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- A Nevada Corporation -

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## TABLE OF CONTENTS

<u>Contents</u>	<u>Page</u>
Preliminary Evaluation	1
Economic Geology	6
Map	12
Offering Circular	14
General Statement	22

**PRELIMINARY EVALUATION**

**HOVARD DISTRICT**

**Mineral County, Nevada**

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# PRELIMINARY EVALUATION

## HOWARD DISTRICT

Mineral County, Nevada

### INTRODUCTION

This report is a preliminary evaluation of the Blue Sphinx, Gold Pen, Lone Star, and Nevada Rand properties in the Howard or Rand district. Although the initial interest was in the Blue Sphinx mine, it became obvious that the other properties should also be considered in attempting to locate one or more economic large tonnage open-pit gold-silver deposits.

### LOCATION AND ACCESSIBILITY

Location is in Sections 29, 32, 33, and 34, T11N, R32E near the crest of the low Gabbs Valley Range at elevations of 5500 - 6000 feet. Hawthorne, Nevada, the closest town, lies south west on U.S. Highway 95. Accessibility to the district is over 30-33 miles of mostly good gravel road and the last 2-3 miles over unimproved dirt mine roads. The important old silver camp of Rawhide lies 15 miles north.

### HISTORY

The district was discovered in 1908 and since has produced about \$360,000 in gold, silver, and copper, mostly from 1914-1920. Activity since that time has consisted only of small leaser operations, and no intelligent extensive exploration programs have ever taken place in the district. Each of the four properties is developed by 250 to 550-foot shafts.

### GEOLOGY

#### Rock Types

All of the exposed rocks appear to be post-Emeralda or Late Tertiary volcanics, consisting of the earlier acidic group-rhyolite and quartz latite welded tuff, and the later

Intermediate group-rhyolacite and andesite flows, tuffs, and breccias. Considerable marked variations in these lithologies can be seen, which will require detailed mapping to work out the proper geology. Color generally distinguishes the two, as the acidic group is tan to light brown in color and the intermediate group usually shades of gray.

### Structure

Without detailed mapping completed at this time, the only known structure of importance is the northwest Bovard fault zone which is expressed by a zone many hundreds of feet wide with faulting, brecciation, and accompanying alteration and bleaching of the rocks. This fault is part of a regional fault extending for 45 miles along the west side of the Gabbs Valley Range. Along or near this zone are located all the mines of the district. Strike varies from N40W - N70W. The mines are approximately located on the accompanying sketch map, and the location with respect to the Bovard fault zone is only generalized.

### Mineralization

At the Blue Sphinx and Gold Pen mines the mineralization occurs mostly as free gold with quartz veins and rounded masses and with iron and manganese oxides throughout a 200-foot wide zone. The rounded nature of the quartz suggests being dragged along in the fault zone. Intense shearing is accompanied by intense alteration and bleaching. A higher-grade zone without well defined limits was mined 3-8 feet wide. Unusually rich pockets of gold-silver ore were shipped from the Nevada Rand mine.

The mineralized shear zone at the Blue Sphinx and Gold Pen mines is about 200 feet wide and at least 1500 feet long. A few prospects, adits, and shafts along the zone show the quartz veining and masses which are apparently necessary for any substantial ore-grade. Oxidation extends to the 250 level so that if residual gold enrichment is present, it should be present at least to that depth.

Four samples taken at the Blue Sphinx mine are certainly not conclusive but give some ideas of grade and gold-silver occurrence.

No.	Description	Oz Au	Oz Ag	\$ Value	Ppm As
T276	19' Altered HW-No quartz	.005	0.44	\$ .75	450
T277	4' Altered FW-No quartz	Tr	0.12	.15	60
T278	6.5' Vein - 90 level	0.20	50	9.75	100
T279	20' Vein zone w/quartz at shaft	0.16	0.74	6.55	200

The samples indicate that wherever quartz is present the values increase to a grade which is quite interesting from an open-pit mining standpoint. Arsenic was run by fluo-X ray-spectrograph to see whether it might be a geochemical pathfinder to the best gold-silver mineralization, which is the case in many districts. Extensive soil cover in many areas makes surface sampling of little practicality. These arsenic values are quite high compared to the normal background of 2 ppm in igneous rocks, thereby indicating the favorable use of soil sampling as a prospecting tool.

### CONCLUSIONS

1. The four mines of the Bovard district comprise an area two miles long which is associated with a major regional fault zone and which has gold-silver mineralization occurring throughout the two mile extent.
2. Although pockets of very rich gold-silver ore have been mined by leasers, there is lower-grade mineralization throughout the zone for widths of up to 200 feet. The grade of this mineralization is of course unknown, but the potential exists for finding one or more deposits totaling in the millions of tons. If the gold is all free, as is reported, the area is unusually attractive, since only \$3 - 4 ore would be required for an economic large-tonnage operation. If the ore requires cyanide treatment, about \$7 millheads would be required.
3. Shallow inexpensive rotary or down-the-hole percussion drilling can be employed in exploration. The very accessible location is conducive to carrying out exploration and mining on a relatively low-cost basis and without too much weather hindrance.

### RECOMMENDATIONS

1. Initial work should consist of geological mapping and geochemical soil sampling for arsenic on at least the Blue Sphinx and Gold Pen ground. A grid should be laid out for proper location of this work. Some additional mine sampling is also recommended.
2. Further study of the Lone Star and Nevada Rand mines should be done at the same time and possible detailed work completed there as well.
3. This work should determine whether the areas of disseminated gold-silver mineralization are sizeable enough to be considered from a large tonnage open-pit standpoint. If favorable, further work should then consist of bulldozer trenching and drilling. If the areas do not appear sufficiently large, no further work would be recommended.

Respectfully submitted,

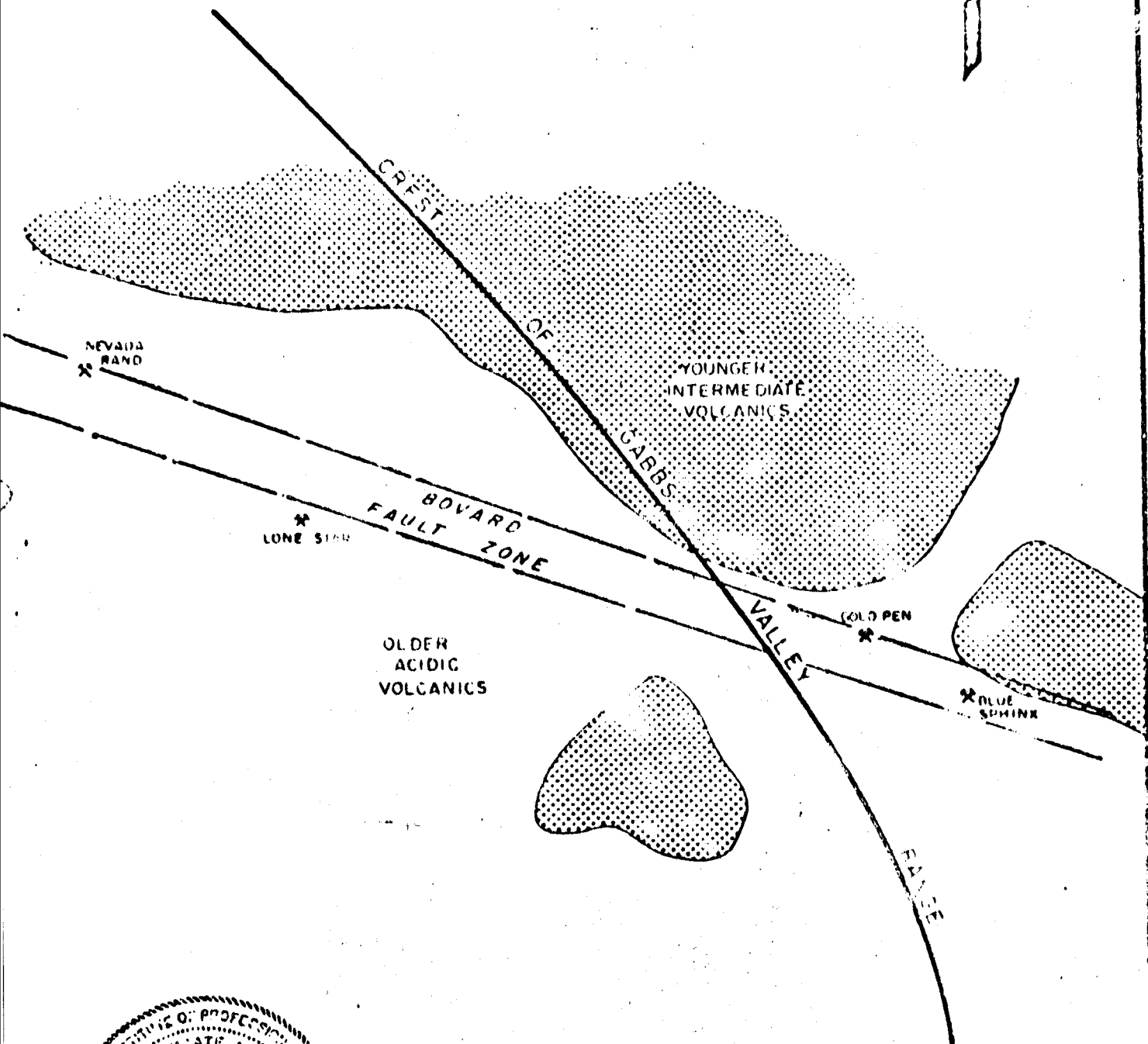
*Charles E. Melbye*

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Cert. Prof. Geol. #344

February 9, 1966



# E C O N O M I C G E O L O G Y



PREPARED FOR MR. F. H. ANNESLEY  
 SKETCH MAP  
**MINES AND GEOLOGY**  
 BOVARD DISTRICT  
 TWIN, NEVADA  
 Mineral County, Nevada  
 Scale 1" = 2000' February, 1906

# AN EXPLORATION GEOLOGICAL APPRAISAL OF THE BLUE SPHINX AREA, BOVARD DISTRICT, NEVADA

## INTRODUCTION

### Production

The Bovard District was active between 1908 and the early 1920's and is reported to have produced about \$400,000 in Au-Ag-Cu (Lincoln, 1923). Owing to ore richness which facilitated "highgrading," this figure is probably conservative. Early recorded shipments averaged \$143 per ton (Holmes, 1911).

### Claims

Blue Sphinx claims cover a 4500 foot segment of the Bovard ore-bearing structure at the southeast extremity of the several mile long district. They are located immediately southeast of the Gold Pen Mine (just over 2000 feet on strike) which produced half the recorded value of the Bovard District.

## GEOLOGY

### Ore control

The Bovard ore-bearing structure is a sinuous NW-SE trending fault zone, dipping steeply northeastward. In the Blue Sphinx and Gold Pen area this structure made ore locally in the form of Au-Ag-rich brecciated and sheared quartz fillings in altered rhyolite.

### Mineralization

Principal ore minerals were native Au, Au-Ag alloy, argentite, and cerargyrite. Traces of Cu carbonates and sulfates and turquoise have been found in surface workings. Chalcopyrite and chalcocite are on record in the northern part of the district (Copper Mountain Mine) where a Triassic limestone-monzonite contact was encountered underground (Lincoln).

In the Gold Pen Mine, nearly pure alunite sheets enveloped the ore bodies (Schrader, 1913, 1914). Only higher grade portions of the Sphinx and Pen veins were mined. Various assays indicate a certain low grade Au-Ag content peripheral to the high grade shoots (Enclosure A) both along the vein and for some distance laterally out from it in the hanging wall and foot wall, which has suggested open pit mining possibilities, but this has not yet been adequately appraised.

### Fault zone

The Bovard fault zone has brought together coarse-grained Tertiary rhyolite of consistent composition on its west side, with younger andesite of variable composition on its east. In the Gold Pen - Sphinx area, there is a zone of distinctive silicic and kaolinitic alteration attendant with the fault, beginning at the northwest end of the Gold Pen workings and persisting southeastward to the southeast end of the Sphinx Claims, a strike length of at least 6600 feet. The zone is 225' wide at the Gold Pen, 350' wide at Sphinx Shaft, and pinches to about 100' width between them. It is confined entirely to the rhyolite side of the fault zone.

Southeastward from Sphinx Shaft, the alteration band gradually narrows again to about 100' width at the saddle, 1200' southeast of the shaft. From the saddle on

## BLUE SPHINX

southeastward, the altered rhyolite zone persists strongly and, perhaps significantly, is accompanied by rapidly expanding intense alteration in the andesite. At approximately 2000 feet southeast of the saddle (3200 feet southeast of Sphinx Shaft) the width of continuous alteration is about 1200 feet. The fate of this mineralization further southeastward, beyond the Sphinx endlines is concealed by colluvium. A number of small prospect pits, adits and shafts are scattered along the exposed length of this zone, but these still plainly favor the altered rhyolite, i.e. the recognized Bovard ore habitat. There appear to have been no important excavations in the altered andesite. (Map, Enclosure B).

ent One movement vector along Bovard fault has apparently been east-side-down. This is necessary to juxtapose younger andesite on that side against older rhyolite on the west.

There is also reason to suspect right lateral offset. This is strongly hinted at by the configuration of alteration along the Bovard fault in the Gold Pen - Sphinx area. The northwestward pinchout of the 6600' + long alteration zone takes place just 400 feet northwest of the Gold Pen and coincides with the sudden westward (leftward) flexure of the fault zone. Under a prevailing right-hand force couple, structures oriented leftward of parallel are subject to relative compressional forces, hence impede solution passage. Conversely, the best mineralization in the Nevada Rand Mine at the northwest end of Bovard District coincides with a sudden rightward (northerly) change in vein trend. (Melbye, 1966).

More fundamentally, there is evidence of a broad right-hand force couple pervading the whole Mineral County region. The frontal fault bounding the east side of Soda Springs Valley, 20 miles southeast of Bovard District, has been postulated to have a dextral offset of 4 miles (Ferguson & Muller, 1949). A strong topographic lineament suggests the Bovard fault may be an extension of this.

## EXPLORATION IMPLICATIONS FROM THE GEOLOGY

Ore mineralization in the Blue Sphinx - Gold Pen area is confined to the west (foot wall) side of the Bovard fault. If mineralization along this fault zone has preferentially selected rhyolite, as it seems, then it is logical to suppose there exists a repetition of the ore environments on the east side of the fault, in rhyolite at depth beneath the andesite. And regardless of rock type, certainly a repetition of the temperature/pressure conditions prevailing during deposition of the Sphinx and Gold Pen ore bodies is to be found so displaced. (Hypothetical section, Encl C).

It would also follow that such hypothetical loci may be offset southeastward from their respective known equivalents on the opposite side of the fault.

A promising candidate for such mineralization is in evidence on the Sphinx claim block. The intensely and widely altered andesite at the southeast end of the Sphinx claims (2500 to 3500 feet southeast of Blue Sphinx Shaft) is of interest

## BLUE SPHINX

on two counts:

1. except for an isolated altered patch 3000 feet northwest of Gold Pen, it represents the only significantly altered andesite area in Bovard District.
2. the zone is southeastward of the Blue Sphinx and Gold Pen mines and might therefore constitute the surface manifestation of an offset parallel of either of those deposits.

**Discussion**

The volume of mineralization represented by the south Sphinx altered andesite area dwarfs the alteration surrounding the Blue Sphinx and Gold Pen lodes. Besides that favorable note, the target is the more attractive for reason of the greater breakage, antithetic fracturing, etc, which can be expected of the hanging wall environment of a near-surface normal fault.

It seems axiomatic that until the rhyolite underlying this hydrothermalized andesite area is investigated, the potentials of the Bovard District must be considered unsurveyed. As of this date, the most favored ore host in the southeastern half of Bovard District has not yet been seen on the most favorable side of the fault.

From the way the Bovard mineralized zone is situated on the sidehill of the Pen - Sphinx area, it is not possible to appraise the original vertical extent of the ore mineralization. There is a certain probability that mineralizations mined at the surface were only the root ends of more extensive ore bodies now lost to erosion. Moreover there is near certainty that the temperature and pressure conditions which prevailed during emplacement of the orebodies now exposed are still to be found, at depth, on the hanging wall side of the fault. And since ore mineralization has not been seen at the surface on the hanging wall side, it is likely that the full vertical extent of whatever ore was developed on that side is still entirely confined under foot.

**Speculated depth**

The depth to this hypothetical environment can only be conjectured at the moment. Detailed field investigation is required before drilling feasibility can be spelled out.

Off hand, it is apparent that a certain unknown depth of andesite must be penetrated before reaching the top of the rhyolite. Ross(1961) estimates the total andesite section in the main part of the Gabbs Valley Range to be possibly over 1000 feet thick. His geologic map shows the andesite of the Sphinx area to be a relatively small island surrounded by rhyolite and showing a relief of just over 500 feet, most of which is uphill of the alteration zone by at least 300 feet. The big factor here will be dip, which,

Once into the top of rhyolite, again depending on dip, the depth to the exposed Sphinx ore horizon is likely to be about 1000 feet (the approximate thickness of

**BLUE SPHINX**

rhyolite section lying uphill of the Sphinx Shaft. The big imponderable here is how high up in the rhyolite section the ore environment persists. That is the part which is no longer in evidence in the Sphinx - Gold Pen locale. It may have been considerable.

**A FURTHER CONSIDERATION**

A possible bonus of the above theory is the following: if the exposed ores of the Sphinx - Pen were indeed the lowermost residuals of now-eroded gold orebodies, then it would seem that buried placer gold deposits are to be looked for in the former alluvial outwashes of this ore zone.

**SUMMARY AND CONCLUSIONS**

The ore horizon of the Bovard District has been exposed through the erosion of the uplifted side of a block fault. An unknown portion of the original ore deposits on this side have been lost to erosion.

It remains to explore for the other half of the district which should lie, still buried, in the down-thrown side of the fault.

An effort should be made to resolve the post-ore movement of the Bovard fault so that a modus of exploration can be designed.

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## BLUE SPHINX

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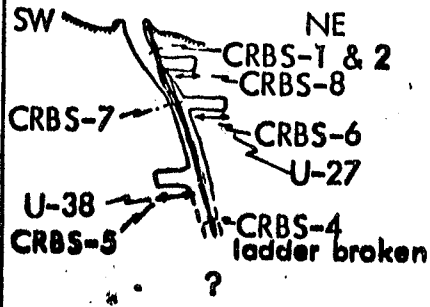
BLUE SPHINX MINE

SAMPLES

method	lab	sample no.	length ft.	Au oz	Ag oz	weight lbs
FA	N	CRBS-5	20	Tr	.867	10
		U-38	20	.17	.19	
FA	N	CRBS-4	6	Tr	.657	2
FA	N	CRBS-6	20	Tr	1.222	20
		U-27	20	.26	.48	
FA	N	CRBS-7	6	Tr	.223	2
FA	N	CRBS-8	30	.021	1.567	30
FA	N	CRBS-9	30	Tr	1.273	30
		U-32	30	1.76	.90	
FA	N	CRBS-11	8	Tr	.983	2
FA	N	CRBS-12	15	.234	1.166	3
FA	N	CRBS-1	1	.478	.499	1
S	A	"	1	2.10	1.87	1
CN	A	"	1	2.15	2.00	1
FA	N	CRBS-2	1	.634	.811	1
S	A	"	1	.07	.64	1
CN	A	"	1	.098	.73	1
		CRBS-15				
		BS-6	6			5

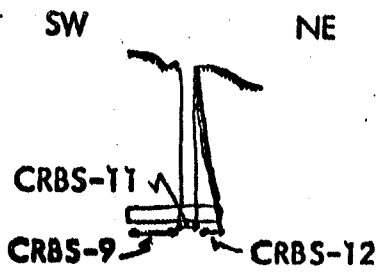
(U = Melbye sample; CRBS or BS = Cooke, Everett sample)  
(N = Nevada Assay Office; A = Nevada Analytical Service)  
(FA = fire assay; S = spectrographic analysis; CN = cyanide extraction)

BLUE SPHINX SHAFT

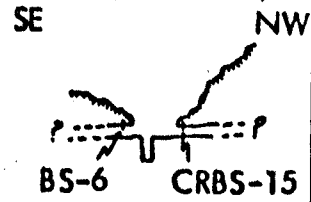


SCALE: 1" = 200'

WINDLESS SHAFT



HEIKES SHAFT  
(Long. section)



BLUE SPHINX INC.  
Principal Mine Workings  
March, 1973  
Brunton & pace, or sketch  
COOKE, EVERETT & ASSOC.



HYPOTHETICAL CROSS SECTION THROUGH BLUE SPHINX CLAIM AREA

