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PRINTED: 05/09/2001

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: BLACK COPPER QUEEN

ALTERNATE NAMES:

SANTA CRUZ COUNTY MILS NUMBER: 69A

LOCATION: TOWNSHIP 23 S RANGE 11 E SECTION 19 QUARTER NW
LATITUDE: N 31DEG 24MIN 56SEC LONGITUDE: W 111DEG 15MIN 54SEC
TOPO MAP NAME: ORO BLANCO - 15 MIN

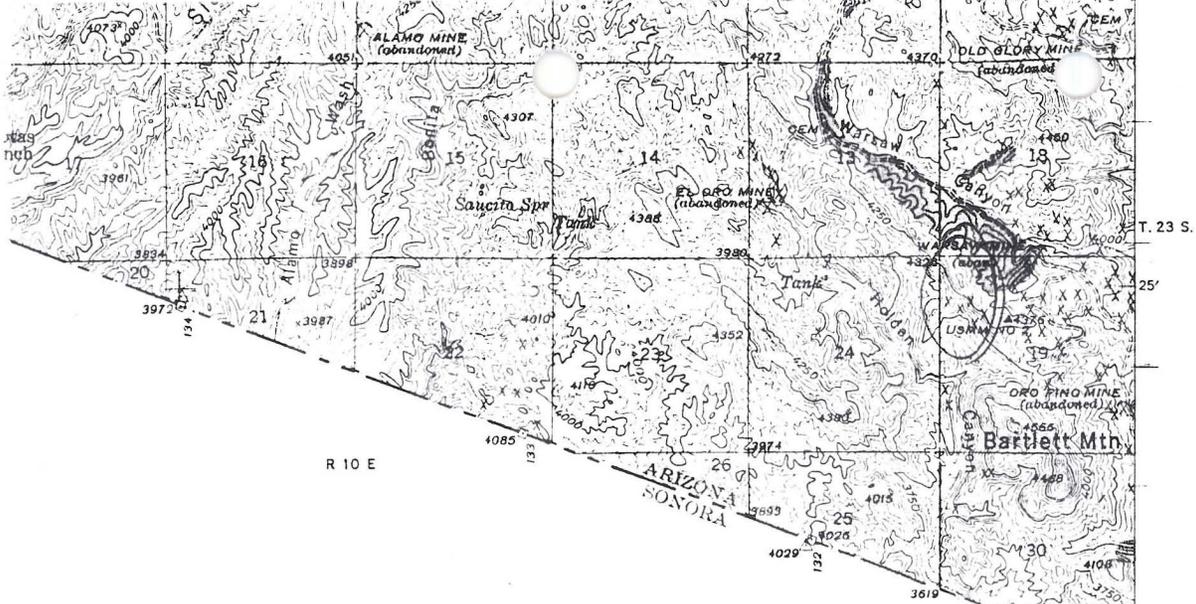
CURRENT STATUS: EXP PROSPECT

COMMODITY:

COPPER
SILVER
GOLD
ZINC
INDIUM
BISMUTH

BIBLIOGRAPHY:

ADMMR BLACK COPPER QUEEN FILE



Black Copper Queen
T23S R10E Sec. 19

+

Oro Blanco, AZ 15'

BLACK COPPER QUEEN PROPERTY

REFERENCES

SANTA CRUZ COUNTY
ORO BLANCO DIST.
T23S R11E Sec. 19

Santa Cruz County MILS Index #69A

Oro Blanco, AZ 15' Topo (included in file)

BLACK COPPER QUEEN

SANTA CRUZ COUNTY

Reich Mining Company are building a small pilot mill on claims in Holden Canyon adjoining the old Franco American. GWI 3-9-68

Still installing Electro Magnetic, Electro-Static Mill equipment made by Rapid Magnetic, Birmingham, England all new - capacity one ton per hour. GWI WR 7-6-68

Visited the Reich Mining Co. - no one around. GWI WR 3-8-69

The Black Copper Queen Mine being developed by the Reich Mining and Development Co. has started a small open pit next to their mill in Holden Canyon. The operations appear to be of a desultory character and this could be due to financing rather than lack of planning. GWI QR 3-1969

Edward A. Reich of the Reich Development & Mining Company has been staking claims around the Black Copper Queen property. It is reported that they have staked over patented and legal claims belonging to other people. GWI QR 9-1969

Ed Reich is still doing some work, staking out more claims, etc. at the Black Copper Queen property. GWI QR 2-27-70

Mine visit - Black Copper Queen near Pittsburg. Some activity expected. GWI WR 3-8-71

Don McCoy and Henry Jarvis of Arivaca have an agreement (?) with the group controlling the Black Copper Queen. They have moved a dozer to the property and plan on doing some exploration work. GWI QR 4-1-71

[REDACTED]

L.A.Y. 1/21 3/24/69

Oro Blanco Dist
Santa Cruz Co.

February 24, 1969

Mr. Edward A. Reich
Flair Merchandising Agency, Inc.
214 West Erie Street
Chicago, Illinois 60610

Dear Mr. Reich:

Thank you for making available to me the material you have put together on the Black Copper Queen Property in Santa Cruz County, Arizona. I am returning herewith the booklet of material you left with me.

I have made photocopies of the Engineering Reports dealing with your property and forwarded a set to:

John G. Roscoe
Continental Exploration, Inc.
Box 11216, Emery Park Station
Tucson, Arizona 85706

Phone: 602-623-0265

I believe that Continental would be interested in seeing copies of the Smelter Settlement Sheets covering shipments from this property. I suggest you forward photocopies of as many such sheets as you have available to Mr. Roscoe. When you are in Tucson, if you are interested, I suggest you contact Mr. Roscoe.

Sincerely,

GUNTHER & CHOKA

By _____
Sidney M. Gunther

enc.

r
cc: J. G. Roscoe
bcc: C. H. Reynolds ✓

Black Copper Queen Property
Santa Cruz County, Arizona

February 24, 1969

John G. Roscoe
C. H. Reynolds ✓
Sidney M. Gunther

I attach photocopies of the following reports on the above property:

January 13, 1967 by T. R. Clarke
January 16, 1967 by T. R. Clarke
January 19, 1967 by A. S. Michaelson

Mr. Reich (not Reiche) is also hung up on a dry separator of English origin. He will probably tell John all about it.

Sidney M. Gunther

r
att.

ARIZONA DEPARTMENT OF MINERAL RESOURCES
Mineral Building, Fairgrounds
Phoenix, Arizona

1. Information from: Personal visit
Address: _____
2. Mine: Black Copper Queen 3. No. of Claims - Patented 0
Unpatented 5
4. Location: Holden Canyon
5. Sec. 24-19 Tp. 10-11E Range 23S 6. Mining District Oro Blanco
7. Owner: Reich Development & Mining Co.
8. Address: Arivaca
9. Operating Co.: same
10. Address: Arivaca
11. President: Ed Reich 12. Gen. Mgr.: _____
13. Principal Metals: Au-Ag 14. No. Employed: 2 - sometimes
15. Mill, Type & Capacity: 1 tph electro magnetic electro static
16. Present Operations: (a) Down (b) Assessment work (c) Exploration
(d) Production (e) Rate _____ tpd.
17. New Work Planned: _____

18. Misc. Notes: _____

Date: 5-6-69

Ed Reich
(Signature)

(Field Engineer)

REPORTS ON
REICHE DEVELOPMENT AND MINING COMPANY
BLACK COPPER QUEEN PROPERTY
SANTA CRUZ COUNTY, ARIZONA, U.S.A.

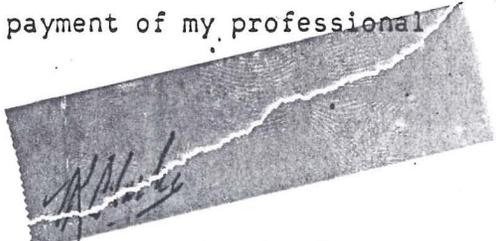
Toronto, Ontario,
January, 1967.

T. R. Clarke & Associates,
Toronto, Ontario,
Canada.

Suite 307-160 BAY STREET

CERTIFICATION

1. I am a graduate of McGill University, Montreal, Canada and hold a Degree of Bachelor of Engineering in Mining.
2. I am a Registered Professional Engineer in good standing in the Province of Ontario and have practiced my profession for over thirty years.
3. I have based my conclusions and recommendations on a personal examination of the property; on information supplied by Dr. A. S. Michaelson of Chicago; and on my experience in the mine development and mine operating field.
4. I have no interest directly or indirectly in the property nor expect to receive any interest directly or indirectly in the property except for the payment of my professional fees.


T. R. Clarke, B. Eng. P. Eng.

Toronto, Ontario,
January 13, 1967.

ML

January 19th, 1967
86906

Reich Development & Mining Co.
214 West Erie Street
Chicago, Illinois 60610

Dear Mister Reich:

Herewith is submitted my report on my most recent trip to your Copper Queen Mines, Arivaca, Arizona in company with T.R. Clarke, mining engineer from Toronto, Ontario; O.R. Mohahan, geophysicist from Detroit, Michigan and Toronto, Ontario; and Mr. Peter Klajda of Tuscon, Arizona, January 5 to 9, 1967.

GEOLOGY:

Similar to previous visitation, being typical of the southwest Rocky Mountains, being typically porphyritic with crossing dike systems. Copper staining as well as shell-type argentite observed in some areas.

OBSERVATIONS:

1-6-67: Arrived on site at about 10:30 a.m. after having inspected the area at the left side of the road where copper stainings were apparent and where according to Peter Klajda there should be a fair copper deposit. Other than stainings no outcroppings that were interesting were observed. Locations of dikes were noted as we approached the primary workings where stripping was made. This strip was examined and showed evidence of copper and possible silver. No samples were taken as this area had been well checked from my last visit. Visible observation could therefore be substantiated by assay reports of this area.

We arrived at the tunnel site and T.R. Clarke and I made a thorough study of the tunnel in order to obtain pertinent evidence of the workings of the tunnel, history of same, and possible disposal site of any diggings. We got to the fork at which I pointed out the details of the mineralization to Roy. At the fork in the tunnel we then proceeded to the right and explored the walls and overhead with conspicuous mineralization and of ores being in place. After being convinced what we saw, we returned to the fork and went in to left tunnel as far as we dared. The water was rather deep and footing was uncertain. After this study was completed we returned to the outside of the tunnel and investigated the other tunnel to the left of this main tunnel. Observations were made and noted in our log books.

Once again we looked above the tunnel site observing the permatite dikes and trying to trace out faults. Meanwhile O.R. Monahan was charting geophysical data and logging his information. Together we all went to the road above the tunnel, where some of the material was at one time shipped to the refinery. I observed some black material and examined it, and found it to be argentite. I said nothing to no one. Soon Roy and Monty both spotted this material and they were both amazed and made remarks that were pleasing to my ear. Pete was questioned by Roy and Monty, but, Pete I found was very cunning. Both had to give information to obtain some. This was not to my liking but it had to suffice.

We made the descent with Roy and Monty remaining in the back of the truck, while observations and plotting geophysical data. We got

1-7-67: Procured a rental car and proceeded to back of the mine sites. Entered the Ruby Road and saw many abandoned diggings, dumps, and boarded workings. All this was evidence that the area had to be of some value. The geological structures all appeared to follow the same pattern that is characteristic of the area. We proceeded to Nogales, then into Nogales, Sonora in Mexico. Had lunch and were back on the road to Tucson. Enroute we stopped Tumacacori National monument. Visited the various buildings and entered the museum where they had a nice exhibit of mining in the Arica and Arivaca area. We observed a map dating back with Arivaca designated. We continued northward stopping at Tubac. Then to our motel, supper and more discussions.

1-8-67: Left early in the morning for a trip to Tombstone, that is a town with historical background. Had breakfast and returned to the airport and plane for Chicago.

OPINION:

We all agreed that:-

1. Peter was very foxy and could hear at the right time.
2. That Ed Reich should not hesitate to stake more claims or obtain leases to protect what he already had.
3. That the climate was conducive to good mining.
4. That the economics of concentrates had to be worked out.
5. That electromagnetic and electrostatic separation was ideal.
6. That in the future, Ed Reich, should keep a record of all of his activities at the mine and not depend on technical and engineering reports.
7. That an ideal state of mineralization in the tunnels and surrounding area do exist.
8. That there is apparent potential.
9. That materials can be concentrated without no difficulty; that all diggings can be up-graded prior to shipping to smelters.
10. That a reasonable engineering assessment was possible.
11. That labor problem should not be too great. Help being available.
12. That a mining venture is feasible.

Respectfully submitted:

A. Michelson

Director

Tech Research International
5057 North Tripp Ave.
Chicago, Ill. 60630
Phone: 312-736-5728

1-19-67

Ste. 307, 160 Bay Street,
Toronto 1, Ontario,
January 13, 1967.

Reiche Development & Mining Company,
Chicago, Illinois.

Gentlemen:

Herewith is my report on your Black Copper Queen mining property located in Santa Cruz, County, Arizona.

PROPERTY AND ACCESS

The property consists of five mining claims approximately 100 acres called Black Copper Queen claims nos. 1 to 5 inclusive. The property can be reached on adequate roads by travelling south some 80 miles from Tucson on highway 89 to Amado thence west some 15 miles to Arivaca thence south 15 miles on the Ruby Road branching southwest at Warsaw Canyon. Canyon.

TOPOGRAPHY AND CLIMATE

The property is located in the mountains with a local difference of elevation between valleys and ridges of 500 plus feet. The property is at approximately the 4,000-foot elevation.

The climate is warm and dry and little to no likelihood of freezing temperatures.

LOCAL RESOURCES

The property is located in cattle grazing country. Local trucking roads exist or can be readily developed. No electric power is available and no water supply in the way of streams or lakes on the property. It was noted that the mine adit contained dammed water and a small continuous

5
1/18

flow was coming from the portal. Only scrub trees and bushes were noted, no large timber.

HISTORY

With some research into old records no doubt the history of the property could be uncovered. However, for the present purpose a suitable reconstruction can be made from the visible evidence on the ground.

The Arivaca region in which the property lies is somewhat older than say modern Tucson. The first serious prospecting likely took place sometime after the Tombstone discoveries. Following the early prospecting miners moved in and sank a series of prospect shafts in likely locations. This method of early development was common in a period both before and after 1900. At some later period, say 1925 or later the adit was driven. The most recent work was the removal of two surface showings that had visible copper values.

If the above history is somewhat along the lines of the actual happenings then it can be assumed that the early prospector and developer was basically interested in silver and the silver carrying veins while the later developer was more attracted to the copper possibilities. Silver is associated with both copper and lead mineralization.

It is also noted that in the vicinity of the old shafts and pits there is some evidence of hand sorting or cobbing having taken place. The lack of a large mine dump at the adit portal means that, visually at least, all the rock excavated from the adit was considered shipping ore and was shipped. From the fact that further mining was not carried out after the development program it must be assumed that under the then prevailing conditions of transportation and metal prices the operation showed insufficient returns to warrant mining. On the other hand the

development work completed, estimated in the range of 100,000 cubic feet of material, must have showed considerable promise to warrant carrying out this extensive program.

GEOLOGY

Unfortunately a local regional geological report was not available and the following brief description is from local observation only.

The host rock in the area consists of limey sediments, volcanic sediments and porphyry typical of the Rocky Mountain Ranges. Locally this formation has been cut by a series of dikes, likely pegmatite. These dikes appear to stand vertically and have three general strikes, namely: Northsouth, Northeast to Southwest and Northwest to Southeast. It was noted on approaching and leaving the property that the presence of these dikes in a distinct criss-cross pattern was very pronounced in the vicinity of the silver veins. At several points in rock cuts and outcrops along the road, copper stain was visible. The host rock in this case appeared to have a porphyritic structure.

EXAMINATION

The property and general area was visited by the writer, T. R. Clarke, P.Eng. B.Eng. January 5 to 9, 1967 accompanied by the owner and Dr. A. S. Michaelson of Chicago and Mr. O. R. Monahan of Detroit.

OBSERVATIONS

Although considerable work has been carried out on the property, over a period of time, apparently no records were maintained and no background information available. The points of interest observed are designated as follows:

1. An old shaft 50 to 75 feet deep to the left and above the road where you first approach the property. Another filled shaft is

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- indicated about 50 feet further up the hill from the open shaft.
2. To the left of the road a large bulldozed area from which a bulk shipment has recently been taken.
 3. Two pits down slope and to the south of No. 2.
 4. A large side hill excavation from which material has recently been shipped.
 5. An adit reported to be some 750 feet to 1,000 feet in length with some raises and winzes.
 6. The reputed location of an early adit, not seen, probably covered by later bulldozing.
 7. Surface lineations observed along the road that could indicate additional structures.

1. The old shafts appeared to be about 5 feet by 5 feet and close to vertical. Very little broken rock material appeared around the collars and it is assumed that the majority of the excavated material was shipped. There was no visible evidence on the walls at the collar of the shaft to indicate a high grade pocket or similar occurrence.

2. A shipment had been made from this area reported to have graded from 5% to 8% copper with about 8 ounces of silver to the ton. The bottom of the cut sloped down about 15 to 20 degrees to the northeast. Some mineralization, mainly copper, was visible on the present pit bottom but appeared to have little vertical depth.

3. Two pits had been put down to bedrock below the edge of No. 2 pit. There was some evidence of mineral but did not appear to be the same vein type material as was removed in No. 2 pit.

4. This pit was cut into the south side of a local ridge or knoll. Not all the mineralized material had been removed and good specimens of copper mineralization could be seen. The mineralization appeared to be

confined to a fold in the host rock plunging to the northeast. It was bounded on the west side by an apparently barren "horse" of limey sediment and appeared to abut against a pegmatite dike on the east. A narrow band of black material, probably silver rich stromeyerite or freibergite was visible against the dike. It was not possible to ascertain whether there had been movement along the dike or not. The material removed from this pit was shipped and reported to assay 10% copper and 10 to 11 ounces of silver.

5. Unfortunately the adit was flooded and the writer could only observe the vein structures for some 25 feet inside the heading. Information supplied by Dr. A. S. Michaelson, who examined the tunnel earlier in the year, indicated that the excavation was some 1,000 feet in extent and had a number of short raises and winzes within the workings. In some places horizontal mineralized widths from 10 feet to 15 feet were observed.

Where visible to the writer the vein appeared as a series of bands of black mineral dipping at about 30 degrees to the northeast and striking generally southeast. The mineralized zone near the portal had a local horizontal width of about six feet.

Outside the portal and to the east a second opening had been made. This opening appeared to have followed a second and underlying mineralized band. Although there was some broken rock and samples at the portal there was no dump to correspond to the amount of excavation indicated. Some samples had been taken from underground earlier in the year by Dr. Michaelson and the significant metals are reported as follows:

Sample A Back sample across 15 feet.

B Bulk from left or north wall for a length of 150 feet.

Sample C Bulk from right or south wall for a length of 150 feet.

D Bulk from back for a length of 150 feet.

E Wall near entry.

SAMPLES

	A	B	C	D	E
<u>Group I</u>					
Copper %	0.6	1.5	0.5	0.4	0.6
Zinc %	2.0	2.5	1.4	1.8	1.2
Lead %	0.4	0.4	0.3	0.3	0.1
Cadmium %	0.05	0.05	0.05	0.03	0.02
Bismuth %	0.03	0.03	0.04	0.04	0.05
<u>Group II</u>					
Gold zos.	2.1	1.2	1.2	0.95	0.85
Silver ozs.	13.5	9.8	17.8	17.4	21.5
<u>Group III</u>					
Platinum	0.12	0.12	0.15	0.12	0.10
Indium	0.38	0.6	0.3	0.12	0.10

The metal distribution suggests the presence of the mineral freibergite, an argentiferous variety of tetrahedrite. The gold and silver values in these samples indicate very definite economic values.

The writer was able to observe some of this material in place. From a visual examination a higher base metal content was expected. On the other hand the water draining from the adit portal was quite clear and very little stain visible on the adjoining rock.

6. These early workings were reported but now appear to be covered with bulldozed material from the No. 2 outcrops. It would appear that an attempt was being made to drive an adit from the northwest to intersect the old shaft at No. 1 location and possibly as far as the shaft at the adit portal.

7. Surface lineations noted from the bulldozed road along the west slope of the ridge on approaching the showing from the north suggest additional vein structures in this vicinity. There is no visible sign of any extensive prospect work having been carried out in this area. A pit showing lead and silver mineralization has been reported high up on the ridge some three-quarters of a mile north of the showings.

ECONOMICS

The economic metals in the deposit appear to be gold, silver and possibly platinum with lesser importance to copper, lead and zinc. The principal base metals have accompanying values in cadmium, bismuth and indium.

The economic development of the property, as a whole, will depend on the ability to outline and be reasonably assured of sufficient raw material to warrant the capital cost of developing and processing the raw material. The processing of the raw material for sale can be by -

- (a) Reducing the precious metals to a base bullion and selling directly to the U.S. Mint.
- (b) Producing concentrates for sale to existing smelters.
- (c) A combination of (a) and (b).

In this matter of producing concentrates for sale to existing smelters it must be realized that each smelter is designed to process a definite type of ore consisting of a definite mineral concentration. No concentrate, regardless of the analysis, has any real value unless it can be sold to a smelter which can economically process same. In order to ascertain the value of a concentrate a complete analysis of the concentrate must be submitted to the smelter who, if interested, will require a typical sample for their own analysis.

SUMMARY AND CONCLUSIONS

Apparently no records are available on the early work on this property. Also due to water it was not possible to examine and sample the rather extensive underground work in the adit. However, on the basis of what can be seen and from information obtained from Dr. Michaelson, regarding his examination of the ground during the summer of 1966, certain conclusions can be drawn.

There appears to be two periods of mineralization. The first, basically copper with precious metal enrichment is confined to structural folds in the formation and likely in the vicinity of intrusive action. It was also noted that at various points on the property minor copper values were seen, likely range between 0.2% and 0.4%, in a host rock with porphyritic structure. The fold structures where noted appeared to have a flat plunge to the northeast.

The second variety of mineralization carrying high silver and gold values appeared to occur in a series of bands striking generally northwest and southeast and dipping flatly to the northeast. This vein structure appeared very strong and persistent. The structure could be traced for a considerable distance and appeared on both sides of a northwesterly trending pegmatite dike. Whether the vein penetrated the pegmatite or was offset by the dikes could not be determined. Using the location of pits and shafts and the pattern of the previous development as a guide it is possible to assume that a number of these flat lying veins lie over top of each other. Again, although it could not be ascertained, it can be assumed that the economic value of the vein structure would depend largely on the nature of the host or country rock through which the vein structures passed. A more brittle rock would shatter and in turn allow more freedom for the mineralization to settle out and

concentrate than would a softer rock.

These silver and gold rich veins are, at this stage, economically the most important structures seen on the property. Although only one vein has been developed there is every indication that a number of veins do exist.

During at least one stage in the history of the property a rather extensive underground program was carried out. The lack of a corresponding ore dump indicates the material was shipped in raw form to a smelter. The fact that further mining was not carried out indicates that the financial return did not warrant further work. This by no means indicates that the property has no economical value. Due to a total lack of records the previous operation cannot be evaluated. We do know however, that although wage scales are much higher than previous, the modern equipment and technology has made today's miner many times more productive than even ten years ago. We also know that today's metal prices are much higher, transportation and recovery procedures much more efficient.

From a geological standpoint the property has barely been scratched and little or no general exploration carried out.

Dr. A. S. Michaelson has carried out a number of concentration tests, the results of which indicate that the economic mineral values can be concentrated into various component parts. This being the case then a higher smelter return and lower transportation costs can be envisaged on the products from a mining operation. At the time of writing this report the analytical values and metallurgical balances have not been completed. Information on this work will be included, when available, as an addendum to this report.

It is therefore concluded that -

1. The property shows clear evidence of the existence of economical mineralization and an indication of greater potential.

- 2. Previous records are not available and geological and analytical data too sparse, at this time, to warrant firm estimates of tonnages and grades available.
- 3. Preliminary test work indicates that the raw material can be concentrated.
- 4. To develop the full potential of the property and to provide data on which to base an engineering assessment (a) additional geological study and sampling is required along with (b) definite figures on the ratio of concentration and the probable dollar value of a smelter return.

The writer feels that on the information available the property has mine making potentials and additional preliminary work is warranted. It is therefore recommended that -

STAGE I

- (a) Existing trenches, outcrops and underground headings be cleaned, sampled and geologically mapped.
- (b) Some additional trenching be carried out over the known zones and the vein material sampled and mapped.

Budget - Elapsed Time - 1 Month

Technical, sampling, mapping, survey, reports	\$ 2,750
Labour	500
Transportation, board etc. at property	750
Bulldozing	500
Analytical	1,000
Contingency and travel	<u>1,500</u>
	\$ 7,000

On completion of this stage a preliminary assessment of the property as a limited or small producer should be possible.

STAGE II

- (a) A preliminary soil sampling or similar survey over the property as a whole.
- (b) A core drilling program to test for the vein structures at depth and for additional structures.
- (c) Investigation regarding concentrates and sales.

Budget - Elapsed Time - 2 Months

Soil sampling, analytical, interpretation	\$ 3,000
Diamond drilling, 5000 feet @ \$6.00	30,000
Analytical	1,000
Expense at property, transportation etc.	1,500
Technical expense, travel, reports etc.	3,500
Concentrate tests and markets	1,500
Contingency	<u>1,500</u>
	\$ 42,000

At this stage there should be sufficient data on which to base a reasonable engineering assessment. However, depending on the type of financing contemplated additional work, to block out actual ore, may be necessary.

Respectfully submitted,

T. R. CLARKE & ASSOCIATES,

T. R. Clarke
T. R. Clarke, P. Eng. B. Eng.

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January 16, 1967

Reiche Development and Mining Company,
Chicago, Illinois,
U.S.A.

Gentlemen:

As requested, herewith is my assessment of a small tonnage operation on your Black Copper Queen property located in Santa Cruz County, Arizona, U.S.A.

My understanding of your intent is to mine the high silver gold mineralization indicated in the adit and to dry concentrate this material and to sell such concentrates to existing smelters.

In this report I will endeavour to logically "questimate" (a) available tonnage and grade, (b) probable capital costs, (c) probable operating costs and (d) until such times as Dr. Michaelson's analytical and concentrating information is available, a probable smelter return.

GENERAL

It must be clearly understood that the geological and engineering data on the property is for all practical purposes non-existent and such "questimates" as are being made in this report are based solely on my observations during an examination of the property in January, 1967; on analytical data supplied by Dr. Michaelson gathered during his examination in July 1966; and on my 40 years experience in the mining development and operating field as a miner, engineer and general manager of operations.

INDICATED POSSIBLE ORE

Grade

The average grade of five bulk samples taken and analyzed by

Dr. Michaelson calculates, for significant metals, at -

<u>Metals</u>	<u>Grade</u>	<u>Units per ton</u>	<u>Price per Unit</u>	<u>Value per ton</u>
Copper	0.72%	14.4 lbs.	\$ 0.38	\$ 5.47
Zinc	1.8%	36.0 lbs.	0.145	5.22
Cadmium	0.04%	0.8 lbs.	2.75	2.20
Bismuth	0.04%	0.8 lbs.	4.25	3.40
Gold	1.26 ozs.	1.26 ozs.	35.00	44.10
Silver	16.0 ozs.	16.0 ozs.	1.293	20.69
Platinum	0.12 ozs.	0.12 ozs.	157.00	18.84
Indium	0.30 ozs.	0.30 ozs.	2.00	0.60

There are various other rare metals indicated in the analysis that are not included here.

The figures shown under Value per ton is indicative but quite unrealistic in estimating the value of the raw ore. From such total value must be subtracted concentrating and smelter losses, transportation, purification and smelter charges. Such figures can only be firmed up after the concentrating and prospective sales data is available. However based on a probable milling operation certain estimates are possible.

It is now assumed that two concentrates are made, one based on the copper mineralization and one based on the zinc. In this case economic recoveries can be expected on all reported values except platinum and indium. Regarding platinum and indium special investigation would be necessary to establish a recovery and sales value.

Taking care of treatment losses and costs the net smelter return for raw ore would now appear.

<u>Metal</u>	<u>Units per ton</u>	<u>Units Recovered per ton</u>	<u>Net Smelter per Unit</u>	<u>Value</u>
Copper	14.4 lbs.	10.8	\$ 0.30	\$ 3.24
Zinc	36.0 lbs.	25.2	0.05	1.26
Cadmium	0.8 lbs.	0.4	2.25	0.90
Bismuth	0.8 lbs.	0.4	3.75	1.50
Gold	1.26 ozs.	1.0	34.00	34.00
Silver	16.0 ozs.	12.8	1.25	16.00

This means that we could expect to receive a smelter return value of \$57.00 per ton from the raw ore with a calculated contained metal value of \$81.00 per ton or 70 per cent of the value. In view of the high content of precious metals in the ores such an estimate would be considered reasonable.

From information available we know that the adit covered some 750 feet of strike length along the vein zone. That horizontal widths were observed up to 15 feet with a possible average width of 8 feet. For the 750 feet of strike length the vertical extent of the vein from adit to surface would vary from 20 feet to 60 feet. On this basis we would have a probable average back of 40 feet. The mineralized zone available now appears to be 750 feet by 40 feet by 8 feet or 240,000 cubic feet or 20,000 tons.

Assuming a 25% dilution factor we now arrive at -

20,000 tons @ \$57.90 per ton or	\$ 1,158,000
<u>5,000</u> tons waste	-
25,000 tons @ \$46.32 per ton	<u>\$ 1,158,000</u>

Use \$46.00 per ton mining grade.

Summarizing, we find that based on the information available a "questimate" of the tonnage and grade of the mineralized zone lying above the present adit is 25,000 tons at \$46.00 per ton for a total

recoverable value of \$1,158,000.

OPERATING PLAN

A number of operating plans for underground have been considered and costed. At the mining stage the principal difficulties appear to be (a) provide sufficient flexibility in the planning to insure continuous mining operations and efficiency and (b) to keep preproduction expense to a minimum, (c) recover the largest tonnage possible from the indicated ore available above the adit. Consideration was given to the following plans:

Plan I

Mine the vein material by open cut methods. On the information available at present the dilution would be excessive and preconcentrating equipment required before final grinding and milling. Such preconcentration would require additional crushing, something in the form of Heavy Media Separation (liquid) and drying. Any saving in the mining method would be lost in the treatment.

Plan II

Drop below the present adit and drive a haulage level possibly in the vein indicated south of the present adit, raise box holes and mine from the bottom of the present adit to surface. Again the information available is too sketchy to warrant the haulage level which could be in waste. Also such an operating mining plan would require trained development miners (usually high priced) and some minor ventilation problems requiring equipment.

Plan III

Plan III, the costing of which is given on the following pages calls for

- (a) Opening the present portal by means of open pit operations for a length of approximately 50 to 75 feet of strike.
- (b) Drive from the southeast end of the present adit horizontally to surface and provide a surface road from the new portal to the west portal and mill site.
- (c) Mine, in retreat, from surface to the present adit floor from both portals leaving pillars in lean spots in the vein material and supplying timber support where necessary.
- (d) To provide flexibility in loading and haulage use a diesel driven ScootCreet for haulage (or similar) and a crawler mounted EIMCo 630 for loading (or similar).
- (e) On the basis of such a plan the mining operation should always have available (1) broken ore reserves, (2) free faces for drilling, (3) flexibility to mine by undercutting any high-grade pockets in the adit floor, (4) flexibility to load and haul from any point on surface where high-grade pockets are indicated.

It is on the basis of Plan III that the underground operation has been costed.

MILLING & CONCENTRATING

This area of the program has been under study by Dr. A. S. Michaelson of Chicago, Illinois. Dr. Michaelson after some consideration has decided on the use of electromagnetic equipment for final concentrate. For this he will require a feed lying between 40 mesh and 100 mesh with a minimum of fines. To produce such a dry feed will require a flowsheet containing (1) primary jaw crusher, (2) secondary crusher, impact mill, screens or centrifugal sizing equipment, bins, conveyors, tramp steel magnet, scales etc. Such a plant, at a milling rate of nine tons per hour is costed here on new equipment.

The writer is familiar with electromagnetic and basic electrostatic separation equipment on tin and beach sand operations. The equipment has performed satisfactorily.

The operation will require diesel driven generators and compressors as well as the mining, milling and transportation equipment. In turn

this equipment will require at least a minimum surface shop to provide repairs and maintenance. Such a shop and equipment has been provided for in the Capital Cost estimates.

CAMP ACCOMMODATION

No provision has been made for camp accommodation except to provide one office and foreman's trailer. The provision of additional accommodation will depend on the availability of a local working force.

CAPITAL COST

As closely as time has permitted the following costs have been based on recent new equipment quotations. However in actual practice much suitable equipment can be obtained from (a) the used equipment market, (b) rentals or rental purchase. Used equipment usually costs, in place 60% to 70% of new equipment cost. Rental purchase can normally spread the cost over a period of 18 months to 24 months with a 20% to 30% down payment.

	<u>Capital Cost Installed</u>
Mine, plant including compressor	\$ 69,300
Surface plant including generator	37,317
Mill plant	<u>73,755</u>
Total Capital Cost	\$ 180,372

PREPRODUCTION COST

A preproduction cost to cover (a) road improvement, (b) site clearing, (c) clearing over orebody, (d) organization etc. is included at \$8,500.

OPERATING COSTS

Operating costs are based on 8 hour working shift per day. Local labour rates quoted to me at Tucson and Nogales were \$1.50 per hour.

However in preparing operating costs I have allowed -

Foreman	\$ 35.00 per shift
Tradesman Class I	30.00 " "
Tradesman Class II	27.50 " "
Tradesman Class III	25.00 " "
Labour Class I	22.50 " "
Labour Class II	20.00 " "

To these I have added 20% government levies etc. for underground and 15% levies for surface.

On this basis the direct operating cost at the property are estimated at

	<u>Personnel</u>	<u>Payroll</u>	<u>Costs per Day Supplies</u>	<u>Total</u>
Mining	7	\$ 210.00	\$ 120.50	\$ 330.50
Surface & shops	4	112.15	61.00	173.15
Milling	<u>4</u>	<u>123.65</u>	<u>48.75</u>	<u>172.40</u>
Total per day	15	\$ 445.80	\$ 230.25	\$ 676.05

Cost per ton on basis of 75 tons per day milled.

	<u>Cost per Ton</u>		
	<u>Payroll</u>	<u>Supplies</u>	<u>Total</u>
Mining	\$ 5.94	\$ 3.07	\$ 9.01
Contingency 10%	<u>.59</u>	<u>.30</u>	<u>.89</u>
	\$ 6.53	\$ 3.37	\$ 9.90

The above costs do not include any allowance for such items as insurance, market expense, head office, travel etc. For this purpose allow \$1.50 per ton milled for a total operating cost of \$11.40 per ton milled.

WORKING CAPITAL

Working capital for the operation should be provided for three months operation or 6,250 tons @ \$11.40 or \$ 71,250.

FINANCIAL REQUIREMENT

The financial requirement will be Capital Cost plus Preproduction Cost plus Working Capital.

Capital cost	\$ 180,372
Preproduction cost	8,500
Working capital	<u>71,250</u>
TOTAL	\$ 260,122

Estimated Operating Profit before Equipment Write-off

Net smelter return 25,000 tons @ \$46/ton	\$ 1,150,000
Operating cost 25,000 tons @ \$11.40/ton	<u>283,000</u>
Estimated Operating Profit	\$ 867,000

Assuming a complete write-off of Capital and Preproduction cost a surplus as follows is estimated -

Estimated operating profit	\$ 867,000
Less -	
Preproduction	\$ 8,500
Capital cost	180,372
Interest	<u>7,500</u>
	<u>196,372</u>
	\$ 670,628

Estimated surplus available for profit and taxes is \$ 670,628.

CASH FLOW

If an operation is contemplated undoubtedly every advantage will be taken to hold the Financial Requirement to a minimum. In the following chart the writer has tried to estimate a probable cash flow taking advantage of rental or rental purchase equipment on some large items. Debt interest is calculated at 1% per month.

Under these operating conditions the maximum financial requirement is \$ 207,690. This maximum peak would be required for three months.

The estimated return before taxes on the project for a fourteen month period is \$585,830.

CASH FLOW

	<u>Preproduction 2 Months</u>	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>	<u>Subsequent</u>
<u>Outlay</u>						
Preproduction & rentals	\$ 13,500	\$	\$	\$	\$	\$
Working capital	25,000	46,250				
Working capital accum.	25,000	71,250				
Capital outlay	77,570	37,000				
Capital outlay accum.	77,570	114,570				
Interest	2,320	6,050	4,730			
Financial requirement	\$ 118,390	89,300				
Financial requirement accum.	118,390	207,690				
Total debt	118,390	207,690	162,420			
<u>Return</u>						
Net smelter return		191,666	287,500	287,500	287,500	95,834
Operating cost & rentals		<u>105,750</u>	<u>105,750</u>	<u>105,750</u>	<u>105,750</u>	
Operating Profit		85,916	181,750	181,750	181,750	95,834
Debt reduction		50,000	162,420	-	-	
Surplus		35,916	19,330	181,750	181,750	95,834
Surplus Accum.		35,916	55,246	236,996	418,746	514,580
Working capital				71,250	71,250	<u>71,250</u>
TOTAL CASH RETURN						\$585,830

The above cash flow assumes some equipment items on rental or rental purchase.

SUMMARY AND CONCLUSIONS

The writer feels that the operating costs and financial estimates have been made sufficiently generous to take care of any minor unforeseen circumstance. The writer would point out that no allowance has been made to establish a camp at the work site or to provide transportation for workers.

On the basis of the information available and on the assumptions made the project appears both feasible and profitable. However the project does hinge on three major factors:

1. The amount of ore available above the adit level.
2. The grade of the run of mine ore.
3. The ability to make and sell concentrates.

One point that keeps coming to mind is that the mine has always been considered as a silver project. Based on the evidence in hand the gold values have greater economic values. In turn this leads to certain questions and assumptions.

1. The silver head value being used is low.
2. The gold head value is high.
3. Gold values were not recovered in the smelting operation.

The writer is familiar with magnetic and high tension separators as used in tin recovery in England and Africa and rutile, zircon and monazite recovery in Australia. The equipment on these applications is very efficient. However when applied to the project under study it is very important to ascertain by submission to a smelter what metals are recoverable and will be paid for.

These points should be resolved before any major expenditures are made.

It is therefore my recommendation that -

1. The adit be drained and thoroughly sampled and the extent, strike dip and grade of the formation ascertained.
2. That further study be made on the milling operation with special emphasis on the sale of concentrates.

Respectfully submitted,

T. R. CLARKE & ASSOCIATES,

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T. R. Clarke, B.Eng. P.Eng.

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