Progress Report 1982

RED CAMEL PROJECT (05065) Churchill County, Nevada

by

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January, 1983

## EXECUTIVE SUMMARY

# RED CAMEL PROJECT (05065) PROGRESS REPORT 1982

This is the PROGRESS REPORT 1982 on our new Red Camel Project (05065) by David R. Ernst. The project area is located 11 miles southwest of Fallon, Churchill County, Nevada. Our interest in the area came from the 1982 Volcanic Precious Metal Reconnaissance Program (05059). Our land position consists of 131 unpatented lode claims (Camel Group) staked in 1982 on BLM land. The claims are within a proposed withdrawal by the U. S. Navy for expanding the Fallon Bombing Range.

The area is underlain by Tertiary-age rhyolite tuff, andesitic-basaltic flows and breccias, and tuffaceous siltstone. These units are overlain by siliceous sinter deposits and cut by hydrothermal breccia dikes and vents. Fallback breccia from the hydrothermal vents are interbedded with the sinter. A rhyolite flow-dome was emplaced into the rhyolite tuff to the south. The area is structurally complex.

The area was the site of a 4.5 square mile hot spring system. Alteration consists of propylitized to completely argillized andesite-basalt, argillized tuffs, argillized and silicified tuffaceous siltstone, and strongly silicified hydrothermal breccia. Up to twenty percent pyrite is in some hydrothermal breccia and the sinters, beccias and altered rocks are strongly iron stained. Geochemical results indicate the area is anomalous in sliver, arsenic, thallium, molybdenum, and chrome.

The objective of this year's program was to complete the Land Acquisition Phase and 25 percent of the Preliminary Model Development Phase at a cost not to exceed \$20,000. We achieved our objective by staking the property, constructing a reconnaissance geologic map, and acquiring preliminary geochemical data. Total cost was \$19,355. The report is late due to the delay in getting geochemical data into and out of the DEC.

The objective for 1983 is to complete 50 percent of the Model Development Phase at a cost not to exceed \$50,000. Progress report by January 31, 1984. This will be accomplished with a program of mapping, sampling, and rotary drilling.

Dave Ernst did a fine job bringing the project along in 1982 as it wasn't acquired until late in the season. I concur with his recommendations for 1983.

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### SUMMARY AND CONCLUSIONS

The objective of the 1982 Red Camel (0565) program was to complete the Land Acquisition Phase and 25 percent of the Preliminary Model Development Phase at a cost not to exceed \$20,000. We achieved our objective by staking the property, constructing a reconnaissance geologic map, and acquiring preliminary geochemical data.

by Tertiary rhyolite The area is underlain andesitic-basaltic flows and breccias, and tuffaceous siltstone. These units are overlain by siliceous sinter deposits and cut by hydrothermal breccia dikes and vents. Fallback breccia from the hydrothermal vents are interbedded with the sinter deposits. Young basalt flows overlie the breccias and sinters, and a rhyolite flow-dome was emplaced into the rhyolite tuff to the is structurally complex with major south. The area northeast-trending faults and minor north-south faults. Rock units in the area are tilted to the northwest about 45 degrees. The area was the site of a 4.5 square mile hot spring system. Alteration consists of propylitized to completely argillized andesite-basalt, argillized tuffs, argillized and silicified and strongly silicified hydrothermal tuffaceous siltstone. breccia. Up to twenty percent pyrite is in some hydrothermal breccia and the sinters, breccias and altered rocks are strongly iron stained. Geochemical results indicate the area is anomalous in silver, arsenic, thallium, molybdenum, and chrome.

I conclude that the Red Camel property has very good potential for a disseminated precious metals orebody. The geochemical results indicate that silver may be the primary metal in this area. Possible host rocks include hydrothermal vents, hidden breccia bodies, the tuffaceous siltstone, and the rhyolite tuff.

## RECOMMENDATIONS

I recommend that the 1983 Red Camel project objective be to complete fifty percent of the Model Development Phase. The budget for the program should be about \$50,000. The program should include detailed mapping (1"=200'), rock chip geochemical sampling, and drilling.

#### INTRODUCTION

This report presents the reconnaisance geology and geochemistry of the Red Camel area. The property was acquired though the 1982 Precious Metals - Volcanic Reconnaissance program (0559).

## Location

The Red Camel project area is located 11 miles southwest of Fallon in Churchill County, Nevada (fig. 1). The area is in sections 27 through 34, T18N, R27E. The property is in the Dead Camel Mountains and on the edge of a Naval bombing range. No known mining district exsists in the area.

#### Land

Noranda staked 131 claims in September, 1982 on BLM land (fig. 2). The claims are known as the Camel Group and were staked by Noranda geologists and John Russel. The Camel claims overlap an existing claim group (Red 1-64) to the east and south. The Red claims are held by Grayhill Exploration and were staked in January, 1982. The Camel group surrounds one claim in the southern portion of the area. The exact location of this claim is not known at this time but it is not in a critical area. This single claim is held by Arvel A. Fallis, a prospector in Fallon. We plan to contact him early in 1983.

Fourteen days after the claims were staked the Navy segregated part of the area for the proposed Bravo-16 bombing range. The segregation voids mineral locations made after the announcement in the Federal Register. Therefore, our claims are valid but no other claims can be located on the proposed bombing range. The range will not be withdrawn without legislation. The legislative processes will take about two years and by that time we will have the property evaluated.

#### History

No metal production is known, but several minor pits and shafts are located in the southern portion of the area. Wonderstone, a banded, silicified tuff used for decoration and other semiprecious gem materials have been collected from the area (Willden and Speed, 1974). There is evidence that a large portion of the area was staked and dropped prior to 1972.

### APPROACH

The 1982 program was designed to give a preliminary evaluation of the Red Camel area. The program included mapping on a scale of 1"=1000' and rock chip geochemical sampling. A total of 18 man-days were spent on the project in 1982.

The geologic mapping involved defining rock units and their relationship to other units in the area. Due to the nature of the mapping, generalizations were made. The geochemical sampling concentrated on hydrothermal breccias and sinters but other units were also sampled. Thirty-eight five pound rock chip samples were taken and analyzed for Au, Ag, As, Sb, and Hg by Barringer Lab in Reno. Selected samples were also analyzed for Tl, Mo, W, Co, and Cr by Hunter Lab in Reno.

### RESULTS

See Appendix for rock chip geochemical results.

## REGIONAL GEOLOGY

The Red Camel area lies on the eastern margin of the Alta and Kate Peak andesitic volcanic fields. Most of the Dead Camel Mountains are underlain by young basalt flows. The rhyolite and andesite units in the area may be correlative with units to the west, but no work has been done to suggest a correlation.

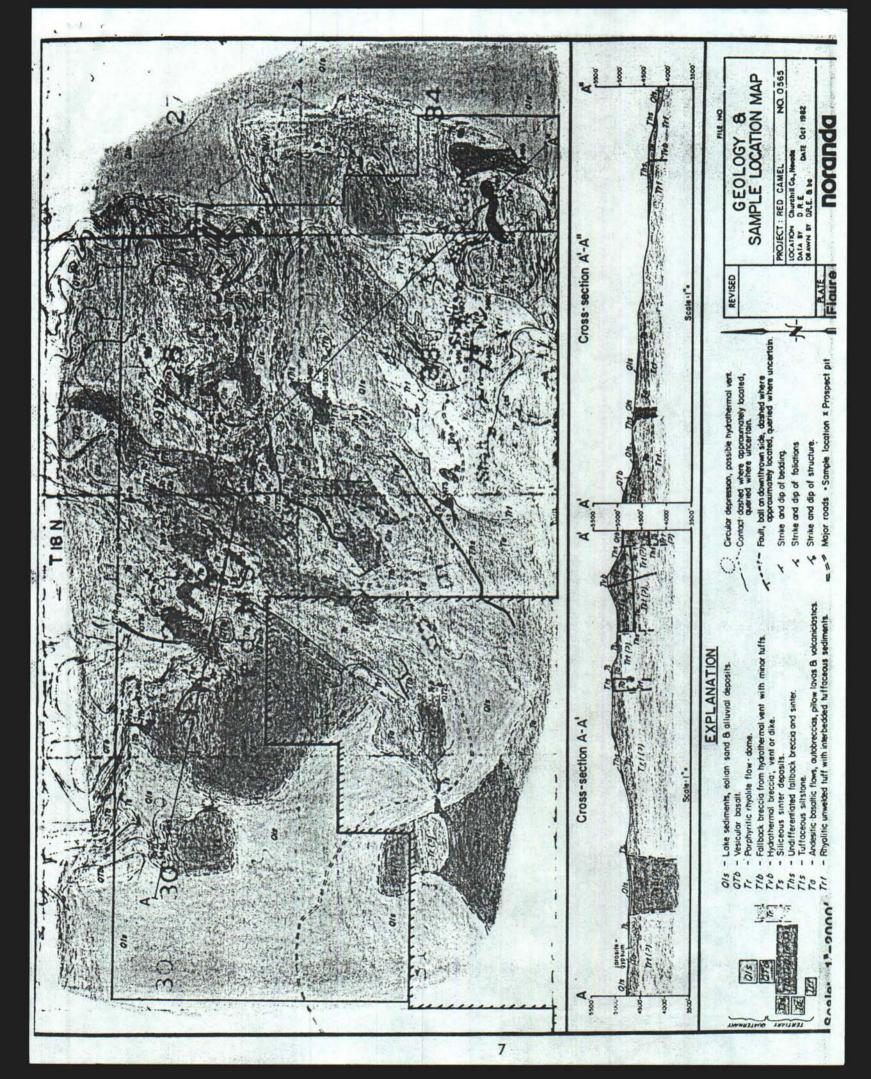
The major structural element in the region is northeast-trending, high-angle normal faults. In the Dead Camel Mountains the only exposed structure is in the Red Camel area. The only mining in the vicinity is for diatomite, and sand and gravel.

## LOCAL GEOLOGY

The following section describes the rock types, structure, alteration, and geochemistry of the Red Camel property. The geology is shown in Plate 1 and figure 3. The area is underlain by a Tertiary volcanic complex that includes (from oldest to youngest) a rhyolitic tuff (Trt), andesitic-basaltic flows, breccias and clastics (Ta), and tuffaceous siltstone (Tts). The andesitic-basaltic unit and the tuffaceous siltstone are cut by hydrothermal breccia dikes (Tvb), and overlain by and interbedded with fallback breccia (Tfb) and siliceous sinter deposits (Ts). A rhyolite flow-dome (Tr) is exposed in the southern portion of the area cutting the rhyolite tuff and the andesitic-basaltic unit. Overlying all units in the northern portion of the area is a Quaternary-Tertiary vesicular basalt (QTb). Lake sediments, eolian sand and alluvial deposits (Qls) are dispersed throughout the area.

## Rock descriptions

Trt - Rhyolitic unwelded tuff with interbedded tuffaceous sediments - about 50% of the rock consists of angular to rounded clasts ( <1mm-20cm) of altered and unaltered andesite (60%), andesitic volcaniclastics (20%), altered biotite rich rhyolite (10%), and uncollapsed pumice fragments (10%). The clasts are in a porphrytic matrix that contains 20% phenocrysts of clear, angular quartz (1mm, 70% of phenos), altered feldspar ( <1mm, 20% of phenos), fresh biotite ( <1mm, 10% of phenos), and magnetite ( <1mm, 1% of phenos). These phenocrysts are in an aphanitic groundmass. The tuff contains thinly laminated interbeds (1 to 10 feet thick) of tuffaceous sediments that consist of water-reworked tuff. The unit is white to light blue green with yellow brown interbeds and is at least 150 feet thick. This tuff was named the Old Gregory Formation by Axelrod in 1956.



- Ta Andesitic-basaltic flows, autobreccias, pillow lavas (?), and volcaniclastics consists of fragment supported monolithologic breccia (autobreccia) in an aphanitic to glassy andesitic-basaltic matrix. Fragments are often very vesicular with iron oxide coatings. The unit also consists of highly vesicular flows, highly jointed flows, and a volcaniclastic member. The clastic member consists of fine- to coarse-grained, thin- to medium-bedded andesitic-basaltic material. The Ta unit is about 250 feet thick and is exposed throughout the claim block as dark red brown to green to black outcrops. Many exposures display spheroidal weathering.
- Tts Tuffaceous siltstone consists of thin-bedded, very fine-grained to fine-grained, platy tuffaceous siltstone. The siltstone contains abundant leaf imprints, sole markings, and thin, small (about 2mm long) blades of organic material. The siltstone is about 100 feet thick, white to light yellow brown to pink in color and often has liesegang banding.
- TVb Hydrothermal breccia; vent or dike consists of angular to rounded fragments ( <1mm to .5m) of sinter (Ts), andesite (Ta), pumice (Trt?), tuffaceous siltstone (Tts), hydrothermal breccia, and flow banded rhyolite supported by a siliceous matrix. The only vent exposed occupies an area of about 300 x 100 feet and cuts Tts. The dikes are from 1 to 10 feet wide with strike lengths from 50 to 700 feet long and cut Trt, Ta, and Tts. The breccia is light gray to light green gray to gray to dark gray in color and contain as much as 20% pyrite.
- Tfb Fallback breccia from hydrothermal vents with minor tuffs consists of material thrown out of explosive hydrothermal vents. The exposures of fallback breccia usually have vague to prominent horizontal bedding. In the central and south-central portions of the area fallback breccia occurs interbedded in the Ta unit. The strike length of this interbed is up to about 4000 feet long. Some of the fallback material appears to be phreato-magmatic or even magmatic in nature. This is indicated by the presence of collapsed pumice fragments in a silicified matrix.
- Ts Siliceous sinter deposits consists of dark red to brown, white to dark gray, green to green gray, thinly laminated, often brecciated, siliceous, sinter terrace deposits. The sinters range in thicknesses from 1 to 20 feet. The sinters contain abundant clastic interbeds and form a thin venear draping over altered andesite in the northern portion of the area. The sinter deposits demonstrate the irregularity of the topography at the time of hot spring activity.

Ths - Undifferentiated fallback breccia and sinter - consists of Tfb and Ts units that are closely associated in space and time.

Tr - Porphyritic rhyolite flow-dome - contains 25% phenocrysts of clear to smoky quartz (40% of phenos, 1mm), unaltered to totally altered feldspar (50% of phenos, 1mm) fresh biotite (8%, <1mm) and magnetite (2%, .2mm) in a white to light gray to pink gray aphanitic groundmass. The flow-dome occurs in the southern portion of the area. The rhyolite is flow banded usually with steep dips, convolutions and autobrecciation. The flow portion of the rhyolite is vitrophyric and is best exposed on the western portion of the flow-dome. A similar rhyolite occurs on the Red claim group in the south-west portion of the area.

QTb - Vesicular basalt - dark brown to black, unaltered, highly vesicular, often platy, contains 50% phenocrysts of plagioclase (<1 to 3mm, 60% of phenos), olivine (<1 to 3mm, 30% of phenos) and pyroxene (<1 to 1mm, 10% of phenos) in an aphanitic, sometimes glassy groundmass. The basalt is thickest on the northern edge of the claim block where it is about 150 feet thick but the thickness elsewhere ranges from 20 to 100 feet.

#### Structure

The Red Camel area is structurally complex with major northeast trending faults and minor north-south faults. The faults are high-angle normal faults with the down dropped side usually to the west. Displacement along the faults is unknown at this time but is probably not greater than about 400 feet. Some of the minor faults to the south have offsets of only a few feet. The rock units in the area are tilted to the northwest with dips ranging from 20 to 57 degrees. It appears that at least some of the faulting was post alteration.

#### Alteration

The alteration at Red Camel consists of silicification, argillization, propylitization, calcite veining and iron staining. The presence of siliceous sinters and fallback breccias indicates that this was an area of hot spring activity. At least 4.5 square miles was affected by the hydrothermal system. The strongest hydrothermal activity seems to have taken place in the northern portion of the claim block. The hydrothermal system probably began during the end of the

andesite-basalt (Ta) volcanism. The system was active through the deposition of the tuffaceous siltstone (Tts) and ended before

the young basalts (QTb) erupted.

Pervasive silicification is in the hydrothermal breccia units (Tvb, Tfb and Ths) and locally in the tuffaceous siltstone. In some cases abundant pyrite (as much as 20%) is present. Silicification is also along fractures in the rhyolite tuff and the tuffaceous siltstone.

Pervasive argillic alteration is in the rhyolite tuff and flow-dome, tuffaceous siltstone, and andesite-basalt units. The intensity of the argillization varies from alteration of only the phenocrysts to total destruction of the original texture. In some areas the andesite-basalt unit is only propylitized. No x-ray data has been collected to determine the alteration mineral assemblages.

Calcite veins occur throughout the andesite-basalt unit. One vein is along a small fault but most of them are between spheres

in spheroidally weathered outcrops.

The strongest iron staining is in the northern portion of the claim block in the andesite-basalt, tuffaceous siltstone, hydrothermal breccias, and sinter deposits. In the tuffaceous siltstone the staining is usually along fractures. Breccias with strong iron staining usually contain abundant pyrite.

Gypsum and jarosite is found on several slopes in the northern portion of the claim block. The origin of the gypsum is unknown at this time. It may be a result of oxidized sulfur or sulfides, or an evaporite layer that formed prior to the young basalts (QTb).

#### Geochemistry

Thirty-five rock chip samples were taken mostly of the hydrothermal breccias and siliceous sinters. Sample locations are shown in Plate 1 and figure 3. The geochemical results indicate that the area is anomalous in silver (as much as 9.7 ppm), arsenic (as much as 375 ppm), thallium (as much as 8 ppm), molybdenum (as much as 30 ppm), and chrome (as much as 450 ppm). No anomalous values of gold, antimony, mercury, tungsten, or cobalt were detected.

Anomalous silver values ( >1 ppm) were detected in hydrothermal breccias and siliceous sinter. Anomalous arsenic values ( >100 ppm) were detected in hydrothermal breccias, siliceous sinter, altered andesite and tuffaceous siltstone. Anomalous thallium ( >4 ppm), molybdenum ( >10 ppm), and chrome ( >100 ppm) was detected in all seven breccia and sinter samples analyzed.

### RECOMMENDATIONS - DETAILED

I recommend that the objective for the 1983 Red Camel program be to complete 50% of the Model Development Phase. The budget for the program should be about \$50,000. To achieve this objective the following programs should be included:

- 1) Detailed geologic mapping at a scale of 1 inch = 200 feet. The mapping should be done early in the year using aerial photos. The mapping should include the northern portion of the Red claim block.
- 2) Detailed rock chip sampling (about 300 samples). The sampling should be done at the same time as the mapping concentrating on breccias and sinters.
- 3) X-ray study to determine the alteration minerals present. The samples (about 10) should be taken while mapping concentrating on the argillized rocks.
- 4) Evaluate targets indicated by sampling and mapping using shallow (200 to 500 foot) reverse-circulation drill holes.
- 5) Contact owner of claim in the southern portion of Camel claim block so that exact location can be identified.
- 6) Investigate water right status in the area.
- 7) Continue to monitor the Navy's plan to acquire area for bombing range.

# SUMMARY OF EXPENDITURES

Geology	3099.58
Geochemistry	2135.53
Geophysics	737.18
Food and lodging	227.39
Transportation	698.00
Drafting	220.00
Land	2238.00
Total	9355. 66

## REFERENCES

Willden, Ronald, and Speed, R.C., 1974, Geology and mineral deposits of Churchill County, Nevada: Nevada Bureau of Mines and Geology Bulletin 83, p.40.

Axelrod, D.I., 1956, Mio-Pliocene floras from west-central Nevada: California Univ. Pub. Geol. Sci., v. 33, p.137-8.

## APPENDIX - GEOCHEMICAL RESULTS

The following is a list of abbreviations used for coding rock descriptions in this appendix:

Sample type: 0 - Outcrop D - Dump

Rock type: AN - Andesite RY - Rhyolite BX - Breccia SN - Sinter

EV - Evaporite ST - Siltstone

GU - Gouge VC - Volcaniclastic

Form-Modifier: AF - Ash flow tuff HY - Hydrothermal

BX - Brecciated NB - Thin bedded

OF - Outflow-fallback DK - Dike

FG - Fine-grained PL - Parallel

lamination

M 42

FL - Flow SI - Siliceous TF - Tuffaceous FT - Fault FW - Footwall UW - Unwelded HW - Hanging wall VT - Vent

Color: BN - Brown LT - Light

DK - Dark RD - Red GN - Green YW - Yellow

GY - Gray

Alteration minerals: CLA - Clay OPA - Opal

GYP - Gypsum SIL - Silica

Alteration mode: SB - Supergene VN - Veined

FT - Fault LD - Ledge

PV - Pervasive

Alteration intensity: W - Weak M - Moderate S - Strong

Oxidation minerals: GO - Goethite JA - Jarosite

HE - Hematite LI - Limonite

Oxidation intensity: W - Weak M - Moderate S - Strong

Sulfide minerals: PY - Pyrite

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ROCK CHIP SAMPLES

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FINAL REPORT 1983
RED CAMEL PROJECT (05065)

by

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Noranda Exploration, Inc.
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Larry L. Lackey, Manager
Reno, Nevada
December, 1983

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## EXECUTIVE SUMMARY

## RED CAMEL PROJECT (05065) FINAL REPORT 1983

This is the Final Report 1983 on the Red Camel Project (05065) written by Peter A. Dilles, a contract geologist; the project was supervised by David R. Ernst. The project area is in the Camel Mountains eleven (11) miles southwest of Fallon, Churchhill County, Nevada. Noranda staked the area in 1982 as a result of reconnaissance visit by members of the 1982 Volcanic-hosted P.M. Reconnaissance Program (05059). We currently hold 131 Camel Group claims. The area is within a proposed withdrawal for a U.S. Navy Bombing Range.

The Camel Mountains are underlain by Tertiary-age volcanic eruptive rocks and was the site of an extensive hot-spring system. The rocks include rhyolitic flow domes and unwelded tuffs, andesite and basalt flows, various types of debris flow, surge and fallback deposits, and tuffaceous sediments. The area is structurally complex.

Alteration consists of silicification of hydrothermal breccia and tuffaceous sediments, argillized tuffs, flows and sediments. The andesite and basalts are propylitized. Alteration decreases with depth and is therefore probably the result of waters from the hot-spring system.

The area is only weakly mineralized. Pyrite is present in the andesites, vent breccia dikes and in sinters. Arsenic and antimony oxides stain breccia and sinters. Anomalous silver values (high 31.5 ppm) were from the fallback breccias, sinters, breccia dikes and one from argillized andesite next to a hot-spring vent. Our target was a Borealis/McLauglin type gold-silver deposit.

The objective of the 1983 program was to complete 50 percent of the Model Development Phase at a cost not to exceed \$50,000. We tested our models by sampling, mapping and drilling at a cost of \$47,000. We found that the Red Camel area has the right geology but insufficient precious metal in the hydrothermal system to produce an ore deposit.

I concur with Dave Ernst's and Pete Dilles' recommendation to discontinue work on the property.



Frontispiece - Photograph looking east at fault contact between light colored argillized tuffaceous sediments and dark colored propylitized andesitic to basaltic flows.

## SUMMARY

The objective of the 1983 Red Camel (05065) program was to complete 50 percent of the Model Development Phase at a cost not to exceed \$50,000. We surpassed our objective and completed the Model Testing Phase by testing three target types. The targets evolved from conceptual and empirical models developed during reconnaissance exploration for volcanic-hosted epithermal precious metal deposits. We tested the targets through detailed mapping (1"=200"), rock chip sampling (274 samples) and 1475 feet of reverse-circulation rotary drilling.

The area is underlain by a volcanic eruptive center. Units, from oldest to youngest, include: 1) a rhyolitic unwelded lithic tuff, 2) a series of andesitic to basaltic flows, autobrecciated flows, lahas and clastic debris, and 3) a stratified partially water-reworked unit of tuffaceous and clastic surge debris. These three units have been normal faulted, tilted and intruded by at least two rhyolitic flow domes. Vent breccia dikes cut all of the preceeding units and fed clastic fallback breccias. Tuffaceous siltstone, siliceous sinter terraces, unconsolidated gypsum-bearing lacustrine sediments and olivine basalt flows overlie the fallback breccias. The area is structurally complex with major east-northeast trending normal faults that tilt the rock units to the northwest. Subordinate north-northwest trending normal faults occur within the major fault blocks. Alteration consists of silicified hydrothermal

breccia and tuffaceous sediments, argillized tuffs, flows and tuffaceous sediments, and propylitized andesitic to basaltic rocks. As much as twenty percent pyrite is in some silicified hydrothermal breccia. Sinters, breccias and altered rocks have strong Fe-staining and locally have arsenic and antimony ochres. The property is anomalous in silver, arsenic, antimony, thallium, molybdenum, and chrome.

Results from the mapping, sampling and drilling indicate the following: 1) the silicified and brecciated rocks have shallow thicknesses (rarely > 50 feet thick), 2) breccia dikes are narrow at depth (< 10 feet wide), 3) breccia dikes are the source for the fallback breccias, 4) at depth (100 to 180 feet deep) alteration is confined to the narrow breccia dikes and blossoms out near the surface, 5) the area is not strongly anomalous in precious metals because out of 312 samples 5 have detectable gold (.04 ppm) and 5 have > 5 ppm silver, and 6) arsenic does not appear to be zoned vertically above silver or gold.

We conclude that the Red Camel property has a low exploration potential for a precious metal deposit. We recommend no further work in 1984 but review during 1985 in light of new ideas.

## INTRODUCTION

This report represents the geology, geochemistry, and drilling results of the 1983 Red Camel Project.

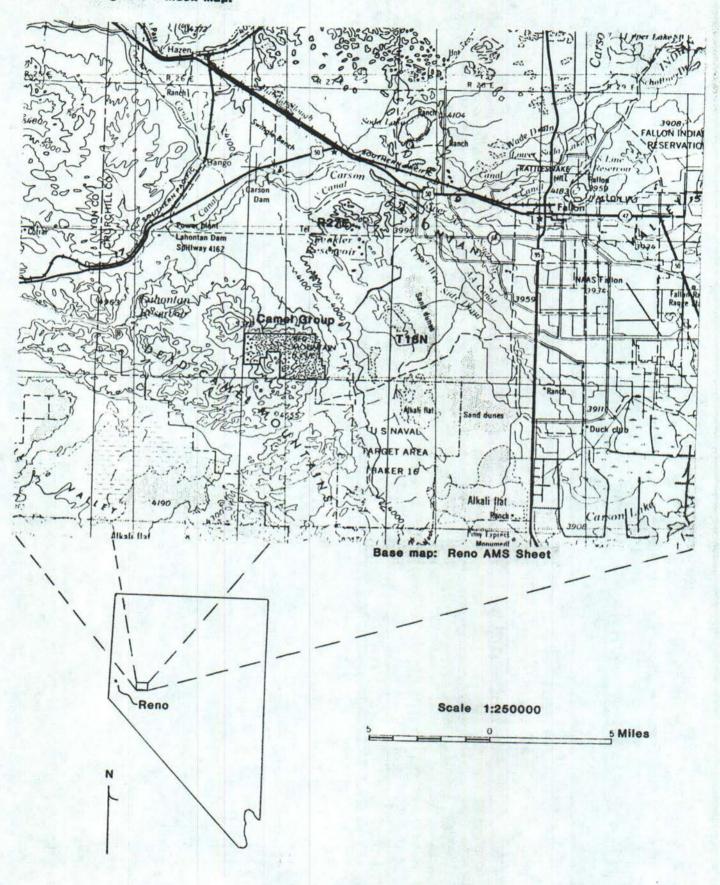
## Objective

The objective of the 1983 program was to complete 50 percent of the Model Development Phase at a cost not to exceed \$50,000. We surpassed the objective by completing the Model Testing Phase at a cost of \$46,680. This was accomplished by testing three target types. The targets evolved from conceptual and empirical models developed during reconnaissance exploration for volcanic-hosted epithermal precious metal deposits. We tested the targets through detailed mapping (1"=200'), rock chip sampling (274 samples) and 1475 feet of reverse-circulation rotary drilling.

# Location

The Red Camel project area is located 11 miles southwest of Fallon in Churchill County, Nevada (Fig. 1). The area is in sections 27 through 34, T18N, R27E. The property is in the Dead Camel Mountains and on the edge of a Naval bombing range. No known mining district exsists in the area.

Figure 1 - Index map.



Land

Noranda staked 131 claims in September, 1982 on BLM land (Fig. 2). The claims are known as the Camel Group and were staked by Noranda geologists and John Russell. The Camel claims overlap an existing claim group (Red 1-64) to the east and south. The Red claims are held by Grayhill Exploration and were staked in January, 1982.

On October 21, 1982, a Notice of Proposed Withdrawal and Reservation of Lands for expansion of the Navy's Baker 16 high speed weapons drop maneuvering area was published in the Federal Register. The notice had the effect of immediately segregating the area from mineral entry under the general mining law for a period of 2 years. Portions or all of 66 of the 131 claims are affected.

The withdrawal is subject to existing, valid rights. In order for our claims to be valid, a discovery must have been made on each claim prior to the withdrawal. As the claims were located based on surface geological evidence, a discovery had not been made by the date of segregation. The claims are therefore in danger of being declared invalid should BLM contest them.

Although we risked wasting exploration dollars by continued exploration on a portion of the claim group, we had a better chance of having the boundary of the area redrawn if our exploration effort proved successful. A discovery during the two year period of segregatation will not validate the original

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locations. Therefore, it was suggested that if the withdrawl is not finalized in two years we should amend and relocate the claims. The 1984 assessment work for Camel #1-131 was sent to the County on December 5, 1983 and to BLM on January 2, 1984. A notice of intent to hold the claims will be filed in early 1984.

# History

No metal production is known, but several minor pits and shafts are located in the southern portion of the area. Wonderstone, a banded, silicified tuff used for decoration and other semiprecious gem materials have been collected from the area (Willden and Speed, 1974). There is evidence that a large portion of the area was staked and dropped prior to 1972.

# EXPLORATION METHOD

The 1983 program was designed to evaluate the property through mapping, sampling, and drilling. A total of 114 man-days were spent on the project in 1983.

During April and early May a 1"=200' geologic map was nearly completed, 274 rock chip samples were taken, and seven X-ray samples were taken. Peter A. Dilles did most of the mapping and sampling. Lori A. Beck mapped and sampled the southeastern portion of the area. David R. Ernst supervised the project. The geologic mapping was done on a blown-up U.S.G.S. aerial photograph then transferred to a mylar blow-up of the Fallon 15' sheet. The 1"=200' scale maps were reduced to 1"=400' for this report. All rock chip samples were analyzed for gold, silver and arsenic. Four samples were also analyzed for antimony. The geochemical determinations were done by Barringer Resources, Inc. in Sparks, Nevada and Noranda Vancouver Geochemical Laboratory in Vancouver, B.C. X-ray analysis of seven samples was performed by Dr. L.C. Hsu of the Nevada Bureau of Mines and Geology. Twelve thin-sections were prepared by Ruperto Laniz in Stanford, CA to aid in rock type determinations.

During the summer the EDP department digitized the 1982 and 1983 sample locations then prepared geochemical contour

maps for silver and arsenic. Drill sites were located and the BLM was given notice of intent to construct roads and drill.

During late October and early November the geologic map was completed, roads were constructed and 1475 feet of reverse-circulation rotary drilling was completed in nine holes. The roads were built by Stockmen's Equipment, Inc. of Fallon, Nevada. Drilling was started by Bruce Young of Young Drilling and Exploration of Round Mountain, Nevada. Young leased an old rig from Orin Pollock to drill Red Camel. The equipment was broken down and the man who actually did the drilling was not experienced with reverse-circulation. We decided to terminate the contract during hole number RC-83-5 when the hammer wore out. C&L Drilling Co. of Nampa, Idaho was contracted to finish RC-83-5 and the remaining holes. Selected five foot intervals were analyzed for gold, silver and arsenic by Legend Metallurgical Laboratory, Inc. in Reno and Cone Geochemical, Inc. in Lakewood, CO. A list of the principal contractors used is in Appendix IV.

## REGIONAL GEOLOGY

Range and north of the Desert Range in Churchill County, Nevada.

No pre-Tertiary basement rocks are exposed in the range. About ten miles to the west an undivided sequence of Jurassic-Triassic age shales, sandstones, andesitic and rhyolitic volcanigenic clastics, and carbonate rocks are exposed near Silver Springs.

Andesitic to basaltic rocks exposed near Red Mountain may be age equivalents of the Alta and Kate Peak Formations of the Virginia Range. Most of the Dead Camel Range is covered by Quaternary-Tertiary age basalts.

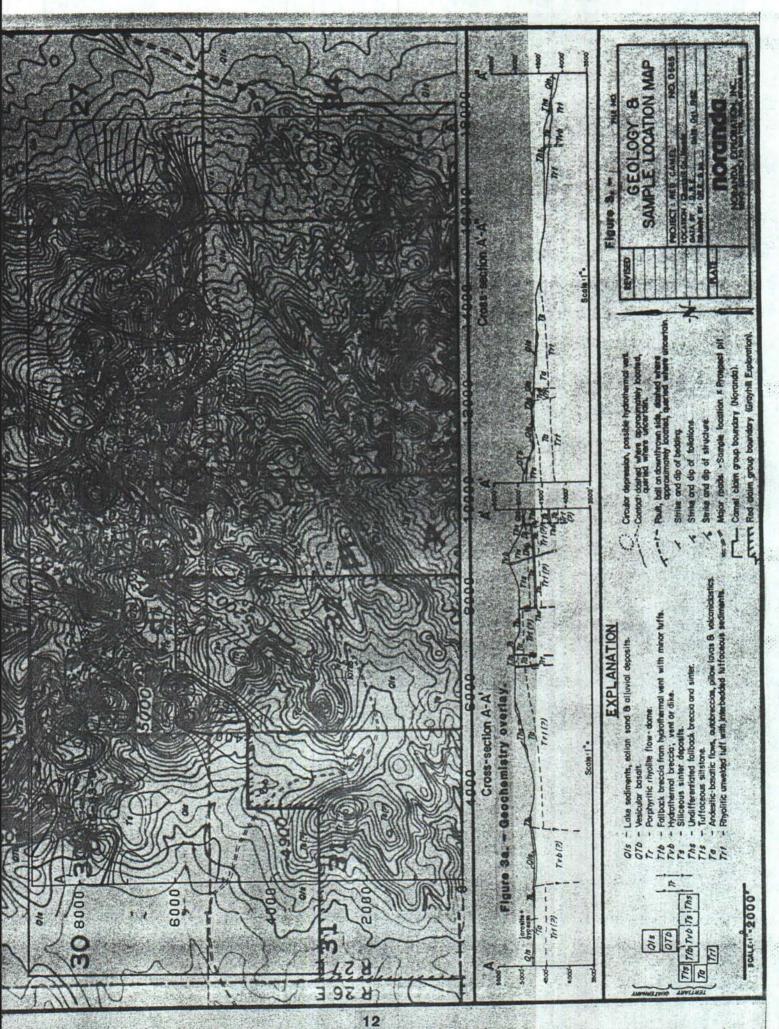
The property lies on the northeastern edge of the Walker Lane structural province. The major structure in the region are northeast trending high-angle normal faults. The only mining activity in the area is for diatomite, and sand and gravel. Previous workers in the area include Axelrod (1956) and Willden and Speed (1974).

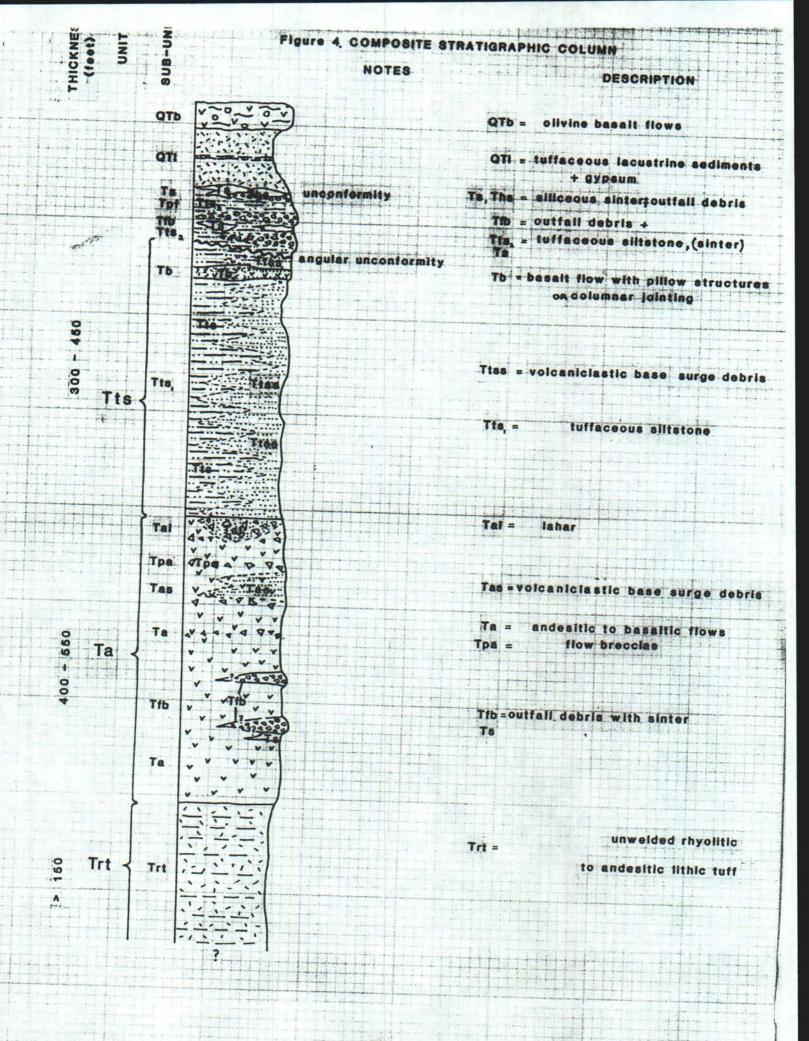
# LOCAL GEOLOGY

The 1983 geologic map (1"=400') of the Red Camel Property is on Plate I. Geologic cross-sections are on Plate II. Figure 3 is a reduced reference copy of Ernst's 1982 1"=1000' geologic map. Figure 3a is a geochemical overlay showing drill hole locations. A composite stratigraphic column for the Red Camel area is presented in Figure 4.

The oldest unit exposed in the area is an unwelded felsic lithic tuff (Trt), overlain conformably by an andesitic to basaltic composite unit containing flows, flow-breccias, lahars, phreato-magmetic surge and airfall(?) debris, fallback breccia, and minor siliceous sinter (Ta). The Ta unit is overlain conformably(?) by the Tts unit consisting of partially waterlain well-bedded tuffaceous siltstone (Tts1) intertonging with coarser, poorly-bedded mafic surge debris (Ttss). The Tts1 unit is capped by basaltic flows (Tb) that are columnar jointed or pillow structured.

The preceeding units were faulted, tilted and eroded prior to the deposition of late tuffaceous siltstones (Tts2), bedded fallback breccias (Tfb and Tpf), siliceous sinters (Ts) and undifferentiated mixed sinter and fallback breccia (Ths). Late sinters draped over paleotopography forming a thin veneer over much of the Red Camel property. Two rhyolite flow-dome complexes (Tr) were emplaced in the southern portion of the area





probably during the late stages of the hot-spring activity. Unconsolidated lacustrine sediments with evaporite beds (QTI) and flow basalts (QTb) covered the Red Camel area following the termination of hot spring activity.

# Rock Descriptions

Trt - Rhyolitic unwelded tuff - white to light blue-green to yellow-brown thin to medium bedded rhyolitic unwelded lithic tuff with interbeds of water-reworked tuffaceous sediments. Clasts comprise 50% of the rock, are angular to rounded fragments (< 1mm - 20cm) of altered and unaltered andesite (60%), andesitic volcaniclastics (20%), altered biotite-rich rhyolite (10%) and uncollapsed pumice fragments (10%). The matrix contains 20% crystal fragments (up to 1mm diameter) of angular quartz (70%), altered feldspar (20%), fresh biotite (9%) and magnetite (1%). Water reworked interbeds are 1-10 feet thick and are almost entirely fine-grained tuffaceous material. The Trt unit was named the Old Gregory Formation (Axelrod, 1956) and is at least 150 feet thick.

Ta - Andesitic to basaltic composite unit - consists of dominantly andesitic to basaltic flows (Ta) and flow-breccias (Tpa) with lesser amounts of lahar (Tal), surge deposits (Tas), pebble-sized and finer pumaceous felsic fallback breccia (Tfb) and minor siliceous sinter (Ts). Some clast-supported andesitic to basalt debris, which may have had a pyroclastic airfall(?) origin, have been grouped with flow-breccias (Tpa) on Plate I.

The total thickness of the unit is at least 400 feet and may be in excess of 600 feet where surge and lahar deposits are thickest. The estimated thickness is 450-550 feet.

This unit is generally dark grey, green, or brown, weathering to pale green or yellow, dense, fine-grained, non-porphyritic, rarely vesicular granular textured rock. Autobreccias are grossly similar containing angular to subrounded mafic to intermediate clasts that are often slightly more glassy. Since flow-breccias are often vuggy, interstices of clasts fill readily with silica to form massive resistant out-crops. In thin-section plagioclase laths (about 30% of rock) are aligned in a glass matrix. Subordinate minerals (in decreasing abundance) include pyroyene, sanadine, magnetite, horn-blende and calcite.

Surge deposits (Tas) are poorly-bedded, very poorly sorted, angular to sub-angular clasts (<1mm-1m) in a sub-silt sized rock flour matrix. Clasts include glass shards, and estitic to basaltic fragments and crystal fragments. Interstial vugs occur where coarse lithic fragments form clast-supported pebble-sized debris beds. Accreated spherical lapilli frequently containing fresh feldspar crystals, are common in overall fine-grained surge facies that are crudely laminated in a thin or flaggy bedded fashion. A few minor unconformities truncate bedding planes. The angle between the existing bedding plane and the unconformity is always less than 10 degrees.

Andesitic to basaltic lahar (Tal) is very common in sections 29 and 30 and was recognized elsewhere on the property.

Material is a friable, chaotic mixture of mud matrix (>60%) and angular to sub-rounded andesitic to basaltic fragments. Lahar with numerous blocks and terraces(?) of sinter is restricted to sections 29 and 30 and may have been deposited much later than most of the Ta unit.

Two beds of pumice-rich bedded fallback breccia are interbedded within the lower half of the Ta unit in the south-west corner of section 28 and the southeast corner of section 29. Up to 40 foot thick fallback beds (Tfb) are composed of angular to sub-rounded pumaceous felsite and andesitic to basaltic fragments in a weakly to moderately silicified matrix. A few small outcrops of laminated siliceous sinter (Ts) are exposed below the fallback beds.

Tts - Tuffaceous siltstone with interbedded basalt flows and surge deposits. Tts1 - Lower Tuffaceous siltstone - characterized by buff to light grey to yellow to pink, flaggy, very fine-grained to fine-grained water-reworked tuffaceous siltstone. The unit is at least 300 feet thick and may be as much as 450 feet thick. The Tts1 unit is intercalated with the Ttss sub-unit in a complex poorly understood fashion. In the southeast corner of section 29 the Tts is a dense, flaggy plant fossil-bearing tuffaceous siltstone that forms a ridgetop. Plant fossils are 1/4 to 1/2 inch wide, fibrous stalks and leaf impressions. Drill hole RC-83-1 contained

a few intervals bearing 2-3 mm diameter spherical, siliceous radiolaria-like microfossils and fossil fragments.

Ttss - Surge deposits - sub-unit of the Tts unit consisting of brown to grey-green to yellow-brown, poorly sorted, fine to medium grained, sub-angular to angular, andesitic to basaltic fragments in thin to massive beds. Bedding is weakly to moderately well defined, debris are not densely packed and rounded to sub-rounded accreationary lapilli occur sporatically. The Ttss sub-unit is thickest in the southwest corner of section 28 where it comprises most of the lower half of the Tts unit.

Editors note: The Ttss subunit may be the same rock unit as Tas.

Tb - Basalt flows - sub-unit of the Tts unit consisting of a 10 to 50 foot thick, black, vesicular alternately columnar jointed and pillow structured basalt flows. The flows occur near the exposed top of the Tts unit and is locally overlain conformably by tuffaceous bedded debris. Pillow-structured basalt is more common in the northern half of section 28 while columnar jointed basalt is exposed in the southern half.

 $Tts_2 - Upper \ tuffaceous \ siltstone - consists \ of \ buff$  to white to yellow, very fine-grained, flaggy bedded tuffaceous siltstone that unconformably overlies the Tts unit. Tts\_2 unit is descriptively identical to Tts. Maximum thickness may be 50

feet or more but is usually one to 20 feet where interbedded with fallback breccia and sinter in section 28.

Editor's note: Tts1, Tts2, and some interbeds in the Trt unit have characteristics very similar to a glassy, flow-banded felsic extrusive rock. The units are usually altered making positive identification difficult.

Tfb - Hydrothermal fallback breccia - unconformably overlying the Tts unit is a 1-30(?) foot thick crudely bedded tabular body of clast-supported breccia. Tfb beds are commonly buff to white, weathering to grey or dark grey, resistant tabular bodies that thicken and thin abruptly. Clasts range from angular to sub-rounded, coarse sand to cobble-sized fragments of flow banded, aphanitic to porphyritic rhyolite (40%), uncollapsed pumice (25%), andesitic to basaltic fragments (15%), tuffaceous sediments (5%), siliceous sinter (5%), and silicified or strongly argillized unidentifiable lithologies (10%). Fallback breccia may be interbedded with, or contain 5 to 20 cm diameter angular fragments of siliceous sinter and tuffaceous siltstone (Tts<sub>2</sub>). The thickest fallback breccia is found in the northwest corner of section 29 and is cut by coarse vent breccia consisting of similar although consistently coarser clastic material (Tpf?). The Tpf sub-unit is exposed atop fallback breccia (Tfb) in sections 29 and 30 and is distinctly pumice-rich. Clast sizes range from 1 to 30 centimeters of sub-angular to sub-rounded andesite to basalt (50%), pumaceous felsite (30%), sinter (10%) and altered lithologies (10%). The sub-unit has a

clast-supported silicified matrix, flanked on top and bottom by sinter.

Tyb - Hydrothermal vent breccia dikes - buff to grey, high angle, multiply brecciated pebble dikes with subrounded to to angular clasts (<1mm-15cm diameter) of pumice, rhyolite, flow-banded rhyolite, andesite and sinter. Matrix is partially to completely silicified. In wider dikes (> 5 feet wide) composite generations of clastic debris have been vertically cemented against each other. Dikes range in width from one foot to 30 feet and have strike lengths of as much as 2,000 feet.

Ts - Siliceous sinter - red, green, buff, brown, white, dense laminated to massive, often brecciated, fractured, veined siliceous sinter terraces and drapes. Sinters contain variable tuffaceous and fallback breccia impurities. In thin section sinters are dominantly salt and pepper fine-grained mosaics of chalcedony. Individual sinter beds may be one to ten feet thick and, rarely 20 feet thick. All of the northern half of the property and much of the southern half was probably covered by sinters. Sinters conformed closely to paleotopography obtaining original dips up to 30 degrees.

Ths - Undifferentiated fallback breccia and sinter-used where impractical to separate.

Tr - Porphyritic rhyolite flow-domes - contains 25% phenocrysts of clear to smoky quartz (40% of phenos, 1mm), unaltered to totally altered feldspar (50% of phenos, 1mm), fresh biotite (8%, < 1mm) and magnetite (2%, 2 mm) in a white to light

gray to pink gray aphanitic goundmass. The largest flow-dome occurs in the southern portion of the area. The rhyolite is flow banded usually with steep dips, convolutions and auto-brecciation. The flow portion of the rhyolite is vitrophyric and is best exposed on the western portion of the flow-dome. A smaller rhyolite flow-dome occurs on the Red claim group in the south-western portion of the area.

QTI - Lacustrine sediments - buff to white, very fine-grained, unconsolidated with evaporitic gypsum beds up to 1" thick. It outcrops poorly and is generally non-resistant. It is covered by olivine basalt flows along the northern edge of the property. Although it is probably up to 100 feet locally, it is usually much less.

QTb - Vesicular basalt flows - black, vesicular olivine basalt flows. This volcanic member weathers to partially rounded, massive blocks and has an estimated thickness of 20 to 50 feet. These rocks cover much of northeastern corner of the property and most of the Dead Camel Range.

Qls - Lake sediments, eolian sand and alluvial deposits - the young unconsolidated sand deposits, locally as thick as 45 feet are probably eolian.

# Structure

Two major faulting episodes have been recognized at Red Camel. The earliest and most prominent are east-northeast trending normal faults down dropped to the southeast. These

faults repeatedly offset Tertiary stratigraphy into a series of gently to moderately, northwest dipping elongate blocks (Plate I). Faults of this type have down-dip displacements as much as 600 to 800 feet in the central portion of the property.

Perpendicular to these east-northeast trending faults is a minor set of north and north-northwest trending normal faults. These faults may have moved in tandem with east-northeast trending fault movement accommodating differential downdropping of east-northeastwardly elongate fault blocks.

Extensional normal faulting has been complicated by subsequent uplift probably related to the emplacement of rhyolitic flow domes. The clearest example of such uplift is visable where volcanic stratigraphy is dramatically 'bowed-up' adjacent to the prominent rhyolite flow-dome complex near the southeast corner of the property. A crude set of radial faults is visable in this area surrounding the margins of this flow dome.

A similar uplift is postulated to have occurred in a geologically complex area surrounding Red Mountain where three isolated 'windows' of rhyolite are present. In addition, several north trending faults with minor displacements, that may belong to a radial fracture set, are present just north of Red Mountain.

The greatest movement along east-northeast trending faults took place before sinter deposition. A minority of these faults offset sinters. Of those that displace sinter, about

half have also recognizably displaced Quaternary-Tertiary basalt.

## Alteration

The alteration consists of the following:

1) silicified fallback breccia (Tfb) and tuffaceous sediments (Tts), 2) argillized tuffaceous sediments, rhyolite tuff (Trt) and andesite to basalt (Ta), and 3) propylitized andesite to basalt. The silicification is strong in the fallback breccia and weak to moderate in the tuffaceous sediments. The silicification rarely exceeds fifty feet thick and at depth is confined to narrow (< 10 feet wide) breccia zones. The argillic alteration is moderate in the tuffaceous sediments, weak to moderate in the rhyolitic tuff and weak to strong in the andesite to basalt. Zones of argillized rock are not well exposed at Red Camel. Limited exposures indicate argillized zones are most abundant in permeable rocks near hot-spring feeders.

X-ray analyses (Appendix III) indicated very little clay was present in samples analyzed, but K-feldspar as adularia was present. Potassium metasomatism of albitic plagioclase is reportedly common in high level hot spring systems (Ellis, 1979; Giles and Nelson, 1982). This may have occurred at Red Camel. Chlorite occurs sporatically in andesitic to basaltic rocks as an alteration product. Calcite veins are common in propylitized

andesite to basalt. Other minerals such as celadonitic mica, zeolites and sepiolite were detected by X-ray analyses.

Editor's note: The Tts unit may not be altered as much as it appears. Moderate silicification may actually be glassy texture and argillization may actually be devitrification.

### Geochemistry

Rock chip sample results are listed in Appendix I. Silver and arsenic contour maps are shown on Plate III and Figure 3a. Reverse circulation rotary drill cutting logs and results are listed in Appendix II. A statistical presentation of the gold, silver, and arsenic results from the rock chip sampling and their respective correlation coefficients appear in Tables 1 and 2.

Out of the 312 rock chip samples taken in 1982 and 1983, five have detectable gold (as much as .04 ppm). Forty of the samples have silver values greater than or equal to 1 ppm and five have greater than 5 ppm (as much as 31.5 ppm). One hundred and sixty one samples have arsenic values greater than or equal to 100 ppm, sixteen have arsenic greater than or equal to 1000 ppm and three have arsenic greater than 2000 ppm (as much as 2600 ppm). In 1983, four samples were analyzed for antimony. All four samples have greater than 20 ppm antimony (as much as 157 ppm).

Out of 74 samples analyzed from the drilling, one sample has detectable gold (.05 ppm), seven samples have silver

TABLE I. - Rock Chip Geochemical Statistical Summary.

Total Frequency	312	312	312
	.030	31.450	6.585 2599.000
Largest Je Z-score	11.505	0.050 -0.290 31.500 14.707	6.585
Lar	0.010 -0.112 0.040 11.505	31.500	2600.00
Smallest e Z-score	-0.112	-0.290	1.000 -0.583 2600.00
Sma	0.010	0.050	1.000
Coeff. of Smallest Largest Variation Value Z-score Value Z-score Range	0.251	3.187	1.706
Standard Deviation	0.003	2.097	362.550
Mean	0.010	0.658	212.506
Variable Name	Au (ppm)	Ag (ppm) 0.658	As (ppm) 212.506

Table II. - Correlation Coefficients for Au, Ag, and As.

1.0	Ag	AS
.314	1.0	
.019	.115	1.0

### DISCUSSION

Rhyolitic lithic tuff and felsic fallback breccia interbedded with andesitic to basaltic debris and flows is present in the lower half of the stratigraphic column. This suggests the Dead Camel Range was a center of felsic volcanism prior to extrusion of andesitic to basaltic flows, flow-breccias and surge deposits in the area. The fallback breccia interbeds may be of phreato-magmatic origin. The pumice fragments in the breccia are either juvenile material or fragments from the unwelded tuff below the Ta unit. The phreato-magmatic andesitic to basaltic surge deposits that dominate the upper half of the Red Camel stratigraphic column in the south half of section 28 are interpreted as evidence of proximal venting (within one Surge debris of this pile appear to have been water-reworked north and west of their greatest thickness (south half section 28). Interfingering of dense sometimes fossiliferous tuffaceous siltstone and tuffaceous to lithic surge debris on an outcrop scale is present to support this interpretation. Furthermore, the basaltic flow (Tb) near the top of the Tts unit is alternately pillow structured and columnar jointed corresponding to the inferred body of water to the north and west.

Bedding attitudes are notably steeper at the base of the Tts unit than those near the top. This may be due to the beginning of extensional normal faulting and associated tilting of fault blocks prior to the final deposition of the Tts unit.

Fallback breccias pinch and swell abruptly in thickness where seen above the Tts unit. Dramatic clast size variations and pinching out of fallback breccia on a small scale suggest the clastic aprons were generated by a series of fairly low energy explosions, not a single regionally extensive blast or series of blasts. The absence of vent breccia dikes within flow-banded rhyolite plugs may be interpreted as evidence supporting either a later genesis for the rhyolite or its role as a central heat engine for fluids and vapor vented along dikes. Given the possibility of several shallow hot rhyolitic plugs in the Red Camel Area convecting meteoric waters may have leached silica (and metals?) from the Trt unit or similar deeper units. Since argillic alteration in the andesitic to basaltic unit (Ta) is not strong and largely propylitic, it is a less likely silica source. Drilling data indicates silica deposition was either at or near surface.

The origin of Tertiary epithermal, hot-spring associated gold deposits has been discussed and described by Ellis (1979), White (1981), Nelson (1982), Holland (1982), and many others. Physical aspects of many known active and fossil gold-bearing hot spring occurrences were utilized for exploration purposes during the 1983 Red Camel Project. Figure 5 shows the Red Camel model before and after drilling. Figure 6 shows the hypothetical models for the Red Camel targets. The working

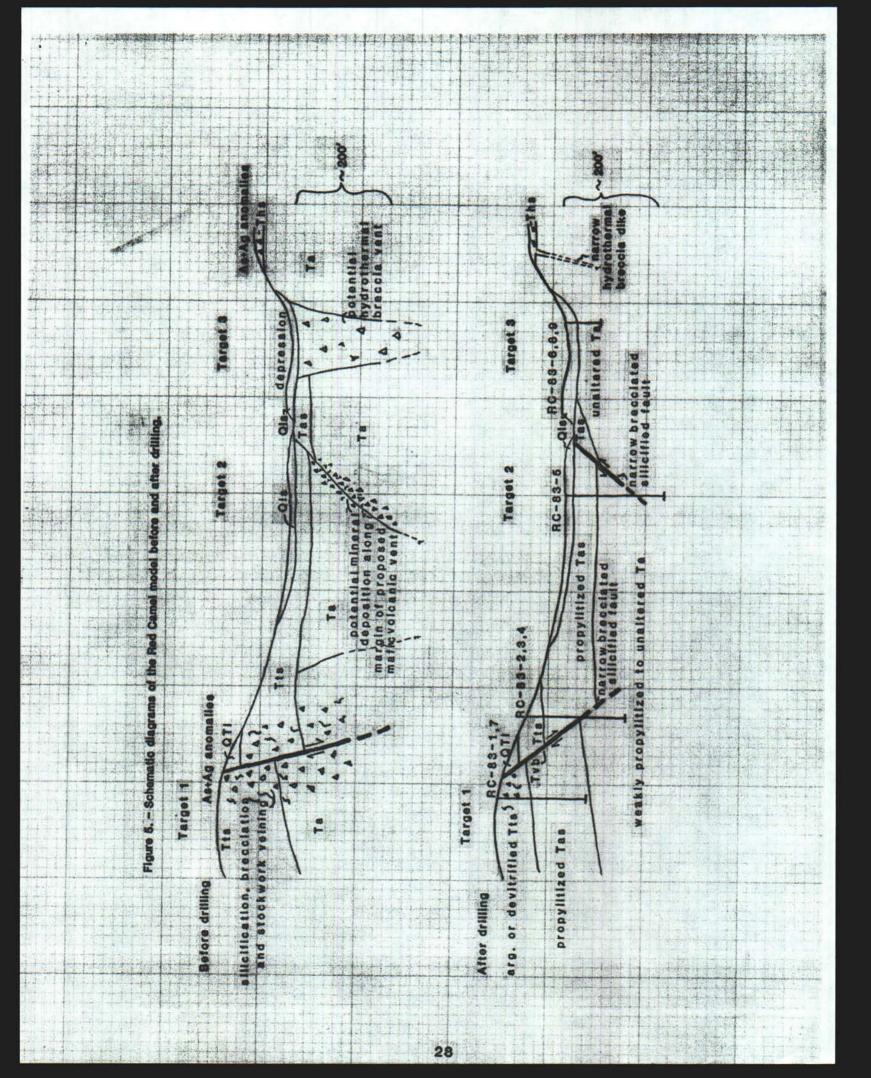
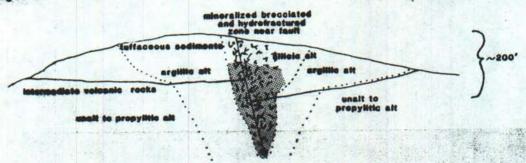


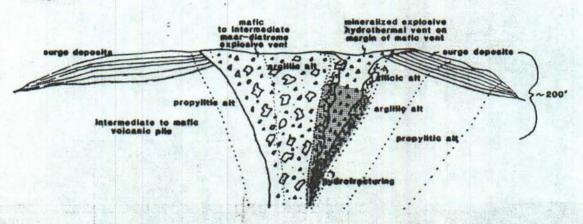
Figure 6.—Schematic diagrams of hypothetical models for Red Camel targets.

Note: Anomalous silver and arsenic values are usually in silicified rocks and sinters. Models call for arsenic zoned above high silver values. Ore grade silver (Igold) shown by stippling.

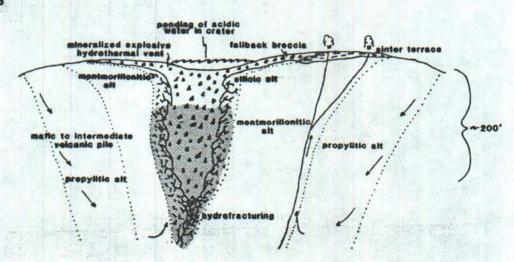
Target 1



Target 2



Target 3



model used, and presented briefly herein, is nearly identical to the models by Nelson (1982), Giles and Nelson (1982) and Holland (1982) to explain the genesis of such fossil systems as McLaughlin, California; Borealis, Nevada; and Cinola, British Columbia.

Extensive siliceous sinters, silicified volcaniclastic sediments, multiply re-opened vent breccia dikes and fallback breccias exposed at Red Camel are grossly comparable with features described at such deposits as McLaughlin (Holland, 1982; Nelson, 1982). Owing to these features it was believed that the Red Camel hot-spring system was capable of generating precious metal concentrations at shallow depths in a similar fashion.

At Red Camel sampling, mapping, and drilling concentrated on delineating area(s) that might overlie a precious metal vein stockwork and/or breccia pipe. The recognition of mafic base surge deposits at Red Camel led to the addition of mafic vent diatremes as possible host for precious metal mineralization (Ernst, 1983).

Conclusions from our exploration program are listed as follows: 1) fallback breccia deposits identified on the surface originated from narrow breccia dikes and not major circular vents, 2) alteration is shallow and confined to narrow breccia structures at depth, 3) the area is anomalous in arsenic but not strongly anomalous in precious metals, 4) arsenic is not zoned vertically above precious metal values, and 5) the area has a low exploration potential for a precious metal deposit.

### EXPLORATION DATA

Hydrothermal vent dikes and brecciated, silicified rocks were sampled preferentially, otherwise sampling was proportional to outcrop area in the northern half of the property. A lower sample density was maintained in the southwest corner of the property. Three to five pound rock chip samples were taken devoid of lichens to represent an area of about twenty feet in diameter at each sample location. The samples were prepared and analyzed by Barringer Resources, Inc. in Sparks and Noranda Vancouver Geochemical Laboratory in Vancouver B.C. No standards were analyzed because the Noranda Sample Plant in Reno was not operating. Prior to conducting the statistical summary and determining correlation coefficients all values entered as negative numbers (less than detection limit) were changed to a value one half that of the detection limit.

Drill cuttings representing five foot intervals were split to about five pounds, usually 1/8 of the total interval. Selected intervals were sent in for analysis while the other samples were stored. The selected samples were pulped by Noranda Sample Plant. Gold standards, Au (OX)-4 or Au low sulfide were included about every twentieth sample. Legend Metallurgical Laboratory analyzed most of the drill samples. Five rushed samples were sent to Cone Geochemical Inc. Both of

these labs were within acceptable error limits for the standards.

	The	following	is a s	ummary of	expenditures:	
1	Drilling.				\$15,137	.00
	Road buil	lding			3,375	.00
	Geochemis	stry			4,167	.00
	Salaries.				18,132	.00
	Food and	lodging				.00
	Supplies.				706	.00
	Transport	tation				.00
	Land					.00
	Miscellan	neous			1,000	.00
Total			•••••		\$46,680	.00
Total	explorat	ion expend	itures	to date	\$66,036	0.0

# RECOMMENDATIONS

We recommend no work in 1984. The claims are valid until September 1, 1985. During 1985 we recommend examination of the property in light of new ideas and models.

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# APPENDIX I ROCK CHIP GEOCHEMICAL DATA

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# APPENDIX II

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#### APPENDIX III

#### X-RAY RESULTS

- B2W-3486 Dark gray, dense felsic rock consisting essentially of quartz and K-feldspar (adularia?). The yellow-brown powdery material filling the irregular veinlets in the rock is jarosite. Clay minerals and alunite are not observed.
- 82W-3486 Altered felsic rock consisting essentially of quartz and much less K-feldspar. The greenish color of the rock appears to be due to the development of poorly crystalline celadontic mica. Alunite and other clay minerals are not observed.
- 83W-1516 Chips of iron-stained felsic rock consisting essentially of well crystaline quartz and K-feldspar (as adularia). No clay minerals are observed.
- 83W-1610 Chips of altered felsic rock containing quartz and K-feldspar with considerable amount of zeolite mineral, chiefly as clinoptilolite.
- Powdery chips of similar rock type as sample 83W-1610 but the zeolite mineral, clinoptilolite, shows better crystallinity and larger quantity in this sample.
- Powdery sample consisting essentially of quartz and less amount of K-feldspar. There seems to be a sign of the presence of sepiolite which, however, shows very poor x-ray diffraction pattern to lend its definite identification.
- Chips of dark gray rock consisting of K-feldspar (adularia), calcite, and less quartz. The dark gray color is due to the presence of some amounts of fine-grained magnetite and hematite. Alteration of this rock along irregular fracture results in yellow-brown material consisting of montmorillonite, and less kaolinite and sericite in addition to the minerals present in the gray rock. K-feldspar and iron ores have decreased in amount whereas quartz increased. The brown color of the alteration product is due to iron staining.

#### APPENDIX IV

#### LIST OF CONTRACTORS

C & L Drilling Rt. 7 Box 7213 Nampa, ID 83651

Pollock's Drilling P.O. Box 123 Ely, NV 89301 (702) 289-8911

> Stockmen's Equipment Inc. P.O. Box 1617 Fallon, NV 89406 (702) 423-3363

Noranda Vancouver Geochemical Laboratory 1050 Davie Street P.O. Box 2380 Vancouver, B.C. V 6B 3T5 (604) 684-9246

Barringer Resources Inc. 1455 Deming Way #15 Sparks, NV 89431 (702) 358-1158

Legend Metallurgical Laboratory, Inc. 125 Manuel Street Reno, NV 89502 (702) 786-3003

Cone Geochemical, Inc. 810 Quail Street, Suite 1 Lakewood, CO 80215 (303) 232-8371

Ruperto Laniz P.O. Box 5032 Stanford, CA 94305

Hsu, Dr. L.C.
Nevada Bureau of Mines and Geology
Mackay School of Mines
University of Nevada - Reno
Reno, Nevada 89557
(702) 784-6987

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April 22, 1983

Mr. Dave Ernst Noranda Exploration, Inc. P. O. Box 7176 Reno, Nevada 89510

Dear Dave:

Attached is the data I promised on our Red claims in the Dead Camel Mountains. It includes data furnished by Lacana and HIMCO.

I feel the area has merit geologically for disseminated gold. The geochemistry is a bit weak but gold is detectable. Let me know what you think.

Essentially, Grayhill is interested in a deal with minimal annual royalty payments and committments with a right to either participate or a production royalty.

I suggest that if you have a serious interest in our claims, that you contact Robert Hemming, who apparently you know. Bob is our Land Man as well as for U.S. Minerals Exploration. Bob has talked to Joyce briefly about terms.

If I get in the area, I will give you a call. We would like to proceed with this diligently because the claims need assessment work this year. Grayhill is prepared to do the work, but I do not want to wait until the last minute.

Sincerely, GRAYHILL EXPLORATION COMPANY

Den & Lane

Dennis L. Lance Vice-President

DLL/jp

Enclosures

RED CLAIMS Churchill County, Nevada the property consists of 64 unpatented lode claims staked in y, 1982. The claims are located approximately 10 miles southf Fallon, Nevada in the Dead Camel Mountains and specifically Mountain (see attached map segment). he property is accessible via several dirt roads. The most route to the property from Fallon is to go south on Highway 95 proximately 4 miles to Lone Tree Road then west on this road point it makes a 90 degree curve heading north. At this dirt road continues on west-southwest accross a corner of val bombing range to the Dead Camel Mountains. Numerous roads take off of this road and traverse Red Mountain and aim group. brief description of the general geology is given in the ill County Bulletin and is attached. large area of alteration exists on and adjacent to the claims ilicification and the formation of jasperoids and "wonderstone" prevalent. everal NE trending high-angle tensional faults have acted as nduits for hydrothermal systems. Favorable Tertiary volcanic and tuffaceous sediments were apparently porous enough to ally altered to jasperoid. ock chip and soil samples collected from the property are often ous in gold as well as the indicator elements (see attached and maps). Unfortunately, wind blown sand interferes with 1 sampling. he claims cover the core area of a large virgin altered area serves further work to determine the potential for dissemiold-silver mineralization. L. Lance , 1982

810 Quall Street, Suite I Lakewood, Colorado 80215 (303) 232-8371

ANALYTICAL REPORT

Job # 2383 07-Dec-81 Page

F'0 # Project: NVQ, WAQ, ORQ

LENNIS LANCE	
GRAYHILL EXPLORATION	CO.
12189 RALSTON RD.	
ARVADA, CO 80004	
24	

SAMPLE NUMBER	FPM AG	FFM AU	PPM AS	FFM SB		
17-27-5-1	0.6	<.02	24	5)		
17-27-6-1 17-27-6-2	1.7	<.02 0.02	158 147 174	6	c.l Mh	
18-27-32-1 18-27-32-2 18-27-32-3	1.2 0.6 0.5	<.02 0.02 <.02	57	5 5	Red Mha Deed Comel A	liters
18-27-33-1	0.4	0.02	118	14)		
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COMMENTS SENT BY THE REPORTING LABORATORY:

CODE FOR INTERPRETATION OF RESULTS:

G=GREATER THAN THE UPPER LIMIT OF DETECTION.

H=INTERFERENCE (NUMERICAL FIELD WILL SHOW BEST ESTIMATE).

L=LESS THAN THE LOWER LIMIT OF DETECTION.

N=UNDETECTED (NUMERICAL FIELD BLANK).

Q=INTERFERENCE AND SMALL SAMPLE.

R=ANALYSIS DONE ON A REDUCED SAMPLE SIZE RELATIVE TO

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1407529	. 1	15	.090	1.0	.003
1407533	. 1	14	. 140	4.2	.003
1407548	. 1	12	.060	1.2	.001
1407558	. 1	É	.050	.4	.001
1407568	. 1	480	1.300	17.0	.007
1407578	. 1	30	. 140	2.6	.003
1407588	. 1	24	.130	1.0	.004
1407598	. 1	15	.090	1.2	.001
1407608	. 1	5	.070	.6	.001
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.... END OF REPORT FOR: CXA8210577 .....

\* CODE FOR INTERPRETATION OF RESULTS:

G=GREATER THAN THE UPPER LIMIT OF DETECTION.

H=INTERFERENCE (NUMERICAL FIELD WILL SHOW BEST ESTIMATE).

L=LESS THAN THE LOWER LIMIT OF DETECTION.

N=UNDETECTED (NUMERICAL FIELD BLANK).

Q=INTERFERENCE AND SMALL SAMPLE.

R=ANALYSIS DONE ON A REDUCED SAMPLE SIZE RELATIVE TO

SAMPLE POPULATION.

S=INSUFFICIENT SAMPLE (NUMERIC FIELD BLANK).

SEND LARGER SAMPLE NEXT TIME

T=DETECTION LIMIT ON SMALL SAMPLE SIZE.

Z=VALUE IS FORTHCOMING.

#### FOR EXAMPLE

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G 50 MEANS THE UPPER LIMIT OF DETECTION OF

50 PPM IS EXCEEDED. ( SAME AS >50)

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OF 4 PPM. (SAME AS <4 PPM)

\* END OF LAB. COMMENTS...

INLESS STATED OTHERWISE ABOVE, ALL ELEMENT VALUES ARE REPORTED IN PPM.

JOB NUMBER: CXA8210576 GEOLOGIST: SAUNDERS ,F

PAGE: 2A

ELEMENT / ANAL. CODE

\*

SAMPLE ID.	AG/D1	AS/DØ	HG/BA	SB/A1	Ĥ	U/ 6
8140762R	.1	38	.940	4.6	-	.002
8140763R	. 1	450	2.400	24.0		.001
8140764R	. 1	63	.350	7.0	1	.001
8140765R	1.5	400	2.300	20.0	_	.002
8140776R	.3	55	.080	1.0		.016
8140777R	. 1	53	. 090	.8		.004
8140778R	. 1	41	.090	1.2		.007
8140779R	. 1	120	.060	2.0		.005
8140780R	2.3	51	.060	3.0		.005
8140781R	.3	12	.070	1.0		.009
8140782R	. 1	17	.080	145.0		.004
8140783R	1	46	.110	3.0		.005
8140784R	. 1	79.	. 656	3.0		.001
8140785R	. 1	11	.060	1.2		.002
8140786R	. 1	95	.080	2.0		.002
8140787R	.1	69	.150	3.6		.003
8140788R	. 1	260	.190	5.4		.005
8140789R	. 1	240	.250	4.8		.005
8140790R	. 1	90	.170	3.6		.002
8140791R	. 1	94	.440	3.6		.002
8140792R	. 1	180	.310	6.8		.002
8140793R	.9	220	.470	8.8		.004
8140794R	.2	200	.850	15.6	1	.001
8140795R	2.6	310	1.500	16.2		.001
8140796R	.1	48	.290	8.0		.002

Red Claims Churchill County Nev. T 17 +18 N RZ7E Rock Chip hocutions

Rea Claims Churchill Cty Nev. TIGN RZ7E Sail Sample locations F.S. 3-5-82



# BOCKY MOUNTAIN GEOGHEMICAL CORP.

O GREG STREET . SPARKS, NE

PHONE: (702) 359-6311

RMGC Numbers:

### Certificate of Analysis

JUN 1 1982'

Local Job No. 82-9-26

Foreign Job No.:....

Invoice No.: R20741

Date:

May 21, 1982

Client

Lacana Mining

P.O. Box 11305

Reno, Nevada 89510

Client Order No.:

none

Report On:

38 samples

Submitted by:

Mike Fiannaca

Date Received:

May 13, 1982

Analysis:

Gold, Silver, Arsenic, Antimony and Mercury

Analytical Methods: Arsenic determined colormetrically. 17 golds determined by atomic absorption and fire assay. All other gold and silver determined by fire assay. All other elements determined by

atomic absorption.

Remarks:

Received as pulp. Gold values less than 0.003 oz/ton by fire

assay were rerun by sensitive AA method.

CC

Enclosed RMGC-SLC File

FAB/rl

All values are reported in parts per million unless specified otherwise. A minus sign (—) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.

ND = None Detected 1 ppm = 0.0001% 1 Troy ox./ton = 34.286 ppm 1 ppm = 0.00292 Troy ox./ton

Sample No.	ppm Arsenic	ppm Antimony	ppb Mercury	ppm Gold
3488	230	3	555	
3489	265	1	1.6 ppm	
3490	175	10	4.2 ppm	
3491	0.032%	1	565	
3492	0.053%	-1	505	
3493	100	71. 30.00		-0.02
3494	155			
3495	200			0.20
3496	210			
3497	260			-0.02
3498	195			
3499	65			
3500	150			-0.02
4351	75			-0.02
4352	45			
4353	5			-0.02
4354	0.043%			-0.02
4355	. 75			0.10
4356	125			0.20
1357	210			0.15
1358	180			0.15
1359	65			0.30
360	50			0.25
361	105			0.15
362	135			0.10



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Sample No.	ppm Arsenic	ppm Antimony	ppb Mercury	ppm Gold
4363	110			-0.02
ns 4364	40			-[]
, 4365	5			-0.02
4366	0.118%	12	955	
4367	20	-1	1.0 ppm	
4368	280	6	1.3 ppm	
4369	145	1	3.5 ppm	
4370	60	-1	1.7 ppm	
4371	0.045%	31	4.5 ppm	
4372	0.045%	9	3.1 ppm	
4373	0.135%	32	3.8 ppm	
4374	0.116%	45	4.5 ppm	
3708	0.32%			

Page 4 of 5

	Sample No.	Oz/T Gold	Oz/T S1lver
	3488	0.228	3.34
	3489	0.008	1.17
	3490	0.022	3.46
	3491	0.015	1.08
	3492	0.005	-0.10
٨	3493	-0.005	
	3494	-0.005	
	3495	-0.005	
	3496	0.005	
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	4352	0.006	
	4353	-0.005	2.11
	4354	-0.005	17014
	4355	-0.005	
	4356	-0.005	
	4357	-0.005	
	4358	-0.005	
1 37 6	4359	-0.005	
	4360	-0.005	
V	4361	ND	
	4362	-0.005	



Page 5 of 5

of claims	Sample No.	Oz/T Gold	Oz/T Silver
of clar	4363	ND	
li <sub>w</sub> ill	4364	0.009 ~ 30	o pper-
77	4365	-0.005	A Property of the second
	4366	0.021	0.74
	4367	0.008	0.24
	4368	0.036	1.25
	4369	0.042	1.15
	4370	0.037	0.62
	4371	0.697	5.11
	4372	0.021	0.45
	4373	0.132	1.24
	4374	0.076	1.17
	3708	0.006	

BY Fland Beacher



FLOY A. BEECHER

4414

Lacana Mining Incorporated P.O. Box 11305 940 Matley Lane, Suite 13 Reno, Nevada 89510 (702) 329-5609

July 8, 1982

RED GROUP, NU.

Mr. Dennis Lance Vice President Grayhill Exploration Co. 12189 Ralston Rd. #210 Arvada, Colorado 80004

Dear Dennis:

Enclosed are the assay results and sample locations for Red Mtn. It is an interesting region and I suggest you acquire the adjacent ground to the northeast of the Red claims.

Thanks for giving me a shot at it.

Your friend,

Wile

Michael Fiannaca

MF: wh

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### Western Testing ( Laboratories

1275 Kleppe Lane, #5 Sparks, Nevada 89431 Telephone: (702) 331-3600

MAR 2 1982

# Report of Analysis (Page 1 of 2)

Submitted by: Lacana Mining, Inc.

P.O. Box 11305 Reno, NV 89510

Attn: M. Fiannaca L. McIntosh Date: February 27, 1982

Laboratory number: 055-3

> (Part I of II) Fire Assay

Analytical method:

Your order number:

Report on: Au, Ag--Part I

As, Hg, Sb--Part II

Invoice number: D184-1

<u>Sample</u>	Au (Oz/Ton)	Ag (Oz/Ton)	
951	Trace	Nil	
952	Trace	Nil	
953	Nil	0.02	
954	0.002	Nil	
955	Trace	Nil	
956	Nil	0.10	
957	Nil	Nil	
958	Nil	Nil	
959	Trace	0.05	
960	Nil	Nil	
961	Trace	Nil	
962	Trace	0.02	
963	Trace	Nil	
964	0.001	Nil	
965	Trace	Nil	
966	0.003	Nil	
967	Trace	Nil	
968	0.001	0.05	
969	0.002	0.12	
970	Nil	0.06	
		(Continued)	

ppm = Parts per million

Percent = Parts per hundred 1 oz/ton = 34.226 ppm

Oz/ton = Troy ounces per ton of 2000 pounds avoirdupois

Fineness = Parts per thousand

1 ppm = 0.0001% 1 ppm = 0.029167 oz/ton



## Western Testing ( Laboratories

1275 Kleppe Lane, #5 Sparks, Nevada 89431 Telephone: (702) 331-3600

# Report of Analysis

Submitted by: Lacana Mining, Inc.

P.O. Box 11305 Reno, NV 89510

Attn: M. Fiannaca cc: L. M<sup>C</sup>Intosh Date: February 27, 1982

Laboratory number: 055-3

(Part I of II)

Analytical method: Fire Assay

Your order number:

Invoice number: D184-1

Report on: Au, Ag--Part I

As, Hg, Sb--Part II

Sample	Au (Oz/Ton)	Ag (Oz/Ton)	
971 972	Trace0.007	0.23 Nil Std	
973 974	0.040 0.052	0.04 Nil	
975	0.020	Nil	

B. M. Clem

General Manager

ppm = Parts per million Percent = Parts per hundred 1 oz/ton = 34.286 ppm Oz/ton = Troy ounces per ton of 2000 pounds avoirdupois

Fineness = Parts per thousand

1 ppin = 0.0001% 1 ppm = 0.029167 oz/ton

Post A as "operate than" Read - as "less than"



1275 Kleppe Lane, #5 Sparks, Nevada 89431 Telephone: (702) 331-3600

### Report of Analysis

(Page 1 of 2)

Submitted by:

Lacana Mining, Inc.

P.O. Box 11305 Reno, NV 89510

Attn: M. Fiannaca

L. McIntosh

Date: March 9, 1982

Laboratory number: 055-3

(Part II of II) Analytical method: A.A./Colorimetr

Your order number:

Report on:

Au, Ag--Part I

Sb, Hg, As--Part II

Invoice number: D184-2

Sample	Sb (ppm) A.A.	Hg (ppm) A.A.	As (ppm Colorimet	) ric
951 952	9	-0.5 1.8	+500 +500	
953 954	20 5	0.7	+500 250	
955 956	44	2.2	+500 200	
957 958	3	-0.5 -0.5	200 200	
959 960	1	-0.5 -0.5	250 90	
961 962	Nil Nil	-0.5 -0.5	90 90	
963 964	3 Nil	3.1 4.9	20 90	
965 966	Nil Nil	4.6	85 +500	
967 968	Nil Nil	4.6	120 90	
969 970	12 Nil	4.8	+500	(Continued)
The second secon	and the second s			(contringed)

ppm = Parts per million Percent = Parts per hundred 1 oz/ton = 34.286 ppm

1.0% = 20 pounds/ton

1 ppm = 0.0001% 1 ppm = 0.029167 oz/ton Read + as "greater than." Read - as "less than."

Oz/ton = Troy ounces per ton of 2000 pounds avoirdupois Fineness = Parts per thousand

MAR 1 : 1382



### Western Testing ( Laboratories

1275 Kleppe Lane, #5 Sparks, Nevada 89431 Telephone: (702) 331-3600

### Report of Analysis

Submitted by: Lacana Mining Inc.

P.O. Box 11305

Reno, NV 89510 Attn: M. Fiannaca L. McIntosh Date: March 15, 1982

Laboratory number: 064-2

(Part II of I Analytical method: A.A./Colorime

Your order number:

Report on:

Au, Ag--Part I

Hg, Sb, As--Part II

Invoice number: D208-1

<u>Sample</u>	Hg (ppm) A.A.	Sb (ppm) A.A.	As (ppm) Colorimetric	
976	Nil	Nil	85	
977	Nil	11	120	
978	Nil	2	115	
979	Nil	15	200	
980	Nil	83	400	
981	-0.5	98	+500	
982	-0.5	Nil	90	
983	2.0	17	+500	
984 985	Nil Nil	Nil	+500 400	
986	Nil	9	+500	
987	Nil	Nil	80	
988	Nil	Nil	90	
989	Nil	Nil	46	
990	1.0	11	160	
991	Nil	Nil	160	

General Manager

ppm = Parts per million Percent = Parts per hundred 1 oz/ton = 34.286 ppm

Oz/ton = Troy ounces per ton of 2000 pounds avoirdupois

Fineness = Parts per thousand

1 ppm = 0.0001% 1 ppm = 0.029167 oz/ton

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NEI Exam(N),	Geologis	t: Er	nst	Field	Time: /8	dy pro	ject#:	05065 Ya	ar: 198
State-County(S	s): NV-	Churchi	llm	ining D	istrict(	D): No	me		
Town: 18N Rar	nge: 27	E Sec: 2	7. 28,29, He	est Rock	ks:1 Age	l Per	Eral	Class	I Typi
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Mineralogy(M): Follow-up Reco				consider	- (O)the	<b>r</b> (camme	ent): <u>0</u>	-Current	project
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Follow-up Reco	om (R): (	Y)es (N	)a (R)ed						
Follow-up Reco	om (R): (	Y)es (N	)a (R)ed						
Follow-up Reco Element(E): Geochem(ppm):	om (R): (	Y)es (N	(R) ed	Sb	.346	72 8.0	}Pb	Zn	1 <sup>Mo</sup>
Follow-up Reco Element(E): Geochem(ppm):	om (R): (	Y)es (N	(R) ed	Sb	.346	72 8.0	}Pb	Zn	1 <sup>Mo</sup> .
Follow-up Reco	om (R): (	Y)es (N	(R) ed	Sb	.346	72 8.0	}Pb	Zn	1 <sup>Mo</sup>
Follow-up Reco Element(E): Geochem(ppm):	am(R): (	Y) es (N	(R) ed	Sb	.346 .346 	72 8.0 NiNi	Pt		30 30
Follow-up Reco Element(E): Geochem(ppm): Element(E): Geochem(ppm):	am(R): (	Y) es (N Ag 7.7 Sn ): N H	) a (R) ed 	SbSbS	Hg .346	7 8 8 9 . 0 Ni 1 2 3	PtPt	Zn U Geophysi	30 

