A

GEOLOGICAL EVALUATION

and

EXPLORATION

REPORT

on the

MORGAN PROPERTY

Gila County, Arizona

by

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the "minor target" has been adequately defined, explored and evaluated.

FORWARD

Predecessors Messrs. Blucher and Heinrichs have reported on the Project as regards geology, mineralization, drilling results, results of their respective phase and work and have provided recommendations leading toward additional work because it was indicated that several questions remained unanswered.

Since much has been previously written on the aforementioned aspects of the Project and exploratory work, the writer will limit his discussion or submissions to justifying the presented conclusions. Repition of facts are herein included only if they will aid and further clarify the particular condition or situation.

During the time of reviewing and studying these reports, the writer has encountered an inequality: Blucher has termed the rock surrounding the Pinal Adit at depth and that encountered in the drill holes as a gneissic quartz diorite while the surface map indicates the rock is schist. Heinrichs and the writer, both classify this rock on the surface and at depth as a schist, preferably the Pinal Schist.

This inconsistency could create confusion and wrong interpretations. The writer thus has some concern as regards the rock classification shown in the drill logs by Blucher.

HISTORY

The Morgan property, formerly known as the Madero property, has been under scrutiny for many years. Miami Copper Co. drilled two holes before 1950. (one hole was found but the second has not been located)

In early 1957, Consolidated Uranium Co. acquired the property and under the direction of the writer, surface and underground geology was mapped and three underground diamond drill holes were completed. (Holes M-1, M-2 and M-3 on Map Nos. 1 and 4)

At that time a three phase exploration program of diamond drilling was designed to explore and develop the area but the program was "cut short" when the results of the three underground holes (first phase) indicated what was at that time submarginal mineralization. The property was dropped.

Apparently the property lay dormant until early 1970 when E + E obtained an option, had geophysical and geochemical surveys completed as well as completing four exploratory diamond drill holes.

AREA OF INTEREST

Heinrichs' work, Bluchers' work and the writers early work all agree that the area of interest and conducive to copper mineralization is that

area surrounding the present underground workings now known as the Pinal Adit, a 520 foot long adit driven on a strong structural feature hosting copper oxide and sulphide minerals.

This is the area of recent concentrated work by Blucher and Heinrich - as well as the early work by Consolidated Uranium Co.

Other than the above area, Heinrichs has indicated an isolated, moderate I.P. anomaly over Schist approximately 2300 feet SSW of Madero Peak or approximately 2000 feet east of the Pinal Adit. Lack of other relative and identifying information to substantiate a "target", prompts the writer to place this "area of interest" in the far background as regards priority.

Blucher mentioned an area below Morgan Peak but failed to expound on the criteria present to justify the area as a target.

GEOLOGY

This subject has been discussed by both Blucher and Heinrichs as part of their work.

Simply stated, rock types in the "area of interest" are diorite, schist and a granite differentiate. The latter two are weakly to moderately mineralized with copper, molybdenum, gold and silver. The former is very sparsely mineralized, mostly with pyrite. A sample of the diorite near the old lower Adit and taken by the writer in early 1957, assayed 0.01% copper.

A granite differentiate just south of Morgan Peak - as mapped by Blucher - was field examined.

MINERALIZATION

Oxide and sulphide copper minerals occur along the schistosity of the schist, along the transverse fractures in the schist and also in part as disseminations in the schist as well as in very thin quartz veinlets which the writer believes is part of the "mineralization" period.

Some oxidation of the sulphide copper minerals has occurred in place. Oxidation of the pyrite - to limonite - has also occurred and this is noticeable as yellow to cream limonite staining of the schist. Oxidation of the ferro-magnesium minerals in the schist creats the tan to brown limonites, also visible in the schist. These latter, darker tones would have a tendency to "cloud" the true color of the former mentioned lighter tints. There is no evidence of a leaching process to produce a zone of secondary copper enrichment at depth.

The sparse presence of pyrite in the schist surrounding the Pinal Adit prohibits the thought at this time, that "secondary enrichment" at depth - in this area - would be possible. Therefor, the weak to moderate copper mineralization encountered in the drill holes is the "normal" type and strength mineralization that can be expected within the drill-

ed depths. Widely spaced structural schistosity features, probably planes of weakness, will have slightly greater copper mineral concentrations as shown on Map No. 3. The writer strongly suspects that the copper mineralization will gradually increase - perhaps up to 100% - horizontally in a northerly direction beyond the two horizontal underground drill holes and towards the schist-granite differentiate contact.

Considerable pyrite phenocrysts are present in the granite differentiate located just below Morgan Peak. Here the pyrite has oxidized to a deep brown-black limonite but has retained its original cubic crystalline habit. Deep red and black limonites (limonites of copper sulphides) are also present. These residual conditions indicate that the process of oxidation is proceeding but has not reached the stage of "leaching". This in turn suggests that primary sulphides are very near the present surface. Both limonite types occur in closely spaced, ($\frac{1}{4}$ to 1 inch wide) quartz veinlets in the granite differentiate and the adjoining schist to some degree. In general, the surface mineralization expression is good and the degree of feldspar alteration (about 30%) in the granite differentiate is good.

EXPLORATION and RESULTS

The Pinal Adit, driven some 40 to 50 years ago, explored the strongly silicified and moderately mineralized N. 20° W. structure for a length of approximately 520 feet. Seventy nine samples, taken by E + E, covering the last 400 feet to the face of the Adit average 0.55% copper. Several single samples assayed 1.00% or better with one sample assaying as high as 2.36% copper.

Prior to 1950, Miami Copper Co. drilled two churn holes. Results of this exploration are not known relative copper values, depth of holes, etc.

In early 1957, Consolidated Uranium Corp. explored the property by diamond drilling three underground holes, M-1, M-2 and M-3. (See Map Nos. 1, 2, 3 and 4) Holes M-1 and M-2 were horizontal and drilled to the right and left at the face of the Adit. Hole M-3 was drilled at -90° in the floor of the Adit just a few feet north of the winze nearest the portal. (See Map No. 4) Assay values are shown on Map No. 4.

In early 1970, E + E caused to have completed two geophysical surveys, (magnetic and I. P.), a geochemical rock chip survey for copper and molybdenum and the diamond drilling of four, -90° surface holes.

Unfortunately, the results of the geophysical surveys do not, for the most part, in the opinion of the writer, reflect to depth the geological and mineralogical evidence exposed on the surface, yet, several anomalies were indicated. An exception to this thought is Area "A", Map No. 2, where a magnetic high is coincidental with a geochemical high and the I. P. zone "C" is offset slightly to the east but in general is parallel to the trend of the mineralization in the Pinal Adit. The writer feels these criteria are a weak reflection and extension of the mineralized zone known to exist around the Pinal Adit. The high of area "A" definitely reflects the magnetite of the granite differentiate visible on the surface and viewed by the writer accompanied by

Elsewhere, with some immagination, the magnetic survey results, coupled with the known rock types on the surface, do reflect these rock types and their contacts.

Assay values in hole M-1 arithmetically averaged 0.371% copper for its entire length of 300 feet. Hole M-2 averaged 0.348% copper for its entire length of 301 feet. Hole M-3 averaged 0.257% copper for the first 143 feet and 0.190% for the next 47 feet while the last 6 feet assayed 0.65% copper. In the case of holes M-1 and M-2, the writer assumed equal weight for both the AX size core and sludge assays to determine the average grade per sample or zone. This proceedure is not exactly correct but it is adequate at this time and for the purpose of this report. (See Map No. 4).

Unfortunately, the four drill holes completed by E + E provide a minimum amount of information for two reasons: (1) due to the general strike and dip of the schist and mineralization in the "area of interest", drill holes should have been directed approximately N. 70° E. and at an angle of -60° E. With this method the holes would have been normal to the strike and would crosscut a wider width or zone of the schistosity, and (2) that the positions of the holes were not in the best interest to obtain maximum information for the amount of drilling completed.

A 500 foot vertical hole only intersects or crosscuts a 250 foot width of a 60° dipping schistosity where as a 500 foot -60° hole, more normal to the schistosity, would crosscut 450 feet of the schistosity.

Except for some very short intervals, the copper content in the core was very poor - basically negative. Comparing these results, particularly holes 3 and 4, with the results obtained by the underground drilling, there is a definite, pronounced difference which prompts the writer to suspect some abnormalties.

The use of angle holes would have provided information over a greater width of intersection than the vertical holes, particularly true for holes 3 and 4. Apparently no sludge was collected and in this type of mineralization, collection of sludge is important as evidenced by the spread of copper content between core and sludge of holes M-1 and M-2. Sludge was not collected from hole M-3 and a review of the assays from this hole indicate a lower copper content than that received from holes M-1 and M-2. The writer attributes this difference to the "washing of the core" and that "softer zones" of lesser core recovery contained copper mineralization which was also "washed away". (Please note core recoveries and assays in included Composite Drill Logs M-1, M-2 and M-3). Vertical hole M-3 compares favorably, value-wise, with holes 3 and 4, but even here there is a slight favor for hole M-3. It should be mentioned that the underground drilling was completed using conventional, non-rotating corebarrel drilling--not wireline, and this would account for the slightly lower core recovery.

A change of assayers during the drilling of hole 2 may also create a low assay value and it is strongly suggested that check assays of samples from all holes be completed by a reputable assayer accepted by the mining industry. These checks should include samples containing 0.02% to

0.90% copper in order to cover "the range" and general mode of the mineralisation of concern. Accuracy in this range is extremely critical and important.

Samples from holes M-1, M-2 and M-3 were copper assayed by the Magma Copper Corp. Assay Office. The writer uses Jacobs Assay Office, Tucson, when ever possible. No molybdenum assays were completed for the samples from these holes, however, had the results been higher, composite samples would have been prepared and assayed for molybdenum, gold and silver.

MINERALIZED RESERVES

The economics of ore deposits are constantly changing due to more efficient operation and the price of the products produced. The average copper content of 0.35% in year 1957 was not considered economical. Today however, such a grade is economical with adequate tonnage to back it up as is now demonstrated by Duval Sulphur with its new Sierrita operation.

The writer has calculated a tonnage but will term it "mineralized reserves" rather than ore reserves because at this stage of the program, the reserve factor is not sufficiently great to be considered "ore" and economically feasible. The calculated tonnage could, however, be a significant contribution to an adjacent mineralized body of higher copper content if such might exist.

The writer has calculated a "mineralized reserve" of 4,620,000 tons as defined by drill holes M-1, M-2 and M-3 and as limited by drill holes 3 and 4. The average grade of this reserve is 0.352% copper, 0.005% molybdenum, 0.10 oz/ton silver and 0.01 oz/ton gold. The contents of the last three metals are estimates but could be quite reliable since they are typical contents of the present operating open pit low grade copper mines in Arizona.

The "reserves" were calculated as two blocks, "A" and "B". (Map No. 1) Block "A" has a triangular shape in plan with hole M-3 as one vertex and a depth of 260 feet each in holes M-1 and M-2 as the other vertices. Height-wise, a distance of 100 feet vertically up and a distance of 140 feet vertically down from the Adit floor were used. (See Map No. 3) The calculation is:

$$\frac{\frac{1}{2} \times 520 \times 300 \times 240}{12} = 3{,}120{,}000 \text{ tons.}$$

Block "B" is rectangular in plan and section. Its breadth is 520 feet, (260 feet in each of holes M-1 and M-2), height-wise, 150 feet vertically up and 140 feet vertically down from the Adit floor and depth-wise, this mineralization can only be safely projected 120 feet north of holes M-1 and M-2--ahead of the face.
The calculation is:

$$\frac{520 \times 290 \times 120}{12} = 1{,}500{,}000 \text{ tons}$$

A 12 cubic foot factor is used for "in place" material.

Grade-wise, core and sludge assays of holes M-1 and M-2 were combined on an equal weighting. (Not technically accurate but satisfactory for

this phase) The resulting "zonal" values were weighted (value x footage) to obtain the average copper content for each hole to depth used and also for the entire 520 feet. Hole M-1 averaged 0.371 % copper and hole M-2 averaged 0.348 % copper. Hole M-3 averaged 0.257% copper for the first 143 feet. The average for holes M-1 and M-2 for 520 feet was 0.360%.

To determine the average grade for block "A", 15% weight or influence was applied to the average grade of hole M-3 and 85% weight applied to the average grade of holes M-1 and M-2 with a resulting grade of 0.35%.

Block "B" has an average grade of 0.36% copper projected for 120 feet north of holes M-1 and M-2. Weighting blocks "A" and "B" by tonnage and grade, the average grade for the entire volume is 0.352% copper for 4,620,000 tons.

This reserve and grade is too small to be considered as economic and operation feasible. Additional reserves of higher grade must be developed if possible.

FUTURE POSSIBILITIES

For the most part, neither the geophysics nor the geochemical surveys, coupled with observable geology, nor the past surface drilling present or identify a "major target" area. Without a recognizable and justifyable "target", expenditures of time, energy and expense are ill-considered.

The present status of the property, in the opinion of the writer, is one of being "on the fence". The possibility of developing a 100,000,000 ton deposit of 0.35% copper in this area is very remote and that is the magnitude which must be considered for a feasible operation. In this frame of mind, the property should be abandoned.

On the brighter side of the fence is the fact that a "minor" target does exist which must be explored before abandonment is enforced. This target" is identified by coincidental "highs" of the magnetic survey, the I. P. survey and the geochemical rock chip survey - meager as it is - and most important of all, substantiated by know, observable surface geology.

This "target" is designated "A" on Map No. 2. It not only has the coincidental highs but also the presence of a granite differentiate containing moderate limonites after pyrite and copper minerals - mostly in closely spaced, thin quartz veinlets. Present also is the contact with the mineralized schist of the Final Adit. A further interesting fact is that target area "A" is directly on strike line with the Adit mineralization but some 400 feet north to its center (the magnetic high). The "mineral reserve" block "B" is "open" in this direction--ahead of the Adit face.

RECOMMENDATIONS

When a target has as many "coincidental" features as Target "A", it

must be seriously considered and systematically explored and, if warranted, developed.

Basically, three phases are required: (1) detailed geologic mapping of target "A" area which is outlined in red on Map No. 2, (2) completion of a soil geochemical survey on a 100 foot grid and the results compared to the detailed geologic mapping and the existing magnetic survey results, and, (3) diamond drilling the area providing results of phase 1 and 2 are positive and still accentuate the target.

Phase 1 and 2, if positive, would then suggest the proper drill hole locations, their directions and angles. Planning of phase 3 at this time would accomplish nothing concrete exploration-wise nor expenditure-wise.

The surface indications as observed by the writer during a very brief examination of the target area prompts the thought that E + E has a 50-50 chance of developing a moderate tonnage of a higher grade reserve than presently indicated around the Final Adit.

It was mentioned earlier in this report that check assays should be completed on the diamond drill core samples from holes 1 thru 4. It is recommended that this be done after phases 1 and 2 have been completed and the results indicate that phase 3 be commenced -- that a target still exists. Composite samples for molybdenum, gold and silver could also be prepared.

If abandonment is indicated, such check work would not be necessary.

Respectfully submitted,

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