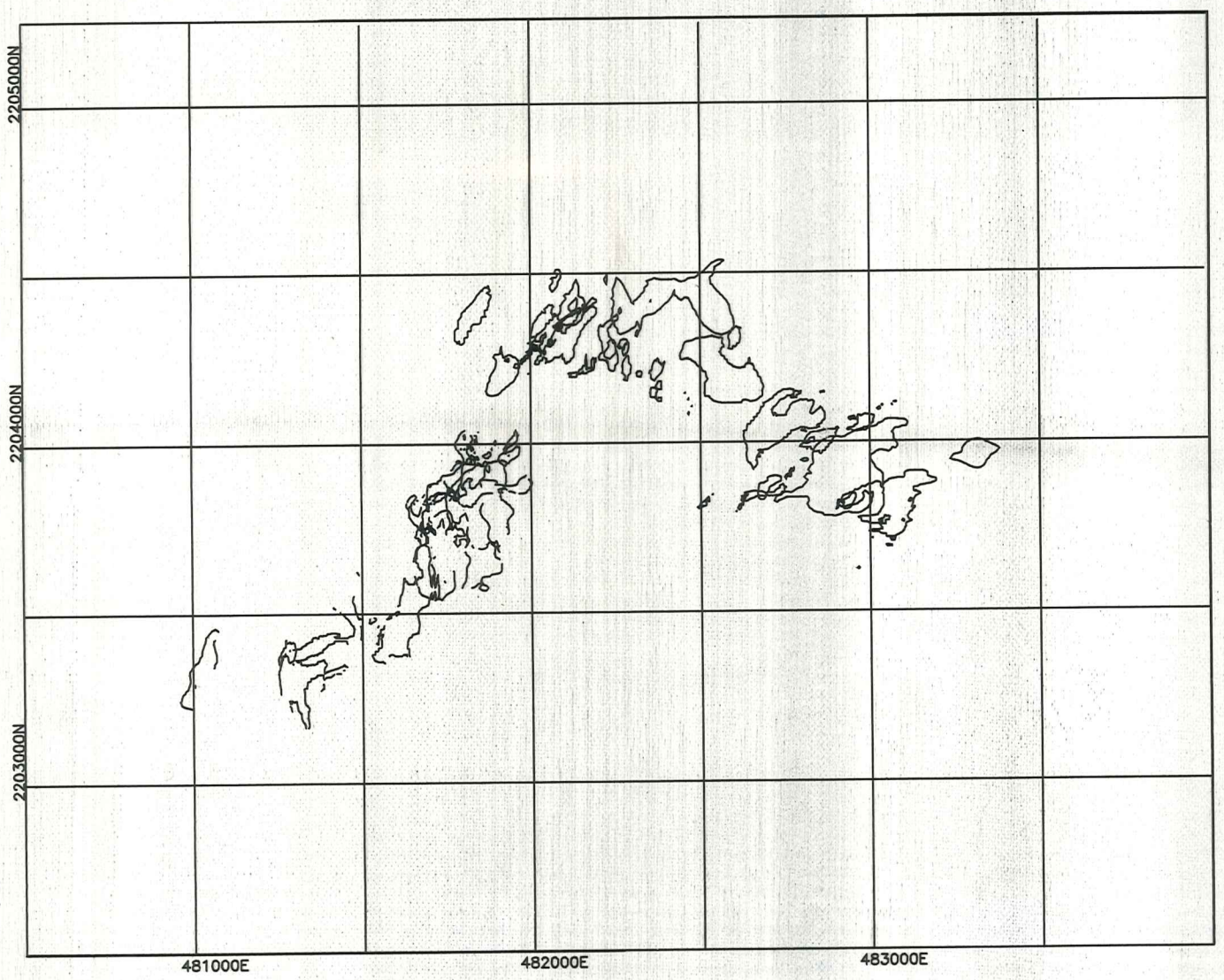
Define the "first decision point." What information is needed and how much it will cost (in dollars) to gain sufficient encouragement to continue exploring for the conceptual target. Cost estimates are to be itemized under the following headings: geology (number of man days needed for mapping), geochemistry (number of samples, estimated cost per sample), geophysics (technique(s) and their estimated costs), and drilling (road construction and reclamation, reverse circulation rotary footage, core footage, assay costs).

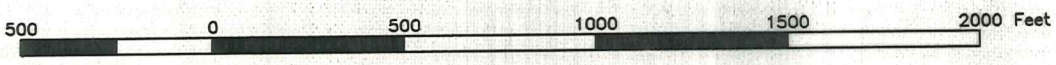
++ <$50,000
+ $50,000 to $100,000
0 $100,000 to $200,000
- >$200,000

REFERENCES

Any material cited in the text should be listed at the end of the prospect summary sheet. Ultimately, this section should include all published reports that pertain to the property, unpublished reports and memoranda, geochemical and geophysical surveys, all databases, maps, and cross sections.

Please follow the reference format used in the Geological Society of America Bulletin.





ROSEBUD FOLIO
0.05 GOLD SHAPE
Composite

Fig. 4e