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July 29, 1982

Dear Mr. Walker,

Mr. N.L. Archbold from our Sparks, Nevada office has sent me the enclosed report for my perusal. I have reviewed the report and feel that the property is not of interest to DEKALB at the present time.

Thank you for letting DEKALB have the opportunity to look at the property and the best of luck in your endeavors to find a partner.

Sincerely Yours,

Gary A. Parkison  
Regional Geologist

## DEKALB Mining, Inc.

MEMO TO: G. A. Parkison

DATE: July 22, 1982

FROM: N. L. Archbold

*N L Archbold*

SUBJECT: Orizaba Property of Canyon Resources Corp., Yavapai and Maricopa Counties, Arizona

Mr. William Walker, Vice President of Canyon Resources, left this report with me today, July 16. I told him I would send it to you for review and action as you wished. You might choose to simply return it to him with our thanks if you don't think a field exam is justified.

In any case, I told him you would respond and return the report when you were finished with it.

*No action taken, went back to Canyon.  
Looks like a long-shot. No good values.  
Can't reproduce gold values.  
GAP*

## DEKALB Mining, Inc.

MEMOTO: G. A. Parkison

DATE: July 22, 1982

FROM: N. L. Archbold

*N L Archbold*

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ORIZABA PROPERTY  
GEOLOGIC REPORT AND PROPOSED PROGRAM  
YAVAPAI AND MARICOPA COUNTIES, ARIZONA

June , 1982

CANYON RESOURCES CORPORATION  
2207 Jackson St., Suite B-101  
Golden, Colorado 80401

# CANYON RESOURCES CORPORATION

2207 Jackson St., Suite B-101

Golden, Colorado 80401

(303) 278-8464

## SUMMARY

Geochemical sampling and geologic mapping has resulted in the discovery of anomalous concentrations of gold, silver, copper, and zinc in Precambrian metavolcanic and metasedimentary rocks within the MG claim group, Orizaba Mine area, Maricopa and Yavapai Counties, Arizona. These rocks comprise an individual greenstone-schist belt that is part of the larger Yavapai Schist Belt of central Arizona.

A major mineralized horizon with extensive gossan development has been recognized and traced intermittently for a distance of nearly 10,000 feet extending from Canyon's MG claims to the main Orizaba mine shaft in Moore Gulch. The Kay mine, being evaluated by Exxon, five miles to the west near Black Canyon, Arizona, is within this same greenstone belt. Both the Kay mine and the Orizaba mine have produced polymetallic massive sulfide ores of volcanogenic origin.

The combined geologic and geochemical data indicate that the Orizaba property (MG claim group) is an excellent exploration target with potential for producing large tonnages of high-grade ores, composed of copper and zinc with gold and silver from multiple sulfide lenses within a favorable stratigraphic horizon. Canyon Resources proposes to lease the Orizaba

property to another company for modest work commitments,  
advance minimum royalty payments, and a 5% net smelter  
return royalty.

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## LAND STATUS

Canyon Resources Corporation, on behalf of the Canyon-Bluesky Joint Venture, staked 24 contiguous lode mining claims on August 8, 1981, and an additional 6 contiguous lode claims on April 30, 1982. These claims cover approximately 620 acres in sections 9, 10, 15, 16, 20, 21, T. 8 N., R. 3 E., Gila and Salt River Base Meridian (Plate I). The MG claims have been filed with the recorder's office for both Maricopa and Yavapai Counties and with the state BLM office.

The majority of the claims are located in the Tonto National Forest, however, claims 1-3 and portions of 5 and 6 are west of the National Forest boundary. The MT plat shows this western area as a state exchange with the Federal Government retaining the mineral rights. Westward from the MG claim block to the Orizaba mine the land is dominantly composed of patented claims. Owners of the claims adjacent to the prospect have expressed their desire to sell the property instead of leasing it for exploration. The Orizaba mine area was reported by the owners to be leased to Conoco.

## GEOLOGIC SETTING

### Regional

The Proterozoic rocks in central Arizona that host massive sulfides have been subdivided into nine major belts or districts (Fig. 3) by Donnelly and Hahn (1981). The geologic setting in which these rocks accumulated is believed to be dominated by volcanic-sedimentary processes. Throughout eastern Arizona numerous volcanic centers were flanked by sedimentary basins that accumulated volcanic and epiclastic material. Several cycles of mafic to felsic volcanism, concurrent with sedimentation, have been identified in the Proterozoic sequence. Total thicknesses in excess of six kilometers has been suggested as a minimum thickness for the Orizaba area, and at least double this amount in the Jerome area.

The stratigraphic setting is characterized by wedge-shaped units of volcanoclastics, tuffs, flows, and sediments that intertongue, forming rapid facies changes. Rock types are common to many of the well known greenstone belts; intrusions with mafic to felsic volcanics and clastic and chemical sediments occur in the Proterozoic exposures. The metamorphic grade of the host lithologies increase to the amphibolite phase near intrusions, but in the central portion of the state the rank is mainly greenschist facies.

## Orizaba Property

The Precambrian rocks within the Orizaba property (MG claim group) are a continuation of the sequence which extends from the Kay mine, near Black Canyon City, Arizona, to the Orizaba mine, in Moore Gulch (Fig. 4). Both mines occur in very similar geologic settings. The geology of the prospect area is composed of massive to foliated, felsic to mafic volcanic tuffs, intercalated with clastic sediments, carbonate-rich sediments, cherts, iron formations, and gossans as shown on Plate II. All of these rocks have been subjected to greenschist facies metamorphism. The favorable host rocks in the project area are within a narrow, northeast-trending, greenstone-schist belt that is bounded on the northwest and southeast by a submarine andesite flow unit and the continental Red Rock Rhyolite, respectively. The exact stratigraphic relationships of the undifferentiated andesitic unit, the favorable host unit (rhyolite interbedded with greenstone), and the Red Rock Rhyolite is unclear. It has been suggested that these contacts may be fault controlled. The strike and dip of the foliation in the undifferentiated andesite flow, intrusive and siliceous sediment unit is similar to that of the southwest-trending greenstone unit, and the occurrence of exhalative cherts along this contact, indicating a paleo-submarine surface, seem to suggest a depositional contact instead of a fault. The nature of the contact between the greenstone and the Red Rock

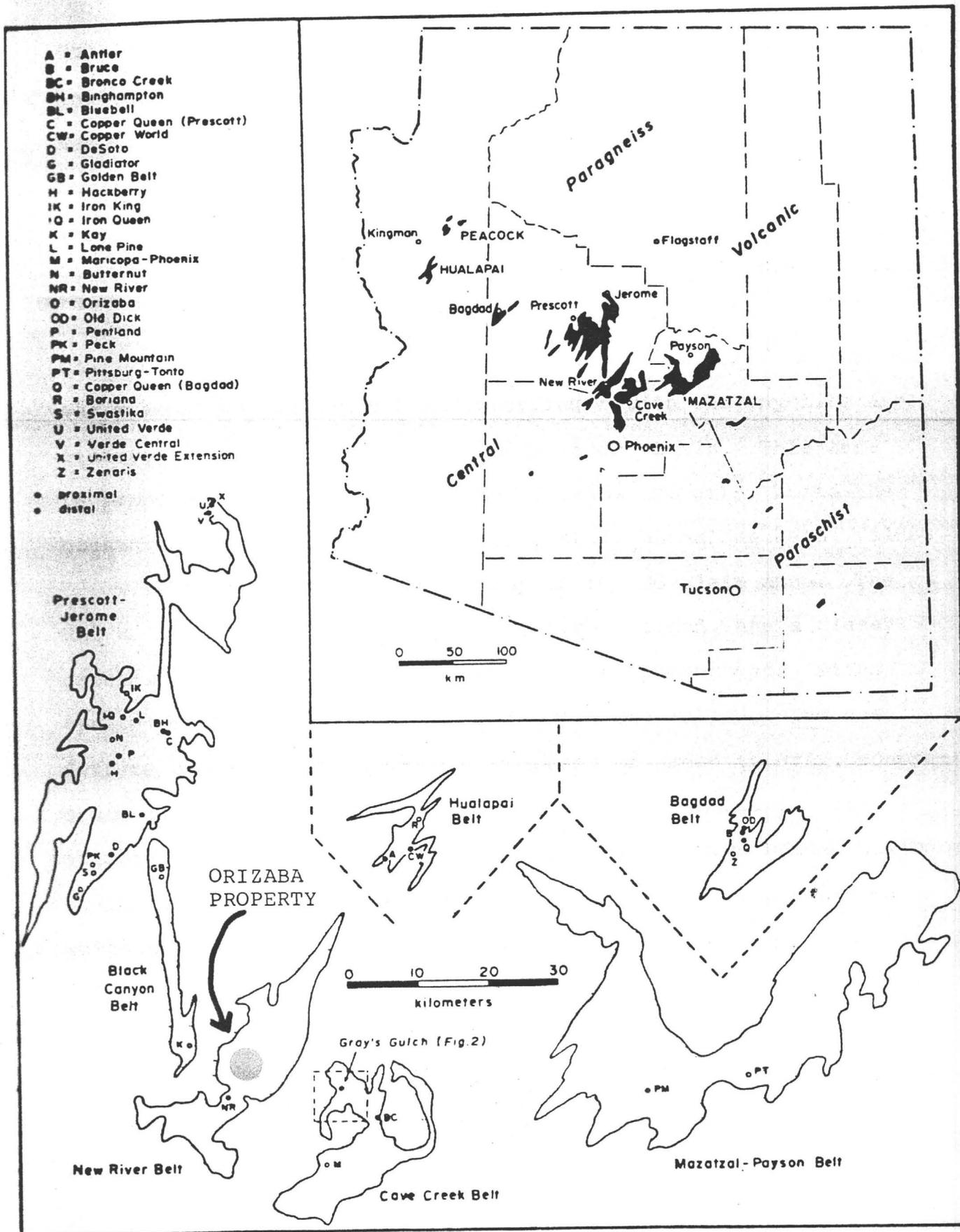


Figure 4 Location of Orizaba Property in relation to massive sulfide deposits in central Arizona (from Anderson and Guilbert, 1979).

Rhyolite is more obscure. Donnelly and Hahn (1981, Fig. 3) show the subaerial rhyolite to be contemporaneous with the marine sedimentation and submarine volcanism and therefore, the contact could also be of a stratigraphic nature.

Southwesterly, along the strike of the favorable host lithology of the Orizaba property area, the amount of rhyolite greatly increases. This is interpreted as representing an area that would have been spatially closer to a volcanic vent, whereas the greenstone sediments that interfinger with the rhyolite are believed to have accumulated in an adjacent basin. This area of probable basin development, the Orizaba property, hosts the gossans and exhalative cherts that contain anomalous metal values.

Plate III shows the geology of the MG claim area. The Red Rock Rhyolite is red to yellow, fine-grained, has a glassy groundmass with 10% quartz and orthoclase phenocrysts, with pyrite relicts and a prominent hematitic coloration. The undifferentiated andesite unit is composed of green to gray, coarse-grained, gneissic rocks with quartz, feldspar, sericite, chlorite, epidote and green chlorite-feldspar porphyries with banded siliceous sediments and andesites and basalts. The favorable greenstone unit is dominantly a phyllite composed of green to gray, chlorite- and carbonate-rich sediments with abundant carbonate veining, and light to dark green, massive to foliated, locally silicified sediments and subordinate andesite flows with local sulfide cherts and gossans. The rhyolite unit is composed of tan to green, massive to phyllitic rhyolite with quartz, sericite, and chlorite

interbedded with cherts and carbonate-rich units. The purple tuffs and sediments range from purple to green to gray in color and consist of phyllitic shales and siltstones locally interbedded with rhyolitic crystal tuffs.

Within the Orizaba property, gossans occur either along the contact between carbonate-poor massive greenstones and carbonate-rich phyllites or within the carbonate-rich phyllites. The principal gossan zone can be traced at the surface for approximately 2,000 feet and individual beds vary from 1 to 10 feet in width. Most of the main gossan zone exhibits extreme leaching and contains 10% to 20% relict structures, suggesting the possibility of enriched ores below present-day surface exposures. Occasionally, a boxwork texture consisting of coarse cellular structures with a finer webwork filling of limonite was observed in gossan samples. This type of relict structure is suggestive that chalcopyrite may have been at least in part, the parent sulfide prior to oxidation. However, as Blanchart (1968) points out, the interpretation of leached outcrops from massive sulfides is extremely difficult due to complex mixtures of the various sulfides. He further notes: "Leached outcrops (of massive sulfides) nonetheless show a contraction in width that often amounts to one-fourth to one-third the width of the sulfide body below". If this has occurred with the gossans on the MG claims, then the potential thickness of a massive sulfide deposit is certainly greater than the exposed

portions of the gossans. The main gossan zone (Plate III) consists of two and sometimes three horizons that locally obtain a thickness of greater than 15 feet. The favorable stratigraphic horizon (greenstones) that hosts the potential drill targets contains gossans that are exposed intermittently over a distance of nearly 10,000 feet, extending from the Orizaba property (MG claim group) to the main Orizaba mine shaft (Plate II).

Exhalative cherts, in addition to the gossans, represent an excellent exploration target for precious metals (gold). The thickness of these units range from one foot to over 30 feet and extend over a distance of 1500 feet in the western portion of the claim group. The majority of these cherts contain varying amounts of limonite with sparse manganese and hematite and locally contain gossan zones. The color of the cherts range from white to green to greenish-gray, probably dependent on the amount of sulfides present in the silica.

## MINERALIZATION

### Model

Massive sulfide deposits are bedded sulfide lenses of Cu-Pb-Zn that are formed in a submarine setting from gases and hydrothermal brines discharging from fractures and fissures. The deposits form near the area of venting (proximal) or more remotely in adjacent basins (distal). Two modes of precipitation are commonly believed to be responsible for the deposition of the sulfides. Boiling of the ore-bearing solutions probably account for deposits near the vent and mixing of these solutions with ambient seawater would cause cooling and a change in the oxidation state to precipitate metals on the seafloor, both near and somewhat removed from the vent area. Through this mechanism of ore deposition the sulfide bodies are essentially contemporaneous with sedimentation and form at the sediment interface, along bedding surfaces.

The Proterozoic of central Arizona provides a favorable terrane for hosting massive sulfide deposits. The volcano-sedimentary stratigraphy appears to consist of at least four cycles of mafic to felsic volcanism. The deposits are often associated with the last episode in any one of the cycles (Donnelly and Hahn, 1981). The massive sulfide deposits in Arizona have produced over 41 million tons of ore, with the United Verde area

accounting for most of this amount. The United Verde deposit had an average grade of 5% Cu, 1.7 oz. Ag, and 0.045 oz. Au (Anderson and Guilbert, 1979). Figure 4 shows the location of known deposits in the central Arizona belt. Gold and silver have been important constituents of the past production. Donnelly and Hahn (1981) show that in four of the massive sulfide deposits the precious metal content exceeded 50% of the value of the orebody. The Iron King mine produced an average grade of 0.123 oz. Au, 3.69 oz. Ag, 2.5% Pb, 7.34% Zn, and 0.19% Cu.

#### Orizaba Area

Although the Orizaba property has had no previous production, it covers a series of gossans that occur in the same stratigraphic horizon as the massive sulfide ores that were produced by the Orizaba mine, located approximately 8000 feet to the southwest. According to the Arizona State Department of Mineral Resources, the Orizaba mine was in production in 1943 and 1944 by Allied Mining and Smelting Company. It was financed by a government loan and was subsequently closed by court order in 1944 by the U.S. Government, for lack of funds. From 1943 to 1944 a 200-ton per day smelter was in operation on the property and employed 55 people. The total production was 7000 tons of massive sulfide ores. In 1961 a Mr. Cavolla purchased the property from the United States Government and since that time there have been many subsequent owners. The patented claims of the Orizaba mine

have been developed to include one major shaft and numerous small surface prospects. The grade of the historic production from this mine could not be found, but analyses of six massive sulfide ore samples from the dump yielded the following values:

<u>Cu (%)</u>	<u>Pb</u>	<u>Zn (%)</u>	<u>Au (ppm)</u>	<u>Ag (ppm)</u>
4.26	-	3.55	1.10 (.032 oz.)	12.01 (.35 oz.)
5.84	-	1.55	0.69 (.02 oz.)	16.12 (.47 oz.)
7.09	-	1.65	1.10 (.032 oz.)	22.30 (.65 oz.)
5.72	-	1.85	1.30 (.037 oz.)	30.87 (.90 oz.)
4.50	-	1.85	1.58 (.046 oz.)	21.27 (.62 oz.)
4.50	-	1.55	1.78 (.052 oz.)	21.27 (.62 oz.)
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Average 5.32%	-	2.00%	1.26ppm (.037 oz/T)	20.64ppm (.60 oz/T)

The assays obtained from these samples are consistent with Donnelly and Hahn (1981, Fig. 5), where they show approximately 20% of the value of the Orizaba production derived from precious metals.

The potential of the Orizaba property is considered to be excellent for hosting deposits of the same tenor as at the Orizaba mine. Several small prospect cuts and one small shaft have been developed on mineralized gossans within the project area. Amselco

is believed to have drilled two or three shallow holes immediately adjacent to the leached outcrop of the main gossan zone. The results of this drilling are unknown but it has been reported that the shallow drill holes were on top of the leached gossan and the down-dip potential was not tested.

### Gold

Plate IV shows the location of anomalous values of gold that were obtained in sulfide-bearing cherts and gossans. Along the southwestern portion of the property, gold values ranging from 0.07 ppm to 1.0 ppm were found in the sulfide-bearing cherts. These beds are generally gray to green in color and locally contain intense limonite, hematite, and manganese staining. A sulfide chert-gossan, located in the creek bed below the shaft in the center of the NW $\frac{1}{2}$  of section 21, also yielded anomalous gold. Five initial samples all assayed from .82 to 1.72 ppm gold, however, out of four additional samples (3806-3809) collected from the same gossan only one yielded 0.62 ppm gold. These additional samples are the ones plotted on Plate IV. The best gold value was obtained from a chert in the northern portion of the property (sample 3754) that assayed 2.3 ppm. This sample came from a chert unit that contains thin stringers of limonite and manganese. Visible copper oxides and sulfides were observed in the sample. After these results were obtained, sample 3816 was collected at the same site for a recheck of the gold content; the rock chips contained no visible copper (but assayed 1050 ppm Cu) and assayed

0.13 ppm gold.

Anomalous gold has been detected in the exhalative cherts and gossans located on the property. The wide range of the anomalous gold, both stratigraphically and laterally, indicates that gold may be associated with most if not all of the mineralizing pulses.

### Silver

Strongly anomalous silver was detected in only one sample (3754) that assayed 130 ppm (Plate V). A recheck of this site (sample 3816) failed to find a strongly anomalous value (1.7 ppm). The initial sample contained visible copper that appears to have been associated with the silver, as it was not observed in the sample chips used in the second assay.

### Copper

Assay values for copper obtained along the main gossan zone ranged from 75 ppm to 335 ppm (Plate VI). The generally low values observed along the gossan are not unusual because of the intense acid leaching that destroyed the sulfides and produced the gossan. A thin chert zone in the north-central portion of sec. 16 yielded values of 9,500 ppm and a recheck of the sample site found a lesser amount of 1,050 ppm.

## Lead

Anomalous lead has not been observed on the project; in fact, no lead has been detected in the main gossan zone (Plate VII). The Orizaba mine has not produced lead and the Orizaba property (MG claim area) is not expected to contain lead.

## Zinc

The maximum amount of zinc reported in the main gossan zone was 190 ppm and 570 ppm, zinc occurs in a chert from the north-central portion of sec. 16 (Plate VIII). The low values of zinc are not surprising because of its high mobility in the surface environment.

## CONCLUSIONS AND RECOMMENDATIONS

Geologic mapping has indicated that the sulfide zones (gossans) on the Orizaba property (MG claims) are in the same stratigraphic horizon that produced polymetallic ores at the Orizaba mine located approximately 8000 feet to the southwest. Gossans with anomalous metal values are exposed intermittently at the surface for the entire distance between the MG claims and southernmost Orizaba mine area, suggesting that the main mineralized horizon has multiple sulfide lenses occurring over a strike length of nearly 10,000 feet. The surface exposure of this main gossan zone is believed to be possibly larger than any other massive sulfide target previously developed in Arizona, with the possible exception of the United Verde and U.V.X. mines at Jerome.

The following items are recommended for the next phase of exploration:

- 1) Trench across the anomalous chert unit in the central portion of sec. 16 for additional sampling as well as exposures.
- 2) Detail mapping and in-fill sampling on the cherts with anomalous gold values located in southwestern portion of claim block.
- 3) Detailed mapping and sampling of the main gossan zones for planning of a drilling program.
- 4) Drill test the main gossan zone as well as the gossan-chert unit in creek bed below the shaft.

## BUSINESS PROPOSAL

Canyon Resources Corporation (Canyon) desires to lease the Orizaba property to another company under the following terms and conditions:

### Work Commitments

\$30,000/year for each of the first five years of the lease. Upon the commencement of a new work-commitment year, that year's work commitment becomes a firm obligation.

### Advance Minimum Royalties

First year: \$15,000  
Second year: 15,000  
Third year: 20,000  
Fourth year: 20,000  
Fifth year: 25,000/year through seventh year

Eighth year and  
annually thereafter: \$50,000/year

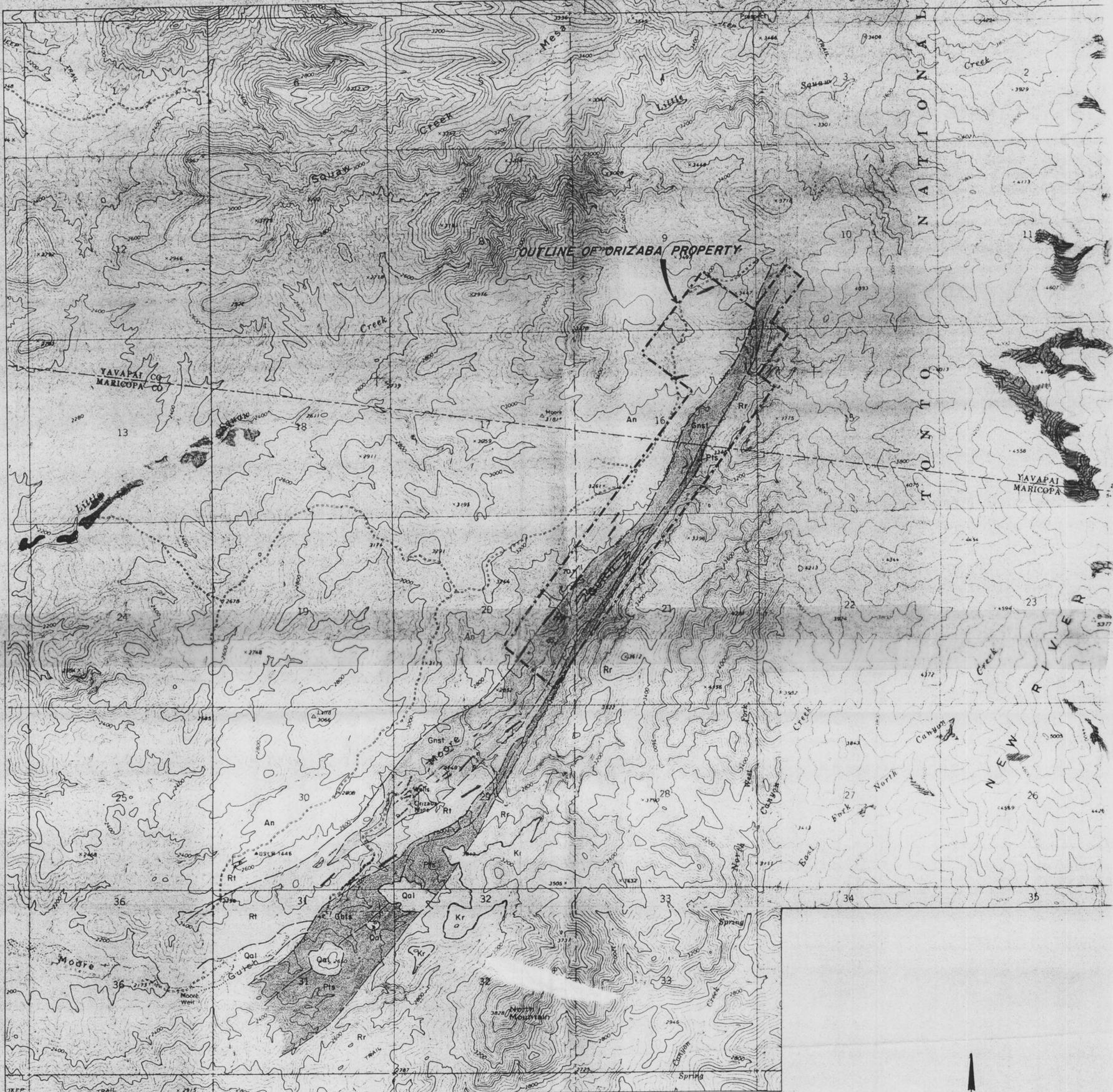
### Production Royalty

Five percent (5%) of Net Smelter Returns on Canyon claims and any open ground subsequently acquired within Area of Interest. Three percent (3%) of Net Smelter Returns on any leases subsequently obtained within Area of Interest.

### Termination

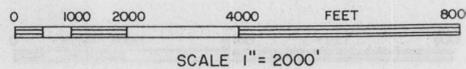
Lessee would have the right to terminate the lease at any time upon thirty-days written notice, but would be responsible for assessment work if the notice were delivered after March 31 of any assessment year, and would be obligated to complete any work commitment agreed to according to the contract.

R3E



EXPLANATION

- QUATERNARY — Qal Alluvium
- CRETACEOUS? — Kr Rhyolite flows
- An Undifferentiated andesites and siliceous sediments, with greenstone roof pendants and xenoliths.
- Gnst Greenstones with local sulfide zones.
- Rt Rhyolite tuffs with chert and carbonate beds and sediments.
- PRECAMBRIAN — Green to brown tuffs and sediments.
- Purple tuffs and sediments.
- Rr Red Rock Rhyolite
- Gossan
- Chert
- Jaspillite
- - - Contact, dotted where approximate
- 70° Strike and dip of foliation



CANYON RESOURCES CORPORATION  
GOLDEN, COLORADO

ORIZABA PROPERTY  
YAVAPAI & MARICOPA COUNTIES, ARIZONA

GEOLOGIC MAP

DATE: 2/20/82

SCALE: 1" = 2000'

PLATE