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James Doyle Sell Mining Collection

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~~FTG/JDS — TB data? why better?~~

WLK I assumed he meant earlier TB data which suggested whitetail basin and conformed with predictions from drilling. Jerry later suggested that the so-called basin shape was caused by a light-weight granite mass to E and what appeared to be a basin was simply the edge of a gravity low in the granite. As I recall, the interpretation of TB data as caused by the Schultze led to the present work. I haven't talked to either Cal or Jerry since they did this work to confirm my assumption. FTG.

JHK → file

GEOPHYSICAL OFFICE - EXPLORATION DEPARTMENT
3422 South 700 West
Salt Lake City, Utah 84119

RECEIVED
MAY 7 1976
EXPLORATION DEPARTMENT

May 3, 1976

Mr. Fred Graybeal, Manager
Tucson Office

J. R MONTGOMERY MEMO
GRAVITY AND MAGNETIC PROFILES
DACITE PLATEAU
GILA AND PINAL COUNTIES, ARIZONA

Dear Fred:

Attached is the subject memo in which Jerry discusses the recent test gravity survey (with some attention given to magnetics) on the Plateau.

I agree with his conclusions that only weak hope exists that a full gravity survey would accurately outline the granite which projects under the dacite from the east. Considering the results from Tony Benavidez' data, which are modestly encouraging, perhaps the odds are a little better than Jerry's first paragraph of conclusions would indicate. ?

If you retain an interest in a full survey, considering the terms indicated by Jerry, we could plan to do the work from this office under a low priority time schedule. Expenses would be carried here.

Yours very truly,

Cal

C. K. MOSS

CKM:am
Attch.

cc: T. C. Osborne, w/JRM Conclusions & Recommendations only.
✓W. L. Kurtz " " " " "

GEOPHYSICAL OFFICE - EXPLORATION DEPARTMENT
3422 South 700 West
Salt Lake City, Utah 84119

May 3, 1976

MEMO TO C. K. MOSS:

GRAVITY AND MAGNETIC PROFILES
DACITE PLATEAU
GILA AND PINAL COUNTIES, ARIZONA

Interest was expressed by the Southwestern U. S. Division in the possibility of tracing the extension of the Schultze granite under the Dacite Plateau. Earlier regional gravity surveys in the area suggested that gravity might be used to map the granite-schist contact. A test survey of thirty-eight stations was carried out in March by personnel of the Geophysical Office. Ground magnetic data were gathered simultaneously to test the viability of magnetics for detecting the contact.

Conclusions and Recommendations

A model study of the test survey indicates that the anomaly from the buried contact will be on the order of 2 milligals. Anomalies of 1 to 2 milligals on the Dacite Plateau could result from density variations in the conglomerate or dacite cover. Anomalies caused by topographic effects even after terrain corrections in this type of environment could be as high as 1 milligal.

Based on the above criteria I would estimate only a 50% chance exists for outlining the buried granite-schist contact under the Plateau, and such an outline would constitute only an approximation of the true condition.

A survey which would adequately cover the area of interest would require about one month's field work for three men, and an additional month for one man in the reduction and interpretation of the data.

(J. R MONTGOMERY)

GEOPHYSICAL DIVISION
3422 SOUTH 700 WEST
SALT LAKE CITY, UTAH 84119

J. H. C.

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November 18, 1970

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MEMORANDUM TO J. D. SELL:

DACITE PLATEAU, ARIZONA
PROBABILITY OF DISCOVERY
PORPHYRY COPPER DEPOSIT

A preliminary attempt has been made to determine the probability of discovery of significant porphyry copper mineralization by blind drilling through the post mineral volcanics of the Dacite plateau. Computerized Monte Carlo simulation techniques were used to develop a statistical base by which probability of discovery might be estimated.

The following paragraphs outline the basic assumptions and procedures of the study.

1. The first step was to assume that at least one porphyry copper type ore body exists beneath the volcanic cover. The probability of this assumption being true was not calculated, but could be estimated by additional work using reasonable geologic criteria.

2. Assuming a blind ore body exists beneath the cover, where and how big is it? Because this question cannot be answered directly, the use of random distribution and frequency distribution models are indicated, and selection is made by a random number generator (Monte Carlo method). A frequency distribution for size of possible target was obtained by using data published for known Arizona porphyry copper deposits (see Table I). Size of the ore bodies and alteration halo's were converted to horizontal dimensions in square miles and grouped into classes represented by histograms, Figures 1 and 2, and cumulative frequency diagrams, Figures 3 and 4.

3. The area of interest covered by post mineral volcanics is about 50 square miles. It was assumed that the possible ore body may exist anywhere under this cover, or occur completely at random within the area.

4. The following steps were used to simulate the number of drill holes necessary to "discover" the mineralized area.

a. An ore zone of certain size was determined by selection from the cumulative frequency distribution table by a random number.

b. The size of the ore zone was divided into the total covered area (50 sq. miles) with the resultant representing the number of possible locations for the zone.

c. By means of random selection the "ore zone" was "inserted" into one of the possible locations.

d. Again by random selection a "drill hole site" was chosen and checked to see if the site matched the ore zone location indicative of a "discovery". If no discovery was made another "drill site" was randomly chosen, exclusive of any previous drill site, and again checked against ore zone location. This procedure is iterated until a "discovery" is made and the number of holes necessary is noted.

e. The computer program now returns to step "a" and proceeds again through step "d". The process is continued for 500 iterations and statistics compiled on the average number of holes needed for a discovery.

CONCLUSIONS:

Computer simulation runs were made for targets made up of (1) a zone actually constituting the ore body, and (2) a zone consisting of the ore body plus significant alteration halo.

It was found that the average number of drill holes necessary to intersect a type 1 target is 55 with a standard deviation of 59, based upon statistics from 500 runs. At a 95% confidence interval the real mean should range between 50 and 60 holes.

For a type 2 target (a more realistic problem) the mean number of holes necessary for discovery is 12 with a standard deviation of 16. The real mean should lie between 10 and 13 at the 95% confidence level based on 750 runs.

From the same simulation runs it is possible to determine the probability of a "discovery" by some specified number of holes. For example, for 5 holes drilled at random spacing there is a 12% probability of hitting a type 1 target and a 43% probability of hitting a type 2 target. The probability of "discovery" when drilling 10 holes is 19% for a type 1 target and 68% for a type 2 target.

In terms of exploration odds, the probability of finding a type 2 target under the Dacite plateau, if one exists, is excellent. Further refinement of the geological parameters in order to reduce the total area of search would increase the probability of an early discovery.

I trust this may be of some help in evaluating the merit of your project. Please feel free to suggest further refinements or changes in the simulation model if desired.

Sincerely,

MARVIN P. BARNES

MPB:am
Encls.

cc: R. J. Lacy, w/enc.
✔J. H. Courtright "
W. E. Saegart "
J. J. Collins "

TABLE I

ARIZONA PORPHYRY COPPER DEPOSITS

	Ore Body Size	Alteration Beyond Ore	Ore Zone Sq. Miles	Significant *Alteration Wd.	Min. Zone **Sq. Mi.
Ajo	4000' x 7000'	5000'	1.00	3300'	4.45
Bagdad	1000' x 5000'	500'	0.18	500'	0.35
Bisbee	2000' x 2000'	7000'	0.14	4600'	3.70
Castle Dome	4000' x 5000'	3000'	0.72	2000'	2.31
Copper City	1500' x 2000'	5000'	0.11	3300'	2.06
Esperanza	2300' x 4200'	?	0.35	1000'	0.85
Inspiration	2500' x 12000'	1500'	1.08	1500'	2.37
Mineral Park	2200' x 3400'	10000'	0.27	6600'	7.34
Mission-Pima	5000' x 7000'	5000'	1.26	3300'	4.96
Morenci	6000' x 13000'	5000'	2.80	3300'	7.73
Ray	3000' x 10000'	1000-15000'	1.08	3300'	4.60
Safford	4000' x 5000'	12000'	0.72	3300'	3.81
San Manuel	2500' x 5000'	5000'	0.45	3300'	3.16 ?
Santa Rita	5000' x 7000'	5000'	1.26	3300'	4.96
Silver Bell Toro	2000' x 2500'	5000'	0.18	3300'	2.34 ?
Silver Bell Oxide	1500' x 2500'	5000'	0.13	3300'	2.17
Superior	5200' x 1000'	?	0.19	500'	0.36

*Significant alteration was arbitrarily assigned as approximate 2/3 of total alteration halo which should represent at least the strong argillic type.

**Total square miles of mineralized zone was calculated by assuming a circular target and using alteration beyond ore as an extension of the radius.

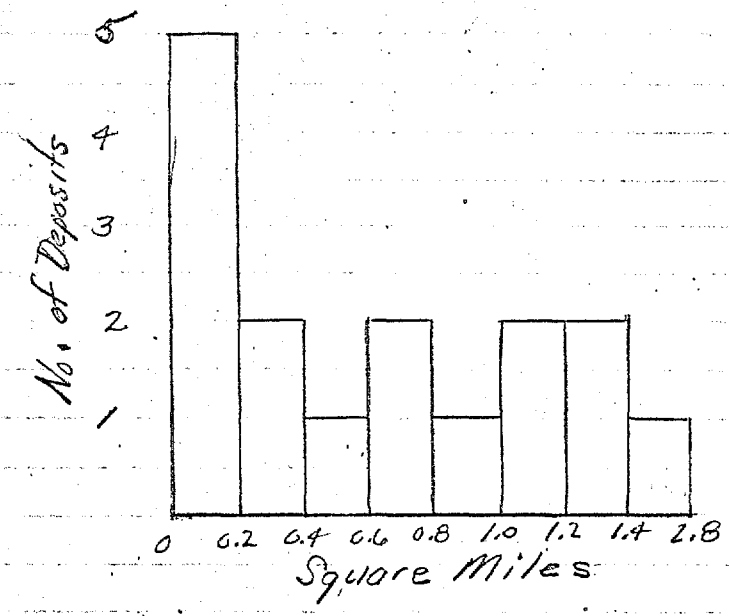

FIGURE 1
Histogram of Ore Zone

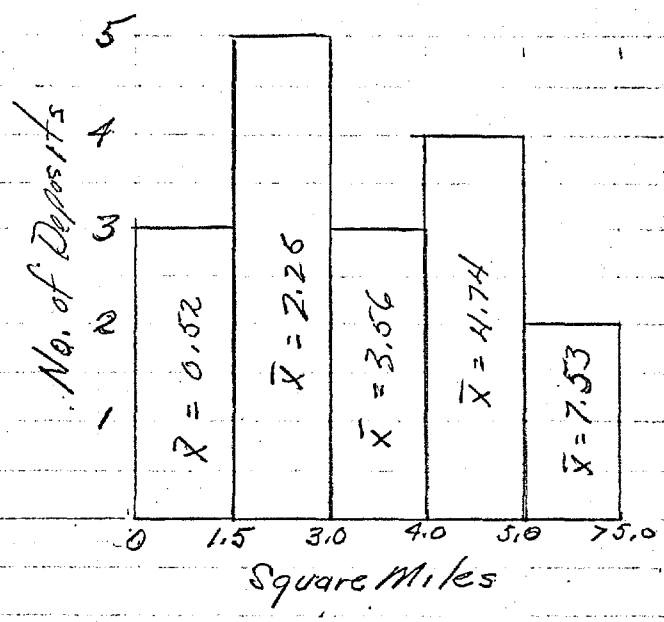

FIGURE 2
Histogram of Ore & Alteration Mineralized Zone

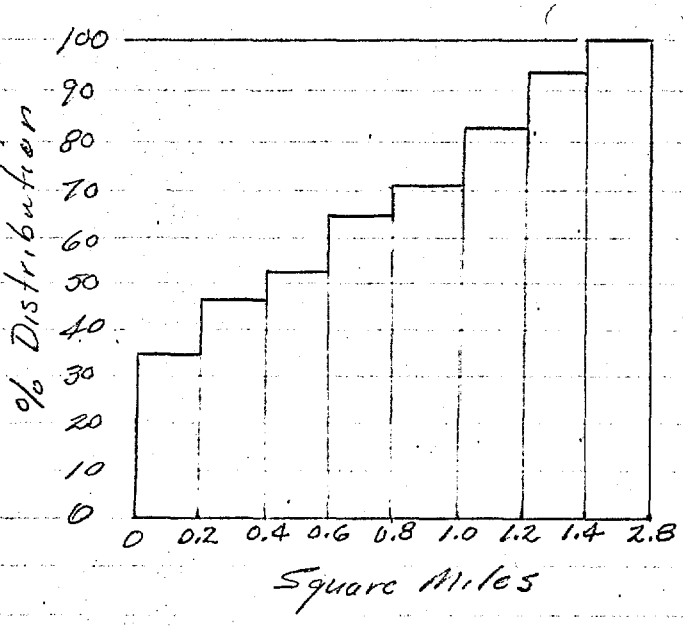

FIGURE 3
Cumulative Frequency Diagram
Ore Zone

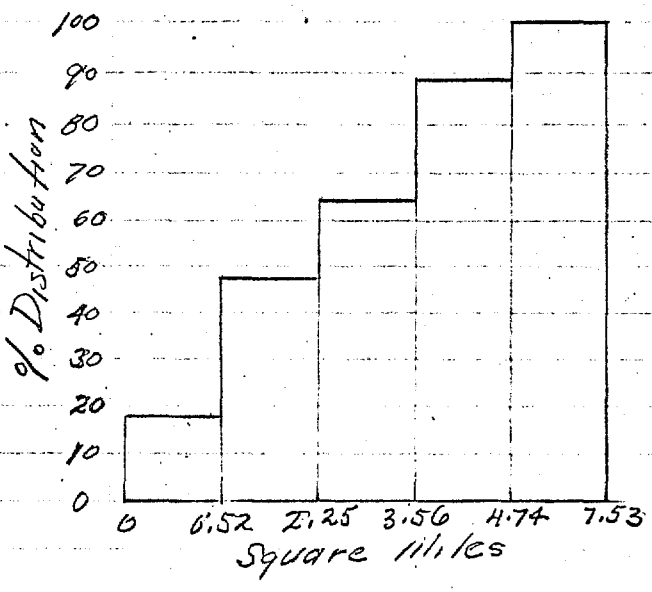

FIGURE 4
Cumulative Frequency Diagram
Ore and Alteration Zone