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Mining District File Summary Sheet

DISTRICT	Rosebud
DIST_NO	4010
COUNTY If different from written on document	Pershing
TITLE If not obvious	1998 Annual Exploration Report, Rosebud Mining Company LLC, Pershing and Humboldt Counties, Nevada, August 18, 1999
AUTHOR	R Vance
DATE OF DOC(S)	1999
MULTI_DIST Y / N? Additional Dist_Nos:	
QUAD_NAME	Sulphur 7.5'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine; Rosebud Project; Newmont Mining Corp; Rosebud Mining Co. LLC; Dozer Hill; South Zone; North Gator Crossing; School Bus Canyon; Valley; Dozer West; Dozer East; Wild Rose West; Wild Rose East; Gator; Sierra; Chance; BNE; North Equinox; Horse Flats; Short Shot; Dreamland; Mother Lode; Oscar; South Kamma; Crafoot-Lewis Mine; Hecla Mining Co.
COMMODITY If not obvious	gold; silver
NOTES	Exploration report; property report; property map; geology; drill hole summaries; reserves; resources; production ~~46p.~~ 48

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: DD 6/4/08 (Initials / Date)
DB: mah 7/08 (Initials / Date)
SCANNED: NV Blue (Initials / Date)

Revised: 1/22/08

Newmont Exploration [redacted] 1998 Report
ANNUAL

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1998 Annual Exploration Report
Rosebud Mining Company LLC
Pershing and Humboldt Counties, Nevada

by

Randall B. Vance

Newmont Mining Corporation
Winnemucca, NV

August 18, 1999

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1998 Rosebud Annual Exploration Report

INTRODUCTION

The Rosebud mine, located 55 miles west of Winnemucca in Pershing County, Nevada, is a Newmont/Hecla joint venture (50:50). The Rosebud deposits are Miocene(?)-age, volcanic-hosted epithermal gold-silver deposits of the low-sulfidation type. Free-milling sulfide stockworks are associated with illitic and kaolinitic clays in the South zone, and silica and illite-dickite clay in the East zone. The dominant ore minerals are marcasite, ruby silvers (pyrargyrite >> proustite), electrum, naumannite, and argentite. The primary control on the deposits is structure. The North and South zones occur in the hanging wall of the South Ridge fault, and the East zone occurs within and in the footwall of the South Ridge fault. Lithology is an important secondary control in the South zone. The deposits are surrounded by a broad halo of argillized volcanic rock.

Newmont Gold acquired its ownership in the venture in May 1997, as part of the Santa Fe Pacific Gold Co. merger. The joint venture is established as Rosebud Mining Company LLC. Hecla Mining is the mine operator, and Newmont Gold is the operator for milling and exploration. All exploration expenditures are shared 2/3 Newmont and 1/3 Hecla. The property consists of 843 unpatented claims and three patented claims.

During 1998 the Rosebud mine produced 130,992 ounces gold at a grade of 0.400 oz/st gold and 556,580 ounces of silver at a grade of 3.06 oz/st silver. Gold recoveries were 97.0%, and silver recoveries were 54.4%. Total cash costs were $176/ounce, and total production costs were $274/oz (Hecla, 1999). Mining costs were $26.88/ton, milling costs were $14.66/ton, and ore trucking costs were $0.15/ton-mile. At the end of 1998, using a cutoff of 0.18 oz/st gold, the proven and probable reserve was 0.484 million tons at 0.392 oz/st gold and 1.8 oz/st silver, containing 189,615 ounces gold and 872,503 ounces silver (Allen, Clayton, and Moore, 1999). At the current production rate, the mine life will expire in the fourth quarter of 2000.

This report relies on background information presented in the *1997 Annual Exploration Report* (Vance, 1998a), and refers to other sources where appropriate. In many cases, specifics from the cited references are omitted in the interest of brevity. For general background information, the reader is referred to the Rosebud Mining Co LLC monthly reports (Vance, 1998c), the near-mine exploration target report (Rogowski, 1998), and site reports by Steve Turner (1997a, 1997b).

1998 PROGRAM

The exploration program during 1998 was staffed with two full-time Newmont geologists (Langstaff, Vance) who were joined in March by a third (Mitchell). A geologic consultant (Rogowski) supplemented this effort at Vertex and Near-Mine targets. Deep targets at Dreamland, Lucky Boy, Brown Palace, and White Alps were the primary emphasis for the year (Figure 1). Surface work (mapping and minor geochemical sampling) and data review were completed at South Ridge, South Kamma, Vertex, Valley, and northeast of the mine. Additionally, several exploration holes were drilled from the mine to test near-mine targets.

Folio development continued from 1997. A variety of geology, geochemistry, geophysical and drill maps were plotted at 1:24,000, 1:6000, and 1:2400 scales. The 24,000 folio is essentially complete, except for needed updates and edits of the rock and soil geochemical database. The 6000 folio is also complete for Sheets 1 and 3 (Figure 2). Sheet 2, which covers the extreme south end of the property, has little data. The names of Lac's 2400 folio were modified to better reflect the target locations (Figure 3). The current inventory of folio maps is shown in Table 1.

Geology

Background information and various aspects of the Rosebud regional and mine geology are described in Allen, Clayton, and Moore (1999), Allen and Clayton (1997), Allen (1996), Brady (1996), Moore (1991), Muerhoff (1995), and Vance (1998a), and are not repeated here.

The Rosebud deposits are best classified as epithermal deposits of the low-sulfidation type (*see* Hedenquist and others, 1996; White and Hedenquist, 1995). Rosebud includes similarities to several other Tertiary volcanic-hosted deposits in northwestern Nevada, such as Sleeper, Comstock, Mule Canyon, Hollister, and Midas (*see* Wallace and John, 1998). One of Rosebud's major differences, particularly to Midas and Sleeper, is the lack of steeply dipping banded veins. Also, in contrast to Midas and Mule Canyon but similar to Sleeper, the wallrock surrounding the Rosebud deposits is commonly argillized and pyritized for hundreds of feet. Lastly, the alteration is strongly influenced by low- to moderate-angle dipping faults. Core, RC holes, and surface outcrops display alteration that is asymmetric around the primary structure: it occurs either in the hanging wall or footwall, but generally is not symmetric. This seems to reflect what is seen in the deposits: the South and North Zones are in the hanging wall of the South Ridge fault and the East Zone is in the footwall. The hanging wall portion of this occurrence model was described by Brewer (1991, p. 9).

During 1998 progress was made in the areas of petrography (Langstaff, 1998h; 1998i; Williams, 1998), whole-rock geochemistry and rock classification

(Langstaff, 1998d, 1999m; Mahood, 1998). The stratigraphic column was refined and improved (Mitchell, 1998b).

Consultants Williams (1998) and Mahood (1998) provided petrographic descriptions. They prepared their own thin-sections; others were prepared by Vancouver Petrographics Ltd. (Langley, BC) or Idaho Petrographics (Grangeville, Idaho). A concerted effort was made to locate the several hundred thin-sections previously prepared by Lac. Many geologists formerly associated with the project were contacted, and offered suggestions, but none knew definitively the location of the thin-sections. They disappeared sometime between Hecla's office relocation from Winnemucca to the mine and Santa Fe's entree into the joint venture. Many of Lac's thin-section billets were found in a weathered cardboard box. Unfortunately it was destroyed in a warehouse fire. A spreadsheet (***R:\geology\reports\technicalmemos\tables\miscsamp.xls***) tracks most of the samples submitted in late 1997 and 1998 for thin-section and/or whole-rock analyses (Tables 2 and 3).

The 1:6000-scale regional geologic and structure map by Moore (1991) was drafted in AutoCad to aid in tectonic and stratigraphic understanding. The north and south sheets were drafted in black and white, and cross sections were drafted on one sheet. (The interpretation overlays were not drafted in AutoCad.)

The 1998 magnetic declination, 15.7°, was determined in October, 1998, from IGRF, using Newmont software. The change is decreasing 3.9′ per year. The Sulphur (1981) 7.5 minute quadrangle shows 17°, which after adjusted for 16 years, compares closely to the IGRF estimate.

As a way to better visualize and model the geologic shapes in the Rosebud mine, particularly the South Ridge fault, digitized shapes (in Surpac) were acquired from Hecla in the spring of 1999, downloaded into Geomodel, edited, and modeled. The results of this work are stored on Newmont's Winnemucca network at ***/nmt/explore/rosebud/model/feb99/.***

The geometry of the South Ridge fault (in the mine) relative to the Sharkfin and Office faults (surface outcrops) received considerable attention (Langstaff, 1998f). The primary supposition was the Sharkfin is actually a high-angle structure, and that a primary feeder fault, largely untested, might lie down-dip of the Sharkfin. Eventually an exploration hole (RS-D350-99) was drilled in 1999 from the southeast part of the East Zone, but it failed to substantiate the concept. Rather, the Sharkfin "fault" may simply be a flexure in the South Ridge fault, with the flexure plunging ~ -30, N50°W. The modeling mentioned above requires a distinct concave-upward bend to connect the South Ridge fault in the mine to the surface outcrops (Sharkfin and Office fault). Why the dips in the South Ridge are similar for more than 2000 feet before dramatically curving upward as it approaches the surface outcrops seems to be more than coincidence, but is not understood.

The Hidden fault, first identified by G. Langstaff, and briefly described by Vance (1998c), was further supported by geochemical plots and reprocessed gravity during early 1999. The Hidden fault bounds the North and East Zones on their northeast sides, striking N50°W, and dipping steeply. The Hidden fault shows offset on the Auld Lang Syne basement surface, and seems to be reflected in the gravity data, which shows a modest northwest-trending high from Dozer Hill towards Dreamland.

1998 Results and Conclusions

Continuing exploration at Rosebud has led to the following geologic observations and conclusions:

- *Petrographic and whole-rock analyses show that the majority of the rocks are rhyolite (including alkali rhyolite and rare high-silica rhyolite) or quartz latite. These determinations were made using TAS (total alkali versus silica) plots of whole-rock geochemical data (Figure 4), and calculated CIPW norms of chemical data plotted on IUGS classifications (Figure 5) (Langstaff, 1999m). There are a few samples that are rhyodacite, dacite and andesite. The Kamma Mountain volcanic rocks are weakly alkaline.*

- *Surface mapping at Short Shot, White Alps and Dreamland identified a new rock unit, named the Rosebud quartz latite (RQL) (Mitchell, 1998a), which is widely altered. The RQL has rare phenocrysts of ß-quartz and sanidine. It intrudes the Wildrose northwest of White Alps as a dike, and shows sill-like contacts elsewhere. Most previous mapping lumped this with Chocolate, but it is distinctly different than typical fine-grained, biotite-hornblende-bearing Chocolate flows. The presence of quartz is definitive, but because quartz phenocrysts are relatively rare, their absence in any single specimen cannot be used as evidence against RQL. Altered rock in RC chips has a granular texture, recognizable sanidine phenocrysts, and rare quartz phenocrysts that are sometimes smoky.*

- *Significant progress was made understanding the Rosebud stratigraphic column and unusual nomenclature. Santa Fe's tentative correlation of the mine's LBT unit with Brady andesite (equal to Wildrose rhyolite) appears correct. The deep holes at Short Shot and White Alps (RS-455, -456) clearly show Bud epiclastics (including Bud volcanics) overlying Wildrose rhyolite, which in turn overlies the "mine Tos". Another Bud-type epiclastic/volcanic breccia occurs in the Chocolate formation at White Alps.*

- *The roots of the Rosebud deposit are not well understood. The South Ridge fault is recognized as a primary conduit for ore fluids, yet it has not been drilled extensively down-dip from the mine workings. The evolution of the*

fault and its relationship to tilted stratigraphy is critical to understanding the timing of ore, and the amount of rotation of the deposits, if any. The presence of silicified and mineralized basement with sub-ore grades suggests the deposits have not been significantly displaced from the underlying low-grade metamorphic rocks. Exploration should continue to focus on (1) identification of ore conduits along and near the unconformity, (2) epithermal alteration and Rosebud-style geochemistry in the basement rocks, and (3) faults that propagate from the basement into the overlying volcanic rocks.

- *Last year the existence of the Rosebud shear, interpreted by Lac as a major left-lateral strike-slip fault, was questioned. Continuing logging, mapping, and analysis of geophysical data and structure contour maps generated additional evidence that the Rosebud shear, as defined by Lac, does not exist. Early in the year the location and significance of the Cave fault was recognized (Vance, 1998c, March), and we began to search along the valley for its possible trace. Only one outcrop (~2203100N,481200E) has been located that is believed to be the surface trace of the Cave fault. Both declines penetrated structures thought to be the Cave fault, and the fault in Decline #2 projects closely to the above surface outcrop. The Cave fault outcrop occurs near the intersection with the South Ridge fault above the southwest edge of the South Zone deposit, where the South Ridge steepens and is cut off by the Cave fault. This intersection is important, and will be evaluated more closely in 1999. About half of the surface trace of the Cave fault coincides with Lac's Rosebud shear.*

- *The Foundation fault, located at the base of the volcanic pile, does not appear to have* ***large-scale****, post-mineral offset in the Rosebud mine area because the ALS basement is locally silicified and mineralized (barite-marcasite-stibnite-pyrargyrite) beneath the North zone, and there are numerous white to gray Dozer-like altered dikes or sills cutting the basement in the mine area. A slickensided, planar tectonic fabric in carbonaceous phylite earlier interpreted as evidence for the Foundation fault may be an older penetrative metamorphic fabric, possibly developed during pre-Tertiary thrusting. The Foundation fault is better defined as the narrow (0.5-5 feet) breccia and microbreccia in the hanging wall volcanic rock, as seen in many core holes. In either case, most of the drill holes that reach the basement do not have major breccias or wide alteration across the contact. Yet the geochemical expression from the ICP shows consistent increases in the epithermal elements As-Sb-Se surrounding this contact (eg,. RS-401c, RS-423c, RS-425c, and RS-446c). In addition, elements commonly enriched in black shales (Mo-Ni-Zn-Cd-Co-Ag-V-Se) dramatically increase at the volcanic/phyllite contact.*

- *Although the basement surface is generally planar, with a gentle northwest dip, there are several places where adjacent drill holes encountered the basement at distinctly different elevations. Two examples are: RBW-17,*

RBW-16, and RS-407 in the Degerstrom target; and RS-406 and RS-424 in the East Dreamland target.

- *There are a few occurrences of altered dikes or sills intruding the basement (RS-448, -449, -451, -452), local decalcification of phyllite in contact with the volcanics (RS-D331-98), and possible carbon flooding along the Foundation fault. Several drill holes on sections show limited gold in the basement (e.g., RL-106c). These holes will be evaluated for underground exploration potential.*

- *The 1998 report stated* "Thick sections of unaltered rocks (1000-1200 ft) may overlie altered rocks (Dreamland). A major flat-lying fault occurs near the top of the lower altered zone." *This fault, which is approximately 50-70° to the core axis, possibly is the Cave fault, because it has the same stratigraphic offset as seen in the declines, i.e., Chocolate above Dozer. It completely cuts out the Bud, LBT, and Tos stratigraphy at Dreamland. As one moves towards the northwest (White Alps holes RS-445, RS-446), stratigraphy in the hanging wall of this fault moves down section (from Chocolate to Bud to LBT).*

Geochemistry

Craig Olsen of Newmont's Winnemucca office managed the geochemical and drill databases using Paradox and Stones software. Originally plans were made to convert to Newmont's GEMS database, but a manpower shortage and jurisdictional dispute precluded the conversion. During the last half of the year a geochemical study by Robert Jackson and Adi Sjoekri brought to light some discrepancies in the rock and drill hole databases. These problems were somehow introduced when the database was converted from Lac/Hecla to Santa Fe. A major review and edit of the rock database to correct the problem was completed in early 1999.

For drill hole composites, the same1997 partial-digestion, 31-element ICP package was used in 1998. The ICP analyses were completed by Acme of Vancouver as a subcontractor for American Assay of Reno. In general, the ICP package was run using 4-sample composites (20 feet) for the RC precollars, and multiple-sample composites for core tails which typically approximated 15-25 feet. Occasionally individual samples were analyzed if a core interval was well mineralized.

Robert Jackson, Newmont Gold geochemist, commented on the quality of the geochemical data:

The rock chip and drill hole data is of good quality. However, it needs to be noted that the drill hole data is derived from 2 different digestions. Most of the drill core from holes in and immediately adjacent to the Rosebud deposit were analyzed using a total digestion (hydrofluoric-perchloric-nitric acids). The remaining holes were analyzed using a partial digestion (hydrochloric-nitric acids). These data will be comparable for most elements, the exceptions being

the major elements Al, Na, K, Ti. Most of the Ca and Mg in these rocks are in carbonate forms that are readily extracted by both digestions.

The soil data suffers from a number of problems. The data was generated from multiple surveys that employed different analytical procedures. This has resulted in variable detection limits and relative accuracy shifts amongst surveys. Distinct differences are observed not only between adjacent surveys but also between overlapping surveys. Also, the soil fraction that was analyzed was –80#. This fraction contains considerable 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.

Robert Jackson and Adi Sjoekri completed a geochemical study of the ICP data from the Rosebud mine (1994 total digestion) and exploration drill holes (1997-98 partial digestion) (Jackson, 1998; Jackson and Sjoekri, 1998). The study generated two map sets. Plans of the mine area were generated at 1:6000-scale every 100 feet from 4300 to 5300 elevation. Plots were made for Au, Ag, As, Sb, Hg, Se, Ca, Fe, Ti, La, W, V, Zn and Zr every 100 feet (~154 maps), and for K, Cu, Mg, Mn, Mo, Na, Ni, and Sr every 300 feet from 4300 to 5200 (~32 maps). Plans of the claim block, including exploration and underground holes, were generated at 1:12,000-scale every 300 feet from 3400 to 6100 elevation. Plots were made for Au, Ag, As, Sb, Hg, Se, Ca, Fe, Mg, Zn, V, and U (~130 maps). As noted above, caution should be used comparing partial-digestion data in the exploration holes versus total-digestion data in the near-mine holes. For most elements they are not directly comparable.

The primary observations and conclusions of Jackson and Sjoekri's study were:

- Hydrothermal alteration (argillization, silicification) results in depletion of Ca, Mn, K, Na, Sr ± P, and enrichment of Au, Ag, Se, Sb, Hg, As, W, U, Cu, Mo, Te, Pb and to a minor degree Zn, Ni, Co, and Bi.
- Looking at very low levels of gold (ten to hundreds of ppb), the Au signature over top of the deposits is weak to unfocused and does not provide a clear target. The mineralization appears to neck down with depth below 5000 ft level, toward the North Zone.
- There is a strong suggestion that the mineralization is focused at the intersection of N-NE structures with E-NE and E-SE structures that are common to the two deposits (South Zone-North Zone, and East Zone). There is not much support for a northwesterly trend to the system. The Au system appears to be open to the E-SE where there is evidence for another locus or intersection with a N-NE structure that is mineralized.
- The upper level expression of the deposit is characterized by: (a) a Hg-Ag plume above the South Zone, (b) an Sb plume above the East Zone, (c) an As-Se plume along an E-W trend over the South and East Zones, and (d) Ca-Mn-Sr-P-Na depletion over the whole of the mineral system (Rosebud mine).
- The Hg signature dissipates at about the 4800 level.
- The basement rocks are enriched in Se, As, Sb, Ag, Mo, Zn, and Ba.
- The geochemical signature of the Rosebud mine is different than Dreamland.

They identified the following targeting favorability criteria based on the Rosebud model:

- Areas of complex structural intersections involving big regional fault zones
- Areas of carbonate and potassium depletion
- Strong multi-element geochemical signatures (Au, As, Sb, Hg, Ag, Se, Cu, Mo, Pb, W, U)
- Presence of felsic volcanic host rocks in the stratigraphic section
- Proximity to the basement contact

Using these criteria, they favored the following seven priority target areas: Degerstrom, Dreamland (in particular East Dreamland), North Rosebud Peak, North Equinox (north of the 212 fault), Oscar, Chance, and Gator.

Two comments concerning their study are warranted. First, the ALS basement can be distinguished geochemically from the volcanic rocks by browsing tabulated down-hole ICP data and looking for enrichments in Mo-Ni-Zn-Cd-Co-Ag-V-Se. Secondly, hydrothermally altered and mineralized volcanic rock can be identified in the same way by closely examining Se, As, Sb, and sometimes Hg. To date the trace elements do not markedly display halos or gradients around mineralized structures or the deposits any better than very low levels of gold (tens to hundreds of ppb).

Geophysics

A geophysical index map was compiled for the 1:24,000 folio (*Rosindex.dwg*). It shows the locations of the various ground and airborne geophysical surveys completed to date.

Radiometric maps (potassium, uranium and thorium) were plotted for the 1:24,000 folio. Potassium and thorium data appear to correlate more closely to mapped bedrock than does uranium. Ternary cluster images identify known altered areas around the mine, and highlight several new areas that warrant field checking.

Forty line miles of IP/resistivity were processed using Newmont inversion software. About 30 lines extend from South Ridge north to White Alps and North Equinox. The quality of the surveys is excellent, but the original survey parameters allow for modeling and interpretation only to about 400 ft. The modeled sections show resistivity contacts not recognizable from bedrock mapping.

An orientation gradient array IP survey, with the ability to penetrate about 1000 feet, was completed in an array south and west of the mine (Valley target).

Completion of the survey was hampered by cultural noise. Very low resistivities were found (single digits in ohm-meters).

The gravity grid was enlarged another 520 stations. It was increased to the west, northwest and north at 800 by 800 ft spacing, and to the east at 400 by 1000 foot spacing. At White Alps, a northeast-trending gravity gradient was originally interpreted to be upthrown basement. The gravity gradient was remodeled along line 2209000 N, but the density of Auld Lang Syne could not reasonably account for the anomaly at those depths. The new interpretation is that the gradient is caused by contrasting densities of volcanic rock, such as a thick sequence of unaltered rhyolite flows (Twr=LBT) on the west, against argillized and silicified rocks on the east, rather than an uplifted basement block on the northwest. The gradient therefore delineates an alteration contact. Although deep holes RS-455 and RS-456, on the northwest edge of the gradient, did not hit the basement, they and RS-445 and RS-446, on the southeast side of the gradient, contain evidence supporting this interpretation.

As a way to select the placement of the first offset hole to RS-425 (5.8 feet of 0.84 oz/st Au), down-hole IP was attempted to identify a chargeable concentration of sulfide. Perforated PVC pipe was installed inside the drill rods, and the rods were pulled over the top of the PVC. Unfortunately, the PVC pipe hung up on the bottom of the rods and it had to be removed. The open hole was adequate for the probe to reach the bottom of the hole at 2400 feet, and the survey was completed (Phillips, 1998b). Only small anomalies were identified in the survey. Apparently the chargeability contrast between the mineralized breccia and the altered wall rock is not sufficiently large to show a strong anomaly.

Drilling

Newmont drilled 28,849 feet of exploration hole during the year, consisting of 16,946 ft of reverse-circulation in 12 holes, and 11,903 ft of core in 16 core and RC/core combination holes (Figure 6 and Table 4). The drill results of individual targets are described below.

All surface drill holes were assigned an RS- prefix and numbered consecutively (from RS-427 to RS-456). A "C" suffix was used to denote core holes. There were four underground exploration holes drilled in 1998: D-280-98, D-331-98, RSDU-453A, and RSDU-454.

Similar to the fall of 1997, Newmont's *Drill Services Group* completed one phase of infill delineation drilling of the East Zone using RC precollars and core tails (RS-427 through RS-442). At the time of drilling, there was no underground access in the East Zone that could easily reach the area needing holes.

Drill hole monumentation and plugging procedures were the same as 1997 (Vance, 1998a, p. 4). Drill hole collars were surveyed in groups of 5 or 10 after completion. Because the pads were larger than in the past (with a deeper cut), the collar generally becomes buried under 1-5 feet of fill after reclamation. The respective core or RC driller completed the abandonment of drill holes. The core drillers abandoned the holes from T.D. to the base of the precollar, and the RC driller abandoned the hole to the collar when pulling the casing. In several instances in the deep holes, the level of the abantonite would drop significantly if the hole was left for a long period, in which case more was added. A cement plug and aluminum monument was placed in the top of the hole.

RC and core drilling contractors and earthwork contractors filled out daily drill reports using Newmont's standard form. Newmont's Drill Services personnel and Rosebud geologists monitored their progress on a daily basis, but the geologists did not sit the rigs. The daily reports were entered into Newmont's DrilCost tracking system, which provided monthly reports detailing drill progress and all associated costs.

Assay procedures established in 1997 continued during 1998 with one exception. In RC drill holes that intersected maroon to red, hematitic and unaltered rock, gold-silver intervals were increased from typical 5-foot samples to every fourth or fifth sample as a way to economize. Pulps were made for every sample in a drill hole. Core tails that lacked alteration were not sampled from top to bottom; rather spot samples of possible altered rock were taken to insure no surprises. For down hole geochemistry, American Assay of Reno provided a 30-element ICP + Se package using partial digestion (aqua regia). This analysis was run on 20-foot composites in RC holes. Core samples were composited into approximate 20-foot intervals, unless strongly mineralized rock was present, in which every sample was analyzed without compositing.

Exploration Targets

Exploration during the first half of 1998 was focussed on discovery of new deposits away from the Rosebud mine. Primary emphasis was placed on the Rosebud-Dreamland-White Alps trend, plus a single hole drilled at North Equinox. As the value of Rosebud's low-cost ounce production became more pronounced with falling gold prices, plans were made to begin exploration around the mine in an effort to extend the short mine life.

Deep Dreamland

Several deep holes drilled in the Dreamland target in 1997 intersected long intervals of altered rock, gold-silver mineralization with encouraging trace-elements, and significant low- to moderate-angle mineralized structures. RS-425, drilled in late 1997, intersected 5.8 feet of 0.856 oz/st gold in a sulfidic breccia within altered rhyolite (Dozer) in the footwall of a fault (Cave fault?). The Au:Ag ratio was 1:1. Three offset holes (RS-443, -444, -450) were drilled around RS-425, but failed to intersect gold greater than 0.095 oz/st. In fact, all three holes show distinctive geologic differences from the first hole. RS-443 may have crossed a steep east-west fault contact and gone into the footwall of the south side of the Dreamland block. RS-444 wandered south and intersected an unusual amount of intrusive rock, indicating proximity to a feeder zone. RS-450 intersected numerous steeply dipping white clay veinlets cutting weakly altered wall rock. Detailed analysis of the data is needed prior to drilling another hole.

Brown Palace & Lucky Boy

RS-422 was drilled in late 1997 as a step-out hole north of Lac's RL-290, and intersected 3.5 oz/st silver in the last 15 feet of the RC hole. A core tail was added in early 1998, and intersected vugs lined with pyrargyrite in the top of the core tail. Gold values were low. Strong alteration and low levels of gold and silver persisted at depth. The amount and intensity of argillization, pyrite, and structure are impressive.

RS-445 was collared near the base of a high-resistivity anomaly as seen in the Lac IP/resistivity. The target was to test the lower mineralized zone as seen at Lucky Boy and Dreamland. The hole intersected long intervals of strongly altered rock, including porphyritic rhyolite, planar laminated rhyolite (LBT), and sanidine-bearing rhyolite. Much of the hole showed clay alteration. The highest gold values were 0.023 oz/st, and the highest silver was 1.23 oz/st.

White Alps

White Alps knob is a bold outcrop of massive silica. The true dip of the White Alps fault has been debated in light of several Lac RC holes that seemingly missed the silicification. Some geologists thought the bold silica outcrops dipped north, whereas others interpreted the structure to dip south, as Lac obviously believed.

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White Alps

White Alps knob is a bold outcrop of massive silica. The true dip of the White Alps fault has been debated in light of several Lac RC holes that seemingly missed the silicification. Some geologists thought the bold silica outcrops dipped north, whereas others interpreted the structure to dip south, as Lac obviously believed.

Two holes were drilled at White Alps in 1998. The first hole, RS-446, was drilled 1100 ft east-northeast of White Alps knob. It was collared in strongly altered Rosebud quartz latite in the hanging wall of the eastern extent of the White Alps fault. The alteration is coincident with anomalous soil geochemistry. The hole intersected a thick interval of moderately to strongly altered RQL before entering Chocolate flows, Bud volcanics. At a depth of 1752 feet the hole hit a silicified fault zone between Bud epiclastics above planar-laminated rhyolite (Wildrose=LBT). The highest mineralized zones were 0.8 ft of 0.037 oz/st Au and 33 oz/st Ag, 2.3 ft of 0.024 oz/st Au and 17 oz/st Ag, and 6.1 ft of 0.01 oz/st Au and 5.4 oz/st Ag. The best values were associated with dark gray to black sulfides in sulfide veins or quartz veins that varied from 25-65° to the core axis.

A visually encouraging lower mineralized zone contained only 200-300 ppb Au and no silver. This lower zone occurs in the footwall of a sharp silicified fault, possibly the Cave fault, and contains pyrite, marcasite, stibnite, and white clay. The hole was deepened to 3070 ft until it hit the Auld Lang Syne basement. This is the deepest basement piercement drilled to date at Rosebud.

The second hole, RS-456, was drilled 350 ft northwest of the White Alps knob, near the intersection of a series of east-west and northeast-striking extension joints. In the road north of this collar for more than 500 ft are numerous fractures with silica, clay, and limonite; the dips are variable but dominantly vertical to slightly northward. Additionally, the collar was located near a jog in the N25E-striking gravity gradient. Originally the gravity gradient was believed to represent an uplifted block of the basement, and as such, represented an attractive conceptual location. However, prior to drilling RS-455, the gravity gradient was remodeled (Ferneyhough, 1998) and interpreted to reflect unaltered volcanic rocks on the northwest side juxtaposed against altered rocks on the southeast. The geophysical model could not account for, or distinguish, the original basement interpretation.

The hole was collared on the southeast side of the gradient. RS-456 intersected a major alteration contact at 270 ft before intersecting Bud volcanics (and epiclastics) from approximately 320-675 ft. A long interval of mostly fresh Wildrose rhyolite was intersected from 675-2270 ft, followed by "mine Tos" from 2270-2370 ft. A major fault occurs at 2370 ft, followed by dark aphyric Wildrose rhyolite from 2370 to 2620 ft. The lack of altered rock compared to holes to the southeast supports the interpretation that the hole is in the footwall of the White Alps fault, which dips steeply to the southeast. The geometry of the strong surface alteration is unclear.

Short Shot

Four shallow holes were drilled by Lac at Short Shot. Given the strong surface geochemistry on the south side of the RQL dike, which strikes west-northwest on

top of the ridge (Mitchell, 1998a), and the attractive surface alteration, a single vertical hole (RS-455) was drilled on the edge of the soil anomaly to test the hanging wall side of the dike. The hole intersected strong but narrow alteration associated with several altered RQL dikes, and bottomed in epiclastics (mine Tos) beneath a 1500-foot thick sequence of largely unaltered Wildrose rhyolite. The Tos is uncharacteristically thick here (~400 feet) compared to 100 feet thick just 1000 feet east in RS-456. The Tos in RS-456 is faulted out along a low-angle fault (40° TCA), and weakly altered and mineralized (1.5 ft of 0.006 oz/st Au and 2 oz/st Ag at 2373.7 ft) in contact with possible RQL. Both holes deviated northwest into the regional bedding. Both holes provide valuable stratigraphic and structural data.

North Equinox

A single hole was drilled at North Equinox to test the down-dip extension of a mineralized fault named "C-NNW" (Langstaff, 1998e). The hole intersected a long sequence of unaltered volcanic breccia before the hammer flooded out at a depth of 1600 feet. Given the weak alteration throughout most of the hole, the hole was terminated. Subsequent cross-sections indicate the hole may not have reached the "C-NNW" fault, but the level of certainty is low.

The source and hydrothermal fluid pathway for the massive silicification on the summit of USMM212 at North Equinox is not understood. The highest gold values occur on the eastern edge of the prospect, where two rock samples yielded 1.4 and 0.8 ppm gold, with anomalous Ag, Sb, Se, As, and Hg. The relationship of the 212 fault to drill hole 97-387, collared in the apparent footwall, needs to be better defined. Additional drilling at North Equinox is warranted.

Target 1A

Target 1A, described in detail by Rogowski (1998), is located southeast of the South Zone in the footwall of the South Ridge fault. Underground drill holes DRSU-453 and –454 were drilled from an exploration drift off of the 2300 access. Both holes penetrated long intervals of variably altered Dozer rhyolite containing only weak gold values. No significant mineralized structures were intersected, despite the fact that DRSU-453 approached the vent raise in the East Zone, where narrow mineralized structures are present.

Target 1B

Target 1B is located about 1000 feet northeast of the North Zone. Four vertical RC holes (RS-448, -449, -451, -452) were drilled to the basement to test the northeastern extensions of the deposits in the hanging wall and footwall of the

possible Cave fault. The strongest alteration and highest gold values occur in the top 470 feet of hole RS-448. Although detectable gold is present from the collar to 470 feet, no gold values exceeded 0.015 oz/st. Alteration posted on sections suggests the altered zone dips moderately to the northwest.

North Zone

D-311-98, an underground delineation hole in the North Zone, intersected silicified and mineralized Auld Lang Syne phyllite at the bottom of the 102-foot hole. A 300-foot exploration hole (D-331-98) was quickly sited in the same station to drill beneath (-20°) previous holes toward the contact of Dozer rhyolite and Auld Lang Syne. The hole intersected more than 250 ft of moderately silicified carbonaceous phyllite cut by quartz and barite veins, and containing pyrite, stibnite and lesser bladed marcasite and silver sulfosalts. Assays in the basement yielded multiple 0.01-0.02 oz/st gold, with a high of 0.142 across 0.5 ft, and several 1-6 oz/st Ag intervals, with a high of 14 oz/st Ag associated with pyrargyrite.

The presence of silicified and mineralized basement is significant, because the roots of the Rosebud deposit have not been identified or specifically targeted for exploration, and the potential is large. There are several epithermal deposits in the world occurring along the unconformity between the volcanic pile and underlying basement rocks. As an example, the Hishikari deposit in Japan (>8 million ounces) contains very high-grade banded veins (>1 oz/st) immediately beneath the unconformity of Tertiary volcanic rocks and underlying Cretaceous-age black shale, sandstone, and mudstone (Izawa and others, 1990). About 2/3 of the gold resource is in the Cretaceous rocks, and 1/3 is in the overlying volcanics.

Upon review of drill holes that reached basement in the North Zone, several intersected silicified basement and a few intervals are greater than 0.1 oz/st gold. Because the base of the North Zone lies near the intersection of the Foundation and South Ridge faults (a basement high), it is not clear whether silica-rich fluids ponded beneath the Foundation fault, flowed parallel to the low-angle South Ridge fault, or both. In either case, exploration should focus on basement highs, whether they are bounded by low-angle or high-angle faults.

South Kamma

Late in the year visually encouraging alteration was identified at the South Kamma target in the southeast corner of the Rosebud claim block (Mitchell, 1998a). Twenty-four "Vase" claims were added to cover the exposed alteration out to the edges of the volcanic field. The area was previously poorly mapped and sampled. A rock survey was completed on the geophysical grid, but the geochemistry was disappointing (including very low Au and Se). No further work

was conducted. The relationship of the South Kamma alteration to the gold deposits at the Rosebud mine is unclear.

Vertex

At the request of Hecla, the "Vertex" target, located on the west end of South Ridge, was mapped in detail and sampled by consultant J. P. Rogowski (1999). He identified planar-laminated LBT underlain by "mine Tos", and a series of north to northeast striking dikes. A drill hole by Santa Fe (96-365) apparently failed to hit the targeted Vertex structure due to interpreted droop.

Permitting

Exploration activities during the first quarter of 1998 were conducted under the Dreamland Notice of Intent. Later work was conducted under a consolidated Plan of Operation (N20-97-002P), approved by the BLM on May 1, 1998, which superceded and incorporated four existing Notices of Intent (N26-89-008P, N26-90-085N, N20-97-030N, and N20-97-042N). The Plan incorporates 20.32 acres of existing disturbance and 33.3 acres of proposed new road and drill sites. The Plan was amended in September to allow 3000 feet of trenching with no net gain. The amount of disturbance in 1998 is shown in Table 5.

An archeological survey was contracted with ARS of Virginia City. The purpose of the survey was to install "T posts" on the ground, at the BLM's request, marking the boundaries of all archeological sites eligible for historic preservation. These include the Dreamland mine area, the large archeological site at the headwaters of Wildrose Canyon, and several others. Also, archeological clearance was given for three drill pads along the eastern edge of the Dreamland site.

Reclamation

Newmont Gold Company's Drilling Services Group supervised a contractor (Legarza) to complete the reclamation and reseeding of exploration roads and drill pads. There was an attempt to reclaim approximately the same amount of new disturbance, without reclaiming trunk roads or key access roads. Mud sumps and pads were re-contoured soon after completion of the holes. This work was completed in late fall, and is summarized in Table 6.

Budget and Expenditures

The consolidated 1998 exploration budget for Rosebud was $1,377,000. The final 1998 expenditure was $1,362,614, or 98.96% of budget (Table 7). As established by the LLC agreement, Newmont's share of the exploration expenditure is 2/3 and Hecla's share is 1/3. The drilling portion of the program was 59.7% (including site prep but excluding reclamation), and labor accounted for approximately 27%.

Administrative

A fire was started in the core warehouse in early February when a diesel powered "torpedo" heater ignited wax and paper core boxes containing RC chips. The fire was extinguished by miners, but after significant damage occurred to materials, core, and the building. The RC chips from Lac's early drill holes between and including RL-11 and RL-220 were lost. Lac had saved duplicate RC chip samples in small vials for some holes, so these were hand-screened to generate new chip trays for some of the destroyed holes. After completing the reconstruction, the missing holes are RL-12 through RL-18, and RL-20 through RL-112.

The fire-fighting effort destroyed the unlogged and unassayed interval (1522 to 2090 feet) of RS-422c, which was stacked on pallets adjacent the RC chips. After consultation with Rosebud's insurance representative, a plan was devised to recover the lost portion of the hole, since it was still in progress. After completing the bottom portion of the hole (2300 feet), a wedge was set at 1450 feet, and the lost interval was re-drilled with N-sized core. The downhole surveys compared closely, and the geologic record of this hole was restored using the combined parts of H- and N-sized core. Eventually the insurance companies reimbursed nearly all costs and losses.

1999 PROGRAM

Prior to beginning the 1999 program, a comprehensive rating and ranking meeting was held in Winnemucca in early February in which 26 targets were compiled, rated, and ranked. A report documenting this process was assembled (Mitchell, 1999). The meeting was attended by 14 technical staff from Newmont and Hecla, and one consultant. This process identified the highest-ranking targets on the Rosebud claim block (Table 8), and allowed us to complete a manpower allocation table. The manpower allocation (Table 9) distributed the available labor pool across the highest priority targets, consistent with the 1999 budget. After the prioritization was finished in early February, a detailed time line with decision points (Figure 7) provided a guide for the 1999 program.

REFERENCES

Allen, K. D., 1996, Geology of the Far East target, East Zone, and North Zone including the 1995 Far East target drilling: Rosebud Mining Company report dated 11/11/96, 6 p.

Allen, K. D., 1998, Rosebud development drilling reports: Rosebud Mining Company LLC monthly reports to Ron Clayton, Rosebud General Manager, (January through December).

Allen, K. D., and Clayton, R. W., 1997, Rosebud resource and reserve estimate as of January 1, 1998: Rosebud Mining Company LLC report, 12/19/97.

Allen, K. D., Clayton, R. W., and Moore, C. R., 1999, Rosebud resource and reserve estimate as of January 1, 1999: The Rosebud Mining Company LLC report, 1/1/99, 16 p., 5 tables, 2 figures, 31 page appendix.

Brady, Mike, 1996, Geologic map of the Rosebud district: consultant to Hecla, North and South Sheets, 9 cross sections, 1:6000 scale.

----------1997, North Equinox target, Rosebud mine, Nevada: internal SFPG memorandum to R. Dixon, 3/10/97, 2 p., 4 figures.

Brewer, N. H., 1991, 1990 annual progress report, Rosebud project, Pershing County, Nevada: LAC Minerals (USA), Inc., 28 p., appendices.

Bucknam, C. H., 1998, Marcasite waste sample--assay results (Rosebud mine): NMS memorandum to S. Santti dated 2/18/98, 9 p.

Clayton, R., 1998a, Monthly progress report, Rosebud project: Hecla monthly reports, (January through December).

----------1998b, Management Committee Meetings minutes: Rosebud Mining Company, LLC, meetings #7 (2/25/98), # 8 (5/27/98), #9 (9/1/98), #10 (11/2/98), and #11 (12/17/99).

Ferneyhough, A. B., 1998, Modeled gravity profile at White Alps (2209000N): Newmont Gold Company geophysical profile, 1 sheet.

Hecla, 1999, Hecla Mining Company annual report, 48 p.

Hedenquist, J. W., Izawa, E., Arribas, A., and White, N. C., 1996, Epithermal gold deposits: styles, characteristics, and exploration: The Society of Resource Geology Special Publication Number 1, poster and book.

Izawa, E., Urashima, Y., Ibaraki, K., Suzuki, R., Yokoyama, T., Kawasaki, K., Koga, A., and Taguchi, S., 1990, The Hishikari gold deposit: high-grade epithermal veins in Quaternary volcanics of southern Kyushu, Japan: Journal of Geochemical Exploration, v. 36, p. 1-56.

Jackson, R. G., 1998, Rosebud down-hole geochemistry: NGC memorandum to R. Vance dated 11/6/98, 2 p.

Jackson, R., and Sjoekri, Adi, 1998, Geochemical model for the Rosebud deposit and exploration criteria for the region: NGC memorandum, 1 p.

Langstaff, George, 1998a, Results of logging RC chips from East Zone delineation holes: Newmont Exploration Ltd. memorandum dated 1/20/98, 6 p.

----------1998b, Update on interpretations of the structure contour maps of the top of basement and the top of the South Ridge fault: Newmont Exploration Ltd. memorandum dated 1/20/98, 4 p.

----------1998c, Au & Ag results of screen-fire assay for 5 sulfosalt-bearing samples: NEL memorandum to R. Vance, K. Allen, dated 6/9/98, 2 p.

----------1998d, Results of whole-rock analyses: NEL memorandum dated 6/15/98, 9 p., 7 figs., 2 tables.

----------1998e, Drill site selection for North Equinox target: Newmont Gold Company memorandum dated 7/9/98, 7 p., 2 figs.

----------1998f, Evidence for the geometry of the South Ridge fault: Newmont Gold Company memorandum dated 7/28/98, 3 p.

----------1998g, Evaluation of the positive gradient-array IP anomaly in the Rosebud shear corridor: Newmont Gold Company memorandum dated 8/24/98, 8 p.

----------1998h, Petrography for North Equinox and Deep RS-422/422.1 samples: NGC memorandum dated 10/21/98, 4 p.

----------1998i, Petrography for summer 1998 drill hole samples: Newmont Gold Company memorandum dated 11/18/98, 8 p.

----------1998j, Chemical effects of alteration at Rosebud based on whole-rock and partial-digestion data: Newmont Gold Company memorandum dated 11/12/98, 4 p., 7 figs., several tables.

----------1998k, Byington's structural analysis of Rosebud: NEL memorandum to K. Allen, 2 p.

----------1998l, Review of downhole geochemical data: NGC memorandum to R. Jackson, R. Vance dated 10/22/98, 13 p.

----------1999m, Interpretation of Rosebud whole-rock geochemical data: NGC memorandum dated 1/8/99, 22 p., appendix.

Mahood, G. A., 1998, Topics in volcanic geology related to the Rosebud mine: consulting report dated 12/7/98, 17 p.

Mitchell, P. A., 1998a, Rosebud monthly reports: Newmont Gold Company monthly reports for March through December.

----------1998b, Rosebud stratigraphic column: Newmont Gold Company table, 1 p.

----------(editor), 1999, Rating and ranking report, Rosebud prospect evaluation: Newmont draft report summarizing the Rosebud prospect rating and rating meeting, February 3-4, 1999, Winnemucca, NV.

Moore, S. C., 1991, Rosebud structural study, Rosebud project, Pershing County, Nevada: report prepared for LAC Minerals (USA) Inc., August 20, 1991, 39 p., 4 oversized plates (1:6000 scale).

Muerhoff, C. V., 1995, Summary of alteration and mineralization at Hecla Mining Company's Rosebud deposit: Hecla report, 5/18/95 (updated 8/10/95), 4 p.

Phillips, N. D., 1998a, Physical property measurements at Rosebud: NGC memorandum dated 1/21/98, 2 p., attachments, 1 pl.

----------1998b, Downhole induced polarization survey: NGC memorandum dated 5/1/98, 2 p., 2 figs., 2 appendices.

----------1998c, Soil Susceptibility Surveys: Rosebud, Chapter 7: Newmont memorandum dated 9/30/98, 7 figures pertaining to Rosebud.

----------1999, Rosebud downhole PIMA samples: Newmont Gold Company memorandum, 1/10/99, 1 p., numerous spectra.

Rogowski, J. P., 1998, Near-mine exploration targets, Rosebud mine, Pershing County, Nevada: report for Rosebud Mining Company, dated 6/12/98, 5 p., 10 pl.

----------1999, Vertex target summary in Rating and ranking report, Rosebud prospect evaluation, Mitchell, P. M., editor: Newmont draft report summarizing the Rosebud prospect rating and rating meeting, February 3-4, 1999, Winnemucca, NV.

Turner, Steve, 1997a, Rosebud property, Pershing County, Nevada: technical review: Newmont Exploration Ltd. memorandum dated June, 1997, 28 p.

----------1997b, Proposed stratigraphic nomenclature for the Rosebud district in Rosebud property, Pershing County, Nevada: technical review: Newmont Exploration Ltd. memorandum dated June, 1997, 9 p.

Vance, R. B., 1998a, 1997 annual exploration report, Rosebud Mining Company LLC, Pershing and Humboldt Counties, Nevada: Newmont Gold Company report dated 5/12/98, 19 p.

----------1998b, Rosebud monthly reports: Newmont monthly reports (January through December).

----------1998c, Rosebud exploration monthly reports: Rosebud Mining Company LLC monthly reports to Ron Clayton, Rosebud General Manager, (January through December).

----------1998d, 1998 Accounting Codes for Rosebud Exploration: Newmont memorandum to Rick Berezay, Rosebud Mining Co., LLC accountant, (1/8/98), 1 p.

Wallace, A. R., and John, D. A., 1998, New studies of Tertiary volcanic rocks and mineral deposits, Northern Nevada rift *in* Contributions to the metallogeny of northern Nevada, Tosdal, R. M., editor: U. S. Geol. Survey open-file report 98-338, p. 264-278.

White, N. C., and Hedenquist, J. W., 1995, Epithermal gold deposits: styles, characteristics and exploration: Soc. Econ Geologists Newsletter, no. 23, October, 6 p.

Williams, S. A., 1998, Petrographic descriptions of 32 thin sections, Rosebud project, NV: private consulting report dated 4/30/98, 18 p., plus a cover letter.

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TABLE 1. ROSEBUD EXPLORATION FOLIOS

\RBAOI\RB-Maps.xls 4/17/99

Folio	Scale	Map Type	Description	Location		Date	File Name
				Winn.	*Rosebud*		
Rosebud Regional (KAMMA)	1:100,000	Airborne Magnetics	Reduced to the pole.	*			
		Radiometrics					
		TM	False Colour (5, 7, 1)	*			
			Alteration (Clay, Iron, Veg)	*			
			Natural Colour (3, 2, 1)	*			
			False Colour (7, 4, 2)	*			
			Interpretation by D. Coulter	*			
Rosebud	1:24,000	Geology	Brady's Map, 1996			2/10/98	r:\dwg-base\rb-24k.dwg
		Geology	Moore's Map, 1991				
		Location Map	(paper, acetate)			1/1/98	
		Topography	Shaded Relief C.I.=50 feet			2/1/98	
		Geochem	Rock Sample Location, Au, ppb			2/1/98	r:\geochem\rock\rkgc-au2.dwg
		Geochem	Soil Sample Location, Au, ppb			2/1/98	r:\geochem\soils\s-gc-au.dwg
		Geophysical Index Map		*	*	9/1/98	
		Airborne Magnetics	Reduced to the Pole	*	*		
			Horizontal Gradient	*			
			First Vertical Derivative	*			
			Interpretation	*			
		Gravity	C.B.A. @ 2.4 g/cc	*	*		
			Interpretation	*			
		Radiometrics	Potassium	*	*		
			Uranium	*	*		
			Thorium	*	*		
			Interpretation	*			
			Ternary Cluster (normalized)	*	*		
			Interpretation	*			
		Topography	DEM Shaded Relief	*	*		Roster4.rtl
		TM	False Colour (7,4,2)	*	*		
			Interp. By D.C.	*	*		
			Interp. By C.P.K	*	*		
		I.P.	Resistivity Model @ 200ft depth	*	*		
			Chg. Model @ 200ft depth	*	*		

Folio	Scale	Map Type	Description		*Winn.*	*Rosebud*	Date	File Name
		Soil M.S.	Soil Magnetic Susceptibility		*	*		
Rosebud Sheet-1	1:6,000	Geology	Brady's Map, 1996					
		Geology	Brady's Cross Sections, 1996					
		Geology	Moore's Map, 1991					
		Geology	Moore's Cross Sections, 1991					
		Drill Holes	Collar and Downhole Traces					
		Drill Holes	Grade-Thickness Map (Au)					
		Geophysical Index Map						
		Airborne Magnetics	Reduced to the Pole		*	*		rbmgrp10.rtl
			Horizontal Gradient		*			
			First Vertical Derivative		*			
		Gravity	C.B.A. @ 2.4 g/cc		*	*		rbgrv-6
			Horizontal Gradient		*			rbhgg-6
		Radiometrics	Potassium		*	*		rbrdk-6
			Uranium		*	*		rbrdu-6
			Thorium		*	*		rbrdt-6
			Ternary Cluster	Norm.	*	*		
				Linear	*			
		Topography	DEM Shaded Relief		*	*		roster4s
		I.P.	Line Location		*			
			Resistivity Model 200 ft depth		*	*		
			Resistivity Interpretation		*			
			Chargeability Model 300 ft depth		*	*		
			Chargeability Interpretation		*			
		Ground Magnetics	Total Field		*	*		
		Ground VLF	EM-16 In-Phase F.F.		*	*		
		Soil M.S.			*	*		
Rosebud Sheet-3	1:6,000	Geology	Brady's Map, 1996					
		Geology	Brady's Cross Sections, 1996					
		Geology	Moore's Map, 1991					
		Geology	Moore's Cross Sections, 1991					
		Drill Holes	Collar and Downhole Traces					
		Drill Holes	Grade-Thickness Map (Au)					

Folio	Scale	Map Type	Description	*Winn.*	*Rosebud*	Date	File Name
2400	1:2,400						
BNE	1:2,400	Topo			*		
Chance	1:2,400	Topo & Geochem			*		
Dreamland	1:2,400	Topo & Geochem			*		
Dozer East	1:2,400	Topo & Geochem			*		
Dozer West	1:2,400	Topo & Geochem			*		
Gator	1:2,400	Topo & Geochem			*		
Horse Crossing	1:2,400	Topo			*		
Mother Lode	1:2,400	Topo & Geochem			*		
North Equinox	1:2,400	Topo & Geochem			*		
North Gator	1:2,400	Topo			*		
Oscar	1:2,400	Topo & Geochem			*		
School Bus Canyon	1:2,400	Topo & Geochem			*		
Short Shot	1:2,400	Topo & Geochem			*		
Sierra	1:2,400	Topo			*		
South Kamma	1:2,400	Topo & Geochem			*		
Sulfur	1:2,400	Topo & Geochem			*		
Valley	1:2,400	Topo			*		
Wild Rose East	1:2,400	Topo & Geochem			*		
Wild Rose West	1:2,400	Topo & Geochem			*		
Special Products	1:6,000	I.P.	IP stacked sections Chargeability Model				
	1:6,000	I.P.	IP8902 Pseudosections				
	1:6,000	I.P.	IP8902 Chg. model sections				
	1:6,000	I.P.	IP8902 Res. model sections				
	1:6,000	Grav/Mag	GM-SYS Grv. & Mag. Model profiles				
Mini-Folio (Valley)	1:2,400	I.P.	Chargeability Inversion Model at 300 ft depth				
		I.P.	Resistivity Inversion Model at 200 ft depth				
		Magnetics	Total Field Ground Magnetics - Dreamland and Dozer Valley Surveys				
		VLF	Frazer Filtered Ground VLF-Annapolis In-Phase				
		VLF	Frazer Filtered Ground VLF-Seattle In-Phase				
		I.P.	Gradient Array IP (acetate and mylar)				
		I.P.	Gradient Array Resistivity				
		I.P.	Chargeability Interpretation (hand drawn)				
		I.P.	Resistivity Interpretation (hand drawn)				
		I.P.	Forward Response of 3D Model				

			MISCELLANEOUS SAMPLES FOR THIN SECTIONS					
Sample/ Hole No.	Location/ Depth	Date	Sample Type	Sample Size	Purpose	Rock Type	Alteration	Comments
RS-401	1495.8-1496.15	3/12/98	whole core	3.9" NQ	ts	BMB-type; white feld. phenos up to .3" long in aphanitic matrix	negligible; phenos to clay + calcite but matrix still dk grey	same unit has intrusive contacts lower in hole
RS-401	1518.0-1518.4	3/12/98	whole core	4.3" NQ	ts	Chocolate; rare hbl microphenos in aphanitic matrix	minor hematite; patchy weak arg but relatively fresh	is there anything diagnostic in texture which could be used for correlation?
RS-401	1944.0-1944.3	3/21/98	whole core	3.2" NQ	ts	Chocolate; altered, aphyric(?), aphanitic rock	pink and green alteration in sharp contact, tr. dissem. calcite	does pink alteration have K-spar? is it younger than than green?
RS-401	1956.3-1956.7	3/21/98	whole core	4.4" NQ	ts	Chocolate; aphanitic grey rock without(?) hbl microphenos	negligible; rare, narrow bleaching along fractures with chl, calcite; tr. dissem. calcite	how does this differ from Chocolate with hbl microphenos?
RS-406	1578.5-1578.7	3/12/98	split core	2.7" HQ	ts	?; very hard, aphyric, aphanitic rock; unaltered(?) dk grey	negligible?; slight bleaching along fractures with grn clay or calcite	is there primary texture? glass?
RS-408	1435.0-1435.2	3/12/98	split core	3.3" HQ	ts	Chocolate?; poorly sorted, congltic, coarse sandstone	negligible; minor Feox; most clasts bleached	are clasts all volc? juvenile?
RS-408	1436.8-1437.1	3/12/98	split core	4" HQ	ts	Chocolate?; clast-sup, volc. congl.	negligible: minor Feox; many bleached clasts	are embayed clasts glassy? prior alteration of bleached clasts?
RS-408	1501.6-1502.0	3/12/98	split core	4.4" HQ	ts	Chocolate (LLT?); weird rock with black things and grey things	negligible; trace Feox, calcite	wild textures - what do they mean?
RS-410	865.7-865.9	3/12/98	split core	2.5" HQ	ts	Dozer?; aphyric rock with fine, planar parallel laminae	strongly bleached; weak(?) arg with dissem. pyrite, py+qtz vnlets	are laminae primary?
RS-410	1055.0-1055.3	3/12/98	split core	4.2" HQ	ts	Dozer?; pale grey, aphyric with tiny cusps and hint of banding	minor Feox; v. weak(?) arg; calcite veins	is there primary texture?
RS-415	938.7-939.0	3/12/98	split core	3.3" HQ	ts	Tos?; poorly sorted, coarse-fine greywacke	negligible?; many bleached grains; py veinlets	volcanic or sedimentary grains? how many basement grains?
RS-418	839.5-839.9	3/12/98	split core	5" HQ	ts	Dozer?; aphyric with cusp texture	weak arg (white); waxy green clay and calcite in cusps	are cusps primary?
RS-418	886.7-887.1	3/12/98	split core	4.5" HQ	ts	Dozer?; aphyric, caraway seed texture and grey blobs up to .2"	weak arg/grn clay; grn clay and py in veins and cusps	is this primary texture?
RS-418	1058.3-1058.5	3/12/98	split core	2.5" HQ	ts	dike in phyllite; aphanitic, aphyric(?)	mod grn-grey clay	is this really igneous rock? any primary textures?
RS-425	2155.8-2156.1	3/17/98	split core	3.4" HQ	ts	Chocolate; rare hbl microphenos in aphanitic matrix	negligible; patchy bleaching along fractures; trace relict hematite; minor calcite in fractures	should have primary textures (if any) for comparison with other units
SK-97-4	3 km S of jct. of Jungo E of access rd.	9/25/97	hand samp	small	ts	black, aphanitic, with fine feld(?) and qtz(?) phenos; local wkly magnetic	Feox and calcite on weathered surfaces and fractures	is it qtz? are they phenos or xenocryst same locality as SK-98-1
SuK-97-3B	1.3 km SE of jct. or mi	9/25/97	hand samp	.5 kg	ts	black, twinned, platy K-spar(?) up to 3 cm in black aphanitic matrix; possibly black cpx up to 5 mm; locally weakly magnetic	Feox and calcite on weathered surfaces and fractures	is it K-spar? collected down hill from SuK-97-3 at later date
F-98-1	hill 1423, 2.4 km S of j W of access rd.	3/21/98	hand samp	1 kg	ts	10-15% 1-2 mm plag laths; 2% 2-3 mm tabular cpx(?); rare round 3 mm opx(?); black matrix; weakly magnetic	Feox on weathered surfaces	should be same unit as SuK-97-3B but no coarse K-spar phenos on outcrop; is it basalt?
RS-422	1238.5	4/3/98	split core	2" HQ	ts	gray crystal-lithic lapilli tuff	slfd away from clay-qtz veinlet	alteration mineralogy
RS-422	1253.8	4/3/98	split core	3" HQ	ts	gray, same?	argillized, possible adularia?	alteration mineralogy
RS-422	1321	4/3/98	split core	1.5" HQ	ts	white tuff?	strong argillization w/ wispy brown	characterize alteration mineralogy

Miscsamp, thinsec
ts=thin section, wr=whole rock, pts=polished thin section

Table 2. Rosebud Thin-Sections

MISCELLANEOUS SAMPLES FOR THIN SECTIONS

Sample/ Hole No.	Location/ Depth	Date	Sample Type	Sample Size	Purpose	Rock Type	Alteration	Comments
							adularia? vnlts.	
D-195-98	East Zone?	4/3/98	mineral specimen			ruby silver: pyrargyrite?		identify
RS-426	1207.6-1208.25	4/19/98	split core	3.2" HQ	pts	breccia of dk sulfidic qtz, grey qtz,	100% alteration/vein	is it adularia? what are sulfides?
						cream to brn adularia(?)		
RS-424	1528.3-1528.6	4/19/98	whole core	3.5" HQ	ts	Chocolate?: hard, finely lam. rock	slight bleaching, green clay & spots	what is mineralogy and lithology?
						and grn sdst(?) w/x-strat(?) &	mostly in sdst, calcite veins	
						soft-sed def.? in conglomerate		
RS-424	1647.5-1647.7	4/19/98	whole core	3.0" HQ	ts	Chocolate?: near vert. contact of vol.	weak/mod green clay, calcite, rare	tuffs or seds? Nature of contact?
						sdst and vol-peb cgl or lithic tuff; ctc	bleaching	
						oblique to bed.; reaction at contact		
RS-424	1698.5-1698.8	4/19/98	whole core	3.8" HQ	ts	Chocolate?: lithic-vitric tuff or sdst;	devitr. of vitrics; weak green clay,	tuff or sed? phenos in vitrics?
						lenticular vitrics up to .5"; weakly	calcite	are they really vitric clasts?
						magnetic; in conglomerate		
RS-424	1808.8-1809.0	4/19/98	whole core	2.4" HQ	ts	Chocolate?: lithic-vitric tuff or sdst;	devitr. of vitrics; weak green clay,	tuff or sed? phenos in vitrics?
						lenticular vitrics up to .6"; weakly	calcite	are they really vitric clasts?
						magnetic; in conglomerate		
RS-424	1994.5-1994.8	4/19/98	whole core	3.0" HQ	ts	Chocolate?: bedded sdst(?) with	negligible?	tuff or sed? black things vitric clasts?
						grading of blebby black things;		
						in conglomerate		
RS-424	2014.5-2014.7	4/19/98	whole core	2.4" HQ	ts	Chocolate?: vitric-lithic lapilli-ash tuff;	negligible?	really tuff? how does texture differ from
						volc. and ALS lithics, feldspar-phyric		seds? any phenos?
						vitrics; bed in conglomerate		
S24-4532:13	stope 24, elev. 4532,	5/98	hand samp	small	pts	sulfide-rich ore with 127 oz/st Au and	100%	identify sulfide minerals, should be som
						1187 oz/st Ag; abundant marc, lesser		weird ones, selenides?
						pyrargyrite, cpy?, brassy electrum?		
RS-423	1206.3-1206.7	5/28/98	whole core	5" HQ	ts	Chocolate?: aphyric, aphanitic; clast-	arg in white patches, hem in red;	is grey unaltered or specularite-rich?;
						like variegated red to white patches	minor calcite, mostly in fractures	does red replace white or vice versa?
						floating in grey matrix		
RS-422.1	1959.0-1959.25	5/28/98	whole core	3.3" NQ	ts	Chocolate?; 3-5% eu-sub, zoned feld	some dark, v. fine hem?; calcite &	how does this compare to BMB-type?
						up to 2 mm in aphanitic matrix	clay? in phenos; calcite and hem	
							in fractures	
RS-422.1	1984.6-1984.8	5/28/98	whole core	2.2" NQ	ts	Chocolate?: 2% eu-sub, 1-mm hbl & bi?	weak arg or possibly green clay;	flow or tuff? are there feldspar phenos
						phenocrysts, 1-2 mm pale splotches	moderate dissem. calcite; rare	
						some could be feldspar phenos;	fractures with bleached margins	
						aphanitic matrix		
RS-422.1	2005.5-2005.8	5/28/98	whole core	3.0" NQ	ts	Chocolate?: 1-3 mm, pale lithics? and	weak arg & green clay in lithics? and	tuff or sed. rock? what is alteration?
						<1mm, inconspicuous crystals in	moderate hem, tr. calcite in matrix	
						dark red, aphanitic matrix		
RS-422	2112.9-2113.2	5/28/98	whole core	3.1" HQ	ts	Chocolate?: <1mm, dark sub-eu hbl &	negligible arg? (no bleaching);	flow or tuff? same rock type as RS-422.
						irreg vitric? shards in dense matrix;	strong dissem. calcite	1984.6? compare to 2140.9
						<1mm white specks of sec. calcite		
RS-422	2140.9-2141.1	5/28/98	whole core	2.1" HQ	ts	Chocolate?: aphyric, aphanitic with	dark green clay in vitric? shards &	no contact with rock at 2112.9, could
						2-3% <1mm, irreg. vitric? shards,	possibly in matrix; mod. dissem.	these be same unit? any mafic pheno

Miscsamp, thinsec

ts=thin section, wr=whole rock, pts=polished thin section

MISCELLANEOUS SAMPLES FOR THIN SECTIONS

Sample/ Hole No.	Location/ Depth	Date	Sample Type	Sample Size	Purpose	Rock Type	Alteration	Comments
						<1% irreg. white specks (secondary?)	calcite	are dark things shards?
RS-422	2317.9-2318.6	5/28/98	whole core	7.7" HQ	ts	Chocolate?: 5% 1-mm, sub-eu hbl	matrix bleached, hbl probably altered	is this same rock type/unit as 2112.9,
						phenos and rare, irreg, dark shards?	to green clay; rare veins and tr.	2140.9 & RS-422.1 1984.6? flow or tuff
						in aphanitic matrix	dissem. calcite; less altered than	would this give better whole-rock
							2112.9?	result than 2112.9?
NWRA-2601	NW of USMM212	7/15/98	rock	2 kg	ts/wr	"brown flow"/"Wildrose":variably devitr.	bleaching related to devitr.?, no	cp. textures to nondevitr. rock
	477,500E; 2213,785N					(pale), platy rock above dense brn	hydrothermal?	
						rock; pos. pseudobreccia		
NWRA-2602	NW of USMM212	7/15/98	rock	1.5 kg	ts/wr	"brown flow"/"Wildrose":dense, pinkish-	minimal; local tiny qtz(?) veinlets; rare	compare textures to devitr. Rock
	477,200E; 2213,875N					grey, with rare, clay-altered feld(?)	glassy black hematite veinlets	and that E of ZZ Top
						phenos? <1 mm	with brown selvedges	
NWRA-2603	in draw E of ZZ Top	7/15/98	rock	1 kg	ts/wr	"intrusion"/"andesite"; dense, red-grey	negligible?	compare textures to "Wildrose"
	481,375E; 2212,500N					vitrophyre; rare, clay-altered feldspar		
						phenos <1mm; like 2602		
RS-443	1563.0-1565.0	9/24/98	split core	1.95' HQ	ts/wr	aphanitic pseudobreccia? with rare	weak green clay + calcite, mostly in	compare to similar samples to
						white, rounded, feld phenos and	"matrix" and fractures; generally	determine effects of pseudo-
						acicular hbl phenos <1 mm; local,	grey	breccia and weak alteration
						weak, irregular banding		
RS-443	1795.2-1797.1	9/24/98	split core	1.90' HQ	ts/wr	brecciated, aphanitic rock with irreg.	weak hematite + calcite	compare to other mmb-bearing
						mmb up to 2 cm and local banding		samples to gauge effects of
						(elongate mmb generally parallel to it);		alteration and to distinguish
						rarely, mmb have rounded white feld		units; about 5% mmb
						phenos <1 mm		
RS-444	1595.3-1599.0	9/24/98	split core	3.0' HQ	ts/wr	weakly porphyritic with <1% irreg mmb	negligible; hem+calcite in fractures;	many phenos look broken -
						<2 cm & <2% total phenos; subhedral	weak alteration of phenos to clay,	could this be tuff? both
						white(alt) & vitreous feld (both with	calcite; mostly uniform grey color	plag & Kspar? mafic phenos
						cal) <3 mm; v. rare round qtz <1 mm;		or small mmb?; least altered
						probably hbl, bi, possibly px phenos;		for comparison with others
						local, faint foliation		
RS-444	1716.6-1719.0	9/24/98	split core	2.4' HQ	ts/wr	2% yel-green, subhedral (rarely em-	weak clay + calcite with pale pinkish	some phenos with Carlsbad
						bayed), locally vitreous feld phenos	yellow matrix and phenos variably	but no albite twins - all Kspar?
						up to 8 mm long in aphanitic matrix;	altered to green clay (not white)	compare geochem to other
						rare glomeroporphyritic clots		coarsely porphyritic units
RS-444	1725.9-1728.9	9/24/98	split core	2.8' HQ	ts/wr	5% yel-white, subhedral (rarely em-	pale grey but possibly weak altera-	Kspar + plag phenos? compare
						bayed), locally vitreous feld phenos	tion of matrix; variable clay + cal-	geochem to other coarsely
						up to 10 mm long in aphanitic matrix;	cite alteration of phenos; trace	porphyritic units
						1% anhedral green clay chunks <2 m	hematite + green clay in fractures	
						may be mafic phenos; rare glomero-		
						porphyritic clots		
RS-444	2017.7-2020.2	9/24/98	split core	2.4' HQ	ts/wr	brecciated aphanitic rock, possibly	red and black hematite, primarily	any microphenos? compare
						with mafic microphenos	in matrix; trace calcite	to other aphyric rocks
RS-445	1863.4-1865.2	9/24/98	split core	1.7' HQ	ts/wr	brecciated, aphanitic, with 1% irreg.	mod. calcite + weak hematite; feld	compare to more altered rocks
						mmb <12 mm, 1% subhedral, white	phenos soft and have calcite	above and to RS-444:1595.3;
						to vitreous feld, and rare, round	even though they look fresh	is it pyroclastic?

Miscsamp, thinsec

ts=thin section, wr=whole rock, pts=polished thin section

MISCELLANEOUS SAMPLES FOR THIN SECTIONS

Sample/ Hole No.	Location/ Depth	Date	Sample Type	Sample Size	Purpose	Rock Type	Alteration	Comments
						qtz 1 mm; possibly rare hbl <1 mm replaced by green clay		
RS-445	1905.0-1907.0	9/24/98	split core	2.0' HQ	ts/wr	same as 1863.4; one smoky qtz is embayed	weak hematite, calcite mostly in fractures and phenos; even vitreous feld are soft	compare to other similar rocks to determine effects of altera-tion; broken phenos suggest this is tuff
RS-446	1901.6-1902.0	9/3/98	whole core	5.7" HQ	ts/wr	apparently aphyric, with abundant laminations (but same as 1918.3)	weak arg, py(&marc?) in laminations & fractures & in clouds 2 cm across	compare to 1907.2 and 1918.3
RS-446	1907.0-1907.4	9/3/98	whole core	4.9" HQ	ts/wr	possibly rare wh. fldspr phenos <1 mm; common laminations	v. weak arg, trace green clay, sparse dissem. py; moderate calcite	compare to 1901.8 and 1918.3
RS-446	1917.9-1918.65	9/3/98	whole core	8.8" HQ	ts/wr	wkly porph. vitrophyre with rare white feldspar phenos <2mm, rare lamin.	dark red-brown, negl. alteration?; mod. calcite, veins of hem.+calcite	compare to 1907.2 and 1901.8
RS-446	2657.8-2658.7	9/10/98	whole core	9.7" HQ	ts/wr	flow(?) with 5% white fldspr phenos 1-3 mm (some zoned with dark cores) and 2% hbl <3mm and rare biotite(?)	negl. but feld altered to clay+calcite and mod dissem cal, cal vnlts	what is it? how does this compare to Brady's Oscar Andesite
RS-446	2756.0-2756.4	9/10/98	whole core	4.5" HQ	ts	med-coarse-grained litharenite in 20-ft coarsening upward bed; mod sorted subrounded-ang. grains, white to black; vitric? black specks	negligible but mod dissem calcite; high mag susceptibility	sedimentary or pyroclastic?
RS-446	2900.6-2901.6	9/24/98	whole core	11.5" HQ	ts/wr	2% sub-euhdrl, wh. fld phenos <10 mm long, 3% an-subhdral, green, ? phenos <5 mm repl. by green clay in aphanitic matrix; some glomeroporhyritic clots	weak green clay and calcite with minor relict grey; bleaching along green clay+calcite veinlets; phenos all altered to white/green clay+cal; rare pyrite in green clay phenos	compare to 2942.5 and similar less altered units to determine original composition and effects of green clay alteration
RS-446	2942.5-2943.3	9/24/98	whole core	10.5" HQ	ts/wr	same unit as 2900.6 with same textures	mod. green clay and cal with more uniform darker green color than 2900.6; wh./green alt. phenos; more pyrite than 2900.6	compare to 2900.6 to determine effects of stronger green clay alteration; any epidote?
RS-446	2963.5-2963.9	9/24/98	whole core	5" HQ	ts/wr	tuff or conglomerate with subrounded volc, sandst, and ALS phyllite clasts and irregular-wispy, vitric(?) lapilli with mafic phenos <1 mm (bi, hbl?); ALS clasts <2 cm, vitric(?) <5 cm	variable arg alteration in volc clasts, otherwise negligible?; minor calcite in fractures	sedimentary or pyroclastic? is this record of earliest T volcanism?
RS-446	3005.8-3006.0	9/24/98	whole core	2.3" HQ	ts	vfg granitoid? with mostly wh. altered feldspar, <10% qtz, 5-10% green, altered hbl? as boulder or dike; or it could be sandstone	weak? clay alteration but no fresh feldspars or mafics	is it really granitoid? pre-16 Ma volcanism?
RS-446	3019.9-3020.7	9/24/98	whole core	8.5" HQ	ts	conglomerate with subrounded pebbles up to 8 cm of volc, mudst?, granitoid?, ALS phyllite with minor, clayey, tuffaceous? matrix	variable arg in volc clasts, otherwise negligible?; minor calcite in fractures	is matrix tuffaceous? how can tuffs be distinguished from sedimentary rocks with tuffaceous component?
RS-450	1810.4-1811.9	9/24/98	split core	1.4' HQ	ts/wr	aphyric rock with 2% irreg mmb up to 15 mm and pervasive, fine spherulitic texture	weak bleaching along dark calcite+ clay veinlets and fractures	least altered for comparison with other aphyric rocks with mmb

Miscsamp, thinsec
ts=thin section, wr=whole rock, pts=polished thin section

Table 3. Rosebud Whole-rock Analyses

		MISCELLANEOUS SAMPLES FOR WHOLE-ROCK ANALYSIS						
Sample/ Hole No.	Location/ Depth	Date	Sample Type	Sample Size	Purpose	Rock Type	Alteration	Comments
RS-401	1956.3-1956.7	3/21/98	whole core	4.4" NQ	wr	Chocolate; aphanitic grey rock without(?) hbl microphenos	negligible; rare, narrow bleaching along fractures with chl, calcite; tr. dissem. calcite	how does this differ from Chocolate with hbl microphenos? what is comp?
RS-410	943.2-943.75	3/20/98	split core	6.3" HQ	wr	Dozer; v. pale grn-grey; weak caraway seed tex.; rare darker xenoliths(?) up to 1 cm	weak arg/grn clay; tr. dissem. pyrite; tr. dissem calcite; rare calcite vns	compare composition of weakly altered to unaltered 1047.4'
RS-410	1047.4-1047.8	3/20/98	split core	5.2" HQ	wr	Dozer; massive, grey, aphyric, aphanitic	negligible; minor hematite & calcite along fractures; tr. dissem. calcite	should be primary igneous comp., possibly slightly higher Fe, Ca
RS-425	2142.7-2143.0	3/17/98	split core	4.6" HQ	wr	Chocolate; apparently aphyric, aphanitic rock	weak arg with rare relict grey; sparse tiny grn specks; tr. dissem. calcite; possibly tr. dissem ext. fine pyrite	should be close to primary comp.; compare to 2159.2'
RS-425	2159.2-2159.6	3/17/98	split core	3.2" + 2.3 HQ	wr	Chocolate; v. rare hbl microphenos & tiny black specks; wavy, subparallel stylolite-like streaks	negligible; minor bleached patches; tr. dissem. hematite & calcite	as close to a primary igneous comp. as it's likely to get
SK-98-1	3 km S of jct. E of access rd.	9/25/97	hand sample	1 kg	wr	black, aphanitic, with fine feld(?) and 2-3 mm px(?) and possibly olv phenos; weakly magnetic	Feox and calcite on weathered surfaces and fractures	is this really basalt? same locality as SK-97-4
SuK-97-3B	1.3 km SE of j	9/25/97	hand sample	2 kg	wr	black, twinned, platy K-spar(?) up to 3 cm in black aphanitic matrix; possibly black cpx up to 5 mm; locally weakly magnetic	Feox and calcite on weathered surfaces and fractures; collected down hill from SuK-97-3	selected for coarse phenos so comp could be biased what is comp?
F-98-1	hill 1423, 2.4 k W of access rd.	3/21/98	hand sample	1 kg	wr	10-15% 1-2 mm plag laths; 2% 2-3 mm tabular cpx(?); rare round 3 mm opx(?); black matrix; weakly magnetic	Feox on weathered surfaces	should be same unit as SuK-97-3B but no coarse K-spar phenos on outcrop; is it basalt?
RS-426	1360.8-1361.5	4/19/98	split core	8" HQ	wr	Chocolate?: grey, aphanitic, apparently aphyric	minor hematite banding and frxtrs; rare bleached bands with(?) clay	is this same as aphyric unit in 401?
RS-424	2009.6-2010.1	4/19/98	whole core	6" HQ	wr	Chocolate?: vitric-lithic lapilli-ash tuff, <3% volc. & ALS lithics, <1% vitrics	devitrified; hematite in fractures	is composition related to other volcanic units?
RS-422.1	1959.2-1960.0	5/28/98	whole core	3.3" NQ	wr	Chocolate?; 3-5% eu-sub, zoned feld up to 2 mm in aphanitic matrix	some dark, v. fine hem?; calcite & clay? in phenos; calcite and hem in fractures	how does this compare to BMB-type?
RS-422.1	1984.8-1985.5	5/28/98	whole core	2.2" NQ	wr	Chocolate?: 2% eu-sub, 1-mm hbl & bi? phenocrysts, 1-2 mm pale splotches some could be feldspar phenos; aphanitic matrix	weak arg or possibly green clay; moderate dissem. calcite; rare fractures with bleached margins	is this same composition as RS-422 2141.9?
RS-422	2141.1-2142.0	5/28/98	whole core	2.1" HQ	ts	Chocolate?: aphyric, aphanitic with 2-3% <1mm, irreg. vitric? shards, <1% irreg. white specks (secondary?)	dark green clay in vitric? shards & weak? in matrix; mod. dissem. calcite	could this be same rock unit as RS-422.1 1984.8? doesn't seem to be contact between them; what is effect of alteratio

Miscsamp, whl.rk.
ts=thin section, wr=whole rock

MISCELLANEOUS SAMPLES FOR WHOLE-ROCK ANALYSIS

Sample/ Hole No.	Location/ Depth	Date	Sample Type	Sample Size	Purpose	Rock Type	Alteration	Comments
RS-422	2317.9-2318.6	5/28/98	whole core	7.7" HQ	ts	Chocolate?: 5% 1-mm, sub-eu hbl phenos and rare, irreg, dark shards? in aphanitic matrix	matrix bleached, hbl probably altered to green clay; rare veins and tr. dissem. calcite; less altered than 2112.9?	
NWRA-26	NW of USMM 477,500E; 2213,785N	7/15/98	rock	2 kg	ts/wr	"brown flow"/"Wildrose":variably devitr. (pale), platy rock above dense brn rock; pos. pseudobreccia	bleaching related to devitr.?, no hydrothermal?	compare chemical composition to others; what is effect of devitr.?
NWRA-26	NW of USMM 477,200E; 2213,875N	7/15/98	rock	1.5 kg	ts/wr	"brown flow"/"Wildrose":dense, pinkish-grey, with rare, clay-altered feld(?) phenos? <1 mm	minimal; local tiny qtz(?) veinlets; rare glassy black hematite veinlets with brown selvedges	compare chemical composition to others; near Lac sample #7
NWRA-26	in draw E of Z 481,375E; 2212,500N	7/15/98	rock	1 kg	ts/wr	"intrusion"/"andesite"; dense, red-grey vitrophyre; rare, clay-altered feldspar phenos <1mm; like 2602	negligible?	compare chemical composition to others; near Lac sample #17
RS-443	1563.0-1565.0	9/24/98	split core	1.95' HQ	ts/wr	aphanitic pseudobreccia? with rare white, rounded, feld phenos and acicular hbl phenos <1 mm; local, weak, irregular banding	weak green clay + calcite, mostly in "matrix" and fractures; generally grey	compare to similar samples to determine effects of pseudo-breccia and weak alteration
RS-443	1795.2-1797.1	9/24/98	split core	1.90' HQ	ts/wr	brecciated, aphanitic rock with irreg. mmb up to 2 cm and local fine banding (elongate mmb generally parallel to it); rarely, mmb have rounded white feld phenos <1 mm	weak hematite + calcite	compare to other mmb-bearing samples to gauge effects of alteration and to distinguish units; about 5% mmb
RS-444	1595.3-1599.0	9/24/98	split core	3.0' HQ	ts/wr	weakly porphyritic with <1% irreg mmb <2 cm & <2% total phenos; subhdrl white(alt) & vitreous feld (both with cal.) <3 mm; v. rare round qtz <1 mm; probably hbl, bi, possibly px phenos; local, faint foliation	negligible; hem+calcite in fractures; weak alteration of phenos to clay, calcite; mostly uniform grey color	many phenos look broken - could this be tuff? both plag & Kspar? mafic phenos or small mmb?; least altered for comparison with others
RS-444	1716.6-1719.0	9/24/98	split core	2.4' HQ	ts/wr	2% yel-green, subhedral (rarely em-bayed), locally vitreous feld phenos up to 8 mm long in aphanitic matrix; rare glomeroporphyritic clots	weak clay + calcite with pale pinkish yellow matrix and phenos variably altered to green clay (not white)	some phenos with Carlsbad but no albite twins - all Kspar? compare geochem to other coarsely porphyritic units
RS-444	1725.9-1728.9	9/24/98	split core	2.8' HQ	ts/wr	5% yel-white, subhedral (rarely em-bayed), locally vitreous feld phenos up to 10 mm long in aphanitic matrix; 1% anhedral grn clay chunks <2 mm may be mafic phenos; rare glomero-porphyritic clots	pale grey but possibly weak altera-tion of matrix; variable clay + cal-cite alteration of phenos; trace hematite + green clay in fractures	Kspar + plag phenos? compare geochem to other coarsely porphyritic units

Miscsamp, whl.rk.
ts=thin section, wr=whole rock

MISCELLANEOUS SAMPLES FOR WHOLE-ROCK ANALYSIS

Sample/ Hole No.	Location/ Depth	Date	Sample Type	Sample Size	Purpose	Rock Type	Alteration	Comments
RS-444	1919.0-1921.7	9/24/98	split core	2.5' HQ	wr	4% yel-green, subhedral (rarely em-bayed), locally vitreous feld phenos up to 10 mm long in aphanitic matrix; rare glomeroporphyritic clots; <1% chunks green clay	weak clay + calcite with pale pinkish yellow matrix and phenos variably altered to yellow-green clay +calc	very similar rock/alt. to rock at 1716.6 but this unit has xenoliths of brec. aphyric rock - same composition?
RS-444	1934.6-1936.8	9/24/98	split core	2.0' HQ	wr	4% yel-white, subhedral (rarely em-bayed), locally vitreous feld phenos up to 10 mm long in aphanitic matrix; rare green clay chunks; rare glomero-porphyritic clots	pale grey but possibly weak altera-tion of matrix; variable clay + cal-cite alteration of phenos; trace hematite + green clay in fractures	very similar rock/alt. to rock at 1725.9 but this unit has xenoliths of brec. aphyric rock - same composition?
RS-444	2017.7-2020.2	9/24/98	split core	2.4' HQ	ts/wr	brecciated aphanitic rock, possibly with mafic microphenos	red and black hematite, primarily in matrix; trace calcite	any microphenos? compare to other aphyric rocks
RS-444	2045.4-2047.4	9/24/98	split core	2.0' HQ	wr	pseudobreccia of generally aphyric rock with v.rare, subhedral, white feld phenos 1-2 mm	weak arg? and green clay + mod. calc primarily in matrix; some "clasts" have concentric grey wisps	compare to other aphyric units
RS-445	1774.7-1779.3	9/24/98	split core	3.5'+ HQ	wr	same unit as 1863.4 but texture not preserved; rare relict feld phenos <2 mm; rare laminations	strong arg, weak silic., rare green clay in fractures; minor pyrite, possible tr. chalcopyrite	compare geochem to less altered rocks to determine if any elements not changed
RS-445	1792.2-1795.0	9/24/98	split core	2.4'+ HQ	wr	same unit as 1863.4 but texture not preserved except some greenish mmb up to 15 mm and some, white subhedral feld phenos 1-3 mm	mod-strong arg, possibly weak silic.; mod pyrite, tr. marc?; hard brown veinlets; tr. green clay after mafic phenos?	compare geochem to less altered rocks to determine if any elements not changed
RS-445	1852.5-1854.2	9/24/98	split core	1.7'+ HQ	wr	same unit as 1863.4 but texture not preserved except rare greenish mmb up to 7 mm and white feld phenos 1-2 mm; possibly rare hbl 1 mm replaced by green clay/sulfide	weak-mod arg, possibly trace silic.; mod. pyrite, wk marc	compare geochem to less altered rocks to determine if any elements not changed
RS-445	1863.4-1865.2	9/24/98	split core	1.7' HQ	ts/wr	brecciated, aphanitic, with 1% irreg. mmb <12 mm, 1% subhedral, white to vitreous feld, and rare, round qtz 1 mm; possibly rare hbl <1 mm replaced by green clay	mod. calcite + weak hematite; feld phenos soft and have calcite even though they look fresh	compare to more altered rocks above and to RS-444:1595.3; is it pyroclastic?
RS-445	1905.0-1907.0	9/24/98	split core	2.0' HQ	ts/wr	same as 1863.4; one smoky qtz is embayed	weak hematite, calcite mostly in fractures and phenos; even vitreous feld are soft	compare to other similar rocks to determine effects of altera-tion; broken phenos suggest this is tuff
RS-446	1901.6-1902.0	9/3/98	whole core	5.7" HQ	ts/wr	apparently aphyric, with abundant laminations (but same as 1918.3)	weak arg, py(&marc?) in laminations & fractures & in clouds 2 cm across	compare to 1907.2 and 1918.3

Miscsamp, whl.rk.
ts=thin section, wr=whole rock

MISCELLANEOUS SAMPLES FOR WHOLE-ROCK ANALYSIS

Sample/ Hole No.	Location/ Depth	Date	Sample Type	Sample Size	Purpose	Rock Type	Alteration	Comments
RS-446	1907.0-1907.4	9/3/98	whole core	4.9" HQ	ts/wr	possibly rare wh. fdspr phenos <1 mm; common laminations	v. weak arg, trace green clay, sparse dissem. py; moderate calcite	compare to 1901.8 and 1918.3
RS-446	1917.9-1918.6	9/3/98	whole core	8.8" HQ	ts/wr	wly porphyritic vitrohyre with rare white fdspr phenos <2mm, rare lamin.	dark red-brown, negligible alteration?; mod. calcite, veins of hem.+cal	compare to 1907.2 and 1901.8
RS-446	2657.8-2658.7	9/10/98	whole core	9.7" HQ	ts/wr	flow(?) with 5% wh. fdspr phenos 1-3 mm (some zoned with dark cores) & 2% hbl <3mm and rare biotite(?)	negl. but fldsp altered to clay+cal and mod dissem cal, cal vnlts	what is it? how does this compare to Brady's Oscar Andesite
RS-446	2900.6-2901.6	9/24/98	whole core	11.5" HQ	ts/wr	2% sub-euhdrl, wh. feld phenos <10 mm long, 3% an-subhdrl, green, ? phenos <5 mm repl. by green clay in aphanitic matrix; some glomeroporhyritic clots	weak green clay and calcite with minor relict grey; bleaching along green clay+calcite veinlets; phenos all altered to white/green clay+cal; rare pyrite in green clay phenos	compare to 2942.5 and similar less altered units to determine original composition and effects of green clay alteration
RS-446	2942.5-2943.3	9/24/98	whole core	10.5" HQ	ts/wr	same unit as 2900.6 with same textures	mod. green clay and cal with more uniform darker green color than 2900.6; white/grn alt. red phenos; more pyrite than 2900.6	compare to 2900.6 to determine effects of stronger green clay alteration; any epidote?
RS-450	1511.4-1512.9	9/24/98	split core	1.5' HQ	wr	brecciated (or pseudobreccia), aphyric rock; local, poor banding due to or enhanced by alteration	weak green clay +? weak arg.; mod calcite	compare to other aphyric rocks, particularly that at 2044.6
RS-450	1550.0-1551.0	9/24/98	split core	.95' HQ	wr	fractured aphyric rock with local hints of fine spherulitic texture	weak green clay + cal. in fractures with bleaching along fractures	less calcite than 1511.4; compare to other aphyric rocks
RS-450	1810.4-1811.9	9/24/98	split core	1.4' HQ	ts/wr	aphyric rock with 2% irreg mmb up to 15 mm and pervasive, fine spherulitic texture	weak bleaching along dark cal.+ clay veinlets and fractures	least altered for comparison with other aphyric rocks with mmb
RS-450	2044.6-2046.2	9/24/98	split core	1.6' HQ	wr	aphyric pseudobreccia with v. rare, white feld pheno?; possible fine spherulitic texture	mostly pale grey with weak arg in "matrix" of pseudobreccia; tr. grn clay; v. pale brown fractures	compare to other aphyric rocks; could it be intrusion same as rock at 1511.4?

Miscsamp, whl.rk.
ts=thin section, wr=whole rock

Table 4: 1998 Rosebud Drill Holes

Hole_Id	Area	Easting	Northing	Elev.	RC Depth	T.D.	Core Footage	Collar Inclination	Collar Bearing	Significant Intercepts
RS-401C	Dreamland	478586	2207849	5703	1494.5	2379	884.5	-90	---	
RS-422C	Lucky Boy	477567	2207919	5749	1130	2380	1250	-90	---	890 ft of 30-160 ppb Au
RS-422.1C	Lucky Boy	477567	2207919	5749	---	2100	653	-90	---	
RS-425C	Deep Dreamland	479389	2207270	5642	1500	2418	918	-90	---	5.8 ft of 0.856 oz/st Au at 1655.7 ft
RS-426C	Dreamland	477913	2207672	5582	1038	1542	504	-90	---	3.4 ft of 0.04 oz/st Au at 1203.9 ft
										2.2 ft of 0.09 oz/st Au at 1207.3 ft
RS443C	Deep Dreamland	479386	2206959	5612	1498.4	2060.3	561.9	-89.51	210	15 ft of 0.05 oz/st Au at 200 ft
RS444C	Deep Dreamland	479634	2207109	5548	1438	2047.4	609.4	-88.9	181	
RS445C	Brown Palace	476941	2207882	5927	1660	2276.3	616.3	-89.2	39	5 ft of 0.023 oz/st Au at 1630 ft
RS446C	White Alps	477493	2208901	6111	1739	3070	1331	-88.4	358	0.8 ft of 0.037 Au, 33 oz Ag at 1756.2 ft
										2.3 ft of 0.024 Au, 16.8 oz Ag at 1766.8 ft
										6.1 ft of 0.01 Au, 5.4 oz Ag at 1883.2 ft
RS447	North Equinox	477282	2212201	6037	1600	1600	0	-89.7	193	
RS448	Target 1B	482906	2205083	5322	1205	1205	0	-89.3	211	detectable Au 0 - 470 ft
RS449	Target 1B	483435	2205175	5358	1130	1130	0	-88.9	210	24 - 108 ppb 0-160 ft
RS450C	Deep Dreamland	479550	2207532	5726	1449	2050	601	-89.0	139	0.5 ft 0.087 Au at 1764.1 ft
RS451	Target 1B	483270	2205670	5371	1220	1220	0	-89.0	84	
RS452	Target 1B	483600	2204702	5341	1050	1050	0	-89.5	162	
DRSU-453A	Target 1A	482113	2203682	4635	0	1000	1000	24.0	125	2.0 ft of 0.225 Au; 0.6 ft of 0.542 Au
DRSU-454	Target 1A	482113	2203685	4632	0	1001	1001	11.0	92	
RS455C	Short Shot	475556	2209281	6042	1259	2066	807	-89.1	285	0.01X in precollar
RS456C	White Alps	476159	2208897	6298	1698	2620	922	-89.2	47	1.5 ft of 0.006 Au, 2.2 oz Ag at 2373.7 ft
D-280-98	Target 2B	481998	2204393	4327	0	825	825	10.0	124	multiple intercepts of 0.03-0.05 Au
										4.7 ft of 0.138 Au at 526.7 ft
RS-D331-98	North Zone	482189	2204536	4322	0	303	303	-20.5	125	80-690 ppb @ 60-300 ft (incl 0.5' of 0.142 Au)
					16946		11902.6			

Note: Drill holes RS-427 through RS-442 were East Zone delineation holes, drilled by Newmont on behalf of the Rosebud J. V.
The RC precollars for drill holes RS-401, -422, -422.1, -425, and -426 were drilled in 1997, and the core tails were drilled in 1998.

Table 5. Surface Disturbance Summary 18-Feb-99

Hole	Road		Pad		Sumps		Total Sq.Feet	Total Acres	Acres, Public
	feet	sq. feet	feet	sq. feet	feet	q. fee			
RS401	0	0	25X50	1250	15X20	300	1,550	0.036	0.036
RS443	0	0	25X50	1250	15X20	300	1,550	0.036	0.036
RS444	620	12,400	25X50	1250	15X20	300	13,950	0.320	0.320
RS445^	0	0	25X50	1250	15X20	300	1,550	0.036	0.000
RS446^	0	0	25X50	1250	15X20	300	1,550	0.036	0.000
RS447	2400	48,000	25X50	1250	15X20	300	49,550	1.138	1.138
RS450	420	8,400	25X50	1250	15X20	300	9,950	0.228	0.228
RS455	50	1,000	25X50	1250	15X20	300	2,550	0.059	0.059
RS456	0	0	25X50	1250	15X20	300	1,550	0.036	0.036
Trenches	1160	23,200	25X50	0	15X20	0	23,200	0.533	0.533
Totals	4,650	93,000		11,250		2,700	106,950	2.455	2.384

^ Rosebud Mining Company fee land (not BLM).

Table 6. Reclamation Summary

Hole	Road		Pad		Sumps		Total Sq.Feet	Total Acres	Acres, Public	Acres, Private
	feet	sq. feet	feet	sq. feet	feet	sq. feet				
RS399	0	0	25X50	1250	15X20	300	1,550	0.04	0.04	
RS400	900	18,000	25X50	1250	15X20	300	19,550	0.45	0.45	
RS401	0	0	25X50	1250	15X20	300	1,550	0.04	0.04	
RS402	0	0	25X50	1250	15X20	300	1,550	0.04	0.04	
RS404	700	14,000	25X50	1250	15X20	300	15,550	0.36	0.36	
RS408	0	0	25X50	1250	15X20	300	1,550	0.04	0.04	
RS422^	0	0	25X50	1250	15X20	300	1,550	0.04		0.04
RS424	0	0	25X50	1250	15X20	300	1,550	0.04	0.04	
RS425	0	0	25X50	1250	15X20	300	1,550	0.04	0.04	
RS426^	0	0	25X50	1250	15X20	300	1,550	0.04		0.04
RS443	0	0	25X50	1250	15X20	300	1,550	0.04	0.04	
RS444	0	0	25X50	1250	15X20	300	1,550	0.04	0.04	
RS445^	0	0	25X50	1250	15X20	300	0	0.00		0.00
RS446^	0	0	25X50	1250	15X20	300	1,550	0.04		0.04
RS447	2400	48,000	25X50	1250	15X20	300	49,550	1.14	1.14	
RS450	0	0	25X50	0	15X20	300	300	0.01	0.01	
Totals	4,000	80,000		18,750		4,800	102,000	2.34	2.23	0.11

^ Rosebud Mining Company fee land (not BLM).

Table 7. Rosebud 1998 Cumulative Budget & Expenditures

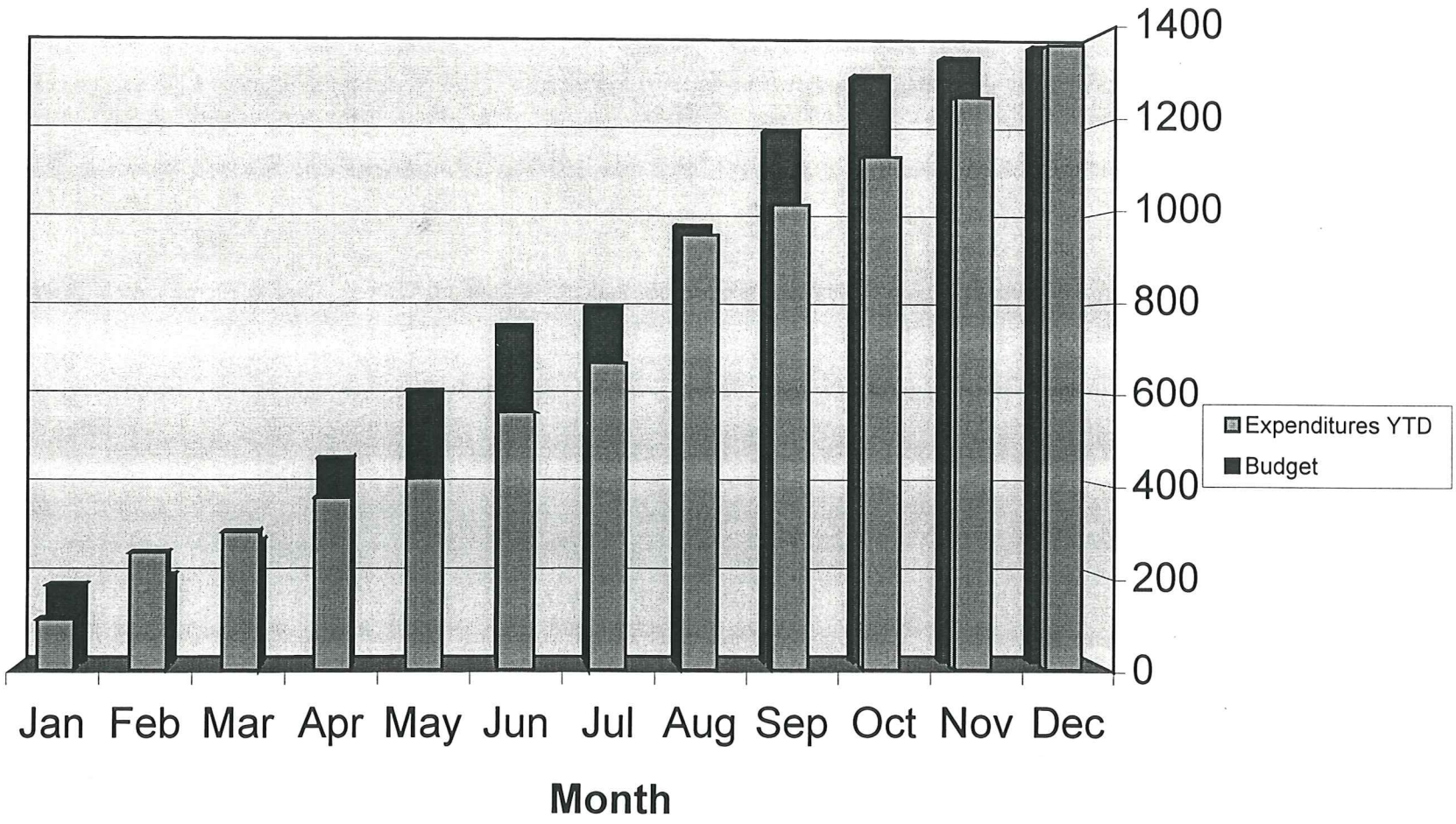


TABLE 8. 1999 Rosebud Target Ranking.

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.

TABLE 9. 1999 Rosebud Manpower Allocation Table.

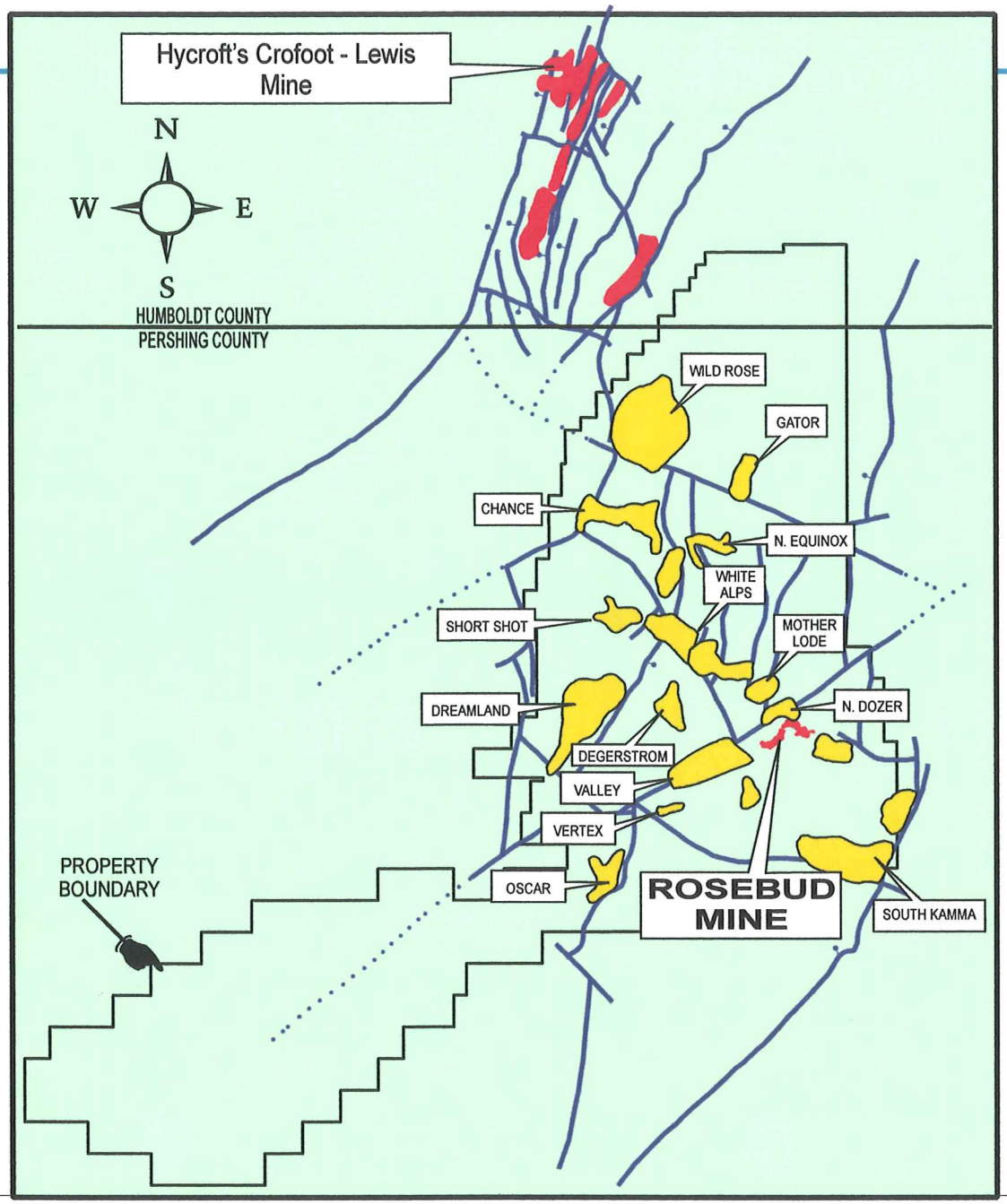
STATUS	STAGE	RANK	PROSPECT	TIME NEEDED	ASSIGNMENT	ACCESS
Advanced	*Priority*	9.	Mother Lode	2 months	Mitchell (1), Rogowski (1)	Yes
		10.	White Alps	3 months	Vance (2), Mitchell (1)	Maybe
		11.	North Equinox	0.3 months	Langstaff , Peer Review	No
District		1.	School Bus Canyon	0.2 months	S.W.A.T. Team	Yes
		2.	Deep Dreamland	3 months	Langstaff *(McLachlin)*	Yes
		3.	Degerstrom	3 months	Langstaff *(Stiles)*	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 *(Rogowski)*	No
		8.	Brown Palace	2 months	Vance	Yes

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

NEWMONT

ROSEBUD PROJECT

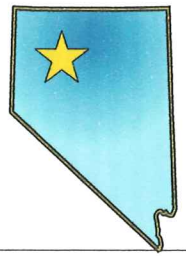
TARGET LOCATION MAP
FIGURE 1

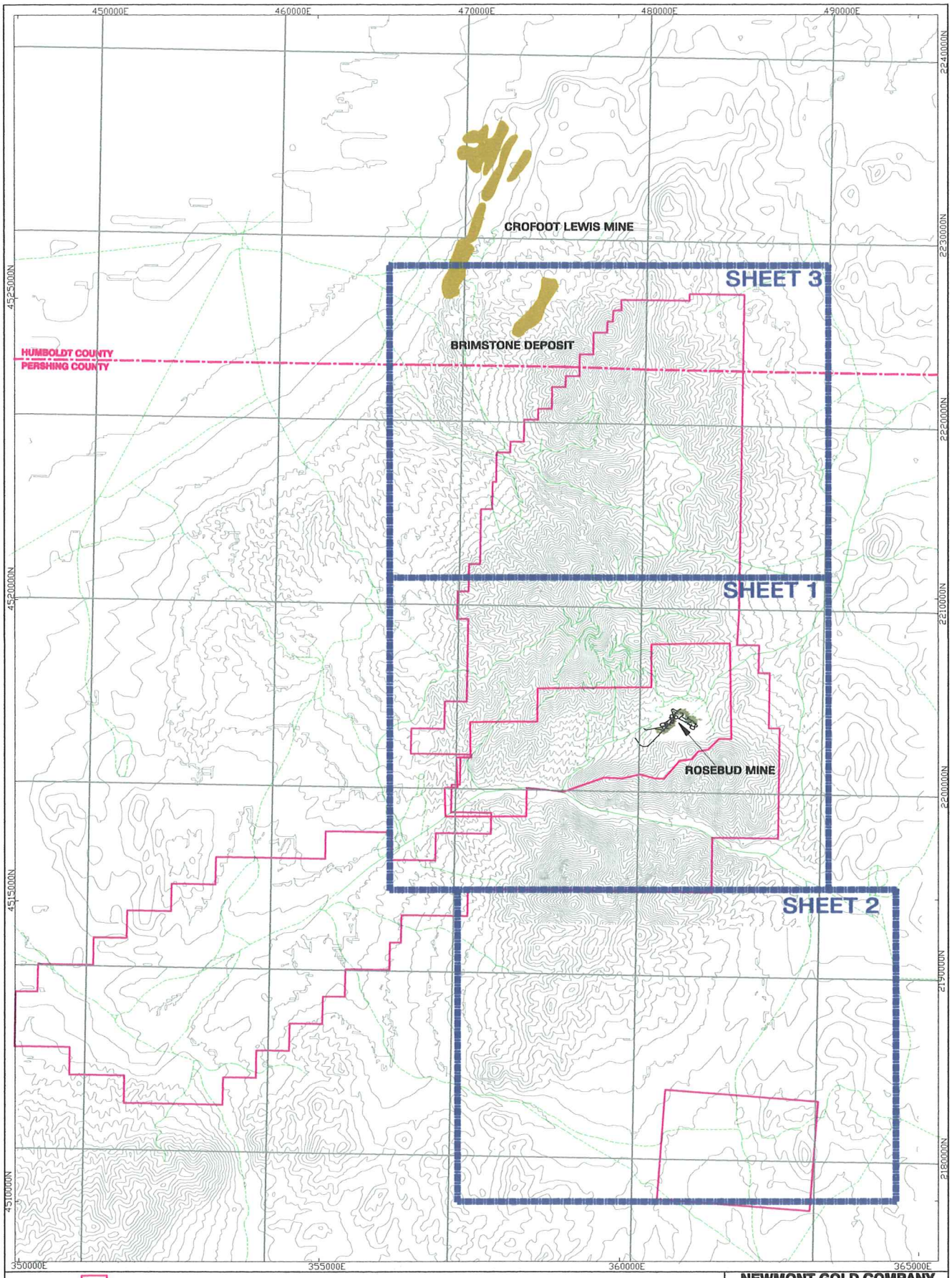


FAULTS

EXPLORATION TARGETS

0 6000
FEET





Rosebud claim block

SCALE: 1"=2000' 1:24000

0 1000 2000 4000 6000

NEWMONT GOLD COMPANY

861 West 6th. Street
Winnemucca Nv.

Telephone (702) 623-3493
Fax (702) 623-1653

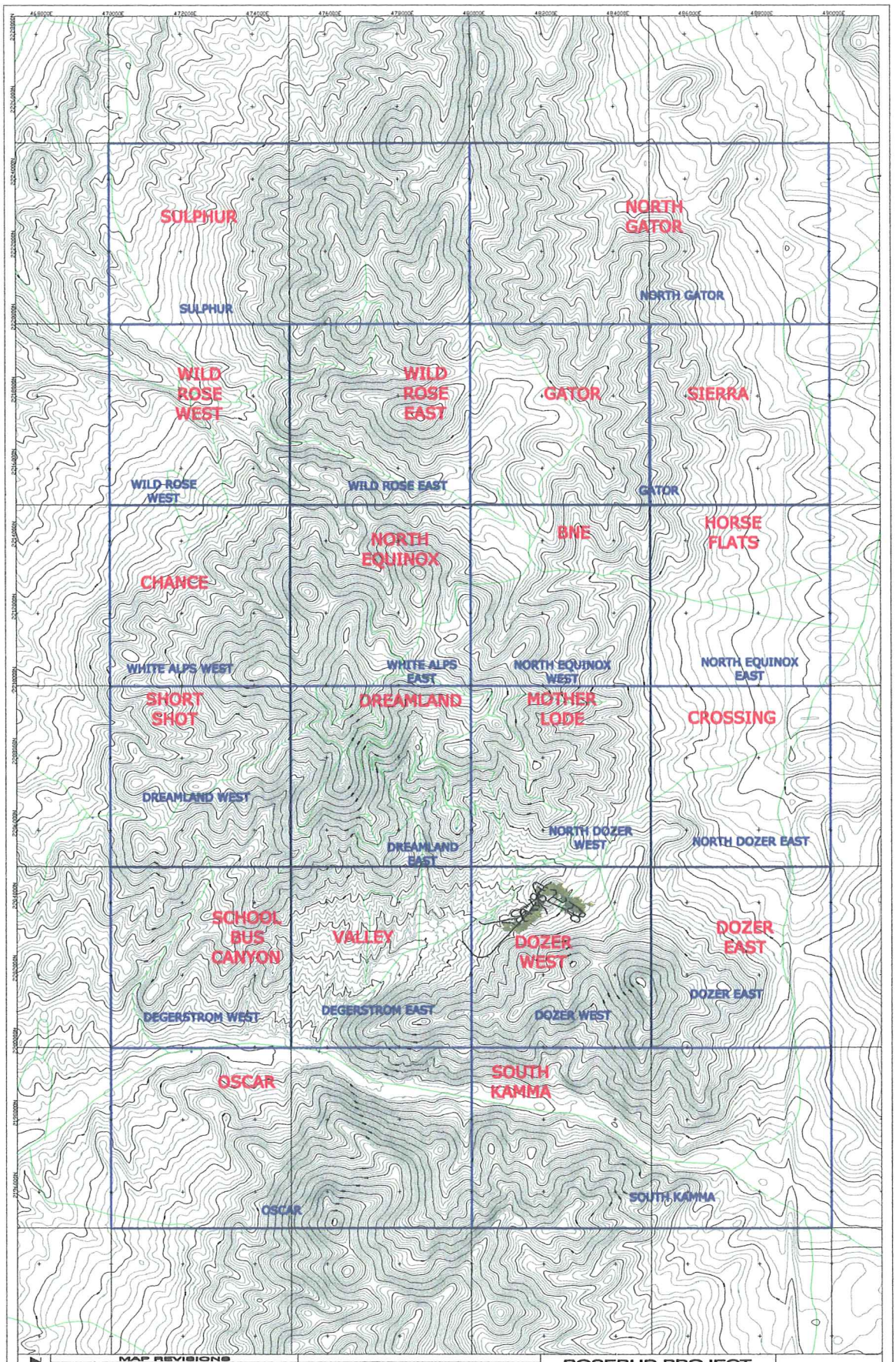
ROSEBUD MINING CO., LLC

INDEX MAP OF 6000 SCALE FOLIO SHEETS

FIGURE 2

PERSHING & NEWADA

GEOLOGIST	BY:	MODIFY BY:	PLOT DATE	PLOT FS	DRAWING FILE
R. Verne	R. Ashcraft/C.Olsen		02-11-02	02-142-2	00WRP02.dwg



MAP REVISIONS

No	DATE	MADE BY	DESCRIPTION	No	DATE	MADE BY	DESCRIPTION
1				11			
2				12			
3				13			
4				14			
5				15			
6				16			
7				17			
8				18			
9				19			
10				20			

INDEX MAP OF 2400 SCALE FOLIO SHEETS
FIGURE 3

scale 1" = 1000' 1:12000

ROSEBUD PROJECT

1:2400 INDEX MAP

1990 LAC SHEETS (blue)

NEWMONT (red)

DISCLAIMER	DATUM	DRAWN BY	PLOT DATE	DRAWING FILE
R. Vinton	WGS84 INFORMATION	R. Ritchie	6-20-99	Rb_Index.dwg

Figure 4. TAS Diagram of Rosebud Rocks

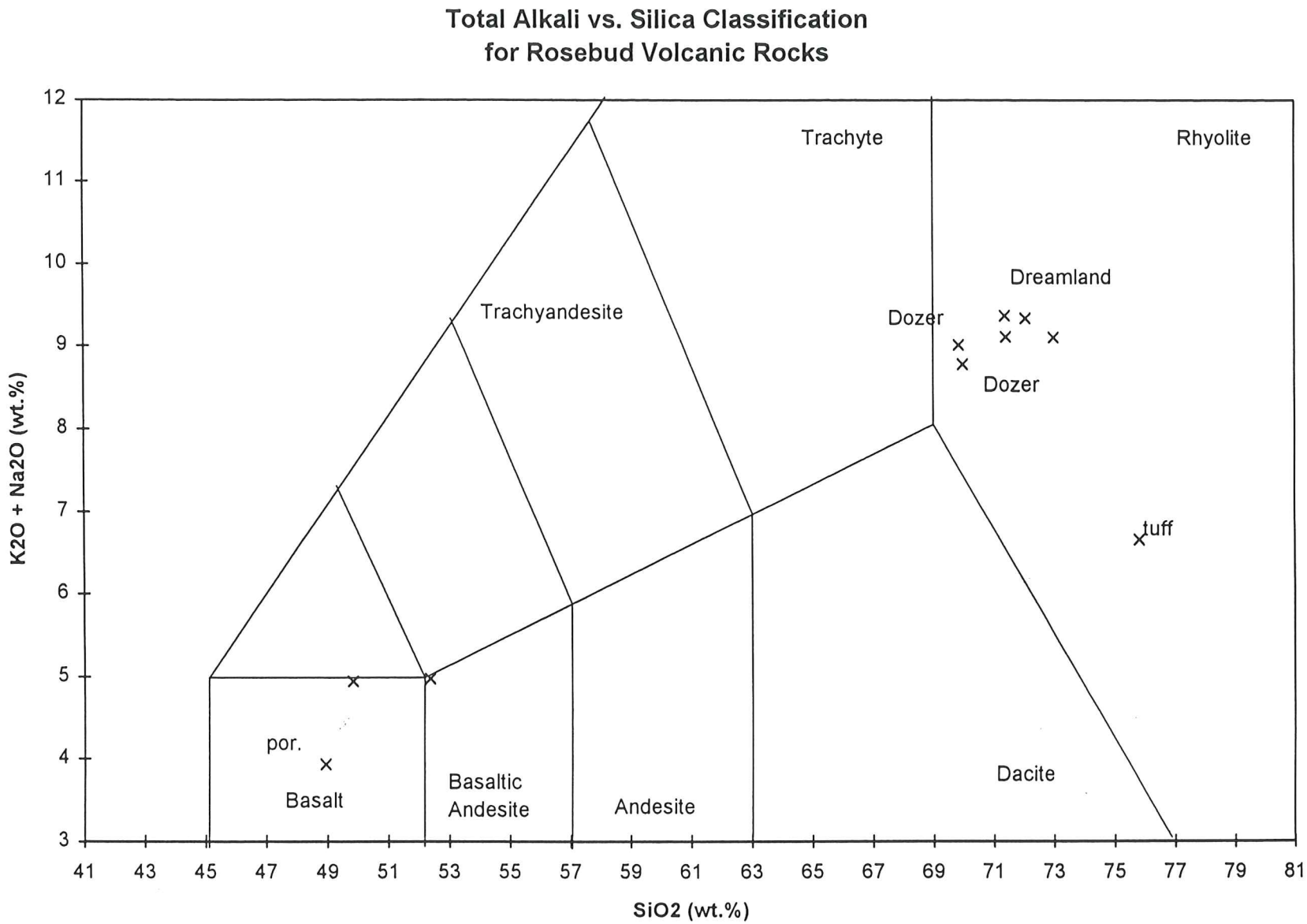
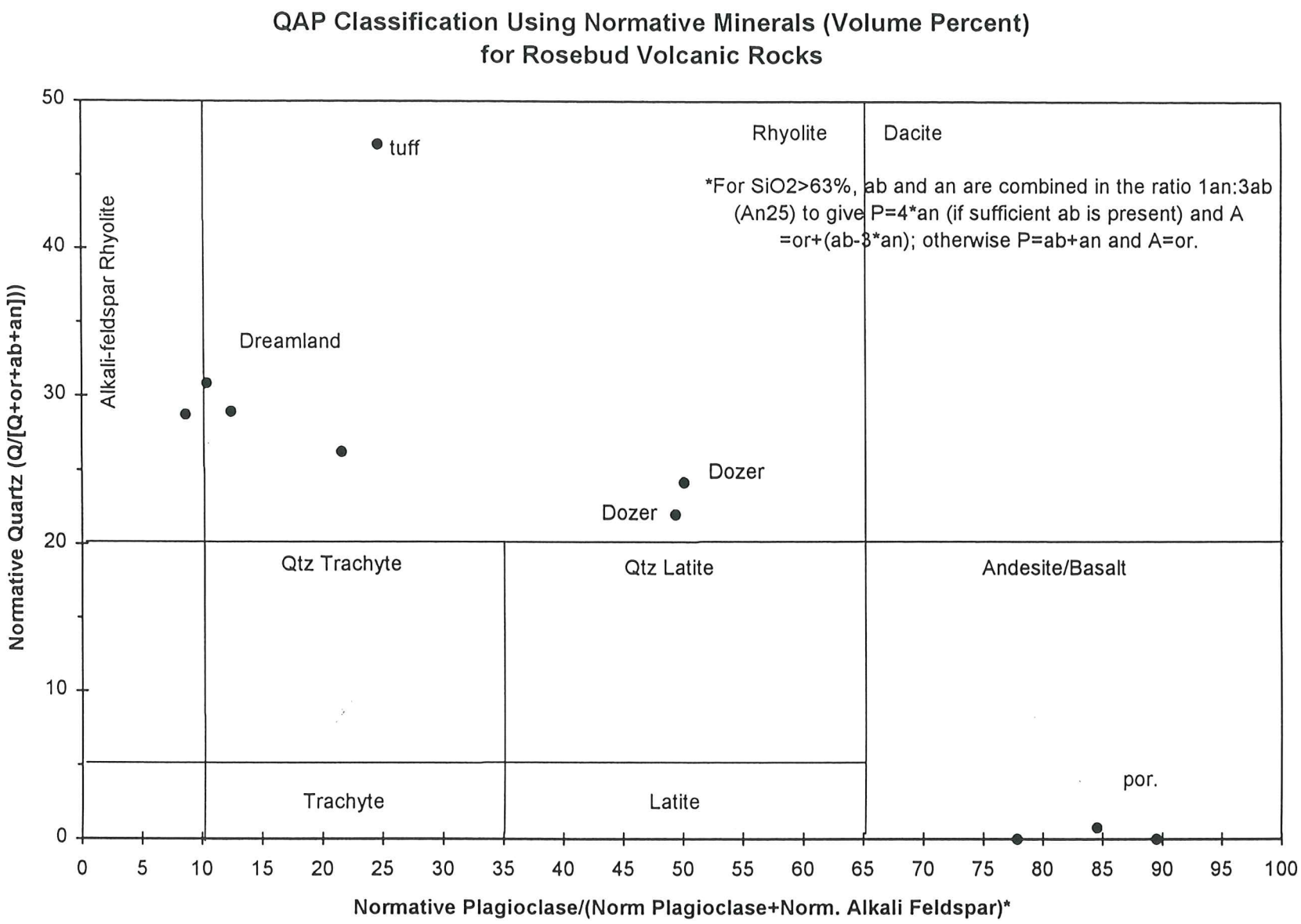
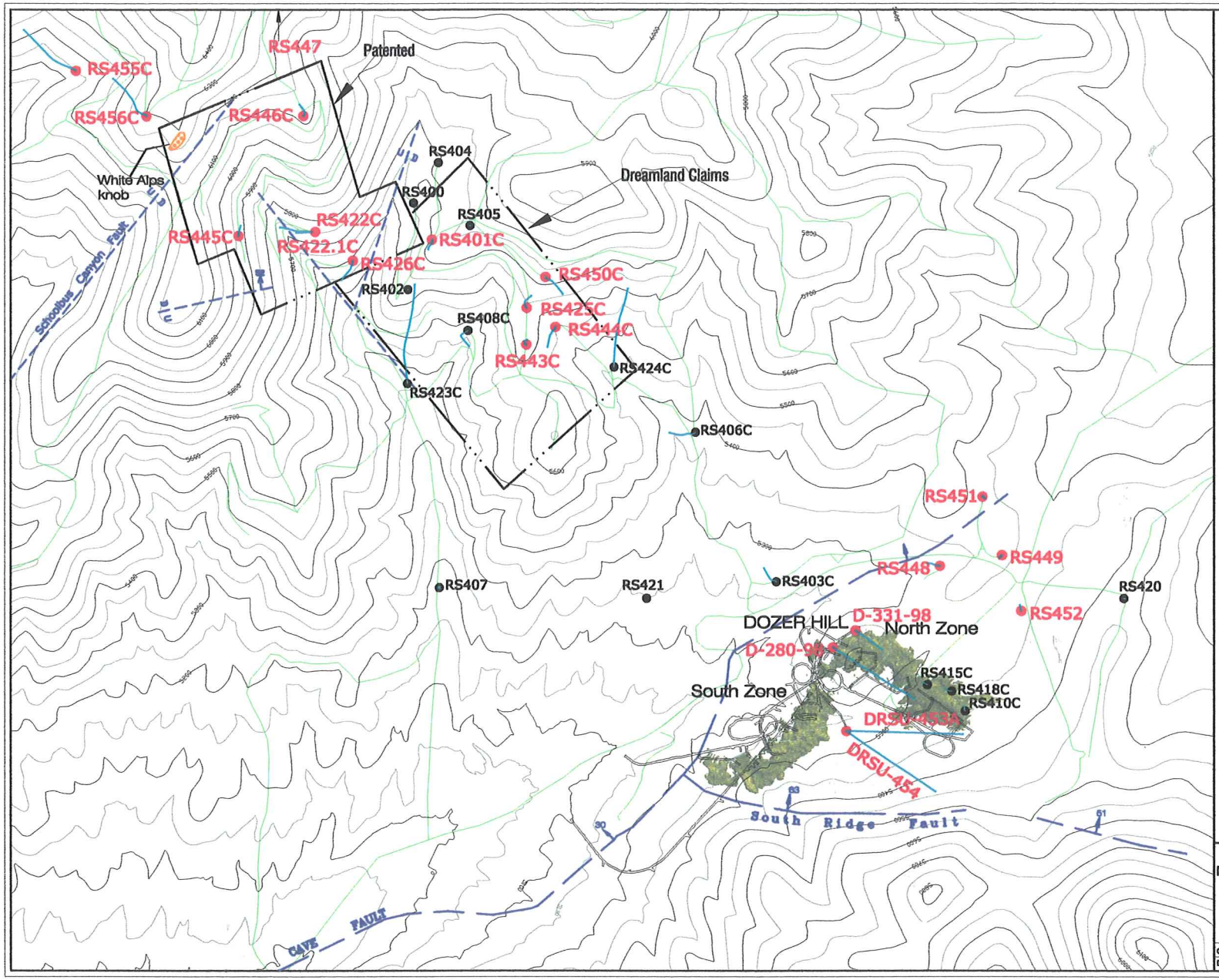


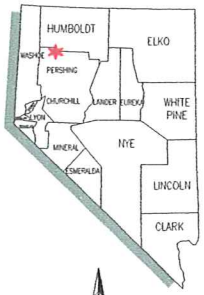
Figure 5. CIPW Plot of Rosebud Rocks





EXPLANATION

- PREVIOUS NEWMONT HOLES
- 1998 DRILL HOLES WITH DOWNHOLE TRACES
- RS-458 Surface
- RS-D345 Underground
- .05 oz/ton modeled Au shape projected to plan
- Fault



0 500 1000 1500

ROSEBUD MINING COMPANY

NEWMONT- HECLA JOINT VENTURE
1998 DRILL HOLE LOCATION MAP FROM DOZER HILL TO SHORT SHOT
Figure 6

Geologist: R. Vance	Date: 13-8-99
Drawn by: B. Alarcon	WinW01 R:\Figures\98anlrprt.dwg

Figure 7

1999 ROSEBUD TIMELINE